Health Technology Clinical Committee
Date: June 17th, 2011
Time: 1:00 pm – 6:00 pm
Location: SeaTac Airport Conference Center – International B Conference Room
Adopted:

HTCC MINUTES

Members Present: Dr. Carson Odegard; Dr. Richard Phillips; Dr. Craige Blackmore; Dr. Marie Annette-Brown; Dr. Kevin Walsh; Dr. Michelle Simon; Dr. Joann Elmore; Dr. Seth Schwartz and Dr. Megan Morris.

Absent: Dr. Christopher Standaert and Dr. Michael Souter

HTCC FORMAL ACTION

1. **Call to Order**: Dr. Blackmore, Chair, called the meeting to order. Sufficient members were present to constitute a quorum.
2. **March 18, 2011 Meeting Minutes**: Chair referred members to the draft minutes; motion to approve and second, and adopted by the committee.
   - *Action: Nine committee members approved the March 18th, 2011 meeting minutes.*
3. **Glucose Monitoring draft Findings & Decision:** Chair referred members to the draft findings and decision and called for further discussion or objection. The Glucose Monitoring findings & decision was approved and adopted by the committee.
   - *Action: Nine committee members approved the Glucose Monitoring findings & decision document.*
4. **Spinal Injections draft Findings & Decision:** Chair referred members to the draft findings and decision and called for further discussion or objection. The Spinal Injections findings & decision was approved and adopted by the committee.
   - Action: Nine committee members approved the Spinal Injections findings & decision document as amended in public meeting.
5. **Applied Behavioral Analysis (ABA or ABA Therapy) based Behavioral Interventions for the Treatment of Autism Spectrum Disorder:** The HTCC reviewed and considered the ABA Therapy HTA supplemental technology assessment report; information provided by the Administrator; state agencies; public members; and heard comments from the evidence reviewer, HTA program, an invited clinical expert, the public and agency medical directors. The committee considered all the evidence and gave greatest weight to the evidence it determined, based on objective factors, to be the most valid and reliable.

HTCC COMMITTEE COVERAGE DETERMINATION VOTE			
	Not covered	**Covered Unconditionally**	**Covered Under Certain Conditions**
ABA based behavioral interventions for treatment of Autism Spectrum Disorder	0	0	9

Discussion: The Chair called for discussion of conditions for Applied Behavioral Analysis based behavioral interventions for the treatment of Autism Spectrum Disorder. Committee members discussed the evidence and its sufficiency related to key outcomes that most impact safety, effectiveness, and cost-effectiveness (the statutory criteria). Relevant evidentiary factors include the type, quality, and relevance of the evidence about the technology; within the context of the degree of importance of key outcomes and alternatives such as the potential and degree of harm, burden of disease untreated or treated with alternatives; and type and degree of effect and patient value preferences.

✓ *Action:* The following conditions were approved by a majority:

- *Limitations of Coverage:* Certain Applied Behavioral Analysis based behavioral interventions are a covered benefit for the treatment of Autism Spectrum Disorder when the following conditions are met:

  1. The Early Intensive Behavioral/developmental Intervention (EIBI) using either the UCLA/Lovaas model or Early Start Denver Model (ESDM) are both covered with evidence development.

✓ *Action:* The committee chair directed HTA staff to prepare a Findings and Decision document on ABA Therapy reflective of the majority vote, and to prepare a document for public comment that provides further descriptive options for the committee to consider regarding the coverage with evidence development condition and potential further specification.

SUMMARY OF HTCC MEETING TOPICS, PRESENTATION, AND DISCUSSION

Agenda Item: Welcome & Introductions

- ✓ The Health Technology Clinical Committee (HTCC) met on June 17, 2011

Agenda Item: Meeting Open and HTA Program Update

Dr. Craige Blackmore, HTCC Chair, opened the public meeting.

- ✓ Dr. Craige Blackmore provided chair remarks
- ✓ Leah Hole-Curry, HTA Program Director, provided an overview of the agenda, meeting guide and purpose, room logistics and introductions.

Agenda Item: Previous Meeting Business

March 18th, 2011 Meeting Minutes: Chair referred members to the draft minutes and called for a motion and discussion. Minutes were circulated prior to the meeting and posted.

- ➢ *Action: Nine committee members approved the March 18, 2011 meeting minutes.*

Glucose Monitoring Findings and Decision: Chair referred members to the draft findings and decision and called for further discussion. The draft findings and decision document was circulated prior to the meeting and posted to the website for a two week comment period. One public comment was received, included in the meeting materials, and were reviewed and discussed.

- ➢ *Action: Nine committee members approved the Glucose Monitoring findings & decision document.*

Spinal Injections Findings and Decision: Chair referred members to the draft findings and decision and called for further discussion. The draft findings and decision document was circulated prior to the meeting and posted to the website for a two week comment period. Fifteen public comments were received, included in the meeting materials, and were reviewed and discussed.

- ➢ *Action: Nine committee members approved the Spinal Injections findings & decision document. Amended with editorial changes. Changes included adding the language "therapeutic" to each of the injections; changed language from "nerve block injections" to "medial branch nerve block injections"; changed language to read "for the treatment of chronic pain" rather than "chronic spinal pain and associated radiculopathies".*

Agenda Item: HTA Program Review

- ➢ Leah Hole-Curry, HTA Program Director, provided the HTA context for the meeting and an update on program activities including:
  - ➢ State purchasing context and budget reductions and reform efforts, medical technology is driver of increased medical costs and has quality gaps
  - ➢ HTA is designed to use reliable science and independent committee to get best information on what works, what is safe and what provides value
  - ➢ HTA outcomes include transparency; reports and articles reviewed; and coverage decisions made
  - ➢ Comparison with private industry and Medicare decisions completed

- Program has received recent recognition from public media, clinical press, and various medical and health policy groups with either story highlights or invited presentations

Agenda Item: Applied Behavioral Analysis based behavioral interventions for treatment of Autism Spectrum Disorder Topic Review

Leah Hole-Curry, HTA Program Director, introduced the technology topic up for discussion:

- ✓ Staff provided an overview of the timeline and referred HTCC members to the included key questions and population of interest for the ABA Therapy review. Because the clinical evidence review was conducted in partnership with the federal Agency for Health Care Quality (AHRQ) report (see background below for more information), HTA stakeholders were notified to submit public comment through the AHRQ website on draft key questions and the draft evidence report, and were notified of the final evidence report. HTA commissioned a supplemental document on the Washington specific requirements such as guidelines, cost and coverage policy, and for convenience, includes the relevant portion of the AHRQ review on behavioral interventions only.
- ✓ Staff welcomed, per HTCC request, an invited clinical expert, Dr. Amy L. Donaldson, PhD, an Assistant Professor in the Department of Speech & Hearing Sciences at Portland State University (PSU). Her research focuses on the assessment and intervention of social communication skills in children with autism spectrum disorder (ASD) within the natural environments. Dr. Donaldson completed a conflict of interest and indicated no conflicts.

Agenda Item: Public Comments

The Chair called for public comments.

- ✓ Scheduled Public Comments: One stakeholder scheduled time for public comments.
  - o Arzu Forough, parent of two autistic children, submitted written materials and spoke in favor of coverage based on evidence and personal experience of positive effect. She noted a court ruling requiring HCA, under the Mental Health Parity Act, to cover ABA Therapy; and that an exclusion for our state's Medicaid program would be improper. She also noted that under the Federal Health Care Reform Act, ABA Therapy is included under the behavioral health benefits (and will be covered in 2014).
- ✓ Open Public Comments: six individuals provided comments during the open portion.
  - o Dr. Sara White, Sendan Autism Center, clinical psychologist, commented that several state and federal agencies have identified ABA as a treatment of choice based on current available research literature and that ABA is covered through many other states through Medicaid and Medicare. She also noted that the AHRQ technology review indicates that pharmacological treatments are the only available efficacious treatment for autism; however, medication doesn't work for all; even for those that do improve often have clinically significant residual symptoms post treatment and medication does not address communication, social or adaptive skill deficits that are often prevalent in children with autism.
  - o Ralph Pampino, Magnolia Behavior Therapy, board certified behavior analyst, commented that other state and federal reports were not included in the evidence technology assessment report and he requested that the committee review the reports he listed, and include them in their assessment.
  - o Dr. Bryan King, representing himself, professor and vice-chair of the department of psychiatry at the University of Washington; Director of the department of child psychiatry

at Seattle Children's Hospital; and Director of Seattle Children Autism Center strongly urged the committee to cover ABA therapy and include local expertise in their discussion in order to set appropriate limits on ABA.

- Dr. Ilene Schwartz, Chair of special education at the University of Washington, board certified behavioral analyst, commented that a series of studies are available that suggest that ABA is effective and she believes ABA is the most effective form of intervention for children with autism. There are certifications for individuals practicing ABA and requested that the committee approve ABA Therapy and ensure that the BCBA (board certified behavioral analysis) is recognized in Washington State for licensing standards to provide behavioral treatment in our state.
- Thomas Wetter, PhD, stated that he was interested in observing our Washington state process.
- Holly Almon, West Coast Behavioral Consultants, board certified behavioral analyst, stated that Washington currently covers some of behavioral analytic services under the children's behavioral and support services through the Department of Social and Health Services (DSHS) provided by a licensed mental health professional. She stated that floor time (included in report) is not an ABA treatment, and that Applied Behavioral Analysis is a science.

Agenda Item: ABA Therapy Topic – Agency Comments

Dr. Jeff Thompson, Medical Director, Department of Social & Health Services, presented the agency utilization and outcomes for ABA Therapy to the committee, full presentation published with meeting materials.

- ✓ Early Intensive Behavioral and Developmental Interventions vs. Typical Benefits
  - Applied behavioral analysis (ABA) is a broad category of early intensive behavioral and developmental interventions. Tx focused on associated behaviors and other behavioral interventions assessing a variety of targets.
  - The AMDG recommendations addressed – Approaches aimed at core symptoms, such as early intensive behavioral and developmental approaches
    - The AMDG will not be discussing – approaches aimed at core symptoms (social skills approach); approaches aimed at core symptoms (play-/interaction-based approach) or approaches aimed at commonly associated symptoms / additional approaches.
- ✓ Side by Side Treatment and Coverage
  - ABA types of therapies include: Floor time, the Social Communication Emotional Regulation Transactional Support model; Early Start Denver Model (ESDM); UCLA/Lovaas model and the ESDM; Pivotal Response Training; Hanen More than Words and Social pragmatic intervention.
  - Current UMP, DSHS, Medicaid Coverage: Psychotherapy services; physical therapy; occupational therapy; speech therapy; pharmaceutical drugs; local school districts and EPSDT (0-21) and Neuro-developmental Centers of Washington (0-6)
- ✓ State Agencies Policies: Coverage – no state agencies cover ABA therapy. Licensure – ABA therapists are not licensed in Washington State (extensive variation in training and credentialing).
- ✓ State Mental Health Services for Children:

- Uniform Medical Plan, Public Employee Benefit Plan, 2011
  - Outpatient mental health and behavioral health therapies, unlimited. Outpatient physical, occupational, and speech therapy services up to 60 visits per calendar year. Inpatient / outpatient neurodevelopmental therapy, up to 60 visits per calendar year. Drugs on the preferred drug list, including stimulants, antidepressants, mood stabilizers, anti-anxiety and anti-psychotics.
- DSHS / Medicaid, 2011
  - Psychotherapy services provided by psychiatrists, psychiatric ARNPs, psychologists, and licensed mental health professionals.
    - Insight oriented behavior modifying/supportive, individual, family or group, up to 20 hours per year. Cognitive behavioral therapy. Elements of other therapies as needed (sensory integration, verbal behavior intervention and applied behavioral analysis).
  - Physical Therapy (PT)
    - Therapies to develop strength; endurance; range of motion and flexibility; re-education of movement; balance; coordination; kinesthetic sense; posture; proprioception for sitting; gait training; group therapy; and dynamic activities to improve functional performance.
  - Occupational Therapy (OT)
    - Development of cognitive skills to improve attention; memory; problem solving; enhancements of sensory processing and adaptive responses to environmental demands; self-care/home management in activities of daily living; use of assistive/adaptive equipment; and community and work integration training.
  - Speech Therapy (ST)
    - Treatment and evaluation of speech, language, voice communication and auditory processing; speech-generating devices; and oral and pharyngeal swallowing function.
  - Annual coverage for outpatient PT, OT and ST is not limited for clients 20 years old and younger, daily coverage is limited to one treatment unit per day.
  - Pharmaceutical drugs for behavioral management

✓ Estimated WA State Insured Autism Population Estimate, Ages 2-12

	2006	2007	2008	2009
Total DSHS 2-12 yrs	333,592	336,949	358,745	399,124
Total UMP/PEP 2-12 yrs	**16,675**	**17,303**	**21,903**	**22,450**
Total Children 2-12 yrs	350,267	354,202	380,648	421,574
Estimate Autism (@1/110)	3,184	3,220	3,460	3,832

- ✓ Cost and Utilization of Treatments with the ICD9 for Autism in Medicaid (2006-2009)

CLAIM TYPE	Paid	Service #	Clients #
EPSDT Claim	**$ 22,626**	**262**	**259**
Home Health Claim	$ 716	1	1
Inpatient Claim	**$ 1,755,320**	**193**	**186**
Med Vendor Claim	$ 159,798	1050	799
OPPS Claim	**$ 520,742**	**3113**	**2582**
Outpatient Claim	$ 564,770	2051	1656
Outpatient Claim	**$ 30**	**1**	**1**
Professional Claim	$ 258,414	3257	2390
Grand Total	**$ 3,282,416**	**9928**	**7874**

- ✓ Multiple Agency Fiscal Note Summary – Bill Number: 5059 SB; Title: Autism Spectrum Disorders. Brief description of what the measure does that has fiscal impact: this bill directs health plans to provide care and treatment of autism spectrum disorders. The mandate would apply to most health plans regulated by Title 48 RCW and self-insured medical plans. It does not apply to Basic Health or Medicaid. It adds new substantively identical sections to chapters 41.05 RCW and 48.43 RCW. This bill impacts the Public Employees Benefits board (PEB) Insured and Self-Insured medical plans.

Part III: Expenditure Detail

III. A - Expenditures by Object Or Purpose

	FY 2012	FY 2013	2011-13	2013-15	2015-17
FTE Staff Years					
N-Grants, Benefits & Client Services	46,315,652	95,981,177	142,296,829	213,336,634	245,509,597
Total:	$46,315,652	$95,981,177	$142,296,829	$213,336,634	$245,509,597

- ✓ AMDG Evidence Focus: Behavioral Interventions that Utilize ABA
  - o Overall Evidence of Effectiveness for any outcome: All behavioral interventions using ABA, other than UCLA/Lovaas = Insufficient SOE.
  - o The EIBDI intervention using UCLA/Lovaas SOE is Low. Low confidence that the evidence reflects the true effect. Further research is likely to change confidence in the estimate of effect and is also likely to change the estimate. Data from which any evidence based conclusions can be drawn are limited to 6 studies rated fair quality of a total of 272 preschool age children; with varied diagnostic criteria; and with varied treatment type and intensity ranging from 10-40 hours.
  - o Low evidence, limited on health outcomes (AHRQ Appendix I). Studies commonly assessed IQ, language and adaptive behavior outcomes. Evidence suggests that certain cognitive/language and educational gains may be durable. It is less clear that adaptive behavior skills see similar patterns of improvement.
  - o Most of the reviews generally concluded that the evidence base of EIBI is inadequate (AHRQ Appendix G, discussion of recent systematic reviews of therapies for children with ASDs) noting: variability in treatment and intervention; limited follow-up; lack of comparative studies; need for replication, and unclear inclusion and exclusion criteria;

three meta-analysis food an average large effect size for IQ change Eldevik, Reichow and Wolery but noted significant concerns about the included studies, such as limited accounting for the effects of maturity, lack of equivalent groups, uncertain treatment fidelity, and small sample sizes. Several authors also noted the need for studies comparing EIBI to other approaches that have been similarly empirically tested.

- Other areas for improvement noted included a need for larger sample sizes; longer follow-up to allow for evaluation of the durability of effects; greater treatment fidelity; improved reporting of methodological and participant characteristics; and greater consistency in treatment approaches and outcomes measurement.

✓ AMDG General Concerns Related to the Evidence:

- Randomized, controlled trials: overall the level of evidence is fair to poor; are limited in number and differential in the types of interventions; minimal head to head studies – many of the studies were randomized with waiting lists rather than comparative therapies.
- Sample sizes: most studies had limited numbers (despite a purported prevalence of 1/150).
- Outcomes: the types of treatment vary greatly, both within and across the available studies, especially for control groups. No clear threshold for clinically meaningful improvement in outcome measures.
- Longer follow-up needed: Autism is a chronic condition yet half of the studies followed children for approximately 2 years or less, and some for only 1 year. This is not sufficient follow-up time to assess the potential impact of an intervention over a lifetime.
- Incremental research strategy needed: outcomes are varied and used intermediate rather than functional outcomes. Many outcomes relied on parental reports versus functional changes (e.g. school attendance).

✓ AMDG & Agencies Summary:

- Safety: No direct concerns related to any of the ABA therapies. No indirect concerns related to use of current alternatives including medications (WA State is one of least reliant on mental health drugs).
- Effectiveness: Evidence is at best low from weak RCTs with the following methodological flaws: probable bias in non-blinded outcome reporting; no RCTs with head to head comparison with usual care.
- Cost: Cost-effectiveness unknown, but direct cost is substantial. The SB5059 fiscal note costs were assumed to be $29K / client ($213 Million 2013-15).

✓ AMDG Recommendations:

- The science for ABA types does not have a sufficient base to justify a $29-50K benefit. The AMDG do not recommend ABA type of therapies as a covered benefit. The AMDG do recommend better promotion of existing benefits do pediatric and PCP.

Agenda Item: Evidence Review Presentation

Oregon Health & Science University (OHSU) presented an overview of their evidence report on ABA Therapy; full presentation was included in meeting materials.

- ✓ *General Background:* Autism spectrum disorders (ASD) are a group of pervasive developmental disorders characterized by impairments in communication, behavior and social interaction, and by repetitive patterns of behaviors and interests (Warren et al., 2011). Prevalence is estimated to be 1 in 110 children, with variation across states, and cost is estimated to be $25 billion dollars per year (CDC, 2002). Expression and severity of symptoms of ASDs differ widely. Treatments of ASD and treatments of symptoms commonly associated with ASD (e.g., anxiety, sensory difficulties) include a range of behavioral, psychosocial, educational, medical, and complementary approaches that vary by a child's age and developmental status.
- ✓ *Background – Behavioral Interventions:* There is no universal consensus regarding which treatment interventions are most effective. ASD currently lacks a curative treatment. The goals of treatment for ASDs focus on improving core deficits in communication, social interactions, or restricted behaviors, as changing these fundamental deficits may help children develop greater functional skills and independence. Common behavioral treatment strategies are: based on learning theory; use reinforcement, promoting, and shaping techniques to increase positive behaviors and decrease frequency of negative behaviors. Behavioral treatments for ASD work to build communication, play, social, academic, self-care, work and community living skills. Therapies often adapted to include parents and teachers as part of therapy.
    - o Behavioral interventions for ASD include: early intensive behavioral and developmental interventions; social skills interventions; play/interaction-based interventions; cognitive behavioral therapy; Neurofeedback and sleep interventions.
    - o Some of these utilize principles of Applied Behavioral Analysis (ABA): Umbrella term used to describe the principles and techniques used in the assessment, treatment and prevention of challenging behaviors and the promotion of new desired behaviors. Goal is to teach new skills and reduce challenging behaviors using systematic reinforcement.
- ✓ Early Intensive Behavioral/Developmental Interventions (EIBDI): prescriptive, high intensity, therapy may include up to 40 hr/wk for 2 yrs or more, intervention based in ABA theory. Interventions grouped into three categories:
    - o Manualized programs: UCLA / Lovaas model (one-on-one therapy sessions and Discrete Trial Teaching). Early Start Denver Model (ESDM) (ABA principles and relationship-based approaches in young children).
    - o Other intensive treatment approaches that have not been manualized: Interventions focused on key pivotal behaviors using parent training (e.g., Pivotal Response Training, Hanen More than Words).
- ✓ The only other behavioral intervention that utilizes the principles of ABA to some degree are play- and interaction-based interventions. Focus on using interactions between children and adults. Target skills including joint attention and play abilities: stepping stones triple P program; relationship development intervention program; mifne model; floortime model and others.
- ✓ *Methods:* For the WA HTA program, the AHRQ systematic review, *Comparative Effectiveness of Therapies for Children with Autism Spectrum Disorders*, identified as sole evidence source (Warren et al., 2011). Search for relevant clinical practice guidelines using Guidelines.gov database. Quality of included systematic review and guidelines rated with standard MED instruments. State, private payors, and policy websites searched to identify insurance coverage policies.
- ✓ *Warren et al. (2011) Methods:* MEDLINE®, ERIC and PsycInfo®, grey literature, reference lists. Included studies published between January 2000 and May 2010, in English. Excluded: Medical studies with fewer than 30 participants; behavioral, education, and allied health studies with fewer than 10 participants; or case reports.
    - o Single-subject studies excluded only if fewer than 10 participants. Two reviewers quality assessed each study: differences resolved through discussion; studies rated as good, fair or poor. Overall strength of evidence assessed using *EPC Methods Guide for Effectiveness and Comparative Effectiveness Reviews* – strength of evidence presented as insufficient, low, moderate, or high.
    - o Single subjects (or N-of-1) research common study design in education and psychology fields: individual serves as his/her own control; intervention is repeated at different times; evaluation is by blinded assessor and all other factors must remain constant. Although standards for single subject research exist, they are not widely applied in research on interventions for ASD. By design, lack external validity or generalizability.
- ✓ *Warren et al. (2011) Findings:* Strength of evidence (SOE) = confidence that the observed effect is unlikely to change with future research. Describes the adequacy of the current research (quality and

quantity). Evaluated using methods established in the EPC methods guide using 4 domains (risk of bias, consistency, directness, precision). No behavioral intervention had better than a low SOE = Low confidence that the evidence reflects the true effect. Further research is likely to change confidence in the estimate of effect and is also likely to change the estimate. All behavioral interventions other than UCLA/Lovaas had insufficient SOE.

- ✓ *Warren et al. (2011) Overall Conclusions:* **Results.** Of 4,120 citations, 714 required full text review and 59 unique studies were included, 13 were good quality, 56 were fair, and 90 poor (78 included for Behavioral Interventions).
  - o Conclusions: Medical interventions including risperidone and aripiprazole show benefit for reducing challenging behaviors in some children with ASDs, but side effects are significant.
  - o Some behavioral and educational interventions that vary widely in terms of scope, target, and intensity have demonstrated effects, but the lack of consistent data limits our understanding of whether these interventions are linked to specific clinically meaningful changes in functioning.
  - o The needs for continuing improvements in methodologic rigor in the field and for larger multisite studies of existing interventions are substantial. Better characterization of children in these studies to target treatment plans is imperative.
- ✓ *Warren et al. (2011) – Findings for Key Question 1: Effects of behavioral treatments that utilize ABA on core/common symptoms.* Over 100 outcome measures included in report.
  - o EIBDI - 34 papers/ 30 study populations (11 fair/19 poor) – overall strength of evidence = Low.
    - 21 Lovaas-based. 7 intensive parent training approaches. 4 social communication skills. 2 pivotal response training (PRT). 2 eclectic approaches. 1 PRT with other behavioral approach.
  - o Play-/Interaction-based Interventions - 15 papers / 13 populations (3 fair, 10 poor) – overall strength of evidence: insufficient.
  - o Other intervention types not in presentation – they did not include ABA as a primary basis; overall strength of evidence: insufficient.
- ✓ *UCLA/Lovaas based approaches:*
  - o Smith (2000): an attempt to replicate Lovaas' original work (N=28, mean IQ 51, mean age 36 months) (RCT, fair)
    - Inclusion: 18-42 mos of age, IQ 35-75, absence of major med problems
    - Intervention: 25 hrs/week individual treatment X 1 year, less over next 2 years
    - Comparator: parent training X 3-9 months
    - Results: (outcome measures = SBIS, BSID, MPSMT, RDLS, VABS; blinded)
      - Mean IQ for treatment group increased 15 pts, no change in control (sig between groups). Largest gains in pervasive developmental disorder, not otherwise specified (PDD-NOS) subgroup. No sig differences in adaptive or challenging behavior between groups.
  - o Hayward (2009): N=46, assignment based on geography (prospective cohort study, fair)
    - Inclusion: age 25-42 months, no major med problems
    - Intervention: 37 hrs/week intensive clinic-based treatment X 1 year
    - Comparator: 34 hrs/week intensive parent-managed treatment X 1 year
    - Results: (outcome measures = BSID-R, MPSMT, RDLS, VABS; blinded)
      - Overall IQ increased 16 pts, verbal IQ 10 pts in both groups. Sig improvement in language, adaptive functioning from baseline. No differences between groups.
  - o Howard (2005): N=61, non-random assignment (included parent preference) (prospective cohort, fair)
    - Inclusion: age < 48 months, English as primary language, no major med problems, no prior treatment > 100 hrs
    - Intervention: 25-40 hrs/week intensive individual treatment (behavior analytic)
    - Comparators: 30 hrs/week eclectic intervention, 15 hrs/week public early intervention program
    - Results: (outcome measures = BSID, WPPSI, SBIS, MPSMT, RDLS, VABS; unblinded)
      - ABA group had sig improvement in all areas assessed. Improved IQ 41 pts (24 pts more than comparator groups). No sig differences in outcome between the two comparator groups.
  - o Cohen (2006): N=42, non-random assignment (prospective cohort, fair)
    - Inclusion: IQ > 35, age 18-42 months, no major med problems, < 400 hrs prior treatment, parent agreement to active participation

- Intervention: Lovaas-based intervention
- Comparator: Unspecified community care
- Results: (primary outcome measure = BSID)
  - ABA group had significantly higher IQ (mean 87, gain 25) than control (mean 73, gain 14). Improved (not significantly) receptive language skills. No differences in expressive language or socialization between the groups at year 3.

o Zachor (2007): N=68, non-random assignment (prospective cohort, fair)
- Inclusion: no major med problems (seizure disorder, hearing deficiency)
- Intervention: Lovaas-based intervention, 8 hrs/day X 1 yr
- Comparator: Eclectic approach, 8 hrs/day X 1 yr
- Results: (primary outcome measure = ADOS; unblinded)
  - Both groups had sig improvement in language/communication and social interaction from baseline, but ABA group improved sig more

o Reed (2007): N=27, assignment based on geography, groups not similar at baseline (high intensity group had higher ability/cognition, lower autism severity) (non-randomized CT, fair)
- Inclusion: age 2.5-4 yrs, no other major interventions during study
- Intervention: High intensity, Lovaas-based at home, ave 30 hrs/wk X 9-10 months
- Comparator: Low intensity, ave 13 hrs/wk X 9-10 months
- Results: (outcome measures = GARS, PEPR, BAS, VABS; unblinded)
  - High intensity group had sig improvement in intellectual (cognitive) and educational function. Low intensity group had sig improvement in educational function. Only difference between groups was in educational function (none in autism severity, cognitive function, adaptive behavior).

o Eikeseth (2002): N=25, (prospective cohort, fair)
- Inclusion: age 4-7 years, IQ ≥ 50, no major medical problems, diagnosis < 6 months prior to study
- Intervention: Lovaas-based intervention (school-based), minimum of 20 hours/week for 1 yr
- Comparator: Intensive, eclectic special education services, minimum of 20 hours/week for 1 yr
- Results: (outcome measures = IQ, language, VABS)
  - Eclectic group had higher average baseline scores across most areas of measurement compared to the behavioral group.
- Lovaas group demonstrated statistically significant gains. IQ: +17 points vs. +4 points; Language comprehension: +13 points vs. -1; Expressive language: +23 points vs. -2; VABS Composite: +11 vs. 0

o Additional Studies = Poor Quality. 3 cohort or nonrandomized trials were poor quality and found inconsistent results; 5 Case series had mixed results and 6 Chart reviews.

✓ *Intensive Parent Training Approaches* – 4 studies (2 fair/2 poor). Overall SOE = Insufficient

o Drew (2002): N=24, mean age 23 months (RCT, fair)
- Inclusion: No "general developmental delay"
- Intervention: Home-based parent intervention, training 3 hrs/week X 6 wks, parents to engage 30-60 min/day X 1 year
- Comparator: Community-based intervention
- Results: (outcome measures = MCDI, GSID, ADI, PSI; unblinded)
  - No difference between groups in nonverbal IQ, autism severity, words/gestures. Intervention group had decrease in overall IQ

o Aldred (2004): N=28, median age 48-51 months (RCT, fair)
- Inclusion: age 2-6 yrs, no global DD, no severe environ deprivation in infancy, English, no hearing/vision impairment, no chronic illness in parents, must have some evidence of desire to interact with adult
- Intervention: Home-based parent training in social communication skills (initial workshop, monthly intervention sessions, 6 months maintenance visits over 1 year)
- Comparator: Treatment as usual
- Results: (outcome measures = ADI, ADOS, VABS, MCDI, PSI; blinded)
  - Intervention group had sig improvement in ADOS scores and expressive vocabulary (MCDI), no sig difference in other scores.

- Two additional poor studies: (1) Green (2010,RCT) found no significant difference in teacher rating of language/ communication or in number of children experiencing diagnostic shift between groups, but rating of parent/child interaction and parent report of language/communication improved in the intervention group. (2) Stahmer (2001, prospective cohort) found that the intervention resulted in changed parenting techniques and perceived language gain.

✓ *Play/Interaction-based Interventions* – 4 studies (1 fair/3 poor). Overall SOE = Insufficient

- Kasari (2006, 2008): N=58, ages 3-4 yrs (RCT, fair)
  - Inclusion: age < 5, accessible for follow up, no seizures or genetic syndromes, plan to remain in program at least 4 weeks
  - Intervention: joint attention or symbolic play
  - Comparator: adult directed ABA therapies
  - Results: (primary outcome measure = growth in expressive and receptive language; blinded)
    - Both intervention groups had sig greater growth in expressive language, as well as duration and initiation of joint attention. Growth in receptive language not affected. Symbolic play group had more growth in play level
- Additional poor quality studies: (1) Whittingham (2009, RCT) found that the intervention group had statistically significant decreases in child challenging behavior scores and that outcomes were maintained at 6 months and duplicated in the wait list control. (2) Field (2001, RCT), Heimann (2006, RCT), Escalona (2002, RCT) all found that the imitation intervention group had greater improvements in spending more time engaged, more social interest and greater reduction in motor activity. (3) Gulsrud (2007, RCT) found that all groups improved, and although there were no differences in toy pointing or sharing, the intervention group showed more improvement over time.

✓ *Warren et al. (2011) – Findings for Key Question 2: Modifiers of treatment outcome*

- This KQ attempts to explore the degree to which child characteristics, treatment factors and systems (e.g., community) influence response to treatment. Only 2 studies were designed and powered to allow identification of true modifiers of treatment effects, and one of these was in the allied health category (not ABA-based)
- Sallows (2005): N= 24, age 24-42 months, (RCT, good)
  - Inclusion: age 24-42 months, neurologically "normal", mental development index of 35 or higher
  - Intervention: parent directed Lovaas approach (30 hrs/wk)
  - Comparator: clinic directed Lovaas approach (30 hrs/wk)
  - Results: (outcome measures: BSID, MPSMT, RDLS, VABS, WPPSI; blinded)
    - Both groups had substantial gains in multiple areas. No group differences related to IQ, language, adaptive behavior
- Several potential correlates suggested by literature, but lack sufficient power to confirm:
  - Frequency/duration/intensity of intervention
  - Child characteristics – one characteristic of particular speculation is cognitive ability/IQ:
    - Several studies of UCLA/Lovaas note pretreatment IQ predicts IQ at follow up, others have found that lower IQ at onset correlates with increased change in IQ over time. For parent training interventions, some studies suggest that those with lower IQ benefit more, while others have found the opposite
  - Family characteristics (parental perceptions/affect)

✓ *Warren et al. (2011) – Findings for Key Question 3: Early Results that Predict Outcomes*

- Evidence is sparse: Some evidence suggests early response to Lovaas or ESDM (increase in IQ) predicts long-term change in IQ. Other evidence suggests change in adaptive behavior occurs over longer period of time.

✓ *Warren et al. (2011) – Findings for Key Question 4: End of Treatment Effects that Predict Outcomes*

- Kasari (2006, 2008): N= 58, ages 3-4 yrs, (RCT, fair)
  - Inclusion: age < 5, accessible for follow up, no seizures or genetic syndromes, plan to remain in program at least 4 weeks
  - Intervention: joint attention or symbolic play for 5-6 weeks, outcomes measured at 6 and 12 months
  - Comparator: adult directed ABA therapies
  - Results: (primary outcome measure = growth in expressive and receptive language; blinded)

- Greater growth in expressive language (not receptive) and initiation of joint attention over time (both intervention groups). More growth in play level in symbolic play group. More use of services overall post-intervention in control group (no difference in use of speech services).

✓ *Warren et al. (2011) – Findings for Key Question 5: Generalization of Treatment Effects*
- For most behavioral interventions, outcomes are assessed in settings outside the treatment setting, but are generally self- or parent-reported (unblinded). Most participants not followed over time, so maintenance of results over time unknown.

✓ *Warren et al. (2011) – Findings for Key Question 6: Drivers of Treatment Effects* = No studies were identified

✓ *Warren et al. (2011) – Findings for Key Questions 7: Treatment Approaches for Children < 2 (at risk for autism).*
- Dawson (2010): N= 48, mean age 38 months, (RCT, good). 4 studies (1 good, 1 fair, 2 poor).
  - Intervention: ESDM
  - Inclusion: age < 30 months, proximity to study center, willingness to participate > 2 years, no neurodevel disorder, no major sensory/motor impairment, no seizures, no major med probs, no psychoactive meds, no hx head injury, no prenatal exposures, IQ > 35
  - Comparator: community-based interventions
  - Results: (outcome measures = MSEL, VABS; unblinded)
    - At 1 year: sig greater increase in IQ, no diff in adaptive behavior. At 2 years: sig greater increase in IQ, receptive/expressive language, adaptive behavior, no change in autism severity or repetitive behaviors.
- McConachie (2005): N= 47, mean age 34-38 months, (non-randomized CT, fair). 4 studies (2 fair, 2 poor)
  - Inclusion: language delay and suspicion for ASD, age 24-48 months, no serious med problem, no intensive home program
  - Intervention: Hanen More than Words
  - Comparator: wait-list control
  - Results: (outcome measures = MCDI, ADOS, BSQ, JAFA, QRS-F, PFQ; blinded)
    - Language use sig higher in intervention group, no diff in behavior issues or autism severity.
- Two additional case series: (1) Vismara (2009): prospective case series evaluating distance learning vs. live instruction for training of parents by therapists (both effective, but fidelity required supervision). (2) Wetherby (2006): prospective case series evaluating Early Social Interaction Project found positive impact on ASD symptoms, but lack of control group limits conclusions.

✓ *Warren et al. (2011) – Findings: Strength of Evidence*
- Strength of evidence (SOE) = confidence that the observed effect is unlikely to change with future research. Describes the adequacy of the current research (quality and quantity). No behavioral intervention had better than a low SOE.
- The following interventions had an insufficient SOE for the specified outcome:
  - ESDM: adaptive behavior, ASD severity, IQ, language/communication
  - Play/interaction-based (imitation): social skills
  - Play/interaction-based (joint attention/symbolic play): joint attention
  - Play/interaction-based (joint attention/symbolic play): joint attention
  - Relationship-focused (play/interaction-based): social skills
  - Parent training (EIBDI): language/communication, repetitive behaviors, social skills
  - Parent focused (play/interaction-based): challenging behaviors
- Limitations for the evidence:
  - Many studies lacked a comparison group; sample size was frequently insufficient to draw conclusions; several studies used inappropriate comparison groups to assess treatment effectiveness; description of the intervention is often inadequate; characterization of the study population was often inadequate; multiple disparate outcome measures, making synthesis difficult; many studies use change in IQ as outcome of interest, but may not be an ideal tool to assess core ASD symptoms; many studies presented on numerous outcomes without adjusting for multiple comparisons, may result in reporting bias
  - Duration of treatment and follow up was generally short; few studies accounted for concomitant interventions which may confound the observed effectiveness; and a minimum clinically significant difference has not been defined

- ✓ *Guidelines* – Four guidelines identified
  - o American Academy of Pediatrics (AAP) (2007) = poor quality
  - o National Autism Center (NAC) (2009) = poor quality
  - o New Zealand Guidelines Group (NZGG) (2008) = fair quality
  - o Scottish Intercollegiate Guidelines Network (SIGN) (2007) = good quality
- ✓ *Policy Considerations:*
  - o No Medicare National Coverage Determinations for the treatment of ASD identified. Of private payors searched (BCBS, Aetna, GroupHealth), only Aetna nationally covers treatment of ASD (includes ABA). 27 states currently mandate insurance coverage of ASD and 15 states (as of May 9, 2011) have pending legislation that would require coverage of autism treatment.
  - o State coverage mandates differ substantially based on: Age limits; maximum benefit limits; covered services; application of coverage mandate to all insurers or only state regulated insurance plans; and licensure of ABA providers.
- ✓ *Summary:*
  - o There is a low strength of the evidence for the effectiveness of UCLA/Lovaas ABA therapy as it pertains to: Adaptive behavior; ASD symptom severity; IQ/ cognitive development; Language/ communication. The evidence is insufficient for all other behavioral therapies. The evidence is insufficient to answer any other questions posed in this report.

Agenda Item: HTCC ABA Therapy Discussion and Findings

Dr. Blackmore, Committee Chair, led a discussion of the evidence related to the safety, efficacy, and cost-effectiveness of ABA Therapy beginning with identification of key factors and health outcomes, and then a discussion of what evidence existed on those factors.

Dr. Blackmore acknowledged that ABA Therapy topic has some unique aspects that were earlier briefed in staff updates to committee members. Specific to the discussion, it is important to note that the broader context of ASD and treatment includes many potential interventions to meet unique individual and family needs. A wide range of psycho-educational, speech therapy, occupational therapy and physical therapy interventions are available, incorporating a mix of behavioral, developmental and education approaches. These services may be provided by professionals in a variety of settings and by or with the involvement of families. Interventions can include services that (a) are called "treatments" and billed as health care services if performed by an appropriately licensed professional; (b) can be delivered by educators, speech language pathologists, or psychologists interchangeably (or by unlicensed individuals under their supervision) in either health care or educational settings; or (c) may be provided by people who are not licensed. The recent AHRQ report identifies the following categories:

- Behavioral interventions (includes ABA based)
- Educational interventions
- Medical and related interventions
- Allied health interventions
- Complementary and alternative medicine interventions (CAM)

This reflects a unique challenge posed by autism: support needs cross social, educational, health and community organizations. Families and individuals may receive services from multiple agencies and programs but these services are frequently not coordinated. The rapid increase in numbers of individuals being identified with ASD, the complexity and diversity of their needs, limited resources, exert increasing pressure on existing education and social services systems and health care. Increasingly, parents and providers have advocated that all interventions be provided or reimbursed through the education or health care system. Especially in the area of psycho-educational or behavioral interventions, there is a lack of clarity in that interventions are long-term and developmental in the same way that education is long term and developmental, but they are also being devised by professionals in the health care disciplines to address a disease process. There is debate over whether the interventions found most successful for young children on the Spectrum are best described

as educational or medical. Medical systems are not well designed for coordinating and integrating care with other service providers. Finally, there is disagreement whether the interventions meet the appropriate standard of evidence for medical insurance which is the discussion and scope of the HTCC.

1. Evidence availability and technology features

The evidence based technology assessment report indicates:

1.1 An evidence based technology assessment report on therapies for treatment of children with Autism Spectrum Disease (ASD), including Applied Behavioral Analysis (ABA) based behavioral interventions, was prepared by a federal research agency's (AHRQ) national evidence based practice centers, Vanderbilt University. The public, comprehensive evidence report of about 900 pages for ASD Therapies, including ABA identified 4,120 potentially relevant articles, and included a detailed review of 159 studies; 78 of which were for Behavioral interventions; of which 34 papers on 30 trials included ABA based interventions. HTA, through its evidence based contractor, extracted the ABA Based behavioral intervention section of the AHRQ report and supplemented it with information required by the HTA program about agency experience, guidelines, coverage, and cost information. Both reports are published online and were subject to extensive public, peer, expert review and comments.

1.2 Autism spectrum disorders (ASD) are a group of pervasive developmental disorders characterized by impairments in communication, behavior and social interaction, and by repetitive patterns of behaviors and interests. Prevalence is estimated to be 1 in 110 children, with variation across states. Expression and severity of symptoms of ASDs differ widely. Treatments of ASD symptoms associated with ASD include a range of behavioral, psychosocial, educational, medical, and complementary approaches that vary by a child's age and developmental status. There is no definitive evidence or consensus on most appropriate treatments. Common behavioral interventions used in the treatment of ASD are based on learning theory and use procedures such as reinforcement, prompting, and shaping techniques to increase the rate of positive behaviors and reduce the frequency of unwanted behaviors. Positive reinforcement and other principles to build communication, play, social, academic, self-care, work, and community living skills and to reduce problem behaviors in individuals with ASD have been used by behavioral therapists.

1.3 ABA is not a treatment or intervention: it is a method or technique used in many behavioral interventions to promote desirable behaviors and decrease undesirable behaviors using systematic reinforcement. There are numerous interventions in educational, community, behavioral health interventions that use ABA methods to treat many different conditions. ABA is a systemic application, at any time during a child's day, of behavioral principles to modify behavior. Some ABA techniques involve instruction that is directed by adults in a highly structured fashion, while others make use of the learner's natural interests and follow his or her initiations. Other techniques teach skills in the context of ongoing activities. All skills are broken down into small steps or components, and learners are provided many repeated opportunities to learn and practice skills in a variety of settings, with abundant positive reinforcement.

1.4 The committee also reviewed information provided by the state agencies, and public members; and heard comments from the evidence reviewer, clinical expert, HTA program, agency medical directors and the public.

2. Evidence about the technology's safety

The committee discussed multiple key factors and health outcomes that were important for consideration in their overall decision on whether the technology is safe. Summary of committee considerations follows.

2.1 The AHRQ conducted systematic review (Warren et. al.) did not have a specific key question focused on safety.

2.2 ABA based behavioral interventions used in a variety of settings including the trials related to treatment for Autism Spectrum Disorder did not report adverse events (though it was not specifically a study question) and overall ABA has not been associated with adverse events.

2.3 No major adverse events, morbidity or mortality was reported.

3. Evidence about the technology's efficacy and effectiveness

The committee discussed multiple key factors and health outcomes that were important for consideration in their overall decision on whether the technology is effective. Summary of committee considerations follows.

3.1 As noted previously, ABA is a method employed in behavioral interventions based on a learning theory and aimed at reducing certain behavior and promoting other behavior through reinforcement, promotion and shaping techniques. Treatment goals focus on reduction of core deficits in communication, social interactions, restricted behaviors because reducing these fundamental deficits may help children develop greater functional skills and independence.

3.2 The evidence based technology assessment report indicates that there are over 100 different outcome measures included in the studies analyzed. The outcomes were grouped into 14 categories including adaptive behavior; adverse events/harms; anger; anxiety; ASD symptom severity; challenging behavior; hyperactivity; IQ/ cognition; joint attention; socials skills; language/ communications; repetitive behavior motor/sensory; and sleep. There are no evidence or expert consensus based standards for appropriate or standard outcomes nor clinically meaningful improvement.

3.3 All ABA based behavioral interventions included in the systematic review were rated as having an insufficient strength of evidence, except ESDM due to the poor quality of individual trials; lack of consistency; and important study limitations in terms of outcomes; reporting; number of patients; and/or quality of design. ESDM rated as insufficient for 10 or 14 outcome categories; and a low strength of evidence for 4 of 14 outcome categories (adaptive behavior, ASD symptom severity, IQ/Cognitive development, language/communication).

3.4 Significant evidence limitations are present for all ABA based behavioral interventions including very few well-controlled trials. Most studies report on short-term outcomes and the degree to which those outcomes translate to functional outcomes over time is largely unknown. The range of treatment approaches evaluated in the literature may not match those that are available in practice, and the highly controlled treatment environments may not translate to outcomes that can be achieved in the community. Fidelity to treatment in the community may be limited, particularly for those interventions that are not manualized. Of the published trials, many have small sample sizes, different treatment approaches, varying durations of treatment, different follow-up times and outcome measures, and cover a variety of treatment intensities. It is difficult to compare data between studies and to make inferences for the general population due to the heterogeneity of study designs. Many observational studies and non-controlled studies lack a description of study methods and a detailed description of applied interventions. It difficult to identify subpopulations of children with ASD who might better respond to treatments based in ABA theory, based on current evidence.

3.5 The OHSU evidence report focused on the clinical evidence on ABA Based behavioral interventions for ASD, as reported in the more comprehensive Warren et.al systematic review of multiple interventions for ASD. The report includes two categories of behavioral treatments that are based on or use ABA methods/techniques. These two categories contain a total of six models, and include a total of 30 studies, 11 rated fair, and 19 rated poor.

- Under the first category, Early Intensive Behavioral/developmental Interventions (EIBI) is a more prescriptive, generally manualized program, with proponents recommending therapy as early as possible, preferably before age three. EIBI typically includes pre-school children in intensive (10 to 40 hrs/wk) treatment in a variety of settings there are three programs that had 26 studies: (1) UCLA/Lovaas model; (2) Early Start Denver Model (ESDM); and (3) Parent Training Model focused on pivotal behaviors. Both UCLA/Lovaas and ESDM programs involve high intensity instruction using ABA techniques but have several differences. The UCLA/Lovaas method uses one-on-one therapy sessions and discrete trial teaching. The ESDM uses ABA principles with developmental and relationship-based approaches for young children.
- Under the second category, Play/Interaction based Interventions using ABA based behavior management, imitation, behavioral drills and child directed training within a relationship or developmental approach in preschool through elementary aged children, there are three programs that had 6 studies: (4) Play Interaction – Parent Focused Model; (5) Play Interaction- Joint Attention Model; and (6) Play Interaction- Imitation Model.

3.6 ***EIBI – UCLA/Lovaas***. Studies of UCLA/Lovaas-based interventions have the most and highest level of evidence of any of the six models of ABA based behavioral interventions identified with clinical evidence and is based on a more structured (use of manual) intervention. The UCLA/Lovaas clinical evidence suggests improvements in cognitive performance, language skills. However, strength of evidence is currently low due to significant evidence limitations; meaning that further research is likely to change confidence in the estimate of effect and is also likely to change the estimate.

- 7 fair quality trials and 14 poor quality studies were identified. The fair quality trials included 272 children total; with an average of 40 children per study. One was an RCT and six were prospective cohort design. Age typically included 18 to 42 month old children; though one study of 27 children included up to age 7. The early intensive behavioral interventions based on ABA methods varied in intensity (10 to 40 hrs) and were compared to eclectic interventions; parent directed EIBI and may not have included manuals or protocols. Studies most commonly assessed IQ, with language, communication, adaptive behavior after 9 months and up to 3 year; although in some studies these were not specified in advance or powered adequately.
- *IQ/Cognitive*: 5/7 trials reported sig. over comparator; 1 trial reported no difference between groups
- *Adaptive Behavior*: 3 trials reported no sig. difference between groups; 2 trials reported sig. improvement over comparator/s
- *Challenging Behavior*: 1 trial reported no sig. difference between groups
- *Expressive language/socialization*: 1 trial reported no sig. difference and 1 trial reported a sig. improvement over comparator
- *Autism Severity*: 1 trial reported no sig. difference between groups
- 14 additional poor quality cohors found inconsistent results; 5 case series had mixed results; and 6 chart reviews were included.

3.7 ***EIBI – Early Start Denver Model***. One good quality RCT studying Early Start Denver model based intervention, also based on a more structured (use of manual) intervention was included and one poor quality case series. Although some positive results are reported for the effects of intensive interventions that use a developmental framework, such as ESDM, evidence for this type of intervention is currently insufficient because few studies of sufficient size and quality have been published to date.

- The RCT study included 48 children; mean age of 38 months and compared to community based interventions. At 1 year, significantly greater increase in IQ was reported; but no differences in adaptive behavior; as 2 years significantly greater IQ, receptive/expressive language; adaptive behavior reported but no change in Autism severity or repetitive behaviors.

3.8 ***EIBI – Parent Training Model focused on Pivotal Behaviors***. Four studies, 2 fair and 2 poor studying parent training models focused on pivotal behaviors were included. However due to small quantity, quality, and size, and low or mixed findings, the overall strength of evidence was insufficient.

- The two fair quality RCT studies included 52 children; with a mean of 23 months, ranging from 24-51 months comparing home based parent intervention with treatment as usual or community based intervention over one year. In one trial; no differences between groups in nonverbal IQ; autism severity; words/gestures occurred and intervention group had decrease in IQ. In the other trial, intervention group had significant improvement in AOS and expressive vocabulary scores; but no other significant differences.
- Two additional poor quality studies reported mixed results.

3.9 ***Play Interaction-based interventions:*** The majority of these interventions consisted of a combination of adult directed behavioral drill and child direct milieu teach approach that incorporates ABA methods and developmental procedures of responsive and interactive methods in a table top structure context; parent led ABA based behavior management strategies; or adult imitation of child's behavior. Children studied were generally between 3 to 6 years old, except for parent focused training up to age 12. The overall strength of evidence is based on 6 total studies; 1 fair quality and 5 poor quality RCTs and is insufficient due to lower quality evidence; low patient and number of studies; and mix of reported effect.

- Evidence from one fair quality trial of 58 children on *joint attention model of play interaction* compared to symbolic play or a control reported no differences between groups in growth of receptive or expressive language; both intervention groups has greater growth in expressive language. (Kasari 2006, 2008)
- Evidence from 3 poor quality trials; children generally 3 to 6 with an outcome most frequently assessed of social behaviors, found that the *imitation based play interaction intervention* group had greater improvements in time engaged, social interest. (Field 2001 Heimann 2006; Escalona 2002)
- Evidence from 2 poor quality trials *of parent focused play interaction* for children from 2 to 12, compared to wait list controls found significant reductions in child challenging behavior at 6 months and duplicated in wait list control. (Whittingham 2009; Gulsrud 2007).

4. Special Populations

4.1 The evidence based technology assessment report indicated that very few studies adequately describe, and even fewer are powered or attempt to measure characteristics that may be associated with differential outcomes; including

- The degree of severity of deficits at baseline; and characteristics such as baseline IQ, social responsiveness and imitation skills
- The diagnosis of the child (PDD-NOS vs. ASD)
- Age of child (particularly very young 18 month to 3 years) at baseline
- Provider type (licensure, professional, parent)

- Intervention setting (home; clinic; other)
- Duration and frequency of intervention

5. Evidence about the technology's value and cost-effectiveness

The committee discussed multiple key factors that were important for consideration in their overall decision on whether the technology has value and is cost-effective. Summary of committee considerations follows.

5.1 The evidence based technology assessment report indicates that total lifetime per capita cost of direct medical treatment for an individual with ASD is estimated to be $305,956, with a total lifetime societal cost of $3.2 million (Ganz, 2007). Given the high cost of treatment, the large number and variety of available treatments, and constrained budgets, state policymakers need to determine which treatments are likely to improve outcomes for children with ASD, so they can better target the use of limited state resources.

5.2 The AHRQ commissioned evidence review is for clinical studies only and does not include a review of cost effectiveness analysis.

5.3 The evidence based technology assessment report indicates that currently 27 states that mandate coverage, there are four types of benefit limits included in current state mandates: overall maximum benefit amounts per year, lifetime maximum benefit amounts, a specific to ABA maximum benefit amount per year, and a lifetime maximum benefit amount specific to ABA. Maximum overall benefit amounts in coverage mandates range from $36,000 to $75,000 per year with most coverage mandates explicating stating that the limits include ABA therapy. The overall maximum benefits are also commonly broken down by age, with the overall benefit maximum for older children (age 7 to 12 and older) ranging from $12,000 to $27,000 per year. Lifetime maximum benefit amounts range from $125,000 to $200,000. Coverage limits specific to ABA therapy range from $30,000 to $50,000 per year, with one state (FL) having a lifetime maximum benefit for ABA therapy of $108,000. Similar to overall benefit limits, ABA specific benefit amounts are also commonly broken down by age, with the benefit maximum for older children (age nine and older) between $12,000 and $35,000 per year.

5.4 The evidence based technology assessment report indicates that no Washington State agency covers ABA therapy for autism; however, other services that are commonly identified as components or alternatives to ABA are covered when provided under a treatment plan of medically necessary therapies.

5.5 Washington state utilization and cost information indicates that with a 50% usage by eligible population of a $50,000 yearly limit (last proposed legislation); the costs, depending on prevalence estimates would range from $70 million to $101 million per year.

6. Evidence on Medicare Decision and Expert guidelines

Committee reviewed and discussed the expert guidelines as identified and reported in the technology assessment report.

6.1 The Centers for Medicare and Medicaid Services (CMS) has no National Coverage Determination.

6.2 27 US states have mandated ABA Therapy benefits; though such legislative policies may not be based on scientific outcomes; the types of mandate vary widely.

- The age limits for state mandates of autism coverage differ significantly. For example, 4 states limit coverage to children 6 years or younger; 5 states set coverage limits for children aged up to 10 through 17 years; 5 states limit coverage to children aged 18

years or younger. Many of the age limits are further segmented into age groups as maximum benefits limits in many states are differentiated by age.

- There are four types of benefit limits included in current mandates: overall maximum benefit amounts per year; lifetime maximum benefits; a specific ABA maximum per year; or a specific ABA maximum per lifetime. Maximum yearly amounts range from $36,000 to $75,000 per year.
- Included services vary in specificity, with most mandates covering diagnosis and treatment of ASD.
- Some state mandates limit applicability to certain entities such as state regulated insurance plans or state employee plans.
- Provider licensure requirements, if any vary widely as well; with most states not having minimum educational or practical experience requirements.

6.3 Guidelines – the evidence based technology assessment report identified four guidelines (American Academy of Pediatrics, 2007; National Autism Center, 2009; New Zealand Guideline Group, 2008; SIGN, 2007).

- American Academy of Pediatrics (AAP), 2007 (rated poor quality) – The American Academy of Pediatrics (AAP) released a guideline in 2007 titled *Management of Children with Autism Spectrum Disorders* (Myers, 2007). The focus of the guideline is to "assist pediatricians in educating families and guiding them toward empirically supported interventions for their children" (Myers, 2007, p. 1162). Myers and colleagues reviewed the primary educational strategies and associated therapies in the treatment of children with ASD (2007). AAP is rated as poor quality because: methods are unclear (no systematic search, no study selection criteria, limited information on the quality of studies). Recommendations are not specific or clearly described. Potential conflict of interest identified. Only a summary of the evidence is provided: primarily a description of treatment modalities and options to consider. Some recommendations for drug treatment.
- National Autism Center (NAC), 2009 (rated poor quality) – The National Autism Center (NAC) released a report in 2009 titled the *National Standards Project*, and is directed towards parents, caregivers, educators, and service providers who make ASD treatment decisions (NAC, 2009). The *National Standards Project* main goals include: (1) describing the strength of evidence around educational and behavioral treatments for ASD; (2) providing the age, diagnosis, and skills/behaviors associated with treatment options; (3) identifying the limitations of the evidence for treatments of ASD; and (4) providing guidance for integrating evidence-based practice into ASD treatment (NAC, 2009). The guideline groups interventions into treatment categories. The categories represent treatments that are substantially similar or have the same core characteristics. It was difficult to know exactly which interventions were included in some of the categories. The strength of the evidence was rated by the NAC as established, emerging, unestablished, or ineffective/harmful. The NAC guideline was rated as poor quality and does not give specific recommendations for interventions or treatment categories. Rated as poor quality because: lack of methodological rigor; no clear link between evidence and recommendation; recommendation not specific; lack of applicability to practice and potential conflict of interest.
- New Zealand Guidelines Group (NZGG), 2008 (rated fair quality) – The *New Zealand Autism Spectrum Disorder Guideline*, published by the New Zealand Guidelines Group (NZGG) in 2008, provides a best evidence summary targeted at primary care providers, educational professionals, policy makers, funders, parents, carers, specialists, and others who make treatment decisions regarding individuals with ASD (NZGG, 2008).

The NZGG guideline conducted a systematic review of the evidence. The guideline specifically discusses the evidence surrounding the identification and diagnosis of ASD, continuing assessments, and access to services and treatments for individuals with ASD, and is rated as fair quality. One of the main reasons for the fair quality rating was the lack of a direct link between the ABA-based recommendations and the evidence. Rated as fair quality because: involvement of funding bodies not stated; recommendations not specific; and applicability to practice not clear. Literature review was limited to systematic reviews (no primary studies included). 10 reviews of ABA identified (4 very good quality, 4 good quality, 2 fair quality). Of the 4 very good quality reviews, 2 found the evidence to be insufficient to make recommendations, 1 concluded that there was no clear answer regarding the most effective therapy for ASK and 1 concluded that EIBI should be the intervention of choice, but that there were substantial threats to the validity of that conclusion.

- Scottish Intercollegiate Guidelines Network (SIGN), 2007 (rated good quality) – the Scottish Intercollegiate Guidelines Network (SIGN) published *Assessment, Diagnosis and Clinical Interventions for Children and Young People with Autism Spectrum Disorders: A National Clinical Guideline* in 2007 to provide an evidence base and give recommendations for the assessment and clinical treatment of ASD. The guideline includes discussion on how multiple disciplines and multiple agencies and how they can work together to best meet the needs of individuals with ASD at all levels of care (SIGN, 2007). The guideline was rated as good quality because: rigor of development was robust and clearly described for both evidence and recommendations; low risk for conflicts of interest and recommendations are specific and applicable to practice.

Committee Conclusions

Having made findings as to the most significant and relevant evidence regarding health outcomes, key factors and identified evidence related to those factors, primarily based on the evidence based technology assessment report, the committee concludes:

1. Evidence availability and technology features

The committee concludes that the best available evidence on ABA Therapy has been collected and summarized.

1.1. The evidence based technology assessment report on therapies for treatment of children with Autism Spectrum Disease (ASD), including Applied Behavioral Analysis (ABA) based behavioral interventions is comprehensive and included extensive public, expert, and peer review. The highest quality evidence for ABA based behavioral interventions included 34 papers on 30 trials; 11 of which were fair and 19 were poor quality.

1.2. Expression and severity of symptoms of ASDs differ widely and treatments of ASD symptoms associated with ASD include a range of behavioral, psychosocial, educational, medical, and complementary approaches that vary by a child's age and developmental status. The heterogeneity of subjects makes evidence based conclusions difficult if not measured in a more standard way. In addition there are over 100 different outcome measures; arranged into 14 categories in the report. The varied outcomes and outcome measures; along with many studies not specifying outcomes in advance is a significant challenge to summarizing and evaluating the effect, based on evidence, of ABA based behavioral interventions on clinically important and meaningful outcomes.

1.3. ABA is not a treatment or intervention, but is a method or technique used by many behavioral interventions to promote desirable behaviors and decrease undesirable behaviors using systematic reinforcement. The committee focus is on interventions that can be described and tested with clinical evidence and the committee agreed with the evidence

based technology assessment's approach of including two categories of behavioral treatments that are based on or use ABA methods/techniques that contain a total of six models:

- Early Intensive Behavioral/developmental Interventions (EIBI), which typically include pre-school children in intensive (10 to 40 hrs/wk) treatment in a variety of settings there are three programs that had 26 studies: (1) UCLA / Lovaas model; (2) Early Start Denver Model (ESDM); and (3) Parent Training Model focused on pivotal behaviors.
- Play/Interaction based Interventions use ABA based behavior management, imitation, behavioral drills and child directed training within a relationship or development approach in preschool through elementary aged children, there are three programs that had 6 studies: (4) Play Interaction – Parent Focused Model; (5) Play Interaction – Joint Attention Model; and (6) Play Interaction – Imitation Model.

2. Is it safe?

The committee concludes that the comprehensive evidence indicates that ABA Therapy is unproven to be safer than alternatives. Key factors to the committee's conclusion included:

2.1. The committee agreed that safety evidence for ABA Therapy is unavailable, and therefore it is unproven as compared with conventional treatment.

3. Is it effective?

The committee concludes that the comprehensive evidence shows that ABA Therapy is an equally effective treatment. Key factors to the committee's conclusion included:

3.1. The committee unanimously agreed that sufficient evidence exists to conclude that ABA Therapy is an equally effective treatment compared to conventional treatments.

3.2. All ABA based behavioral interventions included in the systematic review were rated as having an insufficient strength of evidence, except ESDM due to the poor quality of individual trials; lack of consistency; and important study limitations in terms of outcomes; reporting; number of patients; and/or quality of design. ESDM rated as insufficient for 10 or 14 outcome categories; and a low strength of evidence for 4 of 14 outcome categories (adaptive behavior, ASD symptom severity, IQ/Cognitive development, and language/communication).

3.3. Significant evidence limitations are present for all ABA based behavioral interventions including very few well-controlled trials. Most studies report on short-term outcomes and the degree to which those outcomes translate to functional outcomes over time is largely unknown. The range of treatment approaches evaluated in the literature may not match those that are available in practice, and the highly controlled treatment environments may not translate to outcomes that can be achieved in the community. Fidelity to treatment in the community may be limited, particularly for those interventions that are not manualized. Of the published trials, many have small sample sizes, different treatment approaches, varying durations of treatment, different follow-up times and outcome measures, and cover a variety of treatment intensities. It is difficult to compare data between studies and to make inferences for the general population due to the heterogeneity of study designs. Many observational studies and non-controlled studies lack a description of study methods and a detailed description of applied interventions. It difficult to identify subpopulations of children with ASD who might better respond to treatments based in ABA theory, based on current evidence.

3.4. The committee agreed that while overall, the evidence is insufficient, two of the most studied ABA based behavioral interventions (UCLA/Lovaas and ESDM) have more (though still low quality) evidence, that shows an effect on certain outcomes for some individuals with ASD,

though this literature has substantial quality limitations and applicability limitations about the amount, outcome and type of children that benefit, and the appropriate frequency and setting of treatment. Given this initial positive (though low quality) data for some effect, the committee discussed conditional coverage requiring participation in research.

4. Evidence about the technology's special populations, patient characteristics and adjunct treatment

The committee agreed that no compelling evidence exists to differentiate sub groups or special populations, though there are several important potential correlates that have been suggested in the literature, but the evidence is conflicting or inconclusive.

4.2 The evidence based technology assessment identified several potential correlates that require further evidence:

- The degree of severity of deficits at baseline; and characteristics such as baseline IQ, social responsiveness and imitation skills
- Age of child (particularly very young 18 month to 3 years) at baseline
- Provider type (licensure, professional, parent)
- Intervention setting (home; clinic; other)
- Duration and frequency of intervention

4. Is it cost-effective?

The committee concludes that ABA Therapy is unproven to be cost effective; agreeing with the comprehensive evidence review that no evidence based conclusions about efficacy or effectiveness have been demonstrated, and that therefore no cost effectiveness conclusions can be drawn.

5.1. The evidence report adequately summarized the very low quality evidence on cost.

5.2. Cost is high as demonstrated from mandated benefit yearly amounts ranging from $36,000 to $75,000

5.3. Cost effectiveness is premature given the low efficacy and effectiveness data, and was not substantially determinative. The committee concluded that ABA Therapy is currently unproven to be a cost effective treatment.

Committee Decision

Based on the deliberations of key health outcomes, the committee decided that it had the most complete information: a comprehensive and current evidence report, public comments, and agency and state utilization information. The committee concluded that the current evidence on ABA Therapy demonstrates that there is sufficient evidence to cover with conditions Applied Behavioral Analysis based behavioral interventions for treatment of Autism Spectrum Disorder. The committee considered all the evidence and gave greatest weight to the evidence it determined, based on objective factors, to be the most valid and reliable. Based on these findings, the committee voted to cover with conditions ABA Therapy.

ABA Therapy Coverage Vote

The clinical committee utilized their decision tool to first gauge committee judgment on the status of the evidence in the three primary areas of safety, efficacy, and cost.

Applied Behavioral Analysis based behavioral interventions for treatment of Autism Spectrum Disorder --

Is there sufficient evidence under some or all situations that applied behavioral analysis and other behavioral therapies for the treatment of Autism Spectrum Disorder is:

	Unproven (no)	**Equivalent** (yes)	**Less** (yes)	**More** (yes)
Effective	0	**9**	0	0
Safe	**7**	0	0	**2**
Cost-effective Overall	**9**	0	0	0

Applied Behavioral Analysis based behavioral interventions for treatment of Autism Spectrum Disorder Coverage Vote: Based on the evidence provided and the information and comments presented, the committee moved to a vote on coverage.

HTCC COMMITTEE COVERAGE DETERMINATION			
	Not covered	**Covered Unconditionally**	**Covered Under Certain Conditions**
ABA based behavioral interventions for treatment of Autism Spectrum Disorder	0	0	**9**

Discussion: The Chair called for discussion of conditions for Applied Behavioral Analysis based behavioral interventions for the treatment of Autism Spectrum Disorder. Committee members discussed the evidence and its sufficiency related to key outcomes that most impact safety, effectiveness, and cost-effectiveness (the statutory criteria). Relevant evidentiary factors include the type, quality, and relevance of the evidence about the technology; within the context of the degree of importance of key outcomes and alternatives such as the potential and degree of harm, burden of disease untreated or treated with alternatives; and type and degree of effect and patient value preferences.

- ✓ *Action:* The following conditions were approved by a majority:
  - ➢ *Limitations of Coverage:* Certain Applied Behavioral Analysis based behavioral interventions are a covered benefit for the treatment of Autism Spectrum Disorder when the following conditions are met:
    1. The Early Intensive Behavioral/developmental Intervention (EIBI) using either the UCLA/Lovaas model or Early Start Denver Model (ESDM) are covered with evidence development.

- ✓ *Action:* The committee chair directed HTA staff to prepare a Findings and Decision document on ABA Therapy reflective of the majority vote, and to prepare a document for public comment that provides further descriptive options for the committee to consider regarding the coverage with evidence development condition and potential further specification.

The committee discussed Clinical guidelines, and their coverage determinations are consistent with the several of the higher quality clinical guidelines identified where current evidence is weak, some benefit may occur but the practice requires more evidence to determine approach, quantity, duration, and better evidence on efficacy for important outcomes in addition to IQ and which children are likely to benefit. No Medicare National Coverage Determinations for the treatment of ASD identified. The committee found that the evidence review summarized the most recent, relevant evidence and assessed its quality along with addressing key questions relevant to the committee's statutory criteria including evidence on safety, efficacy, effectiveness and cost that were addressed or transparent in clinical guidelines.

Health Technology Clinical Committee

Findings and Coverage Decision

Topic: **Applied Behavioral Analysis (ABA or ABA Therapy) based Behavioral Interventions for the Treatment of Autism Spectrum Disorder**

Meeting Date: **March 18th, 2011**

Final Adoption:

Number and Coverage Topic

20110617A – Applied Behavioral Analysis (ABA or ABA Therapy) based Behavioral Interventions for the Treatment of Autism Spectrum Disorder

HTCC Coverage Determination

ABA based behavioral interventions for treatment of Autism Spectrum Disorder is a **covered benefit with conditions**

HTCC Reimbursement Determination

❖ Limitations of Coverage

- Certain Applied Behavioral Analysis based behavioral interventions are a covered benefit for the treatment of Autism Spectrum Disorder when the following conditions are met:
  - The Early Intensive Behavioral/developmental Intervention (EIBI) using either the UCLA/Lovaas model or Early Start Denver Model (ESDM) are both covered with evidence development

❖ Non-Covered Indicators

- N/A

❖ Agency Contact Information

Agency	Contact Phone Number
Labor and Industries	1-800-547-8367
Public Employees Health Plan	1-800-762-6004
Health and Recovery Services Administration	1-800-562-3022

Health Technology Background

The Applied Behavioral Analysis (ABA or ABA Therapy) based Behavioral Interventions for the Treatment of Autism Spectrum Disorder topic was selected and published in December 2009 to undergo an evidence review process. The supplemental information published was commissioned by the Washington HTA program to: (1) excerpt the behavioral intervention component of the systematic review conducted for AHRQ by Warren et al. 2011 and (2) to provide supplemental information on guidelines, cost and coverage policies to meet Washington's HTA program requirements.

The HTA program strives to make economical use of state resources and not duplicate high quality clinical evidence reviews. In this case, WA State was a nominator to AHRQ for the topic of ABA Therapy of treatment of Autism, and this topic was incorporated into the broader systematic review that AHRQ conducted on all therapies for treatment of Autism Spectrum Disorders. Thus, a separate clinical evidence search is not applicable here, as the clinical evidence search and summary is included in the systematic review prepared for the Agency for Healthcare Research and Quality (AHRQ), Comparative Effectiveness of Therapies for Children with Autism Spectrum Disorders, (Warren et al., 2011).

Applied behavioral analysis (ABA) is a general intervention approach for the treatment of ASD. It is a systemic application, at any time during a child's day, of behavioral principles to modify behavior. Some ABA techniques involve instruction that is directed by adults in a highly structured fashion, while others make use of the learner's natural interests and follow his or her initiations. Other techniques teach skills in the context of ongoing activities. All skills are broken down into small steps or components, and learners are provided many repeated opportunities to learn and practice skills in a variety of settings, with abundant positive reinforcement.

A range of interventions are available for the treatment of ASD and the symptoms commonly associated with ASD (e.g., anxiety, sensory difficulties). Treatments for ASD focus on improving core deficits in social communication, as well as addressing challenging behaviors to improve functional engagement in developmentally appropriate activities. Common behavioral strategies used in the treatment of ASD are based on learning theory and make use of procedures such as reinforcement, prompting, and shaping techniques to increase the rate of positive behaviors and reduce the frequency of unwanted behaviors. Positive reinforcement and other principles to build communication, play, social, academic, self-care, work, and community living skills and to reduce problem behaviors in individuals with ASD have been used by behavioral therapists.

The comprehensive, public and peer reviewed Applied Behavioral Analysis (ABA or ABA Therapy) based Behavioral Interventions for the Treatment of Autism Spectrum Disorder supplemental report is 91 pages, and identified a relatively large amount of literature; while the AHRA final report is 908 pages.

An independent group of eleven clinicians who practice medicine locally meet in public to decide whether state agencies should pay for the health technology based on whether the evidence report and other presented information shows it is safe, effective and has value. The committee met on March 18th, reviewed the report, including peer and public feedback, and heard public and agency comments. Meeting minutes detailing the discussion are available through the HTA program or online at http://www.hta.hca.wa.gov under the committee section.

Committee Findings

Having considered the evidence based technology assessment report and the written and oral comments, the committee identified the following key factors and health outcomes, and evidence related to those health outcomes and key factors:

1. Evidence availability and technology features

The evidence based technology assessment report indicates:

- An evidence based technology assessment report on therapies for treatment of children with Autism Spectrum Disease (ASD), including Applied Behavioral Analysis (ABA) based behavioral interventions, was prepared by a federal research agency's (AHRQ) national evidence based practice centers, Vanderbilt University. The public, comprehensive evidence report of about 900 pages for ASD Therapies, including ABA identified 4,120 potentially relevant articles, and included a detailed review of 159 studies; 78 of which were for Behavioral interventions; of which 34 papers on 30 trials included ABA based interventions. HTA, through its evidence based contractor, extracted the ABA Based behavioral intervention section of the AHRQ report and supplemented it with information required by the HTA program about agency experience, guidelines, coverage, and cost information. Both reports are published online and were subject to extensive public, peer, expert review and comments.
- Autism spectrum disorders (ASD) are a group of pervasive developmental disorders characterized by impairments in communication, behavior and social interaction, and by repetitive patterns of behaviors and interests. Prevalence is estimated to be 1 in 110 children, with variation across states. Expression and severity of symptoms of ASDs differ widely. Treatments of ASD symptoms associated with ASD include a range of behavioral, psychosocial, educational, medical, and complementary approaches that vary by a child's age and developmental status. There is no definitive evidence or consensus on most appropriate treatments. Common behavioral interventions used in the treatment of ASD are based on learning theory and use procedures such as reinforcement, prompting, and shaping techniques to increase the rate of positive behaviors and reduce the frequency of unwanted behaviors. Positive reinforcement and other principles to build communication, play, social, academic, self-care, work, and community living skills and to reduce problem behaviors in individuals with ASD have been used by behavioral therapists.
- ABA is not a treatment or intervention: it is a method or technique used in many behavioral interventions to promote desirable behaviors and decrease undesirable behaviors using systematic reinforcement. There are numerous interventions in educational, community, behavioral health interventions that use ABA methods to treat many different conditions. ABA is a systemic application, at any time during a child's day, of behavioral principles to modify behavior. Some ABA techniques involve instruction that is directed by adults in a highly structured fashion, while others make use of the learner's natural interests and follow his or her initiations. Other techniques teach skills in the context of ongoing activities. All skills are broken down into small steps or components, and learners are provided many repeated opportunities to learn and practice skills in a variety of settings, with abundant positive reinforcement.
- The committee also reviewed information provided by the state agencies, and public members; and heard comments from the evidence reviewer, clinical expert, HTA program, agency medical directors and the public.

2. Is the technology safe?

The committee discussed multiple key factors and health outcomes that were important for consideration in their overall decision on whether the technology is safe. Summary of committee considerations follows.

- The AHRQ conducted systematic review (Warren et. al.) did not have a specific key question focused on safety.

- ABA based behavioral interventions used in a variety of settings including the trials related to treatment for Autism Spectrum Disorder did not report adverse events (though it was not specifically a study question) and overall ABA has not been associated with adverse events.
- No major adverse events, morbidity or mortality was reported.

3. Is the technology effective?

The committee discussed multiple key factors and health outcomes that were important for consideration in their overall decision on whether the technology is effective. Summary of committee considerations follows.

- As noted previously, ABA is a method employed in behavioral interventions based on a learning theory and aimed at reducing certain behavior and promoting other behavior through reinforcement, promotion and shaping techniques. Treatment goals focus on reduction of core deficits in communication, social interactions, restricted behaviors because reducing these fundamental deficits may help children develop greater functional skills and independence.
- The evidence based technology assessment report indicates that there are over 100 different outcome measures included in the studies analyzed. The outcomes were grouped into 14 categories including adaptive behavior; adverse events/harms; anger; anxiety; ASD symptom severity; challenging behavior; hyperactivity; IQ/ cognition; joint attention; socials skills; language/ communications; repetitive behavior motor/sensory; and sleep. There are no evidence or expert consensus based standards for appropriate or standard outcomes nor clinically meaningful improvement.
- All ABA based behavioral interventions included in the systematic review were rated as having an insufficient strength of evidence, except ESDM due to the poor quality of individual trials; lack of consistency; and important study limitations in terms of outcomes; reporting; number of patients; and/or quality of design. ESDM rated as insufficient for 10 or 14 outcome categories; and a low strength of evidence for 4 of 14 outcome categories (adaptive behavior, ASD symptom severity, IQ/Cognitive development, language/communication).
- Significant evidence limitations are present for all ABA based behavioral interventions including very few well-controlled trials. Most studies report on short-term outcomes and the degree to which those outcomes translate to functional outcomes over time is largely unknown. The range of treatment approaches evaluated in the literature may not match those that are available in practice, and the highly controlled treatment environments may not translate to outcomes that can be achieved in the community. Fidelity to treatment in the community may be limited, particularly for those interventions that are not manualized. Of the published trials, many have small sample sizes, different treatment approaches, varying durations of treatment, different follow-up times and outcome measures, and cover a variety of treatment intensities. It is difficult to compare data between studies and to make inferences for the general population due to the heterogeneity of study designs. Many observational studies and non-controlled studies lack a description of study methods and a detailed description of applied interventions. It difficult to identify subpopulations of children with ASD who might better respond to treatments based in ABA theory, based on current evidence.
- The OHSU evidence report focused on the clinical evidence on ABA Based behavioral interventions for ASD, as reported in the more comprehensive Warren et.al systematic review of multiple interventions for ASD. The report includes two categories of behavioral treatments that are based on or use ABA methods/techniques. These two categories contain a total of six models, and include a total of 30 studies, 11 rated fair, and 19 rated poor.
    - Under the first category, Early Intensive Behavioral/developmental Interventions (EIBI) is a more prescriptive, generally manualized program, with proponents recommending

therapy as early as possible, preferably before age three. EIBI typically includes pre-school children in intensive (10 to 40 hrs/wk) treatment in a variety of settings there are three programs that had 26 studies: (1) UCLA/Lovaas model; (2) Early Start Denver Model (ESDM); and (3) Parent Training Model focused on pivotal behaviors. Both UCLA/Lovaas and ESDM programs involve high intensity instruction using ABA techniques but have several differences. The UCLA/Lovaas method uses one-on-one therapy sessions and discrete trial teaching. The ESDM uses ABA principles with developmental and relationship-based approaches for young children.

- Under the second category, Play/Interaction based Interventions using ABA based behavior management, imitation, behavioral drills and child directed training within a relationship or developmental approach in preschool through elementary aged children, there are three programs that had 6 studies: (4) Play Interaction – Parent Focused Model; (5) Play Interaction- Joint Attention Model; and (6) Play Interaction- Imitation Model.

- ***EIBI – UCLA/Lovaas***. Studies of UCLA/Lovaas-based interventions have the most and highest level of evidence of any of the six models of ABA based behavioral interventions identified with clinical evidence and is based on a more structured (use of manual) intervention. The UCLA/Lovaas clinical evidence suggests improvements in cognitive performance, language skills. However, strength of evidence is currently low due to significant evidence limitations; meaning that further research is likely to change confidence in the estimate of effect and is also likely to change the estimate.

  - 7 fair quality trials and 14 poor quality studies were identified. The fair quality trials included 272 children total; with an average of 40 children per study. One was an RCT and six were prospective cohort design. Age typically included 18 to 42 month old children; though one study of 27 children included up to age 7. The early intensive behavioral interventions based on ABA methods varied in intensity (10 to 40 hrs) and were compared to eclectic interventions; parent directed EIBI and may not have included manuals or protocols. Studies most commonly assessed IQ, with language, communication, adaptive behavior after 9 months and up to 3 year; although in some studies these were not specified in advance or powered adequately.
  - *IQ/Cognitive*: 5/7 trials reported sig. over comparator; 1 trial reported no difference between groups
  - *Adaptive Behavior*: 3 trials reported no sig. difference between groups; 2 trials reported sig. improvement over comparator/s
  - *Challenging Behavior*: 1 trial reported no sig. difference between groups
  - *Expressive language/socialization*: 1 trial reported no sig. difference and 1 trial reported a sig. improvement over comparator
  - *Autism Severity*: 1 trial reported no sig. difference between groups
  - 14 additional poor quality cohors found inconsistent results; 5 case series had mixed results; and 6 chart reviews were included.

- ***EIBI – Early Start Denver Model***. One good quality RCT studying Early Start Denver model based intervention, also based on a more structured (use of manual) intervention was included and one poor quality case series. Although some positive results are reported for the effects of intensive interventions that use a developmental framework, such as ESDM, evidence for this type of intervention is currently insufficient because few studies of sufficient size and quality have been published to date.

  - The RCT study included 48 children; mean age of 38 months and compared to community based interventions. At 1 year, significantly greater increase in IQ was

reported; but no differences in adaptive behavior; as 2 years significantly greater IQ, receptive/expressive language; adaptive behavior reported but no change in Autism severity or repetitive behaviors.

- ***EIBI – Parent Training Model focused on Pivotal Behaviors***. Four studies, 2 fair and 2 poor studying parent training models focused on pivotal behaviors were included. However due to small quantity, quality, and size, and low or mixed findings, the overall strength of evidence was insufficient.
  - The two fair quality RCT studies included 52 children; with a mean of 23 months, ranging from 24-51 months comparing home based parent intervention with treatment as usual or community based intervention over one year. In one trial; no differences between groups in nonverbal IQ; autism severity; words/gestures occurred and intervention group had decrease in IQ. In the other trial, intervention group had significant improvement in AOS and expressive vocabulary scores; but no other significant differences.
  - Two additional poor quality studies reported mixed results.
- ***Play Interaction-based interventions:*** The majority of these interventions consisted of a combination of adult directed behavioral drill and child direct milieu teach approach that incorporates ABA methods and developmental procedures of responsive and interactive methods in a table top structure context; parent led ABA based behavior management strategies; or adult imitation of child's behavior. Children studied were generally between 3 to 6 years old, except for parent focused training up to age 12. The overall strength of evidence is based on 6 total studies; 1 fair quality and 5 poor quality RCTs and is insufficient due to lower quality evidence; low patient and number of studies; and mix of reported effect.
  - Evidence from one fair quality trial of 58 children on *joint attention model of play interaction* compared to symbolic play or a control reported no differences between groups in growth of receptive or expressive language; both intervention groups has greater growth in expressive language. (Kasari 2006, 2008).
  - Evidence from 3 poor quality trials; children generally 3 to 6 with an outcome most frequently assessed of social behaviors, found that the *imitation based play interaction intervention* group had greater improvements in time engaged, social interest. (Field 2001 Heimann 2006; Escalona 2002).
  - Evidence from 2 poor quality trials *of parent focused play interaction* for children from 2 to 12, compared to wait list controls found significant reductions in child challenging behavior at 6 months and duplicated in wait list control (Whittingham 2009; Gulsrud 2007).

4. Special Populations?

- The degree of severity of deficits at baseline; and characteristics such as baseline IQ, social responsiveness and imitation skills
- The diagnosis of the child (PDD-NOS vs. ASD)
- Age of child (particularly very young 18 month to 3 years) at baseline
- Provider type (licensure, professional, parent)
- Intervention setting (home; clinic; other)
- Duration and frequency of intervention

5. Is the technology cost-effective?

The committee discussed multiple key factors that were important for consideration in their overall decision on whether the technology has value and is cost-effective. Summary of committee considerations follows.

- The evidence based technology assessment report indicates that total lifetime per capita cost of direct medical treatment for an individual with ASD is estimated to be $305,956, with a total lifetime societal cost of $3.2 million (Ganz, 2007). Given the high cost of treatment, the large number and variety of available treatments, and constrained budgets, state policymakers need to determine which treatments are likely to improve outcomes for children with ASD, so they can better target the use of limited state resources.
- The AHRQ commissioned evidence review is for clinical studies only and does not include a review of cost effectiveness analysis.
- The evidence based technology assessment report indicates that currently 27 states that mandate coverage, there are four types of benefit limits included in current state mandates: overall maximum benefit amounts per year, lifetime maximum benefit amounts, a specific to ABA maximum benefit amount per year, and a lifetime maximum benefit amount specific to ABA. Maximum overall benefit amounts in coverage mandates range from $36,000 to $75,000 per year with most coverage mandates explicating stating that the limits include ABA therapy. The overall maximum benefits are also commonly broken down by age, with the overall benefit maximum for older children (age 7 to 12 and older) ranging from $12,000 to $27,000 per year. Lifetime maximum benefit amounts range from $125,000 to $200,000. Coverage limits specific to ABA therapy range from $30,000 to $50,000 per year, with one state (FL) having a lifetime maximum benefit for ABA therapy of $108,000. Similar to overall benefit limits, ABA specific benefit amounts are also commonly broken down by age, with the benefit maximum for older children (age nine and older) between $12,000 and $35,000 per year.
- The evidence based technology assessment report indicates that no Washington State agency covers ABA therapy for autism; however, other services that are commonly identified as components or alternatives to ABA are covered when provided under a treatment plan of medically necessary therapies.
- Washington state utilization and cost information indicates that with a 50% usage by eligible population of a $50,000 yearly limit (last proposed legislation); the costs, depending on prevalence estimates would range from $70 million to $101 million per year.

6. Medicare Decision and Expert Treatment Guidelines

Committee reviewed and discussed the expert guidelines as identified and reported in the technology assessment report.

- The Centers for Medicare and Medicaid Services (CMS) has no National Coverage Determination.
- 27 US states have mandated ABA Therapy benefits; though such legislative policies may not be based on scientific outcomes; the types of mandate vary widely.
  - The age limits for state mandates of autism coverage differ significantly. For example, 4 states limit coverage to children 6 years or younger; 5 states set coverage limits for children aged up to 10 through 17 years; 5 states limit coverage to children aged 18 years or younger. Many of the age limits are further segmented into age groups as maximum benefits limits in many states are differentiated by age.
  - There are four types of benefit limits included in current mandates: overall maximum benefit amounts per year; lifetime maximum benefits; a specific ABA maximum per year;

or a specific ABA maximum per lifetime. Maximum yearly amounts range from $36,000 to $75,000 per year.

- Included services vary in specificity, with most mandates covering diagnosis and treatment of ASD.
- Some state mandates limit applicability to certain entities such as state regulated insurance plans or state employee plans.
- Provider licensure requirements, if any vary widely as well; with most states not having minimum educational or practical experience requirements.

- Guidelines – the evidence based technology assessment report identified four guidelines (American Academy of Pediatrics, 2007; National Autism Center, 2009; New Zealand Guideline Group, 2008; SIGN, 2007).
  - American Academy of Pediatrics (AAP), 2007 (rated poor quality) – The American Academy of Pediatrics (AAP) released a guideline in 2007 titled *Management of Children with Autism Spectrum Disorders* (Myers, 2007). The focus of the guideline is to "assist pediatricians in educating families and guiding them toward empirically supported interventions for their children" (Myers, 2007, p. 1162). Myers and colleagues reviewed the primary educational strategies and associated therapies in the treatment of children with ASD (2007). AAP is rated as poor quality because: methods are unclear (no systematic search, no study selection criteria, limited information on the quality of studies). Recommendations are not specific or clearly described. Potential conflict of interest identified. Only a summary of the evidence is provided: primarily a description of treatment modalities and options to consider. Some recommendations for drug treatment.
  - National Autism Center (NAC), 2009 (rated poor quality) – The National Autism Center (NAC) released a report in 2009 titled the *National Standards Project*, and is directed towards parents, caregivers, educators, and service providers who make ASD treatment decisions (NAC, 2009). The *National Standards Project* main goals include: (1) describing the strength of evidence around educational and behavioral treatments for ASD; (2) providing the age, diagnosis, and skills/behaviors associated with treatment options; (3) identifying the limitations of the evidence for treatments of ASD; and (4) providing guidance for integrating evidence-based practice into ASD treatment (NAC, 2009). The guideline groups interventions into treatment categories. The categories represent treatments that are substantially similar or have the same core characteristics. It was difficult to know exactly which interventions were included in some of the categories. The strength of the evidence was rated by the NAC as established, emerging, unestablished, or ineffective/harmful. The NAC guideline was rated as poor quality and does not give specific recommendations for interventions or treatment categories. Rated as poor quality because: lack of methodological rigor; no clear link between evidence and recommendation; recommendation not specific; lack of applicability to practice and potential conflict of interest.
  - New Zealand Guidelines Group (NZGG), 2008 (rated fair quality) – The *New Zealand Autism Spectrum Disorder Guideline*, published by the New Zealand Guidelines Group (NZGG) in 2008, provides a best evidence summary targeted at primary care providers, educational professionals, policy makers, funders, parents, carers, specialists, and others who make treatment decisions regarding individuals with ASD (NZGG, 2008). The NZGG guideline conducted a systematic review of the evidence. The guideline specifically discusses the evidence surrounding the identification and diagnosis of ASD, continuing assessments, and access to services and treatments for individuals with ASD, and is rated as fair quality. One of the main reasons for the fair quality rating was

the lack of a direct link between the ABA-based recommendations and the evidence. Rated as fair quality because: involvement of funding bodies not stated; recommendations not specific; and applicability to practice not clear. Literature review was limited to systematic reviews (no primary studies included). 10 reviews of ABA identified (4 very good quality, 4 good quality, 2 fair quality). Of the 4 very good quality reviews, 2 found the evidence to be insufficient to make recommendations, 1 concluded that there was no clear answer regarding the most effective therapy for ASK and 1 concluded that EIBI should be the intervention of choice, but that there were substantial threats to the validity of that conclusion.

- Scottish Intercollegiate Guidelines Network (SIGN), 2007 (rated good quality) – the Scottish Intercollegiate Guidelines Network (SIGN) published *Assessment, Diagnosis and Clinical Interventions for Children and Young People with Autism Spectrum Disorders: A National Clinical Guideline* in 2007 to provide an evidence base and give recommendations for the assessment and clinical treatment of ASD. The guideline includes discussion on how multiple disciplines and multiple agencies and how they can work together to best meet the needs of individuals with ASD at all levels of care (SIGN, 2007). The guideline was rated as good quality because: rigor of development was robust and clearly described for both evidence and recommendations; low risk for conflicts of interest and recommendations are specific and applicable to practice.

Committee Decision

Based on the deliberations of key health outcomes, the committee decided that it had the most complete information: a comprehensive and current evidence report, public comments, and agency and state utilization information. The committee concluded that the current evidence on ABA Therapy demonstrates that there is sufficient evidence to cover with conditions Applied Behavioral Analysis based behavioral interventions for treatment of Autism Spectrum Disorder. The committee considered all the evidence and gave greatest weight to the evidence it determined, based on objective factors, to be the most valid and reliable. Based on these findings, the committee voted to cover with conditions ABA Therapy.

Health Technology Clinical Committee Authority

Washington State's legislature believes it is important to use a scientific based, clinician centered approach for difficult and important health care benefit decisions. Pursuant to chapter 70.14 RCW, the legislature has directed the Washington State Health Care Authority, through its Health Technology Assessment program to engage in a process for evaluation process that gathers and assesses the quality of the latest medical evidence using a scientific research company and takes public input at all stages. Pursuant to RCW 70.14.110 a Health Technology Clinical Committee (HTCC) composed of eleven independent health care professionals reviews all the information and renders a decision at an open public meeting. The Washington State Health Technology Clinical Committee (HTCC) determines how selected health technologies are covered by several state agencies (RCW 70.14.080-140). These technologies may include medical or surgical devices and procedures, medical equipment, and diagnostic tests. HTCC bases their decisions on evidence of the technology's safety, efficacy, and cost effectiveness. Participating state agencies are required to comply with the decisions of the HTCC. HTCC decisions may be re-reviewed at the determination of the HCA Administrator.

ABA Therapy

Draft Findings & Decision Timeline and Overview of Comments

The Health Technology Assessment (HTA) program received comments in response to the posted Health Technology Clinical Committee (HTCC) draft findings and decision on Applied Behavioral Analysis (ABA or ABA Therapy) based Behavioral Interventions for the Treatment of Autism Spectrum Disorder.

Commenter	Comment Period August 2nd – 16th	Cited Evidence
Patient, relative, and citizen	1	1
Legislator and public official	0	0
Physician and health care professional	2	2
Industry and Manufacturer	0	0
Professional Society and Advocacy Organization	2	1
	All Total = 5	

Comments with Evidence:

Professional Society and Advocacy Organization

Families for Effective Autism Treatment (FEAT) Board of Directors

- Concerned that the draft decision does not explain what "conditions" are being recommended, making it difficult to process. FEAT's main concern is with the committee's statement that there is "insufficient strength of evidence" that ABA-based behavioral interventions are effective. FEAT states that ABA is *already proven* effective by hundreds of peer-reviewed studies; therefore, it would be a grave mistake to make ABA coverage conditional upon new studies or trials, when there is already a scientific consensus that ABA-based intervention is an effective autism treatment. Moreover, if the state offers coverage initially only on a trial basis to a limited number of children, it would be enormously unfair to the majority of children who need treatment immediately.

Physician and Health Care Professional

Sara White, PhD, BCBA-D, Clinical Director of Autism Services, Sendan Center; Jim Harle, MD, Child and Adolescent Psychiatrist, Sendan Center

- Sendan Center stated they had some concerns regarding the very limited scope of approval as well as with how the stipulation of "evidence development" will be implemented. They believe that by only examining the literature from 2000 to 2010, the committee made (and is making) further decisions based on a very limited and truncated understanding of the literature. They strongly urge the committee to consider a broader scope of research when deciding upon the stipulations for the conditions of coverage. Additionally, the committee made a decision to only cover two specific applications of

Applied Behavior Analysis without adequately examining the research literature available on other intervention techniques. Further, some of the literature that was examined in the review by the committee did include strategies outside those that were approved (e.g., Howard, Sparkman, Cohen, Green, & Stanislaw, 2005) and we are unclear as to why only these two intervention models were determined to have adequate evidence. We are also concerned about how the 'evidence development' portion of the recommendations will be carried out. At the meeting there was discussion around access to services being limited to participation in studies with IRB approval. If this requirement is in place we are concerned that it will significantly limit access to services, particularly in more rural areas of the state.

Saba Varghai-Biggar, M.A., BCBA, Tim Gullcik, M.S., BCBA & Quinanna Robins M.Ed., BCBA

- Provided the committee with a reference list of articles to consider for support of Applied Behavior Analysis interventions and strategies to be considered for coverage.

Patient, relative, and citizen

Diana Stadden, Policy and Advocacy Coordinator

- Strongly endorses standardized education and practical requirements for ABA providers. Yet, doesn't support having states mandated to include ABA Licensure Boards in their state coverage mandates. Stated that the Behavior Analyst Certification Board (BACB) corporation established in 1998 to meet professionally credentialing needs identified by behavior analysts, governments, and consumers of behavior analysis services has been very successful; in fact, other similar state programs have since closed and now use the BACB for their certification.

Comments without Evidence:

Professional Society and Advocacy Organization

Aurora R. Bearse, Esq., President, Seattle Children's Autism Guild

- The Seattle Children's Autism Guild requests that the Heath Care Authority (HCA) rule that applied behavior analysis (ABA) treatment is an effective and cost-effective treatment for autism, and to provide ABA treatment as a covered heath care benefit for Washington state employees.

TOPIC: **ABA Therapy for Autism**

Public meeting Date:

Actual Timeline		Total Public Comment Days
Preliminary recommendations published	*October 27, 2009*	
Public comments due:	***November 10, 2009***	**15 days**
Selected set of topics published:	*December 8, 2009*	
Public comments due:	***January 11, 2010***	**35 days**
Draft Key Questions Published:	July 30, 2010	
Public comments due:	**August 16, 2010**	**17 days**
Key Questions Finalized:		
HTA Draft Supplemental report due:	*May 20, 2011*	
HTA Draft Supplemental report published:	*May 23, 2011*	
Public Comments due:	***June 6, 2011***	**15 days**
Final report published:	*June 10, 2011*	
Public meeting Date:	*June 17, 2011*	
Findings & Decision Published	*August 2, 2011*	**15 days**
Public Comments due:	***August 16, 2011***	

BRIEFING DOCUMENT: COVERAGE WITH EVIDENCE DEVELOPMENT (CED)
For WA Health Technology Clinical Committee

Briefing Background: The Health Technology Clinical Committee has made a draft coverage decision for Applied Behavioral Analysis for Autism Spectrum Disorder for conditional coverage: the condition is coverage with evidence development. The HTCC requested staff provide a briefing document to assist the HTCC with finalizing the coverage decision and potentially adding more specific information.

This document provides:

- a brief background and description of coverage with evidence development (CED)
- example parameters for CED
- Resources

BACKGROUND

Health care payers often face a situation where a decision on coverage of a medical service or item is requested, but there is inadequate information about efficacy, effectiveness, safety, and/or cost. Coverage with data collection, or evidence development, or post market/field evaluation (collectively CED) is a potential policy approach to reduce uncertainty by permitting access to the technology in an evaluation setting appropriate to questions that patients, clinicians, and payers have. Use of this policy approach by payers is relatively new and has been tried by Medicare (since 2005) and some US Payers, and in Canada (e.g. Ontario since 2003) and other European health systems. CED provides interim access to medical interventions while generating clinical evidence to inform a decision about whether coverage is appropriate with or without limitations.

In most instances, the HTCC uses the health technology assessment report (a summary and evaluation of the current medical evidence) to determine whether sufficient evidence of a technologies' safety, effectiveness, and cost-effectiveness exists to support coverage. Principles and decision factors considered by the HTCC related to the sufficiency of evidence; determination of health benefit; and other factors for consideration are included in the HTCC decision tool document. Generally, if evidence is not adequate to support a coverage decision, non-coverage would result. In some cases however, the evidence may be sufficient, together with other decision factors, to determine that coverage in the context of further evaluation and study is appropriate. When that occurs, coverage is appropriate when provided within a research setting where added safety, patient protections, monitoring, and clinical expertise are present; and important outcomes are being appropriately studied.

CED Considerations

Once a decision has been made to cover with evidence development, a payer needs to identify the key uncertainties that need to be addressed by the evidence; and then either design the CED program or provide guidance or criteria for studies that could qualify. For the HTA process, the HTCC decides on coverage conditions and agencies decide on implementation. For the ABA Therapy for Autism Spectrum Disease, the HTCC has made a draft decision to cover with the condition of evidence development and requested this briefing on CED to determine what further conditions, if any should be included.

Key uncertainties: The HTCC may want to highlight the key uncertainties and outcomes, or the information may already be captured in the HTCC decision tool; meeting materials; discussion at the public meeting; the draft minutes; and/or the committee findings and conclusions.

CED Program Criteria, Conditions or Guidance: CED programs have ranged from payers designing, financing, and implementing evaluations, studies and trials; to issuing guidance for when the payer

will participate through reimbursement for the intervention. Guidance ranges from general outcomes information to detailed study criteria. Excerpted examples are below, followed by a reference list for the full citations.

CED programs should be accompanied by a clear explanation of the evidence required to warrant conventional coverage. In addition, they should be governed by research plans that identify the institution(s) responsible for the research, define the primary and secondary outcomes under study, estimate the number of patients needed to have adequate power to answer the coverage-relevant research questions, and specify methods of data analysis. In the case of randomized trials, guidelines for early termination based on interim data should be established and the data should be monitored by an independent Data Monitoring Committee. *Miller, et.al, July 2008 Medical Care, V47,7; 746 ///*

Clinical trials sponsored by other entities may also be covered if approved by the benefits administrator, provided that the clinical trial has passed independent scientific review and has also been approved by an Institutional Review Board (IRB) that would oversee the trial; and the clinical trial must be conducted in a setting and by personnel who maintain a high level of expertise because of their training, experience and volume of patients. An IRB is an independent ethics committee usually associated with a university or physician-accrediting organization formally designated to approve, monitor and review biomedical and behavioral research involving humans with the aim to protect the rights and welfare of the subjects. CMTP Framework 2008

To qualify for reimbursement, such a study must be designed to produce evidence that could be used in a future national coverage decision that would focus on whether the item or service should be covered by Medicare under 1862(a)(1)(A). Payment for the items and services provided in the study will be restricted to the Medicare qualified patients involved as human subjects in the study. CMS

CMS will not routinely be involved in the design, review, or execution of research studies. CMS will only provide payment for clinical research that meets the standards of a qualified trial as will be outlined in the revision of the Clinical Trial Policy. We anticipate this NCD will include the following principles:

1. The primary purpose of the trial is to test whether the intervention potentially improves the participants' health outcomes.
2. The trial is well supported by available scientific and medical information or is intended to clarify or establish the health outcomes of interventions already in common clinical use.
3. The trial does not duplicate existing studies unjustifiably.
4. The trial design is appropriate to answer the research question being asked in the trial.
5. The trial is sponsored by a credible organization or individual capable of executing the proposed trial successfully.
6. The trial is in compliance with Federal regulations relating to the protection of human subjects.
7. All aspects of the trial are conducted according to the appropriate standards of scientific integrity.
8. The trial is listed in the National Library of Medicine clinical trials database.
9. The sample of study subjects in the trial should include individuals representative of the Medicare population with the condition described in the NCD. ///

Clinical Trial Coverage Criteria (Regence) Costs for medical services (e.g., inpatient hospitalization, outpatient services, and other ancillary services, such as laboratory tests and imaging) that are associated with an emerging technology that Regence considers investigational may be eligible for coverage when all of the following criteria (A-F) are met:

A. The treatment being studied is therapeutic, intended to directly improve health outcomes, and not for diagnosis or supportive care. B. The treatment being studied is for a condition that is either life-threatening or severely and chronically disabling and that has a poor prognosis with the most effective available treatment. 1) A condition is considered to be life-threatening if it has a substantial probability of causing premature death; 2) A condition is considered severely and chronically disabling if the individual with the condition is unable to perform the functions that are required for daily life and if the severe disability is not expected to improve with the most effective available treatment. C. The member is enrolled and participating in a phase II or phase III clinical trial that is approved by a national body, such as the National Institutes of Health, the National Cancer Institute, or the FDA. D. The clinical trial is conducted under a written research protocol with Institutional Review Board approval. E. There is published evidence from phase II clinical trials that indicates the treatment has a substantial probability of providing a clinically significant and substantial improvement in net health outcomes compared to the most effective available treatment. F. It is likely that the evidence from well-designed clinical trials, including the trial in which the member is participating, will contribute to determining whether the treatment meets the Regence technology assessment criteria detailed in the Introduction to the Regence Medical Policy Manual (see Cross References). Regence

The Centers for Medicare & Medicaid Services (CMS) is expanding coverage for Medicare beneficiaries by requiring national coverage for certain anticancer drugs in National Cancer Institute (NCI) sponsored trials. CMS will cover the studied drug and routine costs of the trials using the following anticancer drugs: oxaliplatin (Eloxatin™), irinotecan (Camptosar®), bevacizumab (Avastin™), and Cetuximab (Erbitux™). Consult the following NCI web page for details of the trials: http://www.cancer.gov/clinicaltrials

- **C80405** is a phase III, first-line metastatic colorectal cancer trial. It consists of multiple arms: FOLFOX, FOLFIRI, CAPOX, or CAPIRI plus bevacizumab; FOLFOX, FOLFIRI, CAPOX, or CAPIRI plus cetuximab; and FOLFOX, FOLFIRI, CAPOX, or CAPIRI plus both bevacizumab and cetuximab. … etc

An FDG PET scan is considered reasonable and necessary in patients with MCI or early dementia (in clinical circumstances other than those specified in subparagraph 1) only in the context of an approved clinical trial that contains patient safeguards and protections to ensure proper administration, use and evaluation of the FDG PET scan. The clinical trial must compare patients who do and do not receive an FDG PET scan and have as its goal to monitor, evaluate, and improve clinical outcomes. In addition, it must meet the following basic criteria:
Written protocol on file;

1. Institutional Review Board review and approval;
2. Scientific review and approval by two or more qualified individuals who are not part of the research team; and,
3. Certification that investigators have not been disqualified.

CED by private payers requires each payer to deem a trial worthy of reimbursement of clinical care costs. Doing that individually for every CED project (assuming CED becomes more common) is quite burdensome and likely to be unsuccessful. However, it still needs to be done independently among participating health plans, and since many health plans do not have staff who can evaluate study design, the role of an independent third party becomes more crucial. Plans may be more interested in engaging a neutral organization like CMTP in a coordinator role that would certify study designs against a set of payer/stakeholder generated CED requirements. CMTP – Lessons 2010

Resources

Miller, et..al. Coverage With Evidence Development: Ethical Issues and Policy Implications; *Medical Care* •July 2008, Volume 46, Number 7, 746.

Levin, et al, Coverage with evidence development: the Ontario experience, *Int J Technol Assess Health Care.* 2011 Apr;27(2):159-68.

Guidance for the Public, Industry, and CMS Staff; National Coverage Determinations with Data Collection as a Condition of Coverage: Coverage with Evidence Development, Issued July 12, 2006 Downloaded from https://www.cms.gov

Research Urgent Treatments – Regency Policy.
http://blue.regence.com/trgmedpol/medicine/med74.html

Coverage for Evidence Development: A Conceptual Framework, Center for Medical and Technology Policy (CMTP) http://www.cmtpnet.org/cmtp-research/applied-policy-and-methods/coverage-with-evidence-development/20090108%20-%20CMTP%20-%20CED%20Issue%20Brief.pdf

Coverage for Evidence Development in the Private Sector: Lessons in Design and Implementation (CMTP) http://www.cmtpnet.org/recent-articles/CMTP%20-%20CED%20Issue%20Brief.pdf

August 16, 2011

Washington State Health Care Authority
Attn: Health Technology Clinical Committee
P.O. Box 42682
Olympia, WA 98504-2682

Re: Effectiveness of Applied Behavioral Analysis (ABA) as a Treatment for Autism Spectrum Disorder

Dear Committee members:

The board of directors of Families for Effective Autism Treatment (FEAT) of Washington appreciates the opportunity to submit comments regarding the draft decision to "cover with conditions" Applied Behavioral Analysis (ABA). Our viewpoint is based on 15 years of experience supporting the autism community. Many FEAT board members have children on the autism spectrum.

Unfortunately the draft decision does not explain what "conditions" are being recommended, making it difficult to react. FEAT's main concern is with the committee's statement that there is "insufficient strength of evidence" that ABA-based behavioral interventions are effective. In fact, ABA is *already proven* effective by hundreds of peer-reviewed studies. It would be a grave mistake to make ABA coverage conditional upon new studies or trials, when there is already a scientific consensus that ABA-based intervention is an effective autism treatment. [1] Moreover, if the state offers coverage initially only on a trial basis to a limited number of children, it would be enormously unfair to the majority of children who need treatment immediately.

Our research indicates that as of 1996, there were over 250 studies published in peer-reviewed professional journals that examined ABA therapy[2] and concluded that it is, in fact, an effective treatment for Autism Spectrum Disorders. Over the ensuing 15 years many more studies have been added to the extant literature. Furthermore, as practitioners of ABA therapy in our programs, FEAT of Washington has validated that this approach has helped children gain significant and sustained progress.

In summary FEAT would like to make the following points:

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[1] In a phone call today, Committee Program Director Denise Santoyo explained to a FEAT Board member that the committee is not ready to release details of the coverage conditions, but that the intent is to cover ABA only for children enrolled in Early Intensive Behavior Intervention trials using the Lovaas method or Early Start Denver Model.

[2] Matson, J.L., Benavidez, D.A., Compton, L.S., Paclawsky, T. & Baglio, C. (1996). Behavioral treatment of autistic persons: A review of research from 1980 to the present. *Research in Developmental Disabilities, 17*, 433-465.

- ABA therapy has been recognized by most states[3], and many insurance providers and corporations as an effective treatment of ASDs.

- Our experience shows that, while children on the spectrum have varying potentials, early and intensive ABA therapy results in significant, sustained and documented progress.

- Most families affected by autism do not have insurance coverage or enough disposable income to pay for treatment. This has created a crisis, and an entire generation of children who are getting little to no therapy.

- The costs of *not* providing ABA services of sufficient intensity and at a sufficiently early age are even more daunting than paying for ABA. According to one study, providing ABA services to young children with ASD saves society—including state governments—between $1.6 and $2.5 million dollars per child.[4] As the committee recognizes, the prevalence of autism, estimated by the Centers for Disease Control and Prevention, is now 1 in 110 children, which by many standards constitutes an epidemic.

- The most appropriate and forward-looking approach is to provide as much ABA coverage as fiscally possible to those populations that are currently underserved. This will: a) help the citizens of our state lead fuller and more productive lives; and b) save the state future financial burdens of supporting a generation of children that could have been helped if only we had acted.

In closing, if the committee incorrectly concludes that there are no proven interventions for Autism Spectrum Disorders, this will suggest to parents of autistic children that they should simply do nothing. This is morally indefensible.

Thank you for your consideration of FEAT's comments. We look forward to working with you to ensure a scientifically supported, ethically responsible decision for the children of Washington.

Sincerely,

FEAT Board of Directors

[3] Currently, as the committee acknowledges, 27 states have laws mandating coverage of ABA services for children with autism.

[4] Jacobson, J.W., Mulick, J.A., & Green, G. (1998). Cost-benefit estimates for early intensive behavioral intervention for young children with autism. *Behavioral Interventions, 13*, 201-226.

Page 6:

Policy Considerations

Federal, state and private payor policies are not consistent in mandating coverage of ABA therapy for the treatment of ASD. Of the federal and private payor policies reviewed, Aetna is the only payor to cover intensive educational interventions and explicitly mentions that there is insufficient evidence regarding the superiority of any specific intervention, such as ABA. An increasing number of states have coverage mandates for the diagnosis and treatment of ASD. Mandate components, such as included treatments, age restrictions, and maximum benefit limits vary significantly between states. *With a lack of standardized educational and/or practical requirements for ABA providers, a small number of states have included ABA Licensure Boards in their state coverage mandates.*

There are standardized education and practical requirements for ABA providers. Some states did have state licensing, but closed them because the national certification is very stringent and covers all that state licensure would, plus more. Please see below:

The Behavior Analyst Certification Board®, Inc. (BACB®) is a nonprofit 501(c)(3) corporation established in 1998 to meet professional credentialing needs identified by behavior analysts, governments, and consumers of behavior analysis services. The BACB adheres to the national standards for boards that grant professional credentials. The BACB certification procedures and content undergo regular psychometric review and validation, pursuant to a job analysis survey of the profession and standards established by content experts in the field.

The Behavior Analyst Certification Board's BCBA and BCaBA credentialing programs are accredited by the National Commission for Certifying Agencies in Washington, DC. NCCA is the accreditation body of the Institute for Credentialing Excellence. The BACB is endorsed by the Association of Professional Behavior Analysts, the Association for Behavior Analysis International, Division 25 (Behavior Analysis) of the American Psychological Association, and the European Association for Behavior Analysis.

The BACB's mission is to develop, promote, and implement an international certification program for behavior analyst practitioners. The BACB has established uniform content, standards, and criteria for the credentialing process that are designed to meet

1. The legal standards established through state, federal and case law;
2. The accepted standards for national certification programs; and
3. The "best practice" and ethical standards of the behavior analysis profession.

The BACB program is based on the successful Behavior Analysis Certification Program developed by the State of Florida. Similar programs were established in California, Texas, Pennsylvania, New York and Oklahoma. All of these programs transferred their certificants and credentialing responsibilities to the BACB and closed.

The Behavior Analyst Certification Board credentials practitioners at three levels. Individuals who wish to become Board Certified Behavior Analysts® (BCBA®) must possess at least a Masters Degree,

have 225 classroom hours of specific Graduate-level coursework, meet experience requirements, and pass the Behavior Analyst Certification Examination. Persons wishing to be Board Certified Assistant Behavior Analysts® (BCaBA®) must have at least a Bachelors Degree, have 135 classroom hours of specific coursework, meet experience requirements, and pass the Assistant Behavior Analyst Certification Examination. Board Certified Behavior Analyst-Doctoral must be BCBAs with doctorate degrees and meet other criteria. BACB certificants must accumulate continuing education credit to maintain their credentials.

The Behavior Analyst Certification Board has developed:

1. Eligibility Standards to take the BACB Certification Examinations
2. Renewal and Recertification Standards to maintain certification
3. Guidelines for Responsible Conduct for Behavior Analysts
4. Professional Disciplinary Standards with appeal procedures
5. A Certificant Registry
6. A process to approve university course sequences and practica
7. Procedures to approve continuing education providers
8. Professionally developed and maintained certification examinations.

The Behavior Analyst Certification Board contracts with Pearson VUE for examination administration, and contracts with Professional Testing Incorporated for psychometrics and examination development. The BACB administers the examinations three times per year in over 200 sites within the United States and over 150 sites outside the US. The BACB has approved course sequences in over 170 universities.

Please learn more at http://www.bacb.com/

Diana Stadden
Policy and Advocacy Coordinator
(Call-Text-Email) 253.576.6351 or Diana@arcwa.org

Denise Santoyo
Washington State Health Care Authority
Health Technology Assessment
Program Coordinator
denise.santoyo@hca.wa.gov

Dear Ms. Santoyo and the Washington State Health Care Authority:

The Seattle Children's Autism Guild writes to request the Heath Care Authority (HCA) rule that applied behavior analysis (ABA) treatment is an effective and cost-effective treatment for autism, and to provide ABA treatment as a covered heath care benefit for Washington state employees.

The Seattle Children's Autism Guild is the all-volunteer fundraising arm of the Seattle Children's Autism Center. Last fiscal year, the Guild raised over a quarter of a million dollars to support the Center's clinical services and to provide critical diagnostic, therapeutic, and family support services to all children, regardless of ability to pay. Guild members include parents of autistic children, friends and extended relatives of families affected by autism, and therapists and other medical professionals who work with autistic children.

We understand that the physicians of the Autism Center have already provided their expert medical opinion on the efficacy of ABA therapy, but we want to emphasize to the HCA that while its decision should give due weight to medical opinions and research studies that strongly support using ABA therapy to treat autistic children, the actual experience of families who make daily decisions to improve the future of their autistic children cannot be ignored.

We are the families with children who have limited communication skills, children who wander from home and school, children who injure themselves and others, children who don't sleep, and children who tantrum uncontrollably. We are the parents who have taken the time to educate ourselves about treatment options and we are the parents to whom newly-diagnosed families often turn for support. We not only depend on ABA intervention to assist our own children, we spend our time and energy raising money for a facility that refers other patients to this established therapy.

In closing, ABA therapy is a proven intervention that is relied upon by our families to ameliorate the symptoms of autistic spectrum disorders and allow our children to better function in society. The HCA should provide ABA therapy as a covered benefit without significant restriction.

Sincerely,

Aurora R. Bearse, Esq., President
Seattle Children's Autism Guild

Cc: Dr. Bryan King, Director, Seattle Children's Autism Center
Arzu Forough, Washington Autism Advocacy

To: State of Washington Health Technologies Coverage Determination

From: Saba Varghai-Biggar, M.A., BCBA, Tim Gullcik, M.S., BCBA & Quinanna Robins M.Ed., BCBA

Date: 8-15-2011

RE: Applied Behavior Analysis

We would like to take this opportunity to provide the committee with a reference list of articles to consider for support of Applied Behavior Analysis interventions and strategies to be considered for coverage.

Applied Behavior Analysis

Applied Behavior Analysis is the science of behavior devoted to the improvement of human behavior and understanding it.

ABA is based on scientific principles and relies on empiricism/ evidence based procedures. It is data driven and excludes hypothetical constructs and fictional explanations of behavior.

It is the design, implementation and evaluation of environmental alteration to produce socially significant improvements in behavior. Behavior Analysts do not attempt to "change the person" per se, but provides therapeutic procedures for the individual to successfully function in society.

The National Research Council recommends early intensive behavioral treatment/intervention (prior to age 5) of 25 hours per week at minimum to achieve best possible outcomes for children with ASD (2001).

Baer, D. M. (1993). Quasi-random assignment can be as convincing as random assignment. American Journal on Mental Retardation, 97, 377-379.

Lovaas, 0. I. (1977). The autistic child: Language development through behavior modification. New York: Irvington.

Lovaas, O., I. (1993). The Development of a Treatment-Research Project for Developmentally Disabled and Autistic Children. Journal of Applied Behavior Analysis, 26,617-630.

Lovaas, 0. I., Koegel, R. L., Simmons, J. Q., & Long, J. S. (1973). Some generalization and follow-up measures on autistic children in behavior therapy. Journal of Applied Behavior Analysis, 6, 131-166.

Lovaas, 0. I., & Smith, T. (1988). Intensive behavioral treatment for young autistic children. In B. B. Lahey & A. E. Kazdin (Eds.), Advances in clinical child psychology (Vol. 11, pp. 285-324). New York: Plenum.

Lovaas, 0. I., & Smith, T. (1989). A comprehensive behavioral theory of autistic children: Paradigm for research and treatment. Journal of Behavior Therapy and Experimental

Psychiatry, 20, 17-29.

McEachin, J. J., Smith, T., & Lovaas, 0. I. (1993). Longterm outcome for children with autism who received early intensive behavioral interventions. American Journal on Mental Retardation, 97, 359-372.

Picture Exchange Communication System (PECS)

Bondy, A. S., & Frost, L. A. (1994). The picture exchange communication system. Focus on Autistic Behavior, 9(3), 1–19.

Chaabane, D. B., Alber-Morgan, S. R., DeBar, R. B., (2009). The Effects of Parent-implemented PECS Training on Improvisation of Mands by Children with Autism. Journal of Applied Behavior Analysis, 42, 671-677

Charlop-Christy, M. H., Carpenter, M., Le, L., LeBlanc, L. A., & Keller, K. (2002). Using the picture exchange communication system (PECS) with children with autism: Assessment of PECS acquisition, speech, social-communicative behavior, and problem behavior. Journal of Applied Behavior Analysis, 35, 213–231.

Frost, L. A., & Bondy, A. S. (1994). The picture exchange communication system training manual. Cherry Hill, NJ: PECS, Inc.

Marckel, J. M., Neef, N. A., & Ferreri, S. J. (2006). A preliminary analysis of teaching improvisation with the picture communication system to children with autism. Journal of Applied Behavior Analysis, 39, 109–115.

Pivotal Response Training

Koegel, R L., Koegel, L. K, & Schreibman, L. (1991). Assessing and training parents in teaching pivotal behaviors. Advances in Behavioral Assessment in Children and Families, 5, 65-82.

Koegel, R. L., O'Dell, M. C., & Koegel, L. K. (1987). A natural language paradigm for nonverbal autistic children. Journal of Autism and Developmental Disorders, 17, 187-200.

Koegel, R. L., Schreibman, L., Good, A., Cerniglia, L., Murphy, C., & Koegel, L. (1989). How to teach pivotal behaviors to children with autism: A training manual. Santa Barbara: University of California.

Pierce, K., Schreibman, L., (1995). Increase Complex Social Behaviors in Children with Autism: Effects of Peer-Implemented Pivotal Response Training. Journal of Applied Behavior Analysis, 289, 285-295

Kennedy Krieger Institute
Research. Treatment. Education.

Applied Behavior Analysis and Neurodevelopmental Disorders: Overview and Summary of Scientific Support

Authors: Louis P. Hagopian & Eric W. Boelter
The Kennedy Krieger Institute and Johns Hopkins University School of Medicine

Applied Behavior Analysis Defined. Behavior analysis is the systematic study of variables that influence behavior (Sulzer-Azaroff & Mayer, 1991). *Applied behavior analysis* (ABA) is a discipline concerned with the application of behavioral science in real-world settings such as clinics or schools with the aim of addressing socially important issues such as behavior problems and learning (Baer, Wolf, & Risley, 1968). Procedures derived from the discipline of ABA have been implemented to assess and treat a broad range of behaviors with individuals diagnosed with intellectual and developmental disabilities. However, despite more than 40 years of applied behavior analytic research there continues to be misperceptions about ABA. One misperception is that ABA is a standardized treatment program that is used for a specific type of problem and with specific types of individuals. For example, some incorrectly believe that ABA is a type of therapy or a specific procedure for teaching children with autism, and that it is synonymous with "Lovaas Therapy" or "discrete trial training." Although discrete trial training represents one type of ABA-based approach, the field of ABA is much broader and includes a range of tactics, methods, and procedures that have been shown to be effective for many different types of problems. Features common to all ABA-based approaches are the objective measurement of behavior, precise control of the environment, and use of procedures based on scientifically established principles of behavior. Any clinical procedure or research investigation adhering to these basic criteria can be considered to be an ABA-based procedure. This includes "functional behavioral assessment," and approaches such as "Positive Behavioral Support," and forms of "Behavior Therapy" that rely on direct observation of behavior and analysis of behavior-environment relations.

Scientific Support for Applied Behavior Analysis. Over the past 40 years a large body of literature has shown the successful use of ABA-based procedures to reduce problem behavior and increase appropriate skills for individuals with intellectual disabilities (ID), autism, and related disorders. Several review articles and meta-analyses have been published summarizing this large body of literature. Six of these articles (DeMyer, Hingtgen, & Jackson,1981; Herbert, Sharp, & Gaudiano, 2002; Hingtgen & Bryson, 1972; Kahng, Iwata, & Lewin, 2002; Matson, Benavidiz, Compton, Paclawskyj, & Baglio, 1996; Sturmey, 2002) collectively reviewed thousands of published studies spanning the years 1946 to 2001. Each of these reviews supported efficacy of ABA-based procedures in the assessment and treatment of problem behavior associated with autism, mental retardation, and related disorders. Similarly, three meta-analyses (Didden, Duker, & Korzilius, 1997; Lundervold & Bourland, 1988; Weisz, Weiss, Han, Granger, & Morton, 1995) that collectively analyzed hundreds of studies published between 1968 and 1994 concluded that treatments based on operant principles of learning were more effective for reducing problem behavior displayed by individuals with ID as well as typically-developing individuals than were alternative treatments. The large body of literature reviewed in these studies provides empirical evidence indicating that procedures developed using ABA-based principles are effective at assessing and treating a variety of socially important behaviors engaged in by individuals with a variety of diagnoses. Furthermore, ABA-based approaches for educating children with autism and related disorders have been extensively researched and empirically supported (e.g., Howard, Sparkman, Choen, Green, & Stanislaw, 2005; Koegel, Koegel, & Harrower, 1999; Krantz & McClannahan, 1998; Lovaas,1987; McGee, Morrier, & Daly, 1999; Strain & Kohler, 1998).

Application of ABA-Based Procedures Across Settings and Populations. ABA-based procedures have been implemented across a variety of settings including hospitals (e.g., Iwata, et al., 1994), schools (e.g., Boyajian, DuPaul, Handler, Eckert, & McGoey, 2001; Northup et al., 1997), and homes (e.g., Derby, et al. 1997; Harding et al., 1999); across a variety of forms of problem behavior including self-injurious behavior (e.g., Iwata, Dorsey, Slifer, Bauman, & Richman, 1982/1994; Kahng, Iwata, & Lewin, 2002), aggression (e.g., DeLeon, Fisher, Herman, & Crosland, 2000; Oliver, Oxener, Hearn, & Hall, 2001.), stereotypic behavior (e.g., Ahearn, Clark, DeBar, & Florentino, 2005; Durand & Carr, 1997; Rapp, Vollmer, St. Peter, Dozier, & Cotnoir, 2004), and pica (e.g., Hagopian, & Adelinis, 2001; McCord, Grosser, Iwata, & Powers, 2005; Piazza, Roane, Keeney, Boney, & Abt, 2002). Additionally, ABA-based procedures have been employed to establish and increase adaptive behaviors as alternatives to problem behavior including communication (e.g., Carr & Durand, 1985; Durand, & Carr, 1992; Hagopian, Fisher, Sullivan, Acquisto, & LeBlanc, 1998; Wacker et al., 1990), daily living skills (e.g., Cuvo, Jacobi, & Sipko, 1981; Horner & Keilitz, 1975), and academic skills (e.g., Daly & Martens, 1994; McComas, Wacker, & Cooper, 1996). ABA-based procedures have also been used with individuals with a variety of diagnoses including, schizophrenia (e.g., Wilder, Masuda, O'Connor, & Baham, 2001), mental retardation (e.g., Lindauer, Zarcone, Richman, & Schroeder, 2002; Saunders, McEntee, & Saunders, 2005), autism (e.g., Hoch, McComas, Thompson, & Paone, 2002; Lerman, Vorndran, Addison, & Kuhn, 2004; Lovaas et al. 1987), attention deficit hyperactivity disorder (e.g., Northup et al. 1997), stereotypic movement disorder with self-injury (e.g., Kahng, Iwata, & Lewin, 2002; Smith, Iwata, Goh, & Shore, 1995), Down Syndrome (e.g., Dalton, Rubino, & Hislop, 1973), and pediatric feeding disorders (e.g., Cooper et al., 1995; Kerwin, Ahearn, Eicher, & Burd, 1995;

Piazza, et al., 2003).

Scientific, Professional, and Government Organizations' Position on Applied Behavior Analysis. Based on the empirical evidence, many scientific, government, and professional agencies and organizations have concluded that ABA-based procedures represent best practices for individuals with autism and mental retardation. For example, the **American Association on Intellectual and Developmental Disabilities** (formerly the American Association on Mental Retardation), the oldest and largest interdisciplinary organization of professionals concerned with mental retardation and related disabilities, designated ABA-based procedures for the treatment of behavioral problems with individuals with mental retardation and related disorders as *"highly recommended"* (their highest rating). Based on the scientific evidence supporting the efficacy of ABA-based procedures for treating problems associated with mental retardation and autism, various scientific organizations have concluded that ABA-based procedures are highly effective, including:

- National Institute of Mental Health (see treatment options section)
- The National Academies Press ("Educating Children with Autism (2001) Commission on Behavioral And Social Sciences and Education")
- Association for Science in Autism Treatment
- Autism Speaks
- Organization For Autism Research ("The Best of the OARacle;" see page 10)

Various Government agencies have also advocated for the use of ABA-based procedures – particularly for individuals with mental retardation and autism who display problem behavior. For example, in 1999 a report on mental health prepared by the **Surgeon General of the United States** stated, *"Thirty years of research demonstrated the efficacy of applied behavioral methods in reducing inappropriate behavior and in increasing communication, learning, and appropriate social behavior."* Government agencies supporting the use of ABA-based procedures include:

- Surgeon General of the United States ("Surgeon General's Report on Mental Health – subsection on Autism")
- New York State Department of Health ("Guidelines: Autism/Pervasive Development Disorders, Assessment and Intervention for Young Children (0-3), Chapter IV - Behavioral and Educational Approaches")
- Maine Administrators of Services for Children with Disabilities ("Report of the MADSEC Autism Task Force") see page 21 of report)

Empirically Supported Treatments for Problems Associated with Mental Retardation, Autism and Related Disorders. Several academic and trade journals that represent specific medical disciplines have published articles indicating that treatments for autism and mental retardation derived from ABA-based procedures are empirically supported treatments. For example, the journal **Current Opinion in Psychiatry** is a current opinion journal with the goal of assisting clinicians and researchers in keeping up-to-date with the large amount of information published in psychiatry. An article reviewing literature on the assessment and treatment of individuals with mental retardations and psychiatric disorders concluded that: *"Interventions based on applied behavior analysis have the strongest empirical basis, although there is some evidence that other therapies have promise."* (Sturmey, 2002). Also, in the Journal **Pediatrics**, the official journal of the American Academy of Pediatrics, an article offering guidelines on scientifically supported treatments for childhood psychiatric disorders concluded: *"The most efficacious psychosocial treatment for autism is applied behavior analysis..."* (Lilienfeld, 2005). Discipline-specific journals that have published articles indicating that ABA-based procedures are empirically supported include:

- Current Opinion in Psychiatry (Grey & Hastings, 2005; Sturmey, 2002)
- Pediatrics (Lilienfeld , 2005)
- Psychiatric Times (Erickson, Swiezy, Stigler, McDougle, & Posey, 2005)
- Scientific Review of Mental Health Practice (Herbert, Sharp, & Gaudiano, 2002)

Furthermore, in 1993 Division 12 of the American Psychological Association developed guidelines for what defined an Empirically Supported Treatment (EST). Regarding ESTs based on single-case design research these guidelines state: "A large series of single-case design experiments must demonstrate efficacy with, (a) use of good experimental design and (b) comparison of intervention to another treatment." (Chambless & Ollendick, 2001). Based on these criteria, ABA-based behavioral treatments have been defined as ESTs for individuals with developmental disabilities (Chambless, et al, 1996).

Legislative Rulings in Support of Funding and Access to ABA-Based Services. Finally, multiple legislative rulings have supported the efficacy of ABA-based approaches for addressing both problem behaviors associated with MR and autism, as well as for educational instruction. Landmark decisions have been made by the **Federal District Court of Philadelphia, U.S. District Court for the Northern District of Illinois, U.S. District Court for the Eastern District of Michigan, South Carolina Federal District Court, U.S. District Court for the Southern District of Indiana; the U.S. District Court for the**

Eastern District of Tennessee, and when ruling on a case involving the use of ABA-based treatment for children with autism the Supreme Court of British Colombia concluded, *"...It is beyond debate that the appropriate treatment is ABA or early intensive behavioural intervention."*

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August 10, 2011

Health Technology Clinical Committee
Washington State Health Care Authority
Health Technology Assessment

Dear members of the Health Technology Clinical Committee,

RE: REQUEST FOR PUBLIC COMMENT ON THE USE OF APPLIED BEHAVIOR ANALYSIS THERAPY FOR AUTISM

We are writing this letter in response to your request for public comment on the matter of funding for applied behavior analysis therapy for autism. We have some concerns regarding the very limited scope of the approval as well as with how the stipulation of 'evidence development' will be implemented that we will outline below.

Firstly, as the committee dscussed the field of applied behavior analysis is varied and broad. While we understand that the purpose was to specifically examine the empirical support for early intensive intervention for autism, by limiting the scope of evdience examined, the committee did not adequately examine research done on other specific techniques that may have empirical evidence to the committee's standards to support their use with this population. Applied Behavior Analysis is a field that is rich in research investigating the nature and application of the principles of learning and has a deep research literature dating back to 1930's for general research in the field and the 1970's for the application of these principles to children with autism. By only examining the literature from 2000 to 2010, we strongly believe that the committee made and is making further decisions based on a very limited and truncated understanding of the literature. We would strongly urge the committee to consider a broader scope of research when deciding upon the stipulations for the conditions of coverage.

Additionally, the committee made a decision to only cover two specific applications of Applied Behavior Analysis without adequately examining the research literature available on other intervention techniques. Further, some of the literature that was examined in the review by the committee did include strategies outside those that were approved (e.g., Howard, Sparkman, Cohen, Green, & Stanislaw, 2005) and we are unclear as to why only these two intervention models were determined to have adequate evidence. We understand that the Howard et al. (2005) article represents a single research study on this intervention package; however, the committee also made the decision to cover the Early Start Denver Model with only a single study indicating efficacy. Again, we would hope that the committee would broaden the scope of the literature review prior to finalizing the conditions of coverage.

As noted above, we also have concerns with the limitation of the initial review to publications between the years of 200 and 2010. By limiting the publication year of the literature examined, the committee did not have an opportunity to examine older seminal literature which may have been helpful in their initial and on-going decision making (e.g., Lovaas, Koegel, Simmons, & Long, 1973; Lovaas, 1987). Examining a broader range of literature may significantly impact the conditions that the committee

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chooses to place on the coverage and even on the stipulations that are developed for evidence development. By limiting the range of studies examined, the committee is making decisions based on a limited understanding of the research. We are convinced that if other technologies were examined in this manner there would be a risk of falsely concluding there was a lack of evidence as well. For example, if the committee were to examine the literature on the use of Haldol to treat psychosis, and limit the literature review to the years 2000 to 2010, it may be possible to conclude that it is not an empirically supported treatment as there are only 15 studies in this date range. But if the entire literature dating back to 1961 is examined, which includes 50 articles, the conclusion would be very different.

We would also like to point out that more intensive Applied Behavior Analysis programs are already funded by the state through the Department of Social and Health Services in the Children's In-Home Intensive Behavioral Support (CIIBS) program. Through this program children who are at risk of placement outside of the home receive more intensive applied behavior analytic services including both one-on-one instruction as well as intensive parent training. We find it to be an irreconcilable contradiction that one agency is identifying Applied Behavior Analysis as the treatment of choice when an individual is in crisis and that this treatment is being applied to keep children in their homes versus being in an institution and another agency is saying that there is not enough evidence to support its efficacy. It would seem that if there is no evidence to support the treatment of individuals with autism using Applied Behavior Analysis, then it would not be the recommended treatment when individuals are in crisis. What's being created now is a system where only individuals with the most severe behavior are given access to services that will be the most beneficial. While this system does allow more individuals to remain in the family home for a longer period of time, it also denies access to these same services until the individual is in crisis and denies access to services for individuals with less severe behavioral issues.

We are also concerned about how the 'evidence development' portion of the recommendations will be carried out. At the meeting there was discussion around access to services being limited to participation in studies with IRB approval. If this requirement is in place we are concerned that it will significantly limit access to services, particularly in more rural areas of the state. There was also discussion of a task force being created to address the issue and determine the requirements for evidence development. We agree that this step may be essential to the development of acceptable criteria for practitioners to meet in order to provide services; however, we would like to respectfully suggest that if a task force is created that there be at least one member who is intimately familiar with psychological research, and specifically with experience in the field of Applied Behavior Analysis. We appreciate wanting to contract with well known entities for the evaluation of medical research when making your initial decision (Oregon Health & Science University), but during the meeting it was glaring evident that the experts you had available to you were not as familiar with the body of literature they had reviewed as they should have been. While this lack of familiarity is understandable as Applied Behavior Analysis is not their area of expertise, it was extremely frustrating that they were not able to answer basic questions about methodological similarities between studies, ethical considerations when conducting long term psychological research, and the control group designs of the various studies that were reviewed and that this lack of familiarity may have impacted the decision that was made. We feel that it is essential that there be an expert in Applied Behavior Analysis present when deciding the stipulations for evidence development to attempt to avoid issues with implementation of the recommendations at a later point in time.

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A repeated concern of the committee was the qualificaitons of the practitioners who would be providing these services and/or lack of state level oversight for implementaiton of services. There are several states that have addressed the issue by creating specific licensure categories for behavior analysts and/or creating exemptions for behavior analysts to practice using the national certification program (please see www.bacb.com for further information on the specific requirements or the attached documents 'BCBAEdQualifications', 'BCBAExpQualifications', 'BCABAEdQualifications' and 'BCABAExpQualifications'). We have attached some sample legislation so that the committee may examine how the issue has been handled in other juristictions (please see the documents 'MO BA Lic Rules Final' and 'WI Lic Law' for further information). Addtionally, TriWest and the Department of Social and Health Services already have policies in place to deal with quality control of high school and bachelor's level practicitioners providing direct service to consumers. Again we have attached those documents for your reference (please see the documents ttiled 'CIIBSQualifications' and 'DOD2007' for further information).

We would also like to return to a point that was raised at the meeting regarding current services versus those using the principles of Applied Behavior Analysis. We understand that there are a large number of services currently available to consumers within these specific heatlh care plans, but we would argue that none of them has the level of evidence supporting their efficacy as Applied Behavior Analysis. We understand the committee's committment to research and we are extremely committeed to evidence-based practice ourselves. However, it appears that Applied Behavior Analysis is being held to a higher standard than other services that are currently covered by insurers (e.g., Occupational Therapy services, Speech and Language Pathologist services, etc.). While we acknowledge the weaknesses in the current state of the research for Applied Behavior Analysis, we strongly believe that at present it is the treatment modality with the strongest research support for indivdiuals with autism spectrum disorders (e.g., National Autism Center, 2009).

Finally, we would again like to address the issue of cost-effectiveness, as the committee failed to review evidence of cost savings when children are treated when they are young and treated intensively with Applied Behavior Analysis. All of the published evidence suggests that with intensive early intervention using Applied Behavior Analysis the cost to society in the long term is significantly less than when children are not given access to these services (e.g., Jacobsen, Mulick & Green, 1998; Columbia Pacific Consulting Firm, 2000). While the cost of fully funding Applied Behavior Analysis programs for individuals on the autism specturm is high, the cost of not funding early intensive behavioral intervention involves not only the extremely high on-going fiscal cost of housing and supporting individuals who are more disable and more behaviorally disturbed, but also the cost of suffering to the individual and the the individual's family through years of incomplete or ineffective treatment.

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In closing we are extremely excited at the bold first step the Health Technology Clinical Committee has taken in voting to cover Applied Behavior Anlaysis with specific conditions. However, we would like to urge the committee to carefully consider the points raised above when deciding the specifics of implementation.

Yours truly,

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COST–BENEFIT ESTIMATES FOR EARLY INTENSIVE BEHAVIORAL INTERVENTION FOR YOUNG CHILDREN WITH AUTISM—GENERAL MODEL AND SINGLE STATE CASE

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Clinical research and public policy reviews that have emerged in the past several years now make it possible to estimate the cost–benefits of early intervention for infants, toddlers, and preschoolers with autism or pervasive development disorder—not otherwise specified (PDD—NOS). Research indicates that with early, intensive intervention based on the principles of applied behavior analysis, substantial numbers of children with autism or PDD—NOS can attain intellectual, academic, communication, social, and daily living skills within the normal range. Representative costs from Pennsylvania, including costs for educational and adult developmental disability services, are applied in a cost–benefit model, assuming average participation in early intensive behavioral intervention (EIBI) for three years between the age of 2 years and school entry. The model applied assumes a range of EIBI effects, with some children ultimately participating in regular education without supports, some in special education, and some in intensive special education. At varying rates of effectiveness and in constant dollars, this model estimates that cost savings range from $187,000 to $203,000 per child for ages 3–22 years, and from $656,000 to $1,082,000 per child for ages 3–55 years. Differences in initial costs of $33,000 and $50,000 per year for EIBI have a modest impact on cost–benefit balance, but are greatly outweighed by estimated savings. The analysis indicates that significant cost-aversion or cost-avoidance may be possible with EIBI.

INTRODUCTION

As expenditures for social welfare, public health, and specialized human services have increased dramatically over the past two decades, there has been an increasing impetus for understanding the costs and consequences (i.e., benefits) of

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the investment of public resources in specific programs and services for children with, or at risk for, disabilities. Welfare reform, Medicaid reform (through such initiatives as managed care and home and community-based services waivers), and scrutiny of the rising costs of early intervention, special education, and adult disability services are all manifestations of the need to contain costs and direct resources in the most efficient and effective ways possible. In the area of early intervention and preschool services as a whole, there has been mounting concern regarding cost–benefit (Guralnick, 1998). This concern has most likely arisen because of the perceived wide variations in costs for seemingly similar services available through public providers and private contractors (see, e.g., Schopler, 1998). There are additional likely concerns that possible economies may be lost when substitute financing mechanisms (for example, Medicaid fee-for-service) are used in lieu of system-wide cost-related rates within educational or other specialized public services (see, e.g., Division of Health, 1997; Eisenhofer, Grant, DiPersio, & German, 1998).

The costs and benefits of services for young children with autism or pervasive developmental disorder—not otherwise specified (PDD—NOS, hereafter abbreviated PDD) have come under particularly intense scrutiny of late (see, e.g., Gresham & MacMillan, 1997; Schopler, 1998). Following the publication of research reports indicating that substantial proportions of children with autism or PDD who received early intensive behavioral intervention (EIBI) achieved normal or near-normal functioning (Lovaas, 1987; McEachin, Smith, & Lovaas, 1993), demand for this intervention has increased. The research findings have been controversial, however, for several reasons: they are relatively recent; the studies are subject to methodological criticisms; they have emerged from a small number of research and service projects; and the intervention is intensive, specialized, highly directive, and expensive. Moreover, these findings have emerged at a time when leaders of some philosophical movements in special education are advocating apparently incompatible practices of unproven efficacy, especially under such rubrics as 'total inclusion' and 'developmental appropriateness' (Kauffman & Hallahan, 1995).

Direct and indirect criticisms of EIBI by some of these advocates have focused on alleged negative side effects (see, e.g., Autism National Committee, 1995a; 1995b; Greenspan & Weider, 1997; Wetherby, Schuler, & Prizant, 1997). Despite their frequent citation, these criticisms are not grounded in sound research or established facts; they involve misinterpretations of behavioral intervention, incomplete or inaccurate understanding of behavioral principles and procedures, or are otherwise suppositional and groundless (Cameron & Pierce, 1994; Eisenberger & Cameron, 1996; Lovaas, 1995; 1996; Luce & Dyer, 1996). Additionally, treatments for autism or PDD most often recommended in lieu of

EIBI typically lack demonstrated efficacy for achieving large and lasting gains (Eaves & Ho, 1996; Freeman, 1997; Green, in press; Smith, 1993; 1996). Thus, for many clinicians and researchers, the question is not whether children with autism or PDD can achieve substantially improved functioning, but what practices lead to the best outcomes for these children and whether the methodology underpinning the research findings on EIBI is sound (see, e.g., Foxx, 1993; Guralnick, 1998; Gresham & MacMillan, 1997; Schopler, Short, & Mesibov, 1989).

This report presents a cost–benefit analysis of EIBI for children with autism or PDD. We estimate costs and benefits of services for children with autism or PDD who receive EIBI relative to those of children without disabilities in general, and children with autism or PDD who do not receive effective intervention or who otherwise continue to need intensive supports. The analysis provides a projection of cost-aversion, that is, the financial costs to society avoided through provision of EIBI services.

Prior Cost–Benefit Analysis

Although critics of EIBI stress philosophical concerns, from a public policy standpoint, the scientifically validated achievement of normal functioning by many children with autism or PDD has profound implications for analysis of the relative costs and benefits of EIBI for these children (see Barnett & Escobar, 1990, for a prospective cost–benefit analysis model). Until recently, benefits could be estimated exclusively in terms of savings that might be associated with decreased, but still persisting, dependency on special service requirements (e.g., supervision) in later childhood and into adulthood. Considering the high cost of specialized educational services for children with autism or PDD compared to regular education or to other categories of special education, potential benefits were confined to relative savings at different levels of care during adulthood. Possible savings reflected comparison of total educational, supportive, and adult services costs with and without EIBI. Because no basis was generally evident for estimating these cost differentials (such as those used by Barnett & Escobar, 1990), the cost–benefit of EIBI for these children has remained unspecified.

EIBI for Autism or PDD

First identified in the 1940s (Kanner, 1943), autism is a disorder of brain development arising before age three, and often identified by that age or shortly thereafter (Bailey, Phillips Rutter, 1996; Rapin, 1997). It is diagnosed

behaviorally, by observing a child for qualitative impairments in three main areas: disordered social interactions, delayed or disordered communication, and restriction in range of interests and activities. It is also characterized by stereotyped behavior, such as ritualistic or repetitive acts (APA, 1994). Historically, it has generally been found that 50–75% of individuals with autism also have some degree of mental retardation (Freeman, 1997; Rapin, 1997), but the rate at which mental retardation is present among people with autism may be somewhat higher because of difficulties in ascertainment among people with profound mental retardation, and inconsistent access for young children with mental retardation to clinicians familiar with autism spectrum disorders.

The relationship between autism and mental retardation is not well understood. Some children with autism have intellectual abilities within the normal—and, in a small number of cases, the superior—range. However, research clearly indicates that children with both autism and mental retardation tend to enter adulthood with these conditions still present (Eaves & Ho, 1996; Jacobson & Ackerman, 1990; Janicki & Jacobson, 1983; Locke, Banken, & Mahone, 1994). They require lifelong care, services, and supervision. Spontaneous recovery and highly successful rehabilitation through special educational processes are very rare. Educational services for children with autism are among the most intensively staffed and expensive forms of special education available under provisions of the Individuals with Disabilities Education Act. The picture is similar for children diagnosed with PDD—NOS, which has many characteristics in common with autism.

During the past 15 years research has begun to demonstrate that significant proportions of children with autism or PDD who participate in early intensive intervention based on the principles of applied behavior analysis (ABA) achieve normal or near-normal functioning (Lovaas, 1987; McEachin, Smith, & Lovaas, 1993) or significant gains in measured intelligence or other aspects of development (Anderson, Avery, DiPietro, Edwards, & Christian, 1987; Birnbrauer & Leach, 1993; Fenske, Zalenski, Krantz, & McClannahan, 1985). Prior to and concurrent with these studies of EIBI, more than 500 studies were published demonstrating the efficacy of numerous ABA techniques for building a wide range of skills in people with autism of all ages (according to the selection criteria used by DeMyer, Hingtgen, & Jackson, 1981; Hingtgen & Bryson, 1972; Matson, Benavidez, Compton, Paclawskyj, & Baglio, 1996). While this collection of studies does not represent a unitary program model for children with autism, in the aggregate it is the empirical foundation on which most home- and center-based EIBI programs are built.

The most comprehensive research on EIBI was published by Lovaas and colleagues at UCLA (e.g., Lovaas, 1987; McEachin *et al.*, 1993), but other

independent investigators confirmed that it is possible for children with autism or PDD to achieve large, comprehensive, and lasting gains (e.g., Birnbrauer & Leach, 1993; Fenske *et al*., 1985; Perry, Cohen, & DeCarlo, 1995; Sheinkopf & Siegel, 1998). It is important to note that many children in the study samples whose skills did not reach normal levels nonetheless made substantial, functional gains in several core areas, such as everyday living and communication skills. A small proportion (about 10%, across studies) appeared to continue to need intensive intervention beyond the early childhood years. Research is ongoing to better identify the specific child characteristics and instructional and programmatic practices that are related to differential outcomes in these children (Green, 1996b; Guralnick, 1998; Smith, Eikeseth, Klevstrand, & Lovaas, 1997).

With the emergence of research documenting substantial improvements for some children with autism or PDD following EIBI, and confirmatory reports that the effects can endure into later childhood (e.g., McEachin *et al*., 1993; Perry *et al*., 1995) and adulthood (Smith, 1998), it has become possible to estimate costs and utilization more specifically. Such estimations are aided by the compilation of costs for adult services in the developmental disabilities service sector by contemporary researchers, data that were not previously available. Thus, costs and benefits for EIBI for autism or PDD may be estimated with reasonable confidence in terms of (i) children who achieve normal functioning, participate in regular education with little or no support, and are vocationally productive as adults, (ii) children who derive sufficient benefit that they are then able to participate in less intensive special education, and evidence persisting but reduced dependency in adulthood (referred to hereinafter as partial effects), and (iii) children who achieve meaningful functional improvements but still require specialized and intensive educational and adult services (referred to as minimal effects).

In the present analyses, costs from the Commonwealth of Pennsylvania are used to develop overall cost comparisons in the calculation of cost–benefit (see appendix A). The model used by Barnett and Escobar (1990) was a prospective analysis of cost and effect associated with early intervention services for a heterogeneous group of at-risk pre-schoolers. The model used for the present analyses, in contrast, entails projection of costs based on economic extrapolations and trends in allocation of services and costs in educational and adult developmental services. Because this method entails economic forecasting rather than cost tracking, it is important to articulate the assumptions that form the basis for the present forecast. The 16 assumptions required to structure these analyses are detailed in appendix B and are indicated as analytic considerations or elements below.

METHODS

Assumptions in the Present Analysis

The assumptions underpinning the general cost model in this paper are the following:

(i) Current research does not identify characteristics of children with autism or PDD that reliably predict their response to EIBI.
(ii) The proportion of children who achieve normal functioning in all areas is probably somewhat lower than the proportion reported in the literature to date (just under 50%).
(iii) In any group of children with autism or PDD who receive competently delivered EIBI, between 20 and 50% will achieve normal functioning; about 40% will achieve meaningful but moderate gains; and about 10% will continue to require intensive special education and adult services.
(iv) For these reasons, cost–benefit should be couched in terms of marginal benefit, as well as the attainment of normal functioning.
(v) Without EIBI the majority of children with autism or PDD will manifest enduring dependency on special education and adult developmental disability services.
(vi) The mix of costs for EIBI services used here is assumed to be a representative average for both center-based and home-based services.
(vii) Children with autism or PDD who ultimately develop normal functioning are assumed to participate in regular education; those who make moderate gains are assumed to participate in special education; and children who make minimal gains are assumed to participate in intensive special education.
(viii) Because no generalizable mortality data exist for people with autism or PDD, cost–benefit analyses including the adult years are made only to age 55.
(ix) Present costs are used as indicators of future costs, with recognition that future reforms in welfare and public health services may result either in decreased per person rates or expenditures, or in substitution of services.
(x) SSI/ADC costs are used as a summary cost for all utilization of general public benefits outside of the early intervention, educational, and developmental service sectors.
(xi) The average duration of EIBI is assumed to be three years.
(xii) Children with autism or PDD who achieve normal functioning are assumed to use family support services only during participation in EIBI;

those who make moderate gains or realize minimal effects are assumed to use 18 years of these services.

(xiii) During adulthood, those who achieve moderate gains are assumed to use 18 years of Medicaid waiver (or equivalent) services and 15 years of supported work services. Similarly, for those who achieve minimal gains, 80% are assumed to use waiver services for 20 years, 20% are assumed to use intensive community services for 23 years, and 40% are assumed to use supported work services for 15 years.

(xiv) Supported employment wages are estimated at 20% of the median household annual income.

(xv) This analysis uses costs reported in several sources for the Commonwealth of Pennsylvania (from Table 1).

(xvi) The service costs and inflators used will tend to underestimate costs slightly; the earnings projected will tend to overestimate income slightly.

All savings shown are net of the expense of providing EIBI.

RESULTS

Gross Cost Differentials

Table 2 shows the estimated costs from age 3 years to 22 years for a non-disabled child, a child with an initial diagnosis of autism or PDD for whom EIBI

Table 1. Present (1996) costs for services and income estimates—Pennsylvania model

Estimate or variable	*Value*
Present age of the child with autism	3 years
Beginning calendar year	1996
Early intervention annual cost	$3,284
Family support services annual cost	$1,110
Intensive early intervention annual cost	$32,820
Regular education annual cost	$7,543
Special education annual cost	$12,935
Intensive special education annual cost	$28,806
Home and community based services (adult) annual cost	$31,818
Intensive community services (adult) annual cost	$46,838
Institutional services (or equivalent, adult) annual cost	$56,775
Supplemental security income/aid to dependent children annual cost (estimate for all generic public support costs)	$5,379
Median household annual income	$33,714
Supported wages annual value (% of median income)	$6,743

Note: This table presents a listing of the 1996 costs used in the analysis.

Table 2. Estimated costs age 3 to 22 years—Pennsylvania model

	Costs with inflation	*Costs in 1996 $*
Nondisabled Child		
Eighteen years of SSI/ADC (10%)	11,768	9,682
Thirteen years of regular education	128,731	98,061
Net	(140,459)	(107,743)
Autism—with normal range effects of early intervention		
Three years of family support services	3,433	3,330
Three years of SSI/ADC	16,380	16,137
Eighteen years of SSI/ADC (10%)	11,768	9,682
Three years of intensive early intervention	101,445	98,460
Thirteen years of regular education	128,731	98,061
Net	(261,717)	(225,670)
Autism—with partial effects of early intervention		
Eighteen years of family support services	27,873	19,980
Eighteen years of SSI/ADC	117,244	96,822
Three years of intensive early intervention	101,445	98,460
Fifteen years of special education	284,916	194,025
Net	(531,478)	(409,287)
Autism—with minimal effects of early intervention		
Eighteen years of family support services	27,873	19,980
Eighteen years of SSI/ADC	117,244	96,822
Three years of intensive early intervention	101,445	98,460
Fifteen years of intensive special education	634,486	432,090
Net	(881,048)	(647,352)

Note: Table shows (expense) only. This table presents findings regarding costs to age 22 years. These include costs for regular education, family support services, SSI/ADC, intensive early intervention, and regular, special, and intensive special education. Costs are attributed according to whether a child is nondisabled, or achieves functioning in the normal range, partial benefit, or minimal benefit from EIBI. Costs are shown separately with inflation and in 1996 dollars.

results in normal functioning, a child with an initial diagnosis of autism or PDD for whom EIBI results in partial (habilitative or remediative) effects, and a child with an initial diagnosis of autism or PDD for whom EIBI results in minimal effects. Costs for nondisabled children include those for regular education and a 10% rate of use of public services (shown as SSI/ADC). Costs for the children with autism or PDD who achieve normal range effects from EIBI include these costs plus costs for family supports, public services, and intensive early intervention. Costs for the children with autism or PDD who realize partial effects from EIBI include the costs for family supports, public services, intensive early intervention, and special education. Costs for the children with autism or PDD with minimal effects from EIBI are the same as those for children with partial effects from EIBI, except that costs for intensive special education are included.

Table 3. Costs from age 22 to age 55 years—Pennsylvania model

	Costs with inflation	*Costs in 1996 $*
Nondisabled child		
Thirty-three years of SSI/ADC and all other public benefits (10%)	(31,358)	(18,434)
Thirty-three years of wages and other income (75%)	1,768,866	801,039
Net	1,737,508	782,605
Autism—with normal range effects of early intervention		
Thirty-three years of SSI/ADC and all other public benefits (10%)	(31,358)	(18,434)
Thirty-three years of wages and other income (75%)	1,768,866	801,039
Net	1,737,508	782,605
Autism—with partial effects of early intervention		
Five years of family support services	(10,331)	(5,550)
Thirty-three years of SSI/ADC	(313,579)	(184,335)
Twenty-eight years of waiver services	(2,860,063)	(821,734)
Twenty-five years of supported work	346,982	145,121
Net	(2,836,991)	(866,498)
Autism—with minimal effects of early intervention		
Five years of family support services	(10,331)	(5,550)
Thirty-three years of SSI/ADC	(313,579)	(184,335)
Thirty years of waiver services (80%)	(2,390,031)	(610,906)
Thirty-three years of intensive community services (20%)	(948,285)	(309,131)
Twenty-five years of supported work (40%)	138,792	67,430
Net	(3,523,434)	(1,042,492)

Note: Table shows income (expense). This table presents findings regarding costs from age 22 to 55 years. These include costs for family support services, SSI/ADC, home and community based services (waiver services), or intensive community services, and income from regular or supported work. Costs are attributed according to whether a person is nondisabled, or achieves normal skills or functioning, partial benefit, or minimal benefit from EIBI. Costs (expenses) and income are shown separately with inflation and in 1996 dollars.

The sources of costs, public expenditures, are shown in Table 2 and in subsequent tables with inflation (i.e., 'Costs with inflation') and without (i.e., 'Costs in 1996 $'). Throughout the tables, net income is shown without brackets and net expenses or costs are shown with brackets. Costs with inflation are $140,459 for a nondisabled child, $261,717 with normal range effects, $531,478 with partial effects, and $881,048 with minimal effects. Corresponding present values (the amount of money invested in US treasury bonds at 6.0% annual interest at age 3 to 22 years equal to the total costs) are approximately $46,423, $86,501, $175,660, and $291,198.

Table 3 shows the estimated costs from age 22 to 55 years for nondisabled individuals, individuals with an initial diagnosis of autism or PDD for whom EIBI results in normal functioning, individuals with an initial diagnosis of autism

or PDD for whom EIBI results in partial (habilitative or remediative) effects, and individuals with an initial diagnosis of autism or PDD for whom EIBI results in minimal effects. For nondisabled children and children with autism or PDD who realize normal range effects from EIBI, as adults, both a 10% rate of use of public services (i.e., costs) and income (e.g., wages) are included in the analysis. For adults with partial effects from EIBI, costs are shown for family supports, public services, Medicaid waiver services (including residential services), and supported work. For adults with minimal effects from EIBI, costs or income are shown for family supports, public services, Medicaid waiver services, supported work, and intensive community services.

Estimated costs with inflation are $1,737,508 for a nondisabled adult or adult initially diagnosed with autism or PDD for whom EIBI results in normal functioning, $2,836,991 with partial effects, and $3,523,434 with minimal effects. Corresponding present values (money invested in US treasury bonds at 6.0% annual interest for ages 3 to 55 years) are approximately a retained value (i.e., net income equivalent to investment) of $83,950 and costs of $137,073 and $170,240. Throughout the remainder of this analysis present value (amount of money that would have to be invested by a family at the outset to pay for services over a specified time period), uninflated value (uninflated costs to place costs in the context of the expense of current goods and services), and inflated value (the number of dollars projected to be spent) are presented to allow broad interpretation of the projected costs.

The estimates of cost in Tables 2 and 3 are consolidated in Table 4 to provide a cost–benefit model for ages 3 to 55 years. With inflation, the net income for a nondisabled individual is estimated at $1,597,049 (based on the median income value shown in Table 1) and that for an individual with an initial diagnosis of autism or PDD for whom EIBI results in normal functioning, $1,475,791; corresponding present amounts for retained value invested from age 3 to 55 are approximately $77,163 and $71,305. With inflation, the net expenditures are $3,368,469 for an individual with autism or PDD for whom EIBI results in partial effects and $4,404,482 for an individual for whom EIBI results in minimal effects, with present values of about $162,753 and $212,809. Again, these represent the amount of money to be invested at the onset of services to cover the costs of services for the entire span of time.

Costs at Differing Levels of Effectiveness

In addition to comparisons of potential costs for services to age 55 with respect to differing outcomes of EIBI, it is also important to recognize the

Table 4. Financial cost–benefit of early intervention—pennsylvania model—ages 3–55 years

	With inflation	*Costs in 1996 $*
Nondisabled child		
Childhood costs	(140,459)	(107,743)
Adult cost or benefit	1,737,508	782,605
Net	1,597,049	674,862
Autism—with normal range effects of early intervention		
Childhood costs	(261,727)	(225,670)
Adult cost or benefit	1,737,508	782,605
Net	1,475,791	556,935
Autism—with partial effects of early intervention		
Childhood costs	(531,478)	(409,287)
Adult cost or benefit	(2,836,991)	(866,498)
Net	(3,368,469)	(1,275,785)
Autism—with minimal effects of early intervention		
Childhood costs	(881,048)	(647,352)
Adult cost or benefit	(3,523,434)	(1,042,492)
Net	(4,404,482)	(1,689,844)

Note: Table shows income (expense). This table combines net costs for ages 3–22 and 22–55 years from Tables 2 and 3. These costs are shown separately with inflation and in 1996 dollars.

varying levels of cost–benefit. Table 5 shows the estimated cost savings that accrue from EIBI services at rates of 20, 30, 40, and 50% achievement of normal functioning. At each level the marginal effects—i.e., the difference in costs between groups for normal range effects or partial effects from EIBI, or between groups for partial or minimal effects from EIBI—are aggregated for 100 people, and then disaggregated to a weighted average (i.e., in the columns titled 'student'). These estimates reflect service effects possibly associated with fidelity of implementation of treatment or with differing case mix. At each level, it is assumed that for 10% of children with autism or PDD, EIBI achieves minimal effects. EIBI is assumed to achieve partial effects for the remaining children.

As Table 5 shows, the average net benefit, as represented by the measure of marginal benefit (e.g., partial versus minimal effects) decreases slightly with an increase in the proportion of children for whom EIBI results in normal functioning. This finding is attributable to the greater difference in cost between nonintensive special education and intensive intervention, compared to the cost difference between nonintensive special education and regular education in this model, based on Pennsylvania cost values. For ages 3–22 years, average per student inflated marginal dollar savings range from $298,651 at 20% effectiveness to $274,709 at 50% effectiveness.

The relationship of level of treatment effectiveness to marginal benefits is markedly reversed for ages 3–55 years, and increased average marginal savings

Table 5. Financial benefits at different levels of effectiveness, age 3 to 22 years, per 100 children and per child served—Pennsylvania model

	Inflated total	*1996 $ total*	*Inflated/ student*	*1996 $/ student*
At 20% normal range				
20 norm range vs. partial effect	5,395,220	3,672,340	269,761	183,617
70 partial vs. minimal effect	24,469,900	16,664,550	349,570	238,065
10 minimal effect	0	0	0	0
Net	29,865,120	20,336,890	298,651	203,369
At 30% normal range				
30 norm range vs. partial effect	8,092,830	5,508,510	269,761	183,617
60 partial vs. minimal effect	20,974,200	14,283,900	349,570	238,065
10 minimal effect	0	0	0	0
Net	29,067,030	19,792,410	290,670	197,924
At 40% normal range				
40 norm range vs. partial effect	10,790,440	7,344,680	269,761	183,617
50 partial vs. minimal effect	17,478,500	11,903,250	349,570	238,065
10 minimal effect	0	0	0	0
Net	28,268,940	19,247,930	282,689	192,479
At 50% normal range				
50 norm range vs. partial effect	13,488,050	9,180,850	269,761	183,617
40 patial vs. minimal effect	13,982,800	9,544,200	349,570	238,065
10 minimal effect	0	0	0	0
Net	27,470,850	18,725,050	274,709	187,251

Note: This schedule presents a comparison of financial benefits at different levels of achievement of normal skills or functioning achieved by EIBI, for children ages 3–22 years, ranging from 20% of children achieving normal skills or functioning (an assumed minimal rate) to 50% of children. At each level, differing rates of achievement of normal range skills or functioning, as well as partial benefit are estimated. Costs are shown in terms of the aggregate of 100 children served, and averages per person served, with inflation and in 1996 dollars.

are associated with increased levels of effectiveness (see Table 6). The format of Table 6 is identical to that of Table 5, and differs only in that marginal costs (i.e., benefits) are shown for childhood and adulthood combined. Estimated average inflated marginal savings range from $656,385 at 20% effectiveness to $1,081,984 at 50% effectiveness. Corresponding present values for these inflated marginal savings are $31,714 and $52,279.

Summary

At a rate of normal functioning achieved by 40–50% of children with autism or PDD who receive EIBI (see, e.g., Lovaas, 1987) compared to virtually ineffective intervention, cost savings per child served are estimated to be from

Table 6. Financial benefits at different levels of effectiveness, age 3–55 years, per 100 children served and per child served—Pennsylvania model

	Inflated total	*1996 $ total*	*Inflated/ student*	*1996 $/ student*
At 20% normal range				
20 norm range vs. partial effect	96,085,200	36,654,400	4,804,260	1,832,720
70 partial vs. minimal effect	72,520,910	28,984,130	1,036,013	414,059
10 minimal effect	0	0	0	0
Net	168,606,110	65,638,530	1,686,061	656,385
At 30% normal range				
30 norm range vs. partial effect	144,127,800	54,981,600	4,804,260	1,832,720
60 partial vs minimal effect	62,160,780	24,843,540	1,036,013	414,059
10 minimal effect	0	0	0	0
Net	206,288,580	79,825,140	2,062,886	798,251
At 40% normal range				
40 norm range vs. partial effect	192,170,400	73,308,800	4,804,260	1,832,720
50 partial vs. minimal effect	51,800,650	20,702,950	1,036,013	414,059
10 minimal effect	0	0	0	0
Net	243,971,050	94,011,750	2,439,710	940,118
At 50% normal range				
50 norm range vs. partial effect	240,213,000	91,636,000	4,804,260	1,832,720
40 partial vs. minimal effect	41,440,520	16,562,360	1,036,013	414,059
10 minimal effect	0	0	0	0
Net	281,653,520	108,198,360	2,816,535	1,081,984

Note: This table presents a comparison of financial benefits at different levels or rates of achievement of normal skills or functioning achieved by EIBI, for people ages 3–55 years, ranging from 20% of children achieving normal range skills or functioning (an assumed minimal rate) to 50% of children. At each level of effectiveness, differing rates of normal range functioning, as well as partial benefit are estimated. Costs are shown in terms of the aggregate of 100 children served, and averages per person served, with inflation and in 1996 dollars.

$274,709 to $282,689 with inflation to age 22 and from $2,439,710 to $2,816,535 with inflation to age 55.

At $32,820 initial annual cost, the total cost–benefit savings of EIBI services per child with autism or PDD for ages 3–22 years ranges from $187,251 to $203,369 without inflation and from $274,709 to $298,651 with inflation. The majority of savings to schools accrue from children who achieve partial benefit rather than normal functioning, and savings decrease slightly on average with increased rates of children achieving normal functioning. At $50,000 initial annual cost, the corresponding cost–benefit savings of EIBI services per child with autism or PDD ages 3–22 years averages from $131,018 to $151,829 without inflation and from $214,801 to $246,551 with inflation.

At $32,820 initial annual cost, the total cost–benefit savings of EIBI services per child with autism or PDD for ages 3–55 years averages from $656,385

to $1,081,984 without inflation and from $1,686,061 to $2,816,535 with inflation. The majority of savings to the lifespan-oriented developmental disabilities sector accrue from children who achieve normal functioning rather than partial benefit. Savings increase substantially on average with increased rates of children achieving normal functioning. At $50,000 initial annual cost, the corresponding cost–benefit savings of EIBI services per child with autism or PDD ages 3–55 years averages from $605,385 to $1,030,984 without inflation and from $1,635,061 to $2,765,535 with inflation.

These findings are summarized in Figures 1 and 2. Figure 1 displays the net cost for services for the four childhood groups that were presented in Table 2: nondisabled, EIBI with recovery effects, EIBI with partial effects, and EIBI with minimal (i.e., 'Nil') effects. Figure 2 displays the net income or net cost for services for the same four groups, as adults, that were presented in Table 3.

DISCUSSION

Limitations of Forecasting

Although the model used here is based on a series of reasoned assumptions that are consistent with the state of the current literature on treatment and practice (see the Methods section and appendix B), several limitations should be highlighted. First, the cost differential forecasts assume that current service trends are indicative of developmental disability service trends that may extend as long as 50 years hence. Specifically, these consist of trends toward community-based adult services, and are based on differences in expenditures associated with variations in levels and intensities of services for people with disabilities. These trends appear to be reasonable in the near term but may not hold up in the long term in the context of health care reform and challenges to disability services presented by competition for resources. Further, increasing costs as the general population ages during the next 20–30 years can be expected to present unique demographic challenges to the present system of resource allocation for the community support of people with handicaps of all ages. Specific rational alternative scenarios that lend themselves to quantitative modeling, however, are not readily apparent.

Second, alternative scenarios might involve stringent cost containment practices that would limit service eligibility and tend to lower expenditures for adults with autism or PDD over the long term. In projecting costs (or expenditures) for care to age 55 we have used a compound rate of 3%. This rate, which is lower than recent past rates of growth in health care and related costs,

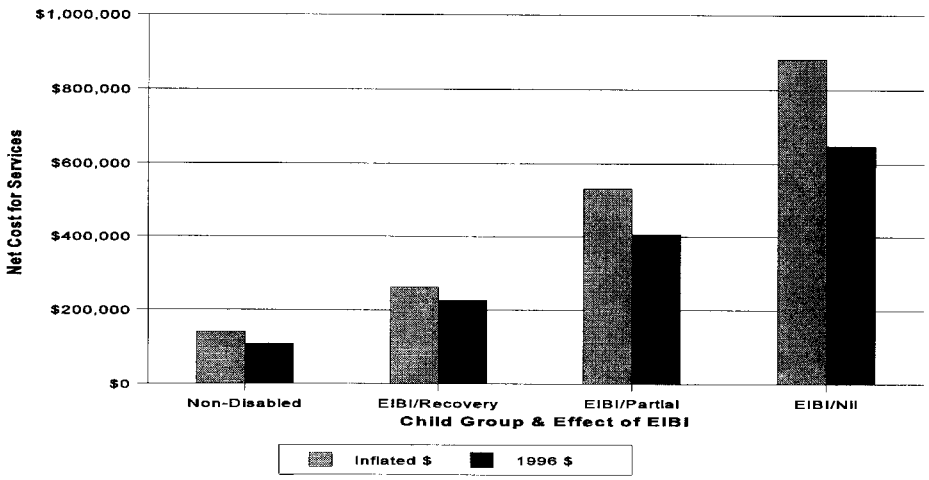

Figure 1. Net average individual cost for early intensive behavioral services ages 3–21 for nondisabled, recovered, partial benefit, and nil benefit groups. Cost is shown as with inflation and in 1996 dollars.

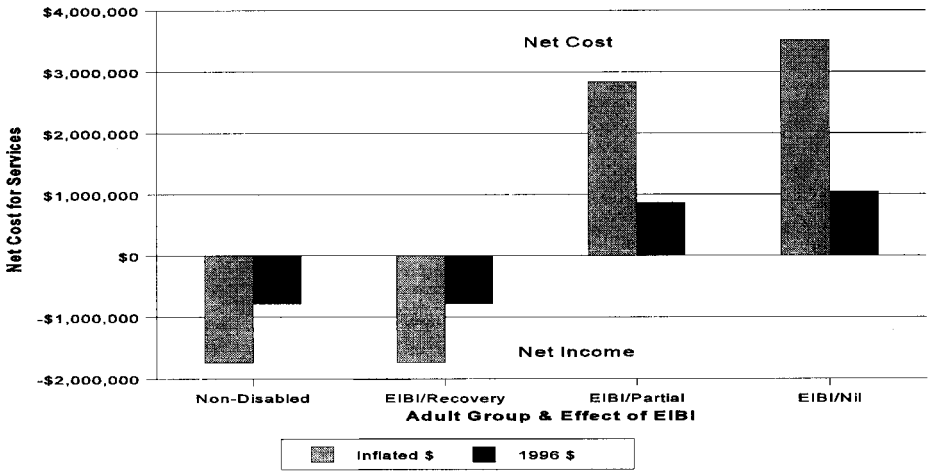

Figure 2. Net average individual cost for early intensive behavioral services ages 3–55 years for nondisabled, recovered, partial benefit, and nil benefit groups. Negative values indicative net earnings (income) and positive values indicate net costs for services. Cost is shown with inflation and in 1996 dollars.

will tend to underestimate future costs; therefore, it is possibly compatible with more stringent cost containment or imposition of limited service eligibility. Moreover, use of a rate of 10% participation in economic supports as a surrogate for all public services at any point in time for nondisabled and normal range effect groups probably represents a substantial underestimate of both

present and future population cohorts. This will tend to underestimate differences in overall cost between these cohorts and people with autism or PDD who realize partial or minimal treatment effects, but the differences in costs among these groups derive primarily from the use of special education, intensive special education, or adult developmental disability services. SSI costs (the economic supports surrogate cost in the present model) were trended forward at 1.5%, which will also tend to be consistent with more stringent cost containment or limited service eligibility.

At another level, it should also be noted that we used a linear model of EIBI effects, in that gains realized from EIBI by primary school entry were assumed to maintain over the long term. There is no indication that the effects of EIBI are evanescent or ephemeral. On the contrary, existing evidence points to the durability of these effects (McEachin *et al.*, 1993; Perry *et al.*, 1995; Smith, 1998). It is understandable how this can occur if the children enter regular primary school with the skills required to benefit from regular education. The skills and susceptibility to social reinforcement acquired during EIBI would likely be maintained by the contingencies inherent in participation in regular educational, family, and community life. On the other hand, if some children who realize normal range or partial effects from EIBI do not sustain these gains, then our model accommodates this by providing cost and benefit estimates in the range of 20% to 30% normal range effects. The cost–benefits at these levels of outcome remain substantial. However, there is no question that the issues that derive from a simulation can only be resolved effectively by prospective tracking of comparative costs for groups of children over time. Such cost tracking has not been a major focus of research in past analyses of early intervention or preschool services, as is evident by its scarcity in the professional literature.

The Intersection of Cost and Quality

The widely accepted view of autism is that it is a severe lifelong disability (see, e.g., Cohen & Volkmar, 1997; Freeman, 1997; Siegel, 1996). Like effective interventions for other severe or chronic disorders, such as cancer or diabetes, EIBI for autism can be characterized as aggressive and invasive. It most likely does not work well when it is performed piecemeal, briefly, or by individuals with inadequate training and experience. Like effective early intervention for children at risk for various other disabilities, EIBI needs to begin early, be provided for many hours per week and many weeks per year for an extended period, be delivered directly to children, address a wide range of needs, and accommodate individual differences (Guralnick, 1998, Ramey & Ramey, 1998).

In short, EIBI is relatively costly when it is done properly, and even then it does not produce complete recovery in every case.

On what basis, then, can investment in EIBI for children with autism or PDD be justified? A primary consideration is the availability of other interventions that have been demonstrated to produce comparable outcomes in scientifically sound studies. Countless therapies for autism have been touted to produce beneficial effects, ranging from the small to the near-miraculous (Green, 1996a; Gresham & MacMillan, 1997; Klin & Cohen, 1997; Maurice, 1996; Smith, 1993; 1996). Contemporary proponents of various other treatments and critics of EIBI state that other approaches can produce dramatic improvements (e.g., Gresham & MacMillan, 1997; Greenspan, 1992; Koegel, Koegel, Frea, & Smith, 1995; Mesibov, 1997; Strain & Cordisco, 1994), yet there is little empirical support for these assertions from methodologically sound research (i.e., studies that included direct, objective, valid and reliable measurement of treatment effects; demonstrations of improvements in multiple skill areas; controls for alternative explanations; replication; and long-term maintenance of treatment gains; see DeMyer *et al*., 1981; Green, 1996a; Schreibman, 1988; Smith, 1993; 1996).

Our analysis suggests that another justification for investing in EIBI is long-term monetary savings for families and for society. Today, however, the resources required to begin EIBI are not always readily available. Even when they are, short-term financial and other considerations often force termination of treatment or reduction in treatment intensity sooner than might be optimal (see, e.g., Graff, Green, & Libby, 1998). Some maintain that the limited resources available for EIBI should be invested only in young children with autism or PDD who are most likely to respond dramatically (e.g., Siegel, 1996). We suggest there is not yet an adequate scientific database on which to base either predictions of treatment responsiveness, or decisions to reduce treatment intensity after relatively brief periods.

While the converging evidence from studies of EIBI suggests that it can produce benefits unmatched by other interventions for autism and PDD, careful research is needed to answer a number of burning questions:

Will the 40–50% rates of attainment of normal or near-normal functioning reported in the initial studies hold up in further replication and follow-up studies?

What child and programmatic variables reliably predict responsiveness to EIBI?

What are the long-term outcomes for the children in the initial studies who did not achieve normal functioning?

Might some children like them attain better outcomes with intensive intervention of longer duration, or intervention that incorporates additional well-tested behavior analytic techniques?

How intensive does EIBI have to be to produce optimal effects?

What is the operational definition of 'intensive'?

Do other early intervention models that involve high rates of one-to-one interactions between adults and children with autism (see, e.g., Rogers & Lewis, 1989) produce outcomes comparable to EIBI?

Can biomedical research shed light on the limiting factors that might militate against a large and sustainable outcome, or contribute to the effectiveness of behavioral intervention?

A second, related set of questions pertains to the nature of EIBI and who is capable of delivering this intervention competently. Some have suggested that only individuals who follow the 'Lovaas model' and have been trained directly by the Lovaas clinic at UCLA should be considered qualified (Buch, 1996; Families for Intensive Autism Treatment, 1996). However, other behavior analysts have achieved outcomes comparable to those of Lovaas and colleagues, including normal functioning in some children with autism or PDD (Birnbrauer & Leach, 1993; Maurice, 1993; Perry *et al*., 1995) and other significant outcomes (Anderson *et al*., 1987; DeMyer *et al*., 1981; Fenske *et al*., 1985; Matson *et al*., 1996; Maurice, Green, & Luce, 1996; Mulick & Meinhold, 1994).

At present, the number of professional-level applied behavior analysts is far too small to meet the growing demand for behavioral intervention for children with autism of all ages. As a result of the demand and supply imbalance, as well as nationwide pressure stemming from implementation of the federally mandated early intervention infrastructure under P.L. 105–17, a kind of cottage industry has developed; large numbers of individuals are simply proclaiming themselves 'Lovaas therapists', 'behavior analysts', or 'behavioral therapists' and extracting large fees from families and other sources for directing and providing EIBI. Fortunately, actions are being taken on several fronts to attempt to remedy this problem. Legally sanctioned, competency-based procedures for certifying professional behavior analysts that have been in place in the state of Florida for many years (see, e.g., Shook, 1993; Shook & Favell, 1996; Shook & Van Houten, 1993; Shook, Hartsfield, & Hemingway, 1995) are being implemented or considered by several other states at this writing. Representatives of several national professional associations have initiated efforts to establish a specialty and proficiency in applied behavior analysis (e.g., Hopkins & Moore, 1993) for licensed psychologists.

In listening to parents, we have discovered that fewer and fewer wish to trust their children with autism and PDD to unproven fad treatments and inadequately prepared service providers (Jacobson, Mulick, & Schwartz, 1995). Many have become astutely discerning consumers once they have learned the relevant dimensions by which to judge treatment effectiveness and professional

competence (Green, 1996a; Van Houten, 1994). Discerning consumers also recognize that long-term treatment effects are at least as relevant as short-term costs, and that the most expensive treatment is that which is ineffective regardless of the monetary price.

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APPENDIX A: SOURCES OF FINANCIAL INFORMATION FOR PER RECIPIENT EXPENDITURE ESTIMATES—PENNSYLVANIA MODEL

This appendix presents information regarding the sources used in order to develop the estimates used in the cost analysis.

The source for early intervention, family support services, home and community based services waiver estimates, institutional costs, and community services costs is D. Braddock, R. Hemp, L. Bathchelder, & G. Fujiura (1995). *State of the states in developmental disabilities*. Washington, DC: American Association on Mental Retardation.

The source for intensive community services is annual expenditures for six persons or fewer ICF/MR plus one-half of the difference between this amount and the annual institutional expenditure, from Braddock *et al*. (1995), as above.

The source for special education expenditures is average for all special education types from Barnett & Escobar (1990, p. 566).

The source for regular education expenditures is USDOE (1992). *The condition of education* (NCES 92-096), p. 334.

The source for intensive early intervention is the average cost of seven model programs reported by S. Harris & J. Handleman (1994). *Preschool education programs for children with autism*. Austin, TX: PRO-ED.

The source for median household income is the 1990 Federal Census of the United States. Supported wages are indexed at 20% average of median household income for Pennsylvania.

All amounts are trended at 3%, except SSI/ADC (AFCD or TANF) which is trended at 1.5%.

APPENDIX B: ASSUMPTIONS UNDERPINNING THE GENERAL COST MODEL

(i) Current research does not identify characteristics of children with autism or PDD that predict their response to EIBI (e.g., initial I.Q. within the moderate to mild range of mental retardation is not a good predictor) during the years before school entry, funded as either early intervention or preschool services. Thus, benefit must be gauged upon outcomes as identified in the literature (e.g., Smith *et al*., 1997).

(ii) The proportion of children who achieve normal functioning in all areas is probably somewhat lower than the proportion reported so far in the behavioral research literature (i.e., just under 50%) because (a) in very young children, when severe or profound mental retardation is present, a conclusive diagnosis of autism or PDD may not be made, and (b) other local or nonspecific factors probably affect whether children are diagnosed or, especially, referred for EIBI.

(iii) In any group of children with autism or PDD who receive competently delivered EIBI, between 20 and 50% will achieve normal functioning.

About 40% will achieve substantial gains that will result in reduced dependency on special services, but they will continue to need some specialized services and supports throughout their school and adult lives. Ten percent (10%) will continue to require intensive special education and intensive adult services, and the remainder will evidence benefit sufficient to reduce the intensity of required educational and adult services.

(iv) For these reasons, cost–benefit should be couched in terms of marginal benefit, as well as the attainment of normal functioning. Analyses should encompass comparison of costs for children with autism or PDD who achieve normal functioning with costs for serving children without disabilities, and with costs for serving children with autism or PDD who make large gains but do not move into the normal range. The latter group should also be compared with children who make minimal gains.

(v) Without EIBI the majority of children with autism or PDD will manifest enduring dependency on adult developmental disability services. This is consistent with the literature on child, adolescent, and young adult development for people with autism or PDD.

(vi) The costs of EIBI center-based services for children with autism or PDD (including those with a home-based, parent-directed component) may not be comparable or equivalent, on average, with the costs of EIBI home-based services when instruction is comparably intensive, but relative costs and utilization mix are not well established. The mix of costs for EIBI services used here is assumed to be a representative average for both center-based and home-based services. Future research will be needed to clarify this assumption.

(vii) Children with autism or PDD who ultimately develop normal functioning are assumed to participate in regular education; those who make large gains but not sufficient for them to participate successfully in regular education are assumed to participate in special education; and children who make minimal gains are assumed to participate in intensive special education (or the equivalent from a cost perspective). Special education alternatives (e.g., intensive special education) are assumed to be equivalent in cost regardless of whether they are delivered in segregated, partially integrated, related service, or fully inclusive models, based on requisite instructional load requirements for comparable instructional and educational effects. In short, comparable instruction is assumed to cost the same regardless of whether an inclusive approach is used or not. This is done only in the absence of data indicating a rational basis for assigning such costs in another manner despite the possibility that such data may subsequently emerge.

(viii) Because no generalizable mortality data exist for people with autism or PDD (owing mainly to the advent of the diagnosis in the 1940s and lack of population cohort data), cost–benefit analyses including the adult years are made only to age 55. There is no compelling evidence of marked mortality prior to age 55 years for children surviving to adulthood, and the lifespan of people with autism or PDD may well be similar to that of the general population and appreciably greater than this cutoff age. Therefore, the cutoff point will tend to underestimate adult income from supported or regular employment, utilization of general public entitlements or benefits during adulthood, utilization costs for adult developmental disabilities services, and costs for utilization of aging services and public retirement or income transfer programs for elders.

(ix) Present costs are used as indicators of future costs, with recognition that future reforms in welfare and public health may either result in decreased per person rates or expenditures, or in substitution of services. To compensate, costs have been trended forward at 3% per annum, except for SSI/ADC (Aid for Dependent Children), or the equivalent such as Temporary Assistance for Needy Families (TANF), which is trended at 1.5%. These trend factors probably represent an underestimate of long-term inflationary factors. For example, the average cost inflator for health-related services from 1986 to 1996 was about 4.5%.

(x) SSI/ADC costs are used as a summary cost for all utilization of general public benefits outside of the early intervention, educational, and developmental service sectors (e.g., public housing subsidies, food stamps, child care, temporary assistance, all forms of public assistance, higher-education grants, vocational assistance, public transportation, and Medicaid card services). Although these are not entered as costs for nondisabled children to age 22 years, they are entered as costs for all children with autism or PDD who achieve normal functioning (three years' cost), and partial or minimal effects (18 years' cost). SSI/ADC is also entered as a cost for 33 years to age 55 years for 20% of nondisabled children and children with autism or PDD who achieve normal functioning, and for 100% of children with autism or PDD who make substantial improvements or who benefit minimally.

(xi) The average duration of EIBI is assumed to be three years, a period that is associated in the literature with apparent best outcomes (Green, 1996a). The existing literature suggests that two years of intervention can result in normal functioning for some children, but in this analysis it is recognized that children may participate in 2–6 years of EIBI, and three years is stipulated to be a reasonable average duration.

(xii) Children with autism or PDD who achieve normal functioning are assumed to use family support services during participation in EIBI. Children who make moderate gains and those for whom minimal effects are attained are assumed to use 18 years of family support services, to age 22 years.

(xiii) During adulthood, those who achieve substantial improvements, but not normal functioning, are assumed to use 18 years of Medicaid waiver (or equivalent) services and 15 years of supported work services. During adulthood, for adults for whom minimal effects are obtained, 80% are assumed to use waiver services for 20 years, 20% are assumed to use intensive community services for 23 years, and 40% are assumed to use supported work services for 15 years. These utilization patterns are a function of variations in individual service needs and potential delays between requests for services and service enrollment associated with waiting lists. With the possible exception of adults with whom intervention has been minimally effective during the preschool years, the cost mixes used are lower than those that are presently typical for intensive comprehensive community services for adults with autism or PDD (e.g., ICF/MR and ambulatory clinic services or equivalent levels of care).

(xiv) Supported employment wages are estimated as comparable for individuals with autism or PDD who achieve substantial or minimal gains, at 20% of the median household annual income. It should be noted that although this probably overestimates income (and thus offset of service costs) for people with minimal benefits, it nonetheless reflects a single-person income level that remains below current poverty level indicators, and a full-time employment (40-hour week) hourly rate of $3.24 hourly in the 1996 base year.

(xv) This analysis uses costs reported in several sources for the Commonwealth of Pennsylvania. Annual regular education costs were $7,543 per year in 1996, special education $12,935, and intensive special education $28,806 (from Table 1). The initial annual cost of EIBI is set at $32,820. To calculate the cost–benefit of this intervention set at a higher level of $50,000, readers may simply subtract $53,100 from inflated benefit totals and subtract $51,540 from uninflated benefit totals.

(xvi) Finally, in composite, the service costs and inflators used will tend to underestimate cost slightly relative to current expenditure patterns, whereas the earnings projected will tend to overestimate income slightly, providing a relatively conservative overall estimate of cost–benefit. All savings shown, however, are net of the expense of providing EIBI.

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About BACB
About Behavior Analysis
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Consumer Information
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Becoming Certified
Maintaining Certification
Approved University Training
Conduct Guidelines
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*Also see:*BCBA Standards

Changes in the Standards

Applicants are responsible for ensuring that they apply under the current BACB Standards. The current BACB Standards will be posted on the BACB website. The BACB Standards are subject to revision in the sole discretion of the BACB Board of Directors. Whenever possible, advance notice of any substantial standard changes will also be posted at this website.

Eligibility to sit for the BCaBA certification examination requires completion of Sections A, and B below and compliance with all other rules and requirements of the BACB.

Quick Links

- Find an Approved Continuing Education Provider
- Application FAQ
- Renew/Recertify
- Board Certified Behavior Analyst-D Application

Recent Developments

- Change in Eligibility Documentation
- Ethics Application
- Implementation of New Degree Requirement to Qualify for Exam

A. Degree Requirement:

Possession of a minimum of a bachelor's degree that was conferred in behavior analysis or other natural science, education, human services, engineering, medicine or a field related to behavior analysis and approved by the BACB (click here for information about acceptable degrees) from any of the following:

1. United States or Canadian institution of higher education fully or provisionally accredited by a regional, state, provincial or national accrediting body; or
2. An institution of higher education located outside the United States or Canada that, at the time the applicant was enrolled and at the time the applicant graduated, maintained a standard of training equivalent to the standards of training of those institutions accredited in the United States.

B. Coursework and Experience Requirements

1. **Coursework:** The applicant must complete 135 classroom hours of instruction (see Definition of Terms below) in the following content areas and for the number of hours specified:
    1.
        1. Ethical considerations – 10 hours
        2. Definition & characteristics and Principles, processes & concepts - 40 hours
        3. Behavioral assessment and Selecting intervention outcomes & strategies - 25 hours
        4. Experimental evaluation of interventions, & Measurement of behavior and Displaying & interpreting behavioral data - 20 hours
        5. Behavioral change procedures and Systems support 40 hours

    Acceptable Coursework: College or university courses in behavior analysis, that are taken from an institution that meets the requirements specified in Section A.

    1.
2. **Experience:** **Experience Standards - BCaBA**

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Also see: BCBA Standards

Experience Standards - BCaBA

About BACB
About Behavior Analysis
About BACB Certificants
Consumer Information
Disciplinary and Ethical/Complaints
Becoming Certified
Maintaining Certification
Approved University Training
Conduct Guidelines
Find a Certificant
Search
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Supervised Experience

Board Certified Assistant Behavior Analyst (BCaBA)
June 2006

Categories of Supervised Experience:

There are three categories of experience: Supervised Independent Fieldwork, Practicum, and Intensive Practicum. Applicants may accrue experience in only one category at a time. Practicum and Intensive Practicum may be accrued only in a BACB approved university experience program (see your university contact for these requirements). University contacts interested in obtaining BACB approval of an experience program, or other interested parties, may click here to view full requirements for all experience categories available to universities with approved experience programs.

Quick Links

- Find an Approved Continuing Education Provider
- Application FAQ
- Renew/Recertify
- Board Certified Behavior Analyst-D Application

Recent Developments

- Change in Eligibility Documentation
- Ethics Application
- Implementation of New Degree Requirement to Qualify for Exam

Amount of Supervised Experience Required:

Supervised Independent Fieldwork: Applicants must complete 1000 hours of Supervised Independent Fieldwork in behavior analysis. The distribution of Supervised Independent Fieldwork hours must be at least 10 hours per week, but not more than 30 hours per week, for a minimum of 3 weeks per month.

Amount of Supervision Required:

Supervised Independent Fieldwork: Applicants must be supervised at least once every 2 weeks for 5% of the total hours they spend in Supervised Independent Fieldwork. Total supervision must be at least 50 hours. A supervisory period is two weeks.

	Supervised Independent Fieldwork
Total hours required	1000
Supervised hours: % of total hours	5%
Total number of supervised hours	50
Frequency of supervisor contacts	1 every 2 weeks

Onset of Experience:

Applicants may not start accumulating experience until they have begun the coursework required to meet the BACB coursework requirements.

Appropriate Applicant Activities:

The applicant's primary focus should be on learning new behavior analytic skills related to the BACB Third Edition Task List. Activities must adhere to the dimensions of applied behavior analysis identified by Baer, Wolf, and Risley (1968) in the article *Some Current Dimensions of Applied Behavior Analysis* published in the *Journal of Applied Behavior Analysis*. Applicants are encouraged to have experiences in multiple sites and with multiple supervisors.

Appropriate experience activities include:

1. Conducting assessment activities related to the need for behavioral interventions,
2. Designing, implementing, and monitoring behavior analysis programs for clients,
3. Overseeing the implementation of behavior analysis programs by others,
4. Other activities normally performed by a behavior analyst that are directly related to behavior analysis such as attending planning meetings regarding the behavior analysis program, researching the literature related to the program, talking to individuals about the program; plus any additional activities related to oversight of behavioral programming such as behavior analyst supervision issues, or evaluation of behavior analysts' performance. The supervisor will determine if activities qualify.

Examples of activities that are not appropriate as experience activities include: attending meetings with little or no behavior analytic content, providing interventions that are not based in behavior analysis, doing non-behavior analytic administrative activities, or any other activities that are not directly related to behavior analysis.

Appropriate Clients:

Clients may be any persons for whom behavior analysis services are appropriate. However, the applicant may not be the client's caretaker (primary or otherwise), related to the client's caretaker or related to the client. Applicants must work with multiple clients during the experience period.

Supervisor Qualifications:

During the experience period, the supervisor must be a Board Certified Behavior Analyst in good standing **or** be approved by the BACB as a faculty member in a BACB approved course sequence. The supervisor may not be the applicant's relative, subordinate or employee during the experience period. The supervisor will not be considered an employee of the applicant if the only compensation received by the supervisor from the applicant consists of payment for supervision.

Contractual and Ethical Considerations:

The supervisor and applicant should execute a contract prior to the onset of the experience that states the responsibilities of both parties, delineates the consequences should the parties not adhere to their responsibilities (including proper termination of the relationship), and includes an attestation that both parties will adhere to the BACB Guidelines for Responsible Conduct. The parties should pay particular attention to Sections 1, 2, and three of the Guidelines and consider the supervisor to be the client of the applicant except as noted above.

Nature of Supervision:

The supervisor must observe the applicant engaging in behavior analytic activities in the natural environment at least once every two weeks. The supervisor must provide specific feedback to applicants on their performance. During the initial half of the total experience hours, observation should concentrate on applicant-client interactions. This observation may be conducted via web-cameras, videotape, videoconferencing, or similar means in lieu of the supervisor being physically present. Supervision may be conducted in small groups of 10 or fewer participants for no more than half of the total supervised hours in each supervisory period. The remainder of the total supervision hours in each supervisory period must consist of direct one-to-one contact. Supervision hours may be counted toward the total number of experience hours required.

Documentation of Supervision:

Supervisors are responsible for providing documentation for each supervisory period on a feedback form provided by the BACB. The feedback form will require documentation of number of hours of experience, number of supervised hours, feedback on the applicant's

performance, the supervisor for each supervisory period, and signatures of the applicant and supervisor. The supervisor must review the completed feedback forms with the applicant and provide a copy for the applicant each supervisory period. The supervisor and the applicant are responsible for retaining their copies of the forms (in the event of a disagreement regarding experience, the BACB will need documentation from each party). The BACB reserves the right to request this documentation at any time following an individual's application to take the certification exam. In addition, the supervisor will be required to verify the applicant's supervision on the Experience Verification Form that is provided within the application for examination.

About BACB
About Behavior Analysis
About BACB Certificants
Consumer Information
Disciplinary and Ethical/Complaints
Becoming Certified
Maintaining Certification
Approved University Training
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Standards for Board Certified Behavior Analyst® (BCBA®)

Changes in the Standards

Applicants are responsible for ensuring that they apply under the current BACB Standards. The current BACB Standards will be posted on the BACB website. The BACB Standards are subject to revision in the sole discretion of the BACB Board of Directors. Whenever possible, advance notice of any substantial standard changes will also be posted at this website.

Eligibility to sit for the BCBA certification examination requires completion of Sections A and B below and compliance with all other rules and requirements of the BACB.

Quick Links

- Find an Approved Continuing Education Provider
- Application FAQ
- Renew/Recertify
- Board Certified Behavior Analyst-D Application

Recent Developments

- Change in Eligibility Documentation
- Ethics Application
- Implementation of New Degree Requirement to Qualify for Exam

A. Degree Requirement:

Possession of a minimum of a bachelor's and a master's degree that was conferred in behavior analysis or other natural science, education, human services, engineering, medicine or a field related to behavior analysis and approved by the BACB (click here for information about acceptable degrees) from any of the following:

1. United States or Canadian institution of higher education fully or provisionally accredited by a regional, state, provincial or national accrediting body; or
2. An institution of higher education located outside the United States or Canada that, at the time the applicant was enrolled and at the time the applicant graduated, maintained a standard of training equivalent to the standards of training of those institutions accredited in the United States.

B. Training and Experience Requirements

OPTION 1: COURSEWORK OPTION

1. **Coursework:** The applicant must complete 225 classroom hours of graduate level instruction (see Acceptable Coursework below) in the following content areas and forthe number of hours specified:
   1. Ethical considerations 15 hours
   2. Definition & characteristics and Principles, processes & concepts - 45 hours
   3. Behavioral assessment and Selecting intervention outcomes & strategies - 35 hours
   4. Experimental evaluation of interventions - 20 hours
   5. Measurement of behavior and Displaying & interpreting behavioral data - 20 hours
   6. Behavioral change procedures and Systems support 45 hours
   7. Discretionary 45 hours

   Acceptable Coursework: College or university courses in behavior analysis, that

are taken from an institution that meets the requirements specified in Section A.

2. **Experience:** Click here for the experience requirements for BCBA eligibility.

OPTION 2: COLLEGE TEACHING OPTION

1. **College Teaching:** The applicant must complete a one academic-year, full-time faculty appointment at a college or university (as described in Section A above) during which the applicant:
   - Teaches classes on basic principles of behavior, single-subject research methods, applications of basic principles of behavior in applied settings, and ethical issues; and
   - conducts and publishes research in behavior analysis.

2. **Experience:** Click here for the experience requirements for BCBA eligibility.

OPTION 3: DOCTORATE/BCBA REVIEW OPTION

1. **Doctorate Degree:** The applicant must have a doctoral degree, conferred at least ten (10) years prior to applying. The field of study must be behavior analysis, psychology, education or another related field (doctoral degrees in related fields are subject to BACB approval).

2. **BCBA Review:**

The applicant must have 10 years post-doctoral experience in behavior analysis. Experience must be verified independently by three Board Certified Behavior Analysts (BCBAs) and supported by information provided on the applicant's CV (curriculum vitae). Applicants who are unable to obtain verification from three BCBAs familiar with their experience may contact the BACB directly to discuss alternatives.

Contact BACB Applications Dept.

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Also see: BCaBA Standards

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- About BACB
- About Behavior Analysis
- About BACB Certificants
- Consumer Information
- Disciplinary and Ethical/Complaints
- Becoming Certified
- Maintaining Certification
- Approved University Training
- Conduct Guidelines
- Find a Certificant
- Search
- Downloads
- FBACC

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Supervised Experience

Board Certified Behavior Analyst (BCBA)
June 2006

Categories of Supervised Experience:

There are three categories of experience: Supervised Independent Fieldwork, Practicum, and Intensive Practicum. Applicants may accrue experience in only one category at a time. Practicum and Intensive Practicum may be accrued only in a BACB approved university experience program (see your university contact for these requirements). University contacts interested in obtaining BACB approval of an experience program, or other interested parties, may click here to view full requirements for all experience categories available to universities with approved experience programs.

Quick Links

- Find an Approved Continuing Education Provider
- Application FAQ
- Renew/Recertify
- Board Certified Behavior Analyst-D Application

Recent Developments

- Change in Eligibility Documentation
- Ethics Application
- Implementation of New Degree Requirement to Qualify for Exam

Amount of Supervised Experience Required:

Supervised Independent Fieldwork: Applicants must complete 1500 hours of Supervised Independent Fieldwork in behavior analysis. The distribution of Supervised Independent Fieldwork hours must be at least 10 hours per week, but not more than 30 hours per week, for a minimum of 3 weeks per month.

Amount of Supervision Required:

Supervised Independent Fieldwork: Applicants must be supervised at least once every 2 weeks for 5% of the total hours they spend in Supervised Independent Fieldwork. Total supervision must be at least 75 hours. A supervisory period is two weeks.

	Supervised Independent Fieldwork
Total hours required	1500
Supervised hours: % of total hours	5%
Total number of supervised hours	75
Frequency of supervisor contacts	1 every 2 weeks

Onset of Experience:

Applicants may not start accumulating experience until they have begun the coursework required to meet the BACB coursework requirements.

Appropriate Applicant Activities:

The applicant's primary focus should be on learning new behavior analytic skills related to the BACB Third Edition Task List. Activities must adhere to the dimensions of applied behavior analysis identified by Baer, Wolf, and Risley (1968) in the article *Some Current Dimensions of Applied Behavior Analysis* published in the *Journal of Applied Behavior Analysis*. Applicants are encouraged to have experiences in multiple sites and with multiple supervisors.

Appropriate experience activities include:

1. Conducting assessment activities related to the need for behavioral interventions,
2. Designing, implementing, and monitoring behavior analysis programs for clients,
3. Overseeing the implementation of behavior analysis programs by others,
4. Other activities normally performed by a behavior analyst that are directly related to behavior analysis such as attending planning meetings regarding the behavior analysis program, researching the literature related to the program, talking to individuals about the program; plus any additional activities related to oversight of behavioral programming such as behavior analyst supervision issues, or evaluation of behavior analysts' performance. The supervisor will determine if activities qualify.

Examples of activities that are not appropriate as experience activities include: attending meetings with little or no behavior analytic content, providing interventions that are not based in behavior analysis, doing non-behavior analytic administrative activities, or any other activities that are not directly related to behavior analysis.

Appropriate Clients:

Clients may be any persons for whom behavior analysis services are appropriate. However, the applicant may not be related to the client or the client's primary caretaker. Applicants must work with multiple clients during the experience period.

Supervisor Qualifications:

During the experience period, the supervisor must be a Board Certified Behavior Analyst in good standing **or** be approved by the BACB as a faculty member in a BACB approved course sequence. The supervisor may not be the applicant's relative, subordinate or employee during the experience period. The supervisor will not be considered an employee of the applicant if the only compensation received by the supervisor from the applicant consists of payment for supervision.

Contractual and Ethical Considerations:

The supervisor and applicant should execute a contract prior to the onset of the experience that states the responsibilities of both parties, delineates the consequences should the parties not adhere to their responsibilities (including proper termination of the relationship), and includes an attestation that both parties will adhere to the BACB Guidelines for Responsible Conduct. The parties should pay particular attention to Sections 1, 2, and three of the Guidelines and consider the supervisor to be the client of the applicant except as noted above.

Nature of Supervision:

The supervisor must observe the applicant engaging in behavior analytic activities in the natural environment at least once every two weeks. The supervisor must provide specific feedback to applicants on their performance. During the initial half of the total experience hours, observation should concentrate on applicant-client interactions. This observation may be conducted via web-cameras, videotape, videoconferencing, or similar means in lieu of the supervisor being physically present. Supervision may be conducted in small groups of 10 or fewer participants for no more than half of the total supervised hours in each supervisory period. The remainder of the total supervision hours in each supervisory period must consist of direct one-to-one contact. Supervision hours may be counted toward the total number of experience hours required.

Documentation of Supervision:

Supervisors are responsible for providing documentation for each supervisory period on a feedback form provided by the BACB. The feedback form will require documentation of number of hours of experience, number of supervised hours, feedback on the applicant's performance, the supervisor for each supervisory period, and signatures of the applicant

and supervisor. The supervisor must review the completed feedback forms with the applicant and provide a copy for the applicant each supervisory period. The supervisor and the applicant are responsible for retaining their copies of the forms (in the event of a disagreement regarding experience, the BACB will need documentation from each party). The BACB reserves the right to request this documentation at any time following an individual's application to take the certification exam. In addition, the supervisor will be required to verify the applicant's supervision on the Experience Verification Form that is provided within the application for examination.

Behavioral Service Provider Qualifications
CIIBS Waiver

Services: *Behavior Support and Consultation and/or Staff/Family Consultation and Training*

Rates: *All outlined services available to providers who meet minimum qualifications through a DDD client fee for services contract. Individual and agency service packages and rates will be negotiated with CIIBS resource managers at initiation and renewal of the contract.*

Behavior Specialist	*The role of the Behavioral Specialist is to develop and oversee the implementation of a written positive behavior support plan, based upon a functional behavioral assessment, for the recipient of Behavior Management and Consultation. Responsible for quarterly written reports of progress and coordinating the implementation of the plan across environments.*
Ph.D. level Behavioral Specialist	**Education Requirements:** o Doctoral degree in psychology, education, or related discipline **Licensure/Certification Requirements:** o Unlicensed providers must be registered or certified with the state of Washington in accordance with the requirements of chapter 18.19 RCW. **Additional Qualification Requirements:** o 1500 hours of relevant course work and/or training in principles of psychology, child development, learning theory, positive behavior support techniques, dual diagnosis, and/or behavior analysis. May be included as part of the degree program. o Two years of relevant experience in designing and implementing comprehensive behavioral therapies for children with developmental disabilities and challenging behavior. **Ongoing Education Requirements:** o 45 hours every 3 years continuing education related to children with developmental disabilities and challenging behavior.
MA Level Behavioral Specialist	**Educational Requirements:** o Master's degree in psychology, education, or related discipline **Licensure/Certification Requirements:** o Unlicensed providers must be registered or certified with the state of Washington in accordance with the requirements of chapter 18.19 RCW. **Additional Qualification Requirements:** o 1500 hours of relevant course work and/or training in principles of psychology, child development, learning theory, positive behavior support techniques, dual diagnosis, and/or behavior analysis. May be included as part of the degree program. o Two years of relevant experience in designing and implementing comprehensive behavioral therapies for children with developmental disabilities and challenging behavior. **Ongoing Education Requirements:** o 45 hours every 3 years continuing education related to children with developmental disabilities and challenging behavior.

Behavioral Technician	*The role of the Behavioral Technician is to implement the written positive behavior support plan as directed by the Behavioral Specialist, including 1:1 behavioral interventions and skill development activity.*
MA Level Behavioral Technician	**Education Requirements:** o Master's degree in psychology, education, or related discipline **Licensure/Certification Requirements:** o Unlicensed providers must be registered or certified with the state of Washington in accordance with the requirements of chapter 18.19 RCW. **Additional Qualifications Required:** o 800 hours of relevant course work and/or training in principles of psychology, child development, learning theory, positive behavior support techniques, dual diagnosis, and/or behavior analysis. May be included as part of the degree program. o One year of relevant experience in designing and/or implementing comprehensive behavioral therapies for children with developmental disabilities and challenging behavior. **Ongoing Education Requirements:** o 45 hours every 3 years continuing education related to children with developmental disabilities and challenging behavior.
BA Level Behavioral Technician	**Education Requirements:** o Bachelor's degree in psychology, education, related or unrelated field **Licensure/Certification Requirements:** o Registered or certified with the state of Washington in accordance with the requirements of chapter 18.19 RCW. **Additional Qualifications Required:** o 800 hours of relevant course work and/or training in principles of psychology, child development, learning theory, positive behavior support techniques, dual diagnosis, and/or behavior analysis. May be included as part of the degree program. o Two years of relevant experience in designing and/or implementing comprehensive behavioral therapies for children with developmental disabilities and challenging behavior. **Ongoing Education Requirements:** o 45 hours every 3 years continuing education related to children with developmental disabilities and challenging behavior.
HS/GED Level Behavioral Technician	**Qualifications Required:** o High School diploma or GED o Age 21 or older o Registered or certified with the state of Washington in accordance with the requirements of chapter 18.19 RCW. o 120 hours of supervised implementation of positive behavior support plans for children with developmental disabilities and challenging behavior. o Two years of experience providing care for children with development disabilities and challenging behavior

	Ongoing Education Requirements: o 45 hours every 3 years continuing education related to children with developmental disabilities and challenging behavior. **Service Requirements:** o First 8 hours of service with a new client under direct supervision of a Behavioral Specialist; monthly supervision thereafter.

Recommendations to the Positive Behavior Support Plan may be made by a Certified Music Therapist and/or a Certified Recreation Therapist as a means to support positive behavior. This is achieved through the use of music and/or recreation related strategies in the child's home or community setting to create positive changes in a child's behavior, resolve conflicts leading to stronger family and peer relationships, explore personal feelings, make positive changes in mood and emotional states, increase a sense of control over life through successful experiences, and strengthen communication skills and physical coordination skills which enhance their health, functional abilities, independence and quality of life.

Music and Recreation Therapy may augment where appropriate, but not substitute for the work of a Behavior Specialist.

Music Therapist	*The role of the Music Therapist is to make therapeutic recommendations to the client's Positive Behavior Support Plan based upon interests and abilities.* **Education and Certification Requirements:** o Bachelor's degree in music therapy, psychology, education, or related discipline; and o National certification through the Certification Board for Music Therapists o Registered or certified with the state of Washington in accordance with the requirements of chapter 18.19 RCW. **Additional Qualifications Required:** o 800 hrs of relevant course work and/or training in principles of music therapy, psychology, child development, learning theory, positive behavioral support techniques, and/or behavioral analysis. May be included as part of a degree program. o One year of relevant experience in designing and/or implementing comprehensive therapies for children with developmental disabilities and challenging behavior **Ongoing Education Requirements:** o 45 hrs every 3 years continuing education related to children with developmental disabilities and behavior
Recreation Therapist	*The role of the Recreation Therapist is to make therapeutic recommendations to the client's Positive Behavior Support Plan based upon interests and abilities.* **Education and Certification:** o Bachelor's degree in recreation therapy, psychology, education, or related discipline; and o National certification through the National Council for Therapeutic Recreation Certification

	○ Registered or certified with the state of Washington in accordance with the requirements of chapter 18.19 RCW. **Additional Qualifications:** ○ 800 hrs of relevant course work and/or training in principles of recreation therapy, psychology, child development, learning theory, positive behavioral support techniques, and/or behavioral analysis. May be included as part of a degree program. ○ One year of relevant experience in designing and/or implementing comprehensive therapies for children with developmental disabilities and challenging behavior **Ongoing Education Requirements:** ○ 45 hrs every 3 years continuing education related to children with developmental disabilities and behavior

Department of Defense Report and Plan on Services to Military Dependent Children with Autism

July 2007

Report and Plan on Services to Military Dependent Children with Autism in the Department of Defense

The requirement for this report is outlined in Section 717 of the John Warner National Defense Authorization Act for Fiscal Year 2007 as follows:

Report Required - Not later than 30 days after completion of the plan required under subsection (a), the Secretary shall submit to the Committees on Armed Services of the Senate and the House of Representatives a report on the plan. The report may include any additional information the Secretary considers relevant.

TABLE OF CONTENTS

I. Executive Summary

Autistic spectrum disorders affect essential human behaviors such as social interaction, the ability to communicate ideas and feelings, imagination, and the establishment of relationships with others. A number of treatments, therapies and interventions have been introduced to ameliorate the negative impact of autism on these areas of concern. Applied behavior analysis (ABA), a systematized process of collecting data on a child's behaviors and using a variety of behavioral conditioning techniques to teach and reinforce desired behaviors while extinguishing harmful or undesired behaviors, is one of the best studied interventions. Time-limited, focused ABA methods have been shown to reduce or eliminate specific problem behaviors and teach new skills to individuals with autism.

The current Extended Care Health Option (ECHO) benefit allows cost sharing of Behavior Analyst Certification Board-certified behavior analysts and associate behavior analysts; "hands-on" ABA tutors who are not TRICARE authorized providers cannot be reimbursed by TRICARE. At this time there is a relative paucity of board certified analysts and associate analysts and it is difficult in most areas, particularly in rural areas, for beneficiaries to find TRICARE authorized ABA providers.

The Department proposes a change in policy and a demonstration program under the Department's demonstration authority under 10 USC 1092 to expand the availability of ABA services to ECHO beneficiaries with autism. The change in policy would expand the definition of who can be a TRICARE-authorized supervisory ABA provider. The demonstration program will permit TRICARE cost sharing of services by ABA tutors under a modified corporate services model. This policy change and demonstration will allow military families to make more effective use of the special education benefit in the ECHO program.

It is the intent of the Department that the provider qualifications set forth for the ABA Tutor demonstration be in place only as a temporary bridge until national standards are established by an appropriate nationally recognized certifying body for ABA providers. To this end, the Department intends to support nascent efforts within the industry to accurately and credibly define a new ABA provider class that performs "hands-on" ABA services.

The Department intends to retain the ECHO benefit as currently outlined in 32 CFR 199.5, except for the changes in provider qualifications that will be implemented in the policy change and demonstration program noted above.

II. Background

a) Report to Congress

The John Warner National Defense Authorization Act for Fiscal Year 2007, Section 717, requires the Department to develop a plan to provide services to military dependent children with autism within the authority of the Extended Health Care Option (ECHO) Program. Congressional language focuses on TRICARE education, training, and supervision requirements for service providers as well as the ability to identify the availability and distribution of those providers. Finally, the Department is to "…ensure the involvement and participation of affected military families or their representatives."

SEC. 717. Report and Plan on Services to Military Dependent Children with Autism.

(a) Plan Required – The Secretary of Defense shall, within 180 days after the date of the enactment of this Act, develop a plan to provide services to military dependent children with autism pursuant to the authority for an extended health care services program in subsections (d) and (e) of section 1079 of title 10, United States Code. Such plan shall include –

(1) requirements for the education, training, and supervision of individuals providing services for military dependent children with autism;

(2) standards for identifying and measuring the availability, distribution, and training of individuals of various levels of expertise to provide such services; and

(3) procedures to ensure that such services are in addition to other publicly provided services to such children.

(b) Participation of Affected Families – In developing the plan required under subsection (a), the Secretary shall ensure the involvement and participation of affected military families or their representatives.

(c) Report Required – Not later than 30 days after completion of the plan required under subsection (a), the Secretary shall submit to the Committees on Armed Services of the Senate and the House of Representatives a report on the plan. The report may include any additional information the Secretary considers relevant.

b) Autism and its treatment[1]

Autism spectrum disorders[2] (ASD) are present from birth or very early in development and affect essential human behaviors such as social interaction, the ability

[1] The section substantially borrows from National Research Council (2001) *Educating Children with Autism*. Committee on Educational Interventions for Children with Autism. Catherine Lord and James P. McGee, eds. Division of Behavioral and Social Sciences and Education. Washington, DC: National Academies Press.

[2] In this report, autism spectrum disorders is used to refer to autistic disorder; pervasive developmental disorder, not otherwise specified (PDD-NOS); and Asperger's Disorder, in accordance with the *Diagnostic and Statistical Manual of Mental Disorders, 4th ed.* (DSM-IV) of the American Psychiatric Association. The terms autism spectrum disorders and autism are used interchangeably.

to communicate ideas and feelings, imagination, and the establishment of relationships with others. It generally has life-long effects on how children learn to be social beings, to take care of themselves, and to participate in the community. Autism is a developmental disorder of neurobiological origin that is defined on the basis of behavioral and developmental features.

Autistic disorders are unique in their pattern of deficits and areas of relative strengths. They generally have lifelong effects on how children learn to be social beings, to take care of themselves, and to participate in the community. The autism spectrum occurs along with mental retardation and language disorder in many cases. Thus, educational planning must address both the needs typically associated with autistic disorders and needs associated with accompanying disabilities.

Autism varies in severity of symptoms, age of onset, and the presence of various features, such as mental retardation and specific language delay. The manifestations of autism can differ considerably across children and within an individual child over time. Even though there are strong and consistent commonalities, especially in social deficits, there is no single behavior that is always typical of any of the autistic spectrum disorders and no behavior that would automatically exclude an individual child from diagnosis of autism.

The prevalence of ASD under the current widely accepted definition in the American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV-TR) has been debated in recent years. A recent report by the Centers for Disease Control and Prevention (CDC)[3] found, in its review of information available in 14 states, that 6.6 per 1,000 – approximately 1 in 152 – children eight years of age had ASD. For comparison, Down syndrome, the most commonly identified cause of mental retardation, occurs in about 1 in 800 births. Juvenile diabetes, a common childhood disorder, occurs in about 1 in 400 to 500 children and adolescents. Finally, autism is more common than childhood cancer, which has a prevalence rate of 1 in 6600 children, according to the National Cancer Institute.

Since the Department of Defense has no registry specifically for beneficiaries with ASD, neither the prevalence of autism within the Military Health System beneficiaries nor the geographic distribution of these beneficiaries is known. Each of the military services has its own Exceptional Family Member Program (EFMP), a mandatory enrollment program that facilitates delivery of services to active duty families with special needs, including ASD. The services differ in how they maintain data on exceptional family members and medical information on individual exceptional family members is not uniformly available. In addition, not all military dependent children with

[3] Rice, Catherine. (2007) *Prevalence of Autism Spectrum Disorders – Autism and Developmental Disabilities Monitoring Network, 14 Sites, United States, 2002.* Morbidity and Mortality Weekly Report Surveillance Summaries, 56(SS01);12-38, February 9, 2007.

autism are enrolled in the EFMP. At present the Marine Corps counts 784 active duty family members (of all ages) with a diagnosis of ASD enrolled in its EFMP. The Army, Navy and Air Force have no readily available information related to the number of active duty family members with autism.

Autism Treatment

Within the field of autism, there are many approaches to intervention that are widely disseminated, but little researched. Some approaches have been greeted with great enthusiasm initially, but have relatively quickly faded out of general use, in part because of their failure to demonstrate worthwhile effects. Examples of discredited therapies include chelation therapy, facilitated communication, and neurofeedback. Other approaches have withstood the test of time across sites and the children and families they serve, though they continue to be largely supported by clinical descriptions of effectiveness, rather than by formal evaluations. Examples of therapies considered by many experts to be promising but lacking peer-reviewed studies with strong experimental designs include Treatment and Education of Autistic and related Communication-handicapped Children (TEACCH) and Developmentally-based Individual-difference Relationship-based Intervention (DIR)/Floor Time.

Education, both directly of children, and of parents and teachers, is currently the primary form of treatment for autism. For children with ASD, education entails not only academic instruction but also training in life skills (language, communication, self help, activities of daily living, etc.). The education of children with autistic disorders was accepted as a public responsibility under the Education of All Handicapped Children Act in 1975. Despite the federal mandate, however, family members report that the goals, methods and resources available vary considerably from state to state and school system to school system.

A large body of research has demonstrated substantial progress in response to specific intervention techniques in relatively short periods of time (e.g., several months) in many specific areas, including social skills, language acquisition, nonverbal communication, and reductions in challenging behaviors. Longitudinal studies over longer periods of time have documented changes in IQ scores and in core deficits (e.g., joint attention), in some cases related to treatment, that are predictive of longer term outcomes. However, children's outcomes are variable, with some children making substantial progress and others showing very slow gains.[4]

Although there is evidence that interventions lead to improvements, there does not appear to be a clear, direct relationship between any particular intervention and children's

[4] For further information please see National Research Council (2001) *Educating Children with Autism*. Committee on Educational Interventions for Children with Autism, page 5 and Chapter 4.

progress. Thus, while substantial evidence exists that treatments can reach short-term goals in many areas, gaps remain in addressing larger questions of the relationships between particular techniques and specific changes.

The consensus across comprehensive intervention programs is generally strong concerning the need for: early entry into an intervention program; active engagement in intensive instructional programming for the equivalent of a full school day, including services that may be offered in different sites, for a minimum of five days a week with full-year programming; use of planned teaching opportunities, organized around relatively brief periods of time for the youngest children (e.g., 15- to 20-minute intervals); and sufficient amounts of adult attention in one-to-one or very small group instruction to meet individualized goals.[5]

There is an increasing consensus among developmental, psychosocial, applied behavior and legal experts that prevention of certain problem behaviors should be a primary focus of intervention, particularly during the early childhood and preschool years. There is also a growing consensus that the most effective form of prevention of problem behaviors is the provision and implementation of an appropriate individualized education plan (IEP) based on proven interventions that have some scientific evidence supporting their value. The New York State Department of Health panel that developed "The Clinical Practice Guideline for Autism/Pervasive Developmental Disorders" went further: "The use of an ineffective assessment or intervention method [is] a type of indirect harm if its use supplants an effective assessment or intervention method that the child might have otherwise received"[6] – i.e., the New York State Guideline discourages the use of unproven services.

Applied Behavior Analysis (ABA)

ABA describes a systematized process of collecting data on a child's behaviors and using a variety of behavioral conditioning techniques to teach and reinforce desired behaviors while extinguishing harmful or undesired behaviors. As defined by the Behavior Analyst Certification Board (BACB), "Applied behavior analysis is the science in which procedures derived from the principles of behavior are systematically applied to improve socially significant behavior to a meaningful degree and to demonstrate experimentally that the procedures employed were responsible for the improvement in behavior." Practically speaking, it is the application of behavioral principles to shape behaviors and teach new skills in an individual. Intervention programming that employs

[5] For further information please see National Research Council (2001) *Educating Children with Autism*. Committee on Educational Interventions for Children with Autism, page 6 and Chapters 5-12.

[6] New York State Department of Health (1999) *Clinical Practice Guideline: The Guideline Technical Report. Autism/Pervasive Developmental Disorders, Assessment and Intervention for Young Children (0-3 Years)*. Albany, NY: New York State Department of Health, Early Intervention Program.

an ABA approach attempts to understand skill and behavior strengths and deficits; to structure the learning environment; systematically teach discrete, observable steps that define a skill; and teach generalization and maintenance of newly learned skills.

The federal Individuals with Disability Education Act (IDEA) requires benefits from interventions, presumes in favor of positive interventions, disallows those that do not produce benefits, and authorizes a wide range of beneficial interventions without preferring any particular ones. Although a number of interventions have shown evidence of accelerating a child's development and reducing behavior problems, none attains the strict research standards for replicated, randomly assigned, controlled, long-term comparison studies. IDEA sets up perhaps the most practical and in some ways the most difficult challenge – that of generating a functional behavior analysis of each child's behavior to fashion an individualized program that will enable the child to progress and to participate in the academic and social life of family, school, and community.

c) The TRICARE basic program

TRICARE, the health plan of the Military Health System, is an entitlement program, governed by statute (Title 10, Chapter 55) and regulation (32 Code of Federal Regulations, Part 199) which are then implemented through the TRICARE Policy, Operations, Reimbursement, and Systems Manuals. The TRICARE basic program covers medically or psychologically necessary and appropriate treatments, procedures, devices, and drugs; some preventive services; and some well child care. As a general rule, medically or psychologically necessary care that is proven safe and effective and considered standard of care in the United States will be a TRICARE benefit under the basic program unless it is expressly excluded from coverage by statute, regulation, or policy. The TRICARE basic program is prohibited by statute (10 U.S.C. 1079(a)(9)) from covering special education, except when provided as secondary to the active psychiatric treatment on an institutional basis. Additionally, TRICARE may not cover unproven care.

For children with autism, the TRICARE basic program covers services such as physician office visits, immunizations, and interventions such as speech therapy, physical therapy, and occupational therapy. Autistic children age three years and older often receive speech, physical, and occupational therapy provided by public or Department of Defense Educational Activity (DoDEA) schools to the extent that they are considered educationally necessary. Additional speech, physical, or occupational therapy may be provided by the TRICARE basic program when additional therapy is considered to be medically necessary. If a child resides on a base where there is a DoDEA school, then the Educational and Developmental Intervention Services program funded by each of the Services' medical departments, provides and pays for early intervention services for children under three years of age. If there is no DoDEA school, then the local

community early intervention program provides services and TRICARE has primary responsibility for paying for these services.

d) The Extended Care Health Option (ECHO) program

ECHO replaced the Program for Persons with Disabilities (PFPWD) on September 1, 2005, as authorized by Section 701(b) of the National Defense Authorization Act for Fiscal Year 2002, Public Law 107-107, which revised subsections (d), (e), and (f) of section 1079 of Title 10, United States Code. Under ECHO, qualifying active duty family members may receive benefits not available under the basic program. Qualifying conditions include moderate or severe mental retardation, a serious physical disability, or an extraordinary physical or psychological condition. Under 10 USC 1079(e), "…Extended benefits for eligible dependents…may include… training, rehabilitation, special education, and assistive devices." ABA, as a behavioral intervention that shapes behaviors and teaches skills, is a special education service that can be cost-shared under ECHO. The government cost-share for these extended benefits is limited under 10 USC 1079(f)(2)(A) to a maximum of $2,500 per month.

Under 10 USC 1079(e), extended benefits under ECHO may include "… respite care for the primary caregiver of the eligible dependent." ECHO offers two types of respite care under 32 CFR 199.5 often referred to as the "date break" and the "sleep benefit." The "date break" provides short-term care of the ECHO beneficiary to allow the primary caregivers (usually family members) the opportunity for rest and time with other family members. This ECHO respite care benefit is limited to 16 hours per month; its cost accrues to the maximum monthly government cost-share. The ECHO Home Health Care respite care benefit, or "sleep benefit," provides up to 8 hours/day, 5 days per week, of care of seriously ill, homebound beneficiaries who require frequent interventions during the time the primary caregivers would normally be sleeping. Both respite care benefits are provided by TRICARE-authorized home health agencies.

While participation in ECHO is voluntary, registration is required, by law, for a TRICARE beneficiary to receive the ECHO benefit. The registration process includes providing the Managed Care Support Contractor (MCSC) with evidence that the beneficiary is enrolled in the EFMP provided by the sponsor's branch of service. Upon completion of the registration process, the MCSC may authorize ECHO benefits.

The law requires a pay-grade based cost-share in months ECHO benefits are received. When the ECHO replaced the PFPWD on September 1, 2005, the amount of the cost share remained unchanged ($25 - $250), with the regulation continuing to limit the cost share to under $100 for all but O-7 to O-10, while the government cost share increased from $1,000 to $2,500 per month. This increase allows beneficiaries to receive more services for the same amount of cost-share.

e) The ECHO program and providers of ABA

An authorized provider under the ECHO program must, under 32 CFR 199.6(e), be a provider otherwise authorized under the TRICARE basic program. Alternatively, if not recognized as such, if they provide services that are only authorized under the TRICARE ECHO program, such as special education services, the provider must meet all the applicable licensing and other regulatory requirements in that state, county, municipality or other governmental jurisdiction in which the ECHO service is rendered. In the absence of such licensing or regulatory requirements, the Director, TRICARE Management Activity or designee determines the applicable requirements necessary to be an authorized provider. At the present time, no state licenses or has explicit regulatory oversight over providers of ABA services. While the states of Florida, Oklahoma, Texas, California, Pennsylvania, and New York each had behavior analyst certification programs, these states ceased their state-level certification efforts after the introduction of a nationally recognized certification process by the BACB in 1998.

TRICARE, as a health plan, is obligated to take reasonable steps to assure the safety, efficacy, and quality of care it provides. One of the most common ways that health plans can assure high quality care is to require that the providers they reimburse meet widely recognized and accepted minimum standards for knowledge, training and experience. The only available nationally recognized credential for ABA providers is through the BACB which certifies providers at the bachelor's degree level (Board Certified Associate Behavior Analyst - BCABA) and at the master's degree level (Board Certified Behavior Analyst - BCBA). A description of the BACB certification requirements for BCBAs and BCABAs is included as Attachment 1. The number and distribution of BACB-certified ABA therapists in the United States are shown in Attachment 2.

Absent state licensing or regulation of ABA providers, the Director, TRICARE Management Activity established a requirement that ABA providers be certified by the BACB. It was expected that high demand for ABA services would provide incentive for large numbers of ABA providers to become certified BCBAs and BCABAs. The current TRICARE benefit allows cost sharing of BACB-certified ABA therapists when providing consultation to the beneficiary in the home or at school, designing and maintaining a behavioral treatment plan, providing hands-on ABA therapy, and training and supervising family members in delivery of ABA. TRICARE currently does not authorize the reimbursement of the "hands-on" provider of ABA services unless the provider is an authorized TRICARE provider as described above.

The behavior analyst profession is in its infancy, yet finds itself in a period of very rapid expansion. This is driven in great part by the growing identification of ABA, unique among treatments used to treat the deficits of autism, as the treatment intervention with substantive evidence for its effectiveness in shaping behaviors and teaching skills.

The number of BCBAs and BCABAs continues to increase, but at this time family members report a relative paucity of board certified analysts. As a result, it is difficult in most areas, especially rural areas, for beneficiaries to find TRICARE authorized ABA providers.

The impact of the scarcity of certified providers is ameliorated by the commonly practiced business model in which a supervising or lead therapist develops the behavioral treatment plan for a child and then provides indirect supervision of the hands-on ABA tutors (also referred to as technicians or instructors) who engage in the one-on-one treatment with the child. In the best scenario, several tutors then provide each client with the recommended intensity of behavioral services (in the range of 8-40 hrs/wk). Unfortunately, such a provider type is not currently regulated by the states or within the industry, nor is this provider type officially recognized by the BACB. In addition, there is no state or industry oversight of ABA business entities, no standardized education or training of tutors, and no verification of basic protections such as criminal background checks as a condition of employment. While there have been calls for TRICARE to recognize a hands-on ABA provider type with substantially less rigorous training, education and experience standards than is currently recognized, it has been clear that lowering ABA provider requirements would eliminate TRICARE's ability to insure that qualified individuals provide ABA services, posing a risk that ABA would be provided ineffectively or harmfully and potentially facilitating child abuse situations given the vulnerability of the patient population.

III. Development of the autism services plan

a) Ensuring family input to the plan

The Department sought family input into the autism services plan by soliciting and carefully reviewing over 450 e-mails sent by family members with military dependent children with autism. A "ChildrenWithAutism@tma.osd.mil" e-mail address was created and family members were asked to describe personal experiences that would help planners understand the context for providing services to autistic children who are in active duty families, as well as their practical recommendations for the plan itself. In addition, Department officials met in person and by phone with select family members on a number of occasions during the plan development process.

Finally, family members met with the Principal Deputy Assistant Secretary of Defense for Health Affairs and the Deputy Under Secretary of Defense for Military Community and Family Policy in a "listening session" for five family members nominated to represent the Army, Navy, Air Force, Marines and Coast Guard as well as three family members representing national military organizations.

Recurring themes identified by family members were organized into a list of discrete issues or ideas for resolution or exploration. The contributions made by family members in writing and through face-to-face communication have contributed substantively to the development of the short and long-term components of this plan. Specifically, participating family members repeatedly emphasized that children with autism require services beyond those currently available under ECHO and that TRICARE requirements for ABA providers are too stringent. Additionally, participating family members were afforded the opportunity to review and comment upon a draft of this report. Representative examples of family member input are included as Attachment 3.

b) Government/expert input into the plan

Government experts in policy and operations that affect the nature and delivery of services to autistic children were engaged on a frequent basis over several months to review a number of recommendations both related to the required plan and those outside its scope. Government experts acting in their official capacities who participated in the development of the Report to Congress included representatives from a number of offices including[7] the TRICARE Management Activity (TMA), Army Office of the Surgeon General, Army Exceptional Family Member Program, Deputy Under Secretary of Defense for Military Community and Family Policy, Navy Bureau of Medicine and Surgery, United States Coast Guard, DoDEA (Education Directorate), U.S. Department of Education Office of Special Education Programs, and the Office of the Air Force Surgeon General. Additionally, the former Coordinator of Autism Programs at the National Institute of Mental Health was consulted.

IV. Select Issues Related to ABA services

a) Summary of State legislation related to autism services

State laws that mandate coverage of ABA and other services related to the treatment of ASD affect neither the TRICARE basic program benefit nor the TRICARE ECHO benefit. These laws do, however, provide an indication of the range of services that fully insured health insurance programs must cover in those states.[8] Unless otherwise noted, these state laws do not explicitly stipulate any requirement for coverage of ABA nor do they stipulate specific requirements for ABA or behavioral therapy provider qualifications.

[7] DoD offices unless otherwise noted.

[8] A health plan is fully-insured if it is purchased from an insurance company or other underwriter that assumes full risk for medical expenses. The federal Employee Retirement Income Security Act (ERISA) of 1974 exempts self-funded health plans from compliance with state laws and regulations. As a federal entitlement program, TRICARE is not subject to state laws or regulations that mandate coverage.

Eight states have specific laws addressing insurance coverage for autism: Georgia, Indiana, Kentucky, Maryland, New York, South Carolina, Tennessee, and Texas:

Georgia. If a policy includes benefits for neurological disorders, it is prohibited from denying benefits for autism. Such benefits are subject to the same terms, conditions, and scope of treatment as those authorized for other neurological disorders (Ga. Code Ann. § 33-24-59. 10).

Indiana. Policies must include coverage for pervasive developmental disorders, including autism. Coverage may not be subject to dollar limits, deductibles, co-payments, or coinsurance provisions that are less favorable to an insured than those that apply to physical illness. Services are limited to those prescribed by the treating physician. Insurers and health maintenance organizations cannot deny or refuse to issue coverage on, refuse to contract with, refuse to renew or reissue, or otherwise terminate or restrict coverage on an individual because of a pervasive developmental disorder diagnosis (Ind. Code §§ 27-13-7-14.7 and 27-8-14. 2-1 through 27-8-14. 2-5).

Kentucky. Health benefit plans must include coverage, including therapeutic, respite, and rehabilitative care, for the treatment of autism for a child two through 21 years of age. Coverage is subject to a maximum benefit of $500 a month for each covered child (Ky. Rev. Stat. Ann. § 304. 17A-143).

Maryland. Policies must include coverage for habilitative services for children under age 19. "Habilitative services" means services, including occupational, physical, and speech therapies, for the treatment of a child with a congenital or genetic birth defect, including autism, to enhance the child's ability to function. Reimbursement for habilitative services delivered through early intervention or school services is not required (Md. Code Ann. § 15-835).

New York. Policies are prohibited from excluding coverage for the diagnosis and treatment of ASD, including autism (N.Y. Ins. Law § 3221(l)(17)). Under the law, insurers are prohibited from denying hospital, surgical or medical care coverage to policyholders based solely on an ASD diagnosis. The law covers New York State health insurance polices and contracts issued, renewed, modified, altered or amended on or after January 1, 2007.

South Carolina. Under this new law passed on June 7, 2007, health insurance plans will be required to provide coverage for the treatment of ASD for persons who are diagnosed with ASD by eight years of age, with continuing coverage through 16 years of age, for treatments prescribed by a medical doctor. Coverage for behavioral therapy is subject to a $50,000 maximum benefit per year. Under this law, insurers may not deny or

refuse to issue coverage on, refuse to contract with, or refuse to renew or reissue or otherwise terminate or restrict coverage on an individual solely because the individual is diagnosed with ASD. This act will take effect on July 1, 2008, (S.C. Code Ann. § 38-71-280)

Tennessee. If a policy includes benefits for neurological disorders, it must provide benefits for ASD to children under age 12. Such benefits must be at least as comprehensive as those provided for other neurological disorders (Tenn. Code. Ann. § 56-7-2367).

Texas. Under this new law passed on June 16, 2007, health plans will be required to provide coverage for treatments including ABA, behavior training and behavior management for autistic children two to six years of age. The provider must: be licensed, certified or registered by an appropriate Texas agency; or hold a professional credential recognized and accepted by an appropriate agency of the United States; or be a TRICARE-certified provider. This act will apply to policies issued or renewed on or after January 1, 2008. (Tex. Stat. Ann. Ins. § 1355.015)

Eleven other states require coverage for autism through their laws mandating coverage for mental illness; these states are: California, Connecticut, Illinois, Iowa, Kansas, Louisiana, Maine, Montana, New Hampshire, New Jersey, and Virginia.

Notwithstanding state mandates that require fully insured health insurance plans to cover behavioral services for children with ASD, coverage of ABA is not the norm for public entitlement or self-funded health plans in the United States.

b) ABA/Intensive Behavioral Intervention(IBI) Supervisor and Tutor Standards

During the preparation of this report, information concerning existing and recommended provider standards for ABA therapists were collected from a variety of sources. The information presented in the attached tables (Attachments 4 and 5) represents an important source from which the requirements developed for ABA/IBI supervisors and tutors (explained in Part V below) will be derived.

c) DoDEA approach to teaching children with ASD

DoDEA, the Congressionally-mandated authority for the education of military dependent students in overseas and selected stateside locations, provides education to eligible Department of Defense military and civilian dependents from kindergarten through grade 12 at 16 installations within the continental United States, Guam and Puerto Rico, and at DoD Dependents Schools (DoDDS) for students located outside the United States.

The DoDEA report, *Reaching and Teaching Children with Autism Spectrum Disorders*, dated September 2002, includes a "Best Practices Guide" which provides a framework to guide teachers and families in identifying appropriate educational services for students with autism. Examples of the services and approaches discussed in this Guide include:

- Applied Behavior Analysis
- Structured Teaching
- Sensorimotor Therapies
- Play
- Arranging the Learning Environment
- Developing Work Systems
- Behavioral Interventions for Children with Autism
- Functional Behavioral Analysis

All of the techniques noted above are used within DoDEA schools, as necessary to provide free and appropriate public education in accordance with the IDEA. As noted in the report, ABA "is a broad approach for facilitating behavior change" and within the educational setting there may be many individuals who use ABA methods, including teachers, special education teachers, aides, and therapists. Additional information on autism and interventions for optimizing an effective instructional program for students with ASD is provided at Attachment 6.

V. Plan components

Under Section 717(a) of the John Warner National Defense Authorization Act for Fiscal Year 2007, the plan should provide for services to military dependent children with autism under the ECHO program and shall include –

(1) requirements for the education, training, and supervision of individuals providing services for military dependent children with autism;

(2) standards for identifying and measuring the availability, distribution, and training of individuals of various levels of expertise to provide such services; and

(3) procedures to ensure that such services are in addition to other publicly provided services to such children.

During the process of completing this report, a number of potential changes to the ECHO program were considered to address issues and concerns brought to light by beneficiaries, family members who contributed to the preparation of this report, providers, and others. The Department proposes a change in policy and a demonstration program under the Department's demonstration authority under 10 USC 1092 to expand the availability of ABA services to ECHO beneficiaries with autism. The change in policy would expand the definition of who can be a TRICARE-authorized supervisory

ABA provider. The demonstration program will permit TRICARE cost sharing of services by ABA tutors under a modified corporate services model. This policy change and demonstration will allow military families to make more effective use of the special education benefit in the ECHO program. Additionally, as a long-term strategy to improve access to ABA services, the Department plans to encourage private sector-initiated efforts to develop national ABA tutor standards for education, training, experience, competency and supervision.

a) Requirements for the education, training, and supervision of individuals providing services for military dependent children with autism

1) Expand the pool of TRICARE-certified ABA supervisors: TRICARE will modify the TRICARE Policy Manual description of an authorized ABA provider in order to expand the pool of TRICARE-authorized ABA supervisors

Goal: To improve the availability of and access to ABA services for beneficiaries by increasing the number of TRICARE-authorized ABA providers who may provide consulting, training, behavioral plan development and supervision of ABA tutors.

Justification: Beneficiary feedback indicates that there are currently too few TRICARE-authorized ABA providers to meet TRICARE beneficiaries' demand for ABA services. Expanding the pool of supervisory-level providers will have particular benefit in conjunction with TRICARE's plan to authorize reimbursement of ABA tutors, since the combination of these two initiatives would allow the common ABA business model to qualify for reimbursement under ECHO. While it is unknown whether more of these supervisory-level ABA providers are necessary to meet the need for ABA services among TRICARE beneficiaries, it is reasonable to assume that increasing the availability of these providers would have a beneficial effect.

Plan: TRICARE will define licensed and/or certified providers within the mental health, education and related fields whose training, education and experience are compatible with accepted standards for ABA supervisors in the profession. These professionals will have the opportunity to become TRICARE-authorized ABA providers under the ECHO program.

This change will test the advisability and feasibility of permitting TRICARE reimbursement of professional providers not currently authorized to render ABA services for consulting, training, behavioral plan development and supervision of ABA tutors.

2) Recognize ABA tutors as TRICARE providers: The Department will implement a demonstration project to expand the pool of TRICARE-authorized providers who can deliver hands-on services. This will allow TRICARE to reimburse ABA "tutors."

Goal: To provide a temporary bridge to increase availability of and access to ABA services for TRICARE beneficiaries by permitting TRICARE cost-sharing for ABA services when provided by individuals recognized as ABA "tutors" who work within a modified corporate services model, implementing a treatment plan prepared and directed by a TRICARE-certified ABA supervisor, pending development of nationally recognized standards for ABA tutor training, knowledge and experience, and state regulation and oversight of individual and corporate ABA providers.

Justification: Currently, ABA services can be cost-shared only when delivered by TRICARE-authorized providers described in the TRICARE Policy Manual, namely BCBAs and BCABAs. However, ABA industry norms are that BCBAs and, to a lesser extent, BCABAs concentrate their professional activities on behavioral planning, consulting and supervision rather than one-on-one intervention services to children. In the commonly employed corporate services model, a lead analyst (usually a BCBA or BCABA) employs non-certified tutors who deliver the hands-on behavioral treatment under the indirect supervision of the lead analyst. However, there are no standards that govern the profession as to the necessary or appropriate education, training, experience and oversight of tutors. Recognizing individuals other than BCBAs and BCABAs as qualified to have their services covered by TRICARE, when these services are provided through this model, will have the immediate effect of both increasing the pool of ABA providers available to active duty military families and reducing the out-of-pocket cost for the majority of families utilizing the ABA benefit.

Plan: The proposed demonstration project will outline at a minimum education, training, experience, competency and supervision requirements for providers of ABA services working at the "tutor" level. The educational requirement will describe formal academic education in defined general or specific subject matter areas. The training requirement will stipulate an amount of supervised activity in providing ABA or related services. The experience requirement will describe the required accumulated service time delivering ABA and related services. The competency requirement will describe the means to ensure that a provider is able to effectively perform tasks that are critical to the delivery of ABA technical services. Under the proposed demonstration, the Department will stipulate standards for direct supervision (i.e., observation of the tutor while the tutor is delivering services) and indirect supervision (i.e., when the tutor is not being observed delivering services). The Department will specify the required qualifications of the supervisor, to include BCBA and BCABA therapists (and other professionals with recognized education, experience and skills in ABA outlined previously).

This demonstration project will set the requirements for ABA tutors through a process of informed best estimate of the necessary education, training, experience, competency and supervision qualifications required for this level of service provider. The requirements will be derived from current industry practices; recommendations of ABA experts, established ABA service organizations and other interested parties; and

considerations to ensure the quality of care delivered and safety of TRICARE beneficiaries. Individuals who meet these criteria will be recognized as ABA tutors whose services can be cost shared by TRICARE for the duration of the demonstration project.

This demonstration will test the advisability and feasibility of permitting TRICARE reimbursement for ABA services delivered by non-professional providers, under a modified corporate services model, in the absence of state or industry oversight. Neither the TRICARE basic program nor the ECHO program currently authorizes reimbursement for providers working within this type of unregulated corporate structure. A permanent change to the TRICARE benefit to permit reimbursement of services provided by ABA tutors under a corporate services model would require a change to the Code of Federal Regulations.

3) Support field-initiated efforts to develop ABA tutor standards. The Department plans to facilitate efforts by ABA professionals to develop ABA tutor standards.

Goal: To ensure long-term availability and affordability of ABA services for TRICARE beneficiaries by supporting industry efforts to identify national standards of an ABA tutor-equivalent provider class.

Justification: In the interest of putting provider standards in place as quickly as possible, the Department will be establishing criteria that are, of necessity, not evidence-based and therefore are approximations. The Department possesses neither the technical expertise nor the professional mandate to create a standard for behavioral education providers where none currently exists. The creation, development and recognition of a professional entity is a many years long process in which the entity is subject to the scrutiny of scientific examination, professional peers, the public, and governmental regulation bodies. This iterative and extended process is the best means to ensure that a profession 1) develops an identity through education, training and experiential standards, 2) embodies an identifiable and persisting need in the society, and 3) provides professional services that have been repeatedly confirmed by the scientific process as safe and effective.

Provider standards established by TRICARE for the purpose of the ABA tutor demonstration will be approximated by DoD using existing industry practices; recommendations of ABA experts, established ABA service organizations and interested parties; and quality of care and safety considerations. It is not DoD's intent to create professional standards for this profession, as it would inappropriately bypass the process by which a professional group comes into existence and receives public and institutional recognition on a widespread basis. Provider requirements developed without the profession's input and a credible consensus process will not meet the needs of this new

and rapidly evolving profession. An extremely high standard for comprehensiveness, field-generated input, and professional review are required to credibly define a viable national provider class that will achieve recognition within the profession and among clients and third-party payers over time.

It is the intent of the Department that the provider qualifications set forth for the ABA tutor demonstration be in place only as a temporary bridge until national standards are established by an appropriate nationally recognized certifying body for ABA providers.

Plan: The Department intends to encourage nascent efforts within the industry to accurately and credibly define a new ABA provider class that performs services much as have been described in this report for ABA tutors. Such support would be aimed at encouraging a prompt initiation and timely completion of the process of standards development.

b) Means for identifying the availability and distribution of providers

As noted in the recent Government Accountability Office report, *Military Personnel: Medical, Family Support, and Educational Services Are Available for Exceptional Family Members*, dated March 16, 2007, the Department does not limit assignments based on special education needs when making assignments for service members within the United States because children are entitled to special education and related services from their local school systems under the IDEA. As family members noted in their input to this report, this assignment practice sometimes results in military children with autism being assigned to locations where ABA providers are scarce.

As noted in the previously referenced DoDEA report, *Reaching and Teaching Children with Autism Spectrum Disorders*, the number of children diagnosed with ASD has increased nation-wide as well as within the DoDEA schools, and such children have unique needs. However, family members report that the availability of services for children with autism and other disabilities is inconsistent from one location to another and depends, to some extent, on state laws and policies.

Since public schools have primary responsibility for the provision of special education services, and the availability of services is variable, it is impossible to quantify the distribution of individuals of various levels of expertise to provide ABA and other intensive behavioral interventions for children with autism. Within public schools, ABA principles and techniques may be used by teachers, special education teachers, teachers aides, and non-professional tutors.

While the Department cannot determine the distribution of non-certified ABA providers who deliver services through schools and other venues, the BACB has tools

available that show the distribution of certified ABA therapists (BCBAs and BCABAs). Under the TRICARE program, these are the only ABA therapists currently authorized as TRICARE providers of ABA services. Attachment 2 shows the geographic distribution of BCAB-certified ABA therapists.

Market forces are likely to be the primary drivers of the number and geographic distribution of ABA providers across the nation. This is important because military-dependent children with autism represent a very small fraction of the national population of children potentially requiring the services of ABA providers. In addition, there is anecdotal evidence (media reports, family member input, etc.) that many parents (military and civilian) currently pay out-of-pocket for ABA services for their autistic children. As a result, there may be little incentive for providers to geographically locate closer to active duty families just because of TRICARE reimbursement of their services. Finally, because frequent and regular supervision is an essential component of delivered ABA services, any expansion of providers will continue to require an adequate balance between ABA supervisors and those they supervise.

Following the implementation of this demonstration project (and the policy change noted above for ABA supervisors), the Department will evaluate claims data to determine whether the number of beneficiaries receiving ABA services has increased, and whether beneficiaries are accessing more ABA service hours under ECHO.

c) Procedures to ensure that services provided are in addition to other publicly provided services to such children

The Department is required under 10 USC 1079(f)(4) to ensure that special education services provided under the ECHO program are authorized only when public facilities are not available or adequate. The statute states in pertinent part:

> 10 USC 1079(f)(4): "To qualify for extended benefits under paragraph (3) or (4) of subsection (e) *[paragraph (3) includes 'special education'—under which the applied behavior analysis benefit falls],* a dependent of a member of the uniformed services shall be required to use public facilities to the extent such facilities are available and adequate, as determined under the joint regulations of the administering Secretaries."

This statutory requirement is implemented under 32 CFR 199.5(h)(3)(iv). These procedures consist of authorizing ECHO benefits – a process performed by the three regional MCSCs – that consists primarily of determining that the requesting beneficiary is ECHO-registered, and that the requested benefit meets the intent of the ECHO and is not available and adequate from a public facility.

As an example, the regional MCSC for the TRICARE west region, TriWest, assigns a nurse case manager to each beneficiary registered in ECHO. The nurse speaks with the sponsor or beneficiary and determines services that are currently being provided and the identity of the providers, (e.g. the school system) and then obtains the IEP or individualized family service plan (IFSP) that describes the educational and support services that are already being provided to the beneficiary. The IEP is reviewed to determine if the services requested through the ECHO are already being provided by a public facility. If the beneficiary does not have an IEP or IFSP or if the individual is home schooled, then the nurse requests that the school system complete the Public Facility Use Certification form. On that form, the school system is asked to identify any services that are being provided to the child or to confirm that no services are being provided.

VI. Conclusion / Future Plans

Autism affects as many as 1 in 152 children in the United States according to a recent CDC report. The Department has been a leader in providing coverage for health and special education services for children with autism and TRICARE is one of the very few health plans providing coverage for special education services. Though the ECHO benefit was increased from $1000 to $2500 per month in the recent past, TRICARE beneficiaries have found it very difficult to obtain services from TRICARE authorized ABA providers. TRICARE authorized providers are currently limited to those recognized by the BACB. However, the professionalization of the field remains in its infancy and the number of BACB-certified behavior analysts remains limited in number and geographic distribution. These certified professionals are almost exclusively providing behavior analysis and intervention planning services rather than the one-on-one technical intervention that is the actual tool effecting behavior change in autistic children. This new field has yet to define the provider class that delivers the one-on-one technical services to children. ABA tutors will increasingly be asked to provide services to the many children being diagnosed with ASD.

TRICARE believes it can expand the number of ABA providers, both supervisory and hands-on therapists, so that military families can make effective use of the ABA benefit in the ECHO program.

The proposed “ABA tutor” demonstration project is seen as an interim solution to a problem which the industry itself is both acutely aware of and is seeking to solve. The identification and description of a new ABA provider class is an effort most coherently and comprehensively tackled by the profession itself. In this way such a provider class will be integrated into the evolution of the profession and will mature as the profession matures. The potential impact on children with autism demands nothing less than a thoughtful, well-established and comprehensive process for determining the education,

training, experience, supervision and competency standards for this class of providers. Since the Department has an acute need for ABA providers today, and industry implementation of ABA tutor certification will likely not occur until at least 2009, the Department will develop TRICARE-determined provider standards now – consistent with our best educated guess about the provider requirements that are likely to be adopted by industry in the future.

A number of recommendations have surfaced as an important by-product of the effort to respond to Congress's request in Section 717. While these recommendations were not specific to the charge in the congressional language, the Department has every intention of exploring them for items that can be implemented within existing statute and regulation. Specifically, the ability of families to access the respite care benefit available through the ECHO program has emerged as a consistent item of concern among family members and their representatives. While it is expected that the TRICARE policy modification and demonstration project in and of themselves will lead to increased use of the ECHO respite benefit, the Department intends to carefully review the construction of this benefit and consider changes that are necessary to make it available to more families.

Other concerns identified by family members that merit additional consideration by the Department include the perceived lack of support at the base level for families with autistic children, the stated need for case management of autistic beneficiaries, and assignment policy based on special education needs of the service member's dependent children. Still other significant concerns noted by family members on the final page of Attachment 3 are outside the purview of the Department of Defense.

The Department intends to retain the ECHO benefit as currently outlined in 32 CFR 199.5, except for the changes noted in the demonstration project described previously.

TRICARE will continue to work with Department officials as well as family members as it explores opportunities to improve services to special needs children, including those with autism.

Attachment 1:

Behavior Analyst Certification Board (BACB)
Certification Requirements for BCBA® and BCABA® ABA Therapists

Standards for Board Certified Behavior Analyst® (BCBA®)

Eligibility to sit for the BCBA certification examination requires completion of Sections A and B below and compliance with all other rules and requirements of the BACB.

A. Degree Requirement: Possession of a minimum of a bachelor's and a master's degree from any of the following:

1. United States or Canadian institution of higher education fully or provisionally accredited by a regional, state, provincial or national accrediting body; or
2. An institution of higher education located outside the United States or Canada that, at the time the applicant was enrolled and at the time the applicant graduated, maintained a standard of training equivalent to the standards of training of those institutions accredited in the United States.

B. Training and Experience Requirements

OPTION 1: COURSEWORK OPTION

1. Coursework: The applicant must complete 225 classroom hours of graduate level instruction (see Acceptable Coursework below) in the following content areas and for the number of hours specified:
   a. Ethical considerations – 15 hours
   b. Definition & characteristics and Principles, processes & concepts – 45 hours
   c. Behavioral assessment and Selecting intervention outcomes & strategies – 35 hours
   d. Experimental evaluation of interventions – 20 hours
   e. Measurement of behavior and Displaying & interpreting behavioral data – 20 hours
   f. Behavioral change procedures and Systems support 45 hours
   g. Discretionary – 45 hours

Acceptable Coursework: College or university courses in behavior analysis, that are taken from an institution that meets the requirements specified in Section A.

OPTION 2: COLLEGE TEACHING OPTION

1. College Teaching: The applicant must complete a one academic-year, full-time faculty appointment at a college or university (as described in Section A above) during which the applicant:

- Teaches classes on basic principles of behavior, single-subject research methods, applications of basic principles of behavior in applied settings, and ethical issues; and
- Conducts and publishes research in behavior analysis.

EXPERIENCE:

Categories of Supervised Experience:
There are three categories of experience: Supervised Independent Fieldwork, Practicum, and Intensive Practicum. Students may accrue experience in only one category at a time. Practicum and Intensive Practicum may be accrued only in a BACB-approved university experience program.

Amount of Supervised Experience Required:
Supervised Independent Fieldwork: Students must complete 1500 hours of Supervised Independent Fieldwork in behavior analysis. The distribution of Supervised Independent Fieldwork hours must be at least 10 hours per week, but not more than 30 hours per week, for a minimum of 3 weeks per month.

Practicum (University only): Students must complete 1000 hours of Practicum in behavior analysis within a university experience program approved by the BACB. The distribution of Practicum hours must be at least 10 hours per week, but not more than 25 hours per week, for a minimum of 3 weeks per month.

Intensive Practicum (University only): Students must complete 750 hours of Intensive Practicum in behavior analysis within a university experience program approved by the BACB. The distribution of Intensive Practicum hours must be at least 10 hours per week, but not more than 25 hours per week, for a minimum of 3 weeks per month.

Amount of Supervision Required:

COMPARISON OF CATEGORIES

	Supervised Independent Fieldwork	Practicum	Intensive Practicum
Total hours required	1500	1000	750
Supervised hours: % of total hours	5%	7.5%	10%
Total number of supervised hours	75	75	75 minimum
Frequency of supervisor contacts	1 every 2 weeks	1 every week	2 every week

Onset of Experience:
Applicants may not start accumulating experience until they have begun the coursework required to meet the BACB coursework requirements.

Appropriate Applicant Activities:
The applicant's primary focus should be on learning new behavior analytic skills related to the BACB Third Edition Task List. Activities must adhere to the dimensions of ABA identified by Baer, Wolf, and Risley (1968) in the article "Some Current Dimensions of Applied Behavior Analysis" published in the *Journal of Applied Behavior Analysis*. Applicants are encouraged to have experiences in multiple sites and with multiple supervisors.
Appropriate experience activities include:

1. Conducting assessment activities related to the need for behavioral interventions,
2. Designing, implementing, and monitoring behavior analysis programs for clients,
3. Overseeing the implementation of behavior analysis programs by others,
4. Other activities normally performed by a behavior analyst that are directly related to behavior analysis such as attending planning meetings regarding the behavior analysis program, researching the literature related to the program, talking to individuals about the program; plus any additional activities related to oversight of behavioral programming such as behavior analyst supervision issues, or evaluation of behavior analysts' performance. The supervisor will determine if activities qualify.

Supervisor Qualifications:
During the experience period, the supervisor must be:

1. A Board Certified Behavior Analyst in good standing, or
2. Approved University Experience: A faculty member who has been approved by the BACB as an instructor in the university's approved course sequence.

The supervisor may not be the applicant's relative, subordinate or employee during the experience period. The supervisor will not be considered an employee of the applicant if the only compensation received by the supervisor from the applicant consists of payment for supervision

Nature of Supervision:
The supervisor must observe the applicant engaging in behavior analytic activities in the natural environment at least once every two weeks. The supervisor must provide specific feedback to applicants on their performance. During the initial half of the total experience hours, observation should concentrate on applicant-client interactions. This observation may be conducted via web-cameras, videotape, videoconferencing, or similar means in lieu of the supervisor being physically present. Supervision may be conducted in small groups of 10 or fewer participants for no more than half of the total supervised hours in each supervisory period. The remainder of the total supervision hours in each

supervisory period must consist of direct one-to-one contact. Supervision hours may be counted toward the total number of experience hours required.

Standards for Board Certified Associate Behavior Analyst® (BCABA®)

Eligibility to sit for the BCABA certification examination requires completion of Sections A and B below and compliance with all other rules and requirements of the BACB.

A. Degree Requirement: Possession of a minimum of a bachelor's degree from an approved institution (see BCBA description)

B. Coursework and Experience Requirements

1. Coursework: The applicant must complete 135 classroom hours of instruction (see Definition of Terms below) in the following content areas and for the number of hours specified:
   a. Ethical considerations – 10 hours
   b. Definition & characteristics and Principles, processes & concepts – 40 hours
   c. Behavioral assessment and Selecting intervention outcomes & strategies – 25 hours
   d. Experimental evaluation of interventions, & Measurement of behavior and Displaying & interpreting behavioral data – 20 hours
   e. Behavioral change procedures and Systems support – 40 hours

   Acceptable Coursework: Same as for BCBA.

Experience:

Categories of Supervised Experience:
Same as for BCBA

Amount of Supervised Experience Required:
Supervised Independent Fieldwork: Students must complete 1000 hours of Supervised Independent Fieldwork in behavior analysis. The distribution of Supervised Independent Fieldwork hours must be at least 10 hours per week, but not more than 30 hours per week, for a minimum of 3 weeks per month.

Practicum (University only): Students must complete 670 hours of Practicum in behavior analysis within a university experience program approved by the BACB. The distribution of Practicum hours must be at least 10 hours per week, but not more than 25 hours per week, for a minimum of 3 weeks per month.

Intensive Practicum (University only): Students must complete 500 hours of Intensive Practicum in behavior analysis within a university experience program approved by the BACB. The distribution of Intensive Practicum hours must be at least 10 hours per week, but not more than 25 hours per week, for a minimum of 3 weeks per month.

Amount of Supervision Required:

COMPARISON OF CATEGORIES

	Supervised Independent Fieldwork	Practicum	Intensive Practicum
Total hours required	1000	670	500
Supervised hours: % of total hours	5%	7.5%	10%
Total number of supervised hours	50	50	50
Frequency of supervisor contacts	1 every 2 weeks	1 every week	2 every week

Onset of Experience:
Same as for BCBA

Appropriate Student Activities:
Same as for BCBA

Supervisor Qualifications:
During the experience period, the supervisor must be:

1. A Board Certified Behavior Analyst in good standing, or
2. Approved University Experience: A faculty member who has been approved by the BACB as an instructor in the university's approved course sequence.

Attachment 2:
Distribution of BACB Board Certified Analysts and Associate Analysts by State^
(as of May 8, 2007)

^Note: Not all BCBA and BCABA therapists are available to provide services to DoD ECHO beneficiaries with ASD. Some ABA therapists are employed full-time by schools, residential treatment centers, juvenile detention centers, and other institutions. Other therapists teach ABA at colleges. Still others deliver ABA services, but only to individuals with mental retardation and other developmental disabilities.

Attachment 3:
Family Contributors, In Their Own Words

Theme	Representative Comments
Mobility of Military Families / Assignments	… it would be nice to have a reliable one-stop source for information on benefits for that each new location you are required to move to.
	…consider publishing a list of duty stations where the best care is available for EFMP [Exceptional Family Member Program] Autistic Dependents. This would help CSM's and Branch Reassignments (DA) place soldiers in duty assignments that support and facilitate helping Soldiers with Austistic children.
	Families face gaps in [ABA] services for up to two years with each move. You end up reinventing the wheel each time. Given a three year rotation cycle, parents spend significant amounts of time fighting for services.
	Highly mobile military families are always at the bottom of the waiting lists [for Medicaid waiver programs]. Some families don't even bother to put their names on the list because they know it's a ten year wait.
	It would have been helpful to our transition if the losing site and the gaining site shared more information about my son's needs.
	Making sure that EVERY base that houses Autistic children of ANY severity has trained staff to help the parents find the specialists their child is going to need would be a great help.
Base / Service Support	Create autism support groups around military communities. Encourage family members to start support groups and provide them with a starter kit/funds to start and maintain the support group.
	Lack of support at the base level is a major problem for families with autistic children.
	Chain of command often shows lack of sensitivity, no empathy, when it comes to a service member with an autistic child.
	EFMP supposedly looks at the area where you are going to be assigned, but then provides no advice about where to live, which schools to attend, where ABA services are available, etc. There should be a case worker to welcome you and recommend all these things.
Coordination of Care	Is there a way to have TRICARE benefits linked with benefits that are offered by local agencies and provide a pamphlet to the parents of the resources and benefits available in certain areas?
	TRICARE needs to partner themselves with the DoD EMFP, Autism Organizations, and the State and County special needs professionals. Don't stovepipe another program; it's a joint effort by all.
	Losing site and gaining sites need to share more information.
	TRICARE and OSD should consider a case management program for qualifying family members similar to that for wounded service members.
MTF Care and Support of Autistic Children	The pediatricians we have seen on base have never referred us to any specialized doctors or treatments, and those innovative or new treatments that may help our child seem to be off limits because they are with doctors that currently are not on TRICARE's list of providers, or the clinics just have no idea they even exist.
	Each MTF provide a coordinator to build a list of developmental pediatricians, qualified to treat autistic children, as well as Occupational Therapy, Speech Therapy, and Respite Care professionals. Simply saying, "we have services in town" is not enough. There must be a way for parents, new to an area and likely to be transient, to quickly find NETWORK care.
	One thing I have found is there is little to no expertise in the military medical system dealing with autism.

Theme	Representative Comments
Education	…there really needs to be some military avenue where Military families can be assigned an advocate either from the military or someone hired by the military to help parents fight to get the schools to provide the proper services to their children.
	My son was eval'ed by the school district and they barely wanted to give him any treatment where as the medical community wanted to give him more treatment.
	Once they are diagnosed, the child should be able to attend PSCD (Pre-School for Children with Disabilities) immediately, not wait until they are 3.
	Schools are not designed or equipped to provide ABA services, or speech therapy or occupational therapy.
	TRICARE should cover the costs of non-certified ABA home therapists under the following conditions. The home therapist should: • Receive consistent training from a competent and professional BACB certified ABA consultant for a period of six months or more. • Remain with the same family for six months or more. • Demonstrate measurable and documented progress as evidenced by quality ABA data. • Provide continual updates on the child's progress, with confirmation from the family and ABA consultant
	There should be a law to require public schools [at the new duty station] to accept the IEP [individual education plan] that old school [at the previous duty station] developed.
	…the emphasis on BCBA [Board Certified Behavior Analyst] providers is overly restrictive. Individuals with a BCBA need to only have a Master degree, five additional classes or classes subsumed within their degree and 1000 hours of supervised experience.
Applied Behavior Analysis (ABA)	The ABA benefit needs to be easier to get.
	Access to ABA services is vital for our children. With the mobile nature of military families, gaps are too common.
	It would really be great if therapists could be contracted or affiliated with the medical centers. I was pretty much on my own to find a qualified therapist, pretty scary to think what might be out there treating our kids.
	Provide money for those who need ABA therapy in their home, give them waivers for those who are not specialists (who are expensive) but those individuals trained and under the guidance of the specialist to do so.
	Because autism spectrum disorders range from mild to severe, I would suggest having 2 levels of coverage. Those that are severely affected may need 40 hours of ABA since ABA is generally not available in the public schools. However, for children in the moderate to mild end of the spectrum, 10 hours a week may be all they can fit into a schedule with other school settings providing additional support and necessary interaction with typically developing peers.
	Licensed Psychologists can provide appropriate behavior supervision, behavior analysis and behavior interventions under psychology licensing law in all 50 states.
	Within my agency, BCBAs [Board Certified Behavior Analysts] are not allowed to independently supervise cases, but are under the supervision of licensed professionals who can more fully evaluate the range of treatment issues and needs.
	Restrictive provider standards mean that the majority of [military] families are unable to access services.
	I feel that the amount of money authorized for this therapy should be based on the severity of Autism that the child has.

TRICARE and/or ECHO Benefit	[TRICARE should cover] Genetic counseling - for those families who want to have more children but are fearful they carry a genetic defect.
	We would not expect tricare to cover costs of unapproved or research related treatments, but would ask that tricare allows for various degrees and kinds of treatments as each case of autism is unique and each child with autism requires a personalized set of goals and treatment plans.
	Please add RDI [Relationship Development Intervention] to the list of autism interventions approved for reimbursement.
	He was able to do the hippo-therapy [horse-aided therapy] summer program that helped him improve in many areas. ONLY TRICARE would not pay for any of it.
	Provide an aide in-classroom as a benefit.
	Add a personal care aide to ECHO [Extended Care Health Option] benefit.
	Cost-share residential home for autistic adult dependents as well as adult day care.
	Respite care should include not only a Home Health Aid for the autistic child but also a babysitter for the other children in the family.
	Provide no-red-tape/barrier-free access to qualified providers in the areas of language & speech development, social skills, self-help skills, and most needed behavioral modification issues.
	The ECHO benefit should be increased to provide payment for 35 actual hours per week of IBI [intensive behavioral intervention].
	The ECHO benefit should cover private school.
	Nutritional counseling should be covered…Many children benefit from GF/CF [gluten-free, casein-free] diets, etc., and many children fall into the "picky eater" category, which obviously affects development.
	$2,500 is not enough.
	So how about being able to choose what therapy you'd like to use with the $2,500, rather than just ABA.
	I would love to see a service where we [have]…the ability to choose what I think is best for my child without the worry that it is covered. In other words, I would love to go see who I think my child needs with it being paid 100% no question. I would love to have ALL medication paid for with no question. Just because it's not on your allowed list does not mean that it won't help our children.
Other	We don't know how many autistic children there are in DoD; we need a database.
	There is a critical need for "no strings attached" respite care because of the Global War on Terrorism.
	Develop programs and support for adults with Autism. As the children get older, support and assistance will change once they turn 18. They will still need assistance once they are considered adults. So will the parents of "adults" with Autism.
	Place DoD/TRICARE efforts into the County school systems as a partnership; that's where the most impact has been made with [my son's] developmental growth spurts.
	If parents could use a voucher to pay for what they need, it would help bridge the gap [in availability of services].
	Fix service members' loss of Supplemental Security Income benefits for disabled children when deployed SMs receive mandatory deployment-related special pays and allowances (additional income makes them ineligible for SSI benefit).
	Help families to plan for the future of the autistic children.
	Career success means moving to places where [ABA] services are not available.

Attachment 4:

ABA/IBI Director/Supervisor Standards

		Standards					
Originator	**Title/Role**	**Education**	**Training**	**Experience/ Certification**	**Competency**	**Ongoing Supervision**	**Other**
ACES[1]	Supervisor	BA or Masters degree in related field	None specified	1) BCBA* or BCABA* for TRICARE 2) For other payers, 3 years experience working with children with autism and employed by ACES for at least one year.	None specified	Clinical director who has Masters degree and 3-4 years of experience in field must have been a supervisor for at least one year with ACES. Supervisors are directly supervised at least 2 times per month and twice per month as a group.	1) CBC* 2) TB* "clearance" 3) CPR*/ First Aid trained
CARES[2]	Supervisor			BCBA* *or* BCABA* *or* licensed psychologist		BCBA* or BCABA* supervisors are supervised weekly by a licensed psychologist	

ABA/IBI Director/Supervisor Standards

		Standards					
Originator	**Title/Role**	**Education**	**Training**	**Experience/ Certification**	**Competency**	**Ongoing Supervision**	**Other**
CARD[3] Present to December 31, 2009	Program Supervisor	MA in Psychology, Education, Behavior Analysis, Behavior Science, Human Development, Social Work; *or* a credential in school counseling, school psychology, special education, MFCC, clinical social work, educational psychology; *or* State psychologist license	Passed didactic training for ABA Instructors (see Attachment 5). Minimum 40 hours didactic training provided by reputable agency that is directed by a BCBA*.	Passed field training for ABA Instructors (see Attachment 5). Minimum 3 months full-time co-supervision of clients with a mentor in a reputable agency that is directed by a BCBA*.	Must demonstrate competencies in the topics defined for didactic training. Must pass reputable agency's internal written and oral exams.	None	1) CBC* required 2) PLI* required
CARD[3] January 1, 2010 to December 31, 2012	Program Supervisor			Requirements above AND 2 years experience in the field of ABA working with children			
CARD[3] After January 1, 2013	Program Supervisor			Requirements above *and* BCBA*			

ABA/IBI Director/Supervisor Standards

		Standards					
Originator	**Title/Role**	**Education**	**Training**	**Experience/ Certification**	**Competency**	**Ongoing Supervision**	**Other**
CARD[4]	Senior Therapist	Jr./Sr. level undergraduate or BA in psychology or related field	CARD therapist training and 27 hours of training by CARD, inclusive of lecture, modeling, role play and feedback.	Eligible to become Senior Therapist after employed by CARD as therapist for one year	Must receive a passing grade on CARD a 3 hour written examination and oral presentation.	Supervised by supervisors with Masters degree in psychology or related field, but not required to have BCBA* or BCABA* certification.	Must pass field evaluation and written pre-training exam administered by CARD prior to Sr. therapist training.
	Supervisor	Masters in psychology or related field	CARD therapist/Sr. therapist trainings and 70 hours of training by CARD, inclusive of lecture, modeling, role play and feedback.	96 hours of written assignments and 127 hours of practical experience under the direct supervision of a managing supervisor	Passing grade on a 6 hour written exam administered by CARD, passing grade on all written and practical assignments, and passing grade on a 4 hour oral examination	Supervised by Director of program Dr. Doreen Granpeesheh who is a clinical psychologist. On-going training on developments in autism and ABA	

ABA/IBI Director/Supervisor Standards

		Standards					
Originator	**Title/Role**	**Education**	**Training**	**Experience/ Certification**	**Competency**	**Ongoing Supervision**	**Other**
Province of Ontario, Canada These providers are Provincial employees working within government facilities.	Clinical Director: Responsible for overseeing, monitoring, and evaluation of the intensive behavioral intervention, client assessments and Individual Program Plans.	Doctoral degree in Psychology	Training and extensive clinical experience in intensive behavioral intervention for children with autism. Eligible/registered with College of Psychologists of Ontario.				1) CPR* 2) First Aid and Crisis Prevention and Intervention training
	Senior Therapist: Responsible for a set number of children and for supervising instructor therapists (see Attachment 5). Provide families with training related to behavioral intervention and home programming.	Working towards master's level graduate degree in psychology or related field. Alternative combinations of clinical experience and educational backgrounds might also be appropriate.		6 months direct clinical experience in an IBI program for children with autism.		Ongoing clinical supervision from Clinical Director/Supervising Psychologist	

ABA/IBI Director/Supervisor Standards

		Standards					
Originator	**Title/Role**	**Education**	**Training**	**Experience/ Certification**	**Competency**	**Ongoing Supervision**	**Other**
University of Washington Autism Center	Supervisor	Masters Degree in Special Education or Psychology, or BCBA* working toward one of the above degree plans.		BCBA* *or* BCABA* certification not required for this level if the person has masters degree in special education or psychology.		Supervisors are reviewed 1-4 times per month by the Director of this program who has PhD in psychology but is not a licensed psychologist.	
Microsoft ABA Benefit Provider Requirements	Certified Provider/Program Manager	Masters or PhD in education, psychology, speech/language pathology, behavior analysis, or occupational therapy Specialization of the master's or PhD in child clinical psychology, special education, applied psychology, behavior analysis, or speech/language pathology		1500 documented and supervised hours of providing one to one intensive behavioral program consultation or program manager services to children with autism spectrum disorders. Services can be provided in center, school or home. Supervised hours must meet the following criteria: a. One hour of supervision has occurred for every 20 hours of service, i.e., a minimum of 75 hours of supervision. b. At least 500 hours of consultation or program manager services must be home-based *or* must involve substantial contact with/service to families. c. Supervised by an individual with qualifications specified in numbers 1 and 2 above and extensive experience supervising or providing intensive behavioral program consultation services for children with autism *or* BCBA*		None identified	

ABA/IBI Director/Supervisor Standards

		Standards					
Originator	**Title/Role**	**Education**	**Training**	**Experience/ Certification**	**Competency**	**Ongoing Supervision**	**Other**
Ms. Karen Driscoll[5]	Clinical Director: Serves as clinical director of ABA agency. Supervises Program Supervisor. Reviews and approves treatment reports prepared by Program Supervisor	Masters degree in behavior analysis, psychology, special education, or another human service discipline	1) BCBA* *or* 2) has extensive training and experience in application of ABA principles in treatment of ASD Has taken relevant coursework in behavior analysis, research design, legal and ethical issues.	Supervised practicum, internship, or employment experiences in ABA.	Not addressed	Not addressed	1) ABA Agencies to carry GLI* and PLI* $1M or greater 2) Cleared CBC*
	Program Supervisor	Bachelor's degree	1) BCBA* or BCABA* certification *or* 2) Two years training and hands on experience in the application of ABA principles in treatment of children with ASD.	Experience should have been supervised by an individual at the Clinical Director level.	Evaluated annually on all aspects of competency	Receives supervision and training from Clinical Director on an ongoing basis.	

ABA/IBI Director/Supervisor Standards

*** ACRONYMS**

ABAT - Applied Behavior Analysis Tutor	BCBA - Board Certified Behavior Analyst	ITP - Individualized Treatment Plan
ASD - Autism Spectrum Disorder	CBC - Criminal background check	PLI - Professional liability insurance
BCABA - Board Certified Associate Behavior Analyst	GLI - General liability insurance	TB - Tuberculosis skin test

Footnotes to Attachment 4

[1] ACES / Comprehensive Educational Services, Inc. is an autism services provider with centers in San Diego and Orange, California.

[2] Center for Autism Research, Evaluation and Service (CARES) is a private sector agency providing assessment and treatment services to children with autism. CARES is centered in southern California with its main office in San Diego.

[3] Center for Autism and Related Disorders (CARD), Inc. has its headquarters in Woodland Hills, CA. CARD uses ABA techniques within a comprehensive autism treatment program and has fifteen centers in the U.S. (nine in California), three internationally. These standards were provided independently to TRICARE by several sources and represent what CARD recommends as standards for IBI/ABA directors/supervisors delivering services to TRICARE beneficiaries.

[4] These recommendations were provided by CARD and represent standards for ABA directors/supervisors operating within their own centers.

[5] Ms. Driscoll represented the U.S. Marine Corps as a family member participant in the preparation of the NDAA 2007 Sec 717 Report to Congress and reported that she received input from parents of military-dependent children with autism in preparing this recommendation.

Attachment 5:

ABA/IBI* Tutor Standards for Field Practice

Recommended/Instituted Requirements[1]

		Standards					
Originator	**Title/Role**	**Education**	**Training**	**Experience**	**Competency**	**Ongoing Supervision**	**Other**
ACES[2]	Tutor	1) High School degree and continuing education (amount unspecified) *or* 2) BA in Education or Psychology *or* 3) Teachers Aide certificate and 2 years practical experience	70 hours of "In-field Observation and Methodology Training" 35 hours of "In-field Training and Support"		No specific criteria identified	1) Direct observation of ABAT* delivering services by supervisor[1] 1-2 "times" per month 2) Supervisors "regularly" review data book for child's progress 3) Clinic meetings used as additional form of supervision	1) CBC* 2) TB* "clearance" 3) CPR*/ First Aid trained
CARES[3]	[tutor]	Bachelor's degree	15 hours didactic training; training in documentation requirements.			CARES	

ABA/IBI* Tutor Standards for Field Practice

		Standards					
Originator	**Title/Role**	**Education**	**Training**	**Experience/ Certification**	**Competency**	**Ongoing Supervision**	**Other**
CARD[4] Present to December 31, 2009	Therapist [tutor]	Enrollment towards BA in Psychology, Education, Behavior Analysis, Behavior Science, Human Development, Social Work	Minimum 20 hours didactic training under supervision of "qualified" ABA supervisor. Defined minimum curriculum of 21 topics identified	Minimum 25 hours "field training" with "qualified" ABA therapist	Must demonstrate proficiency of therapeutic methodologies and understanding of ABA principles per written and field evaluations	Must receive ongoing supervision at a rate of 4 hrs/month by a "qualified" ABA supervisor.	Neither CBC* nor PLI* required
CARD[4] January 1, 2010 to December 31, 2012		BA in Psychology, Education, Behavior Analysis, Behavior Science, Human Development, Social Work					
CARD[4] After January 1, 2013		BA in Psychology, Education, Behavior Analysis, Behavior Science, Human Development, Social Work *and* BCABA*					

ABA/IBI* Tutor Standards for Field Practice

		Standards					
Originator	**Title/Role**	**Education**	**Training**	**Experience**	**Competency**	**Ongoing Supervision**	**Other**
CARD[5]	Therapist [tutor]	Jr./Sr. level undergraduate or BA in psychology or related field	24 hrs of in office training by CARD, inclusive of lecture, modeling, role play and feedback.	40 hours of direct 1:1 supervised field experience with a Senior Therapist	2 hour written exam administered by CARD final 2 hour field evaluation during a session.	2-3 hours/month on-going training. 2-6 hours/month direct supervision per case (by case supervisor). 2 hours/month drop in evaluation by senior therapist or supervisor. 30 minutes/month evaluation feedback by supervisor.	1)CBC* 2) TB* clearance
Autism and Behavioral Sciences College Certificate Training, Sarah Lawrence College, Province of Ontario, Canada[6]	Instructor therapist [tutor]	Minimum of a 2 or 3 year college diploma (Early Childhood Education, Developmental Service Worker, Child and Youth Worker, etc.) *or* undergraduate degree (BA psychology)	405 hours of ABA specific coursework	350 hours field placement (observation and practice of ABA). Practice supervised at all times by either practicing ABA tutor of MA level Senior Therapist	Didactic tests and supervisor evaluation forms. Additional competencies evaluated via live observation of student providing services	N/A	General college entry requirements

ABA/IBI* Tutor Standards for Field Practice

		Standards					
Originator	**Title/Role**	**Education**	**Training**	**Experience**	**Competency**	**Ongoing Supervision**	**Other**
Microsoft ABA Benefit Provider Requirements	[tutor]	ABA tutors are hired independently by families and overseen/supervised by Microsoft ABA Certified Provider/Program Manager (see Attachment 4). Families are provided literature with guidance on choosing an ABA tutor and are advised against leaving their children alone with the tutor.					
Provincial Training for Autism service providers (Instructor Therapists) Province of Ontario, Canada Instructor Therapists (ITs) are Provincial employees working within government facilities.	Instructor therapist [tutor]	Minimum of a 2 or 3 year college diploma (Early Childhood Education, Developmental Service Worker, Child and Youth Worker, etc.) or undergraduate degree (BA psychology, related field)	75 hours of classroom instruction - trainees must pass a written exam with 80% then they begin working with children under the supervision of a Senior Therapist (see Attachment 3)	The Senior Therapist who directly supervises that new ITs will determine how much supervision, hands on training, etc., to get the staff working longer periods of time more independently. On average 3 months supervised experience with 3 hours direct observation/week .	Practice competency for new ITs evaluated via a live or taped intervention session (1:1 with a child for approx. 45 minutes) employing a provincial scoring tool.	Continue to work under the super-vision of a Senior Therapist and Psychologist who are responsible for the child's therapy. Direct supervision may mean the formal scheduled review of each child and this is done weekly by super-vising staff and by looking at charts, at team meetings (bi-weekly/monthly), and at other times is informal.	CPR* First Aid and Crisis Prevention and Intervention training

ABA/IBI* Tutor Standards for Field Practice

		Standards					
Originator	**Title/Role**	**Education**	**Training**	**Experience**	**Competency**	**Ongoing Supervision**	**Other**
Gina Green, PhD[7]		High School Education	Didactic training in ABA concepts to pass written objective test	Hands-on training with at least one child in a wide variety of techniques	Must pass with >90% accuracy direct observational evaluation of skills	1) Of development of ITP*, ABAT* and parents by BCBA*. BCABA* can assist, with tasks under supervision of BCBA 2) Direct observation of ABAT*/parent delivering services by BCBA*/BCABA* supervisor minimum 42 min/wk. 3) Direct ongoing didactic and hands-on supervision to ABAT* minimum 1 hr/month	1) Employer provider must do CBC* on every ABAT* employee 2) Employer provider must have PLI*

ABA/IBI* Tutor Standards for Field Practice

		Standards					
Originator	**Title/Role**	**Education**	**Training**	**Experience**	**Competency**	**Ongoing Supervision**	**Other**
Ms. Karen Driscoll[8]	[tutor]	Bachelor's degree *or* a minimum of undergraduate coursework in progress	Training includes lecture on theory and practice of ABA and direct instruction and demonstration of teaching principles and techniques	Experience in implementing ABA helpful, but not required	Masters level Clinical Director[9] ensures initial and ongoing training. Competency assessed through direct observation and objective measures of ability to demonstrate key ABA principles and techniques	1) Supervisory consultations provided on regular basis. Supervisor is a) BCBA* *or* b) BCABA* *or* c) 2 years training and hands-on experience in the application of ABA principles in treatment of children with ASD 2) Meetings held on ongoing basis to review progress, problem solve areas of difficulty, introduce new goals and monitor implementation of therapy techniques	1) CBC* 2) CPR*/ First Aid 3) ABA Agencies to carry GLI* and PLI* $1M or greater

ABA/IBI* Tutor Standards for Field Practice

		Standards					
Originator	**Title/Role**	**Education**	**Training**	**Experience**	**Competency**	**Ongoing Supervision**	**Other**
LTC Scott Campbell[10]	Therapy assistant [tutor]	High school diploma	1) 4 hours of non hands-on ABA training 2) Completes additional training each year	8 hours of hands-on supervised experience	No specific criteria identified	Supervision 1 hr/month with: a) BCBA* or b) BCABA*	1) CBC* 2) PLI* for corporate provider/supervisory analyst 3) Lead analyst must submit update to treatment plan every 6 months

ABA/IBI* Tutor Standards for Field Practice

*** ACRONYMS**

ABAT - Applied Behavior Analysis Tutor	BCBA - Board Certified Behavior Analyst	ITP - Individualized Treatment Plan
ASD - Autism Spectrum Disorder	CBC - Criminal background check	PLI - Professional liability insurance
BCABA - Board Certified Associate Behavior Analyst	GLI - General liability insurance	TB - Tuberculosis skin test

Footnotes to Attachment 5

[1] In some cases the standards outlined were provided as recommendations to TRICARE, in others the standards represent current practice as it exists in the identified organization.

[2] ACES / Comprehensive Educational Services, Inc. is an autism services provider with centers in San Diego and Orange, California

[3] Center for Autism Research, Evaluation and Service (CARES) is a private sector agency providing assessment and treatment services to children with autism. CARES is centered in southern California with its main office in San Diego.

[4] Center for Autism and Related Disorders (CARD), Inc. has its headquarters in Woodland Hills, CA. CARD uses ABA techniques within a comprehensive autism treatment program and has fifteen centers in the US (nine in California), three internationally. These standards were provided independently to TRICARE by several sources and represent what CARD recommends as standards for ABA tutors delivering services to TRICARE beneficiaries.

[5] These recommendations were provided by CARD and represents standards for ABA tutors operating within their own centers.

[6] This certification program is being reviewed by Provincial authorities for consideration as the standard for pre-employment training and education for ABA tutors.

[7] Dr. Green is a Board Certified Behavior Analyst and researcher in applied behavior analysis working in San Diego, CA. She provided her recommendations to Mr. Don McKinney, District Representative of Congressman Darrell E. Issa (R-CA).

[8] Ms. Driscoll represented the U.S. Marine Corps as a family member participant in the preparation of the NDAA 2007 Sec 717 Report to Congress and reported that she received input from parents of military-dependent children with autism in preparing this recommendation.

[9] BCBA/BCABA not required.

[10] LTC Campbell, an interested service member, submitted his recommendations to the Deputy Chief Medical Officer of TRICARE Management Activity in a letter dated September 14, 2006.

Attachment 6:
Department of Defense Education Activity
Approach to Teaching Children with Autism Spectrum Disorders

The Department of Defense Education Activity (DoDEA), the Congressionally-mandated authority for the education of military dependent students in overseas and selected stateside locations, provides education to eligible DoD military and civilian dependents from kindergarten through grade 12 through two programs: 1) the DoD Domestic Dependents Elementary and Secondary Schools (DDESS) for dependents at 16 installations within the continental United States, Guam and Puerto Rico, and 2) the DoD Dependents Schools (DoDDS) for students located outside the United States in Europe, Korea, mainland Japan, and Okinawa.

The DoDEA report, "Reaching and Teaching Children with Autism Spectrum Disorders: A Best Practices Guide," dated September 2002, is a comprehensive document intended to provide information and best practice guidance for teachers, paraprofessionals, related service providers, parents and administrators in educating children with ASD. The report provides a framework to guide teachers and families in identifying appropriate educational services for students with autism; descriptions of several types of services for autistic children used within schools; and recommendations for best instructional practices for individuals with ASD.

According to the Guide, in DoDEA schools, an appropriate instructional program for students with ASD is:

- Based on current research and state-of-the-art practices;
- Developed for individual students on the basis of comprehensive and accurate assessments conducted by school and medical personnel;
- Determined by a multidisciplinary Case Study Committee (CSC) team that includes the student's parents and the student, when appropriate;
- Comprised of a variety of approaches and instructional strategies for program planning and intervention;
- Implemented by appropriately trained and competent school and medical personnel; and
- Evaluated by systematic measurement of student outcome-based progress.

Examples of the approaches to educational programming are provided in the following excerpts from the Guide:

Developmental Approach
Treatment methodology derived from the developmental approach provides a "blueprint" from which to select sequential skill objectives, according to the individual's unique profile of learning strengths and weaknesses. The Developmental Approach particularly lends itself to programming for social relationships and affective behaviors. Specific goals could involve establishing the developmental sequence of social and emotional skills.

Applied Behavior Analysis (ABA)
The ABA principles, with their emphasis on highly structured and sequenced teaching strategies, and systematic, data-based evaluation methods, are especially suited to the goal of effective instruction for students with ASD. Intervention programming that employs an ABA approach

attempts to (1) understand skill and behavior strengths and deficits, (2) to structure the learning environment, (3) systematically teach discrete, observable steps that define a skill, and (4) teach generalization and maintenance of newly learned skills. It is important to realize that "Applied Behavior Analysis (ABA)" is a broad approach for facilitating behavior change. One specific training method within ABA is referred to as "Discrete Trial Training (DTT)" and can be effective when applied to a particular skills and behavior. Some instructional objectives lend themselves quite well to a DTT approach. For example, a receptive labeling task (e.g., "Show me the [noun]") would be quite easily and appropriately taught through a 10-trial session in which the trial is identically presented and practiced with consequences for successful trials. The next level of planning would involve consideration of specific skills that should be taught through discrete trial training.

Structured Teaching

Structured teaching is a way to develop teaching strategies and to change the environment to make the world more meaningful for children with special needs. These structures can be utilized at all developmental levels and do not limit the curriculum. They are simply a component of the curriculum. An integral part of the ASD student's program planning should include behavioral techniques for structuring the environment and setting up tasks. Ideas for this level of programming are based on the structured teaching strategies developed and refined by the Treatment and Education of Autistic and related Communication handicapped Children (TEACCH) program.

Psychotherapies

Mental health providers can play a valuable role in a comprehensive program for a student with ASD. For example, mental health professionals within the schools, communities and medical facilities should provide support for families, particularly for families whose child has recently received a diagnosis of ASD. Mental health providers can also consult with teachers, facilitate social skills groups for students, and assist with in-service training for school faculty and community personnel. Although it has been well-documented in the research literature that individualized psychotherapy (e.g., "talk therapy") is not particularly effective with children with ASD, therapeutic strategies can certainly be geared toward behavioral change and skill-building.

Sensorimotor Therapies

In recent years sensory integration theory has provided valuable information about how individuals with ASD process and respond to incoming sensory stimulation. There is now clear evidence that sensory integration difficulties can significantly influence an individual's behavioral functioning, and that activities which address sensory deficits or excesses can assist students with ASD in developing independent functioning. For example, inclusion of stimulatory and regulatory activities such as rhythmic rocking, sequential body pressure and joint compression input, swinging, jumping, moving to music, and swimming may be beneficial strategies for encouraging attention to task and calming children.

Play

Play activities have long been included in interventions for children with various psychological and medical disorders. The literature on educational practices has documented the role of play activities as an effective tool for teaching children diagnosed with ASD. The

TEACCH program, for example, has acknowledged that typical play behaviors are very difficult for many children with ASD to learn independently or vicariously. However, structured teaching of play activities fits with the adage "play is work, and work is play" for children with ASD. Play should be used to teach appropriate manipulation of a variety of play and leisure items. Play activities can gradually increase the child's tolerance for playing alongside and cooperatively with others. These play activities can be conducted in individualized instructional settings, and through small play groups. Play training can also be instrumental in facilitating social, language, and cognitive development in non-threatening and natural environments. Development of individual play goals, and even a play group, for children diagnosed with a ASD should involve consideration of each child's level of functioning, and unique needs. The group activities should be carefully planned with specific target goals and structured to provide each child with the opportunity to develop or enhance new skills. [*NOTE: Traditional, psychoanalytically oriented play therapy geared to help the child develop more effective coping strategies, is not an effective strategy for children with autism.]*

Finally, the guide provides descriptions of a number of best practices for individuals with ASD, including insuring an appropriate student-teacher ratio and intensity of services; facilitating an effective transition from Early Intervention to school services; insuring effective sharing of information among agencies and providers; enhancing parent involvement and commitment; insuring optimal use of resource personnel; arranging the learning environment to improve a student's independent functioning and his recognition and compliance with rules and limits; adopting effective techniques for managing challenging behaviors; choosing appropriate instructional strategies; training peer partners; and transitioning from school to adult life.

Attachment 7:
Table of Abbreviations

ABA	applied behavior analysis
ABAT	applied behavior analysis tutor
ACES	ACES, San Diego, CA
ASD	Autism Spectrum Disorders
ABA	applied behavior analysis
BACB	Behavior Analyst Certification Board
BCBA	Board Certified Behavior Analyst®
BCABA	Board Certified Associate Behavior Analyst®
CARD	Center for Autism and Related Disorders, Inc., San Diego, CA
CARES	Center for Autism Research, Evaluation and Service, San Diego, CA
CBC	criminal background check
CDC	Centers for Disease Control and Prevention
CFR	Code of Federal Regulations
CPR	cardiopulmonary resuscitation
DIR	Developmentally-based Individual-difference Relationship-based Intervention
ECHO	Extended Care Health Option
DoDEA	Department of Defense Education Activity
DDESS	Domestic Dependents Elementary and Secondary Schools
DoDDS	Department of Defense Dependents Schools
EFMP	Exceptional Family Member Program
GLI	general liability insurance
IBI	intensive behavioral intervention
IDEA	Individuals with Disability Education Act
IEP	individual education plan
IFSP	individualized family service plan
IT	instructor therapist
ITP	individualized treatment plan
MCSC	managed care support contractor
MFCC	marriage, family, and child counseling
PFPWD	Program for Persons with Disabilities (PFPWD)
PLI	professional liability insurance
RDI	Relationship Development Intervention
TB	tuberculosis
TEACCH	Treatment and Education of Autistic and related Communication-handicapped Children
USC	United States Code

Ex. B to Affidavit of Douglas G. Hildebrand dated March 23, 2000

Preliminary Report

Cost-Benefit Analysis of Lovaas Treatment For Autism and Autism Spectrum Disorder (ASD)

This is Exhibit "B" referred to in the affidavit of Douglas G. Hildebrand sworn before me, at Vancouver, BC this 23rd day of March 2000

A COMMISSIONER FOR TAKING AFFIDAVITS FOR BRITISH COLUMBIA

Prepared for
Harper Grey Easton
Barrister and Solicitors

Submitted by
Columbia Pacific Consulting
1550 – 650 West Georgia Street
Vancouver, B.C. V6B 4N8

December 7, 1999

Table of Contents

1.0 Introduction and Summary

Columbia Pacific Consulting was retained by Harper Grey Easton to undertake a preliminary cost-benefit analysis of the Lovaas treatment. The primary objective of the study is to determine if the Lovaas treatment represents an efficient allocation of government health care expenditures.

Columbia Pacific developed the analytical framework for the study including a computerized cost-benefit model which is capable of efficiently producing results for a range in key assumptions. The basic methodology applied in this analysis is consistent with cost-benefit studies[1] conducted in the United States. The key "cost" assumptions which essentially drive the model were developed through discussion with Harper Grey Easton and, in turn, extensive material provided to Harper Grey Easton by the provincial government.

Principal benefits of Lovaas treatment is the avoided cost of care services which may persist over the individual's lifetime if no such treatment is received in the individual's early childhood. In addition to the cost savings, an additional benefit from the Lovaas treatment is the increased expected lifetime earnings an individual with autism or ASD may enjoy over his/her lifetime.

The cost-benefit analysis is carried out in constant 2000 Canadian dollars over a hypothetical 3-year-old's lifetime. The cost-benefit model has been applied to a Base Case ("most likely" case) as well as various other cases where key assumptions in the Base Case are altered for purposes of sensitivity analysis. Parameters subject to sensitivity test include:

- the outcome distributions in both "with" and "without" Lovaas treatment scenarios;
- the cost of Lovaas early intensive intervention;
- the actual current provincial government funding for care and services relative to the Base Case level;
- the cost level assumed in the analysis;
- the effectiveness of the Lovaas treatment;

[1] John W. Jacobson et al (1996), *Financial Cost and Benefits of Intensive Early Intervention for Young Children with Autism – Pennsylvania Model Achieving Cost Savings.*

- the discount rate.

Two evaluation criteria are employed to assess the results: net benefits and internal rate-of-return[2].

The results of our preliminary study indicate substantial per capita cost savings from the Lovaas treatment over a 3-year-old's lifetime. A listing of some preliminary results is provided below relative to our valuation date of April 1, 2000:

- In the Base Case, the cost savings per child are estimated at $1,005,600 excluding labour income and $1,150,000 including labour income, assuming the Law and Equity Act real discount rate of 3.5% for service costs and 2.5% for labour income; the estimated internal rate-of-return is approximately 42%[3];

- In the case where the lowest success rate in "with" Lovaas treatment scenario is obtained, the cost savings per child are estimated at $642,200 excluding labour income and $761,300 including labour income; the estimated internal rate-of-return is approximately 31%;

- In the case where the cost for Lovaas early intensive intervention is 30% higher than the assumed level in the Base Case, the cost savings per child are estimated at $950,000 excluding labour income and $1,094,400 including labour income; the estimated internal rate-of-return is approximately 25%;

- In the case where the success rate in "with" Lovaas treatment is 50% higher than the assumed rate in the Base Case, the cost savings per child are estimated to be $1,368,900 excluding labour income and $1,538,700 including labour income; the estimated internal rate-of-return is approximately 52%;

- In the case where actual current government expenditure on care services is 20% below the assumed level in the Base Case, the cost savings per child is estimated at $767,400 excluding labour income and $911,800 including labour income; the estimated internal rate-of-return is approximately 27%;

- With a real discount rate at 8%, the cost savings per child are estimated at $369,800 excluding labour income and $395,600 including labour income.

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[2] Net benefits are discounted to present value at a specified discount rate (cost of capital). Internal rate-of-return is the real discount rate that equates benefits and costs.

[3] This internal rate-of-return is calculated based on cost savings excluding wage income. Including wage income increases this return by less than one percentage point.

This preliminary report consists of four sections. Section 2.0 outlines the analytical framework that was used in the cost-benefit analysis. Section 3.0 presents the main results from the Base Case as well as those from the sensitivity analysis. Section 4.0 provides the cost-benefit study conclusion.

2.0 Cost-Benefit Analysis Framework

2.1 Overview

The general framework is one of comparing the expected lifetime costs for a child afflicted by autism or autism spectrum disorder (ASD) under two alternative scenarios: (i) "with" Lovaas treatment; (ii) "without" Lovaas treatment.

In order to determine expected lifetime costs, annual cost estimates are developed from age 3 (the assumed optimum age to commence Lovaas treatment) over the lifetime. A normal life expectancy is assumed for both the "with" and "without" treatment scenarios.

In the "with" treatment scenario, the candidate child is assumed to undergo intensive Lovaas treatment for three years (age 3 to 6), and to require no other services concurrent with treatment. The annual cost of and need for services following treatment depends on the treatment outcome: normal, semi-dependent and very dependent. Cost estimates are made for each outcome as the candidate progresses through childhood, adolescence and adulthood. Service costs pertain to health care, education and residential care.

In the "without" treatment scenario, annual cost estimates for health care, education and residential care are made from age 3 onwards relative to two potential outcomes; semi-dependent and very-dependent. Normal functioning is not assumed as a possible outcome "without" treatment.

Lovaas treatment is assumed to improve the candidate child's functioning. Without treatment the outcomes are assumed to be 50:50[4] in terms of semi-dependent and very-dependent. With treatment, a certain percentage chance is attributed to normal functioning and the probability of semi-dependent and very-dependent outcomes are assumed to decrease relative to the without treatment scenarios.

It can be envisioned, therefore, that the focus of the cost-benefit analysis is essentially comparing the front-end investment at an early age of intensive Lovaas treatment, on the one hand, and cost savings triggered by the treatment due to improved functioning, on the other.

[4] This is the assumed outcome distribution for the "without" treatment scenario in the Base Case.

In addition to cost savings as the primary benefit of investing in Lovaas treatment, the cost-benefit analysis also explores and quantifies the benefit of added labour income due to improved functioning with Lovaas treatment. Labour income is a key component of Gross Domestic Product (GDP) of British Columbia, and the analysis estimates the additional labour income (earnings) triggered by Lovaas treatment relative to the without treatment scenario. Basically, the added labour income can be viewed as an "opportunity cost" without treatment (forgone income) which is now captured with treatment.

The analysis provides for gender distributions as the incidence rate of autism and ASD is heavily skewed. Differential mortality rates for men and women (Statistics Canada's Life Table, 1990-1992) are incorporated into the analysis. Differential earnings for men and women (by assumed education level) are also incorporated into the analysis. No gender distinction, however, is made in respect of the annual cost of services.

All costs and benefits (expressed in constant 2000 dollars) are discounted to present value applying real, pre-tax discount rate in accordance with the Law and Equity Act, at your direction. The cost-benefit model calculates net benefits and internal-rate-of-return, the key measures of efficiency. These key measures are calculated for a Base Case, which reflects "most likely" estimates for costs and outcomes. Sensitivity analysis then explores the effect of altering key assumptions in terms of costs, outcomes and discount rates.

The analytical framework is generally consistent with the provincial government's Guidelines for Benefit-Cost Analysis (1977).

2.2 Costs "With" Lovaas Treatment

The costs for the "with" Lovaas treatment scenario are identified in Table 1, attached. These costs are allocated to three broad categories as follows:

(i). Child Care

(ii). Education

(iii). Adult Care

Each major category is further broken down into detailed service items. Estimates of the annual amount of these cost items were prepared by Columbia Pacific based on information from several sources. Data sources include information provided by Harper Grey Easton and reports prepared by various private and public sector organizations both in Canada and the United States. All the costs are assumed to be mutually exclusive.

The need for services following treatment depends on the treatment outcomes. Three possible Lovaas treatment outcomes are listed as follows:

Outcome 1: children who achieve normal functioning, participate in regular education with little or no support, and are vocationally productive as adults;

Outcome 2: children who derive sufficient benefit from early intensive intervention that they are then able to participate in nonintensive special education, and evidence persisting but reduced dependency in adulthood;

Outcome 3: children who achieve meaningful functional improvements but still require specialized and intensive educational and adult services.

U.S. research has demonstrated that significant proportions of children with autism or ASD who participate in Lovaas treatment achieved normal (Outcome 1) or near-normal functioning (Outcome 2), whereas a small proportion (about 10% across several studies) appeared to continue to need intensive intervention beyond the early childhood years (i.e., Outcome 3). In any group of children with autism or ASD who receive Lovaas treatment, between 20% to 60% will achieve normal functioning. Ten percent (10%) will continue to require intensive special education and intensive adult care, and the remainder will evidence benefit sufficient to reduce the intensity of educational and adult care requirements.

For purposes of Base Case analysis, we assume 40% will achieve normal functioning (Outcome 1), 50% will achieve semi-dependent (Outcome 2) and 10% remains very dependent (Outcome 3). In the sensitivity analysis, we explore the effect of changing the percentage of outcome distributions[5].

2.3 Cost "Without" Lovaas Treatment

The costs for the "without" Lovaas treatment scenario are identified in Table 2, attached. Although cost items are categorized similarly in both "with" and "without" treatment scenarios, there are two major differences in terms of (i) outcome types and (ii) cost duration within the Child Care category.

The first difference is that in the "without" treatment scenario, only two potential outcomes are assumed to be possible; semi-dependent (Outcome 2) and very dependent (Outcome 3). Normal functioning (Outcome 1) is not assumed as a possible outcome "without" treatment.

[5] In the sensitivity analysis, while the percentages of Outcome 1 and Outcome 2 may vary, the percentage of Outcome 3 is assumed to remain at 10% in all cases.

The second difference is that under the "without" treatment scenario, the cost duration for certain cost items in the Child Care starts from age 3 instead of age 6, as there is no Lovaas early intensive intervention between age 3 to 6.

For purposes of Base Case analysis, we assume 50% will achieve semi-dependent functioning (Outcome 2) and 50% remain very dependent (Outcome 3). In the sensitivity analysis, we explore the effect of changing the percentage of outcome distributions.

With regard to annual cost amount, except for Lovaas early intensive intervention and service costs for Outcome 1 in the "with" treatment scenario, service costs for Outcome 2 (or 3) are assumed to be the same in both "with" and "without" treatment scenarios in the Base Case. In terms of cost relationship between Outcomes 2 and 3, all costs for Outcome 2 are assumed to be 70% of those for Outcome 3. In sensitivity analysis, we examine the effect of changing the cost percentage of Outcome 2 relative to Outcome 3. In addition, we will also test the results by increasing the effectiveness of Lovaas treatment (i.e., for the same outcome, required service will be less in the "with" treatment scenario than in the "without" scenario).

2.4 Benefits of Lovaas Treatment

2.4.1 Cost Savings of Lovaas Treatment

The primary benefit of the Lovaas treatment is the expected cost savings in health, education and care expenditures.

Table 3 summaries the annual cost by age group for both "with" and "without" treatment scenarios in the Base Case, it also provides the cost savings in the Base Case.

Table 3 indicates that expected costs over an individual's lifetime in the "with" treatment scenario differ from those in the "without" treatment scenario. Due to its intensive early treatment cost and higher expected success rate, expected annual costs incurred by an individual receiving the treatment tend to be higher during the treatment period, but substantially lower for the remaining lifetime. The cost savings from the Lovaas treatment is reflected in the difference in net present value of lifetime care costs incurred in the "without" and "with" treatment scenarios. If this difference is positive, it indicates a net cost savings from the Lovaas treatment to the society.

In deriving the net present values of cost for both scenarios, we have applied discount rate[6] and normal survival rates for Canadian male/female (based on Statistics Canada's 1990-92 Life Tables) to the cost items listed in Tables 1 and 2.

2.4.2 Increases in Labour Income and GDP from the Lovaas Treatment

In addition to the cost savings, an added benefit from the Lovaas treatment is that it may increase the expected labour income that an individual with autism or ASD can earn over his/her lifetime. As labour income is a key component of Gross Domestic Product (GDP) of British Columbia, an increase in the expected lifetime earnings triggered by the Lovaas treatment tend to increase the net gain from the treatment.

The lifetime labour income projections are conducted under the following assumptions:

Outcome 1: Individuals who achieve normal functioning may participate in the labour market as independent employees. To be conservative, we assume that their full-time full-year earnings are commensurate with 90%[7] of average BC male/female with all levels of schooling. Labour market contingencies are in line with the educational referent group average. Labour market entry is assumed to occur in the mid-year when the individual turns age 19;

U.S. research indicates that individuals who derive sufficient benefits from early treatment but still require on-going adult care (Outcome 2) and individuals who achieve limited functional improvement (Outcome 3) cannot function as independent employees but may enjoy "supported employment wages". As such, our corresponding labour income assumptions are listed below:

Outcome 2: Full-time full-year earnings are commensurate with average BC male/female in low skill jobs and are adjusted for contingencies of average BC male/female with grade 9-10 education. Labour market entry is assumed to occur in the mid-year when the individual turns age 21;

Outcome 3: Full-time full-year earnings are commensurate with 75% of average BC male/female in minimum wage jobs and are adjusted for contingencies of average BC male/female with grade 9-10 education. Labour market entry is assumed to occur in the mid-year when the individual turns age 21;

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[6] The discount rate applied in the future care cost estimates is 3.5% per annum (as specified under the Law and Equity Act).

[7] Lovaas (1993) and Lovaas (1987) clearly indicate that "certain residual deficits may remain in the normal functioning group that cannot be detected by teachers and parents and can only be isolated on closer psychological assessment, particularly as these children grow older."

In all three cases, we assume a retirement age of 65.

The lifetime earnings projections include normal survival rates for Canadian males/females (based on Statistics Canada's 1990-92 Life Tables), and discounting at 2.5% per annum (as specified under the Law and Equity Act).

Our projections include estimates of Employment Insurance (EI) benefits net of the individual's own contributions. In addition, we also include a 6% allowance for other non-wage benefits in our estimates[8].

We note that we have delayed the labour market entry ages for all three scenarios to allow the possibility that individuals with autism may spend longer time to obtain the assumed education level.

2.5 Discount Rate

At your direction, in estimating the present value of the lifetime cost of care and education, we have applied a real discount rate of 3.5 percent per annum compound pursuant to the Law and Equity Act. In estimating the present value of lifetime employment income, we have applied a real discount rate of 2.5 percent per annum compound pursuant to the Law and Equity Act.

In Section 2.8.2 below, we discuss our calculation of the internal rate-of-return, which is to be compared with other hurdle rates.

2.6 Study Period

The period of analysis is the hypothetical 3-year-old candidate's remaining lifetime. For purposes of calculation, we assume a normal life expectancy in our study in accordance with the Statistics Canada Life Table, 1990-1992.

2.7 Incidence Rate by Gender

Recent epidemiological studies indicate that autism occurs in approximately 1 of 1000 people, with males outnumbering females by approximately 4 to 1. There is also evidence that there may be an equal number of "autistic-like" individuals[9]. As such, in our study, we have assumed the incidence ratio between male and female as 4:1.

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[8] Earnings projections on this basis are provided in Tables 15 - 20 in the appendix.

[9] Individuals with many features of autism, but not enough to meet standard diagnostic criteria.

2.8 Cost-Benefits Measures

2.8.1 Net Benefits Per Candidate Child

The cost-benefit analysis is conducted on a per candidate child basis. Three criteria can be employed in the cost-benefit analysis: net benefits, benefit-cost ratio and internal rate-of-return. Each of these three criteria is a good measure of the efficiency of resource allocation and will yield complementary results.

Net benefits are the present value of the difference between the costs from the "without" and "with" treatment scenarios. In this analysis, net benefits are also reflected in the additional expected labour income enjoyed by those who have received Lovaas treatment.

The benefit-cost ratio is the ratio of discounted benefits to discounted costs. It indicates the relative size of the benefits in comparison to the costs. The decision criterion is that the benefit-cost ratio should exceed unity.

The internal rate-of-return is the discount rate that equates the present value of net benefits to zero. It measures the rate of return of resources invested in a particular option, and the decision criterion is that the internal rate-of-return should exceed the social opportunity cost of capital.

In choosing between alternatives directed at a specific objective, it is important to consider more than one criterion since different criteria provide complementary information about the efficiency of a particular alternative. In this analysis, we focus on two of these three criteria: net benefits and internal rate-of-return.

2.8.2 Internal Rate-of-Return Comparisons

The Base Case analysis resulted in an internal rate-of-return (IRR) of approximately 42%. This IRR result can be compared with the following hurdle (discount) rates:

i). Law and Equity Act Specified Discount Rates

Under the Law and Equity Act, the real discount rate applied to future care costs is 3.5% per annum, and the real discount rate applied to wage income is 2.5% per annum, with an 1% allowance for real wage growth.

ii). British Columbia Bond Rate

The cost of new borrowing by the provincial government can be approximated by the yield on long term British Columbia Government Bonds. In real terms, the yield on long term BC Government Bonds is currently about 4.5%[10].

iii). BC Government's Discount Rate for Capital Investments

In assessment of major capital projects, the BC Government and its crown corporations typically apply a real, pre-tax discount rate of 8%. The Multiple Account Evaluation Guidelines prepared by the BC Government's Crown Corporations Secretariat (February 1993) indicates that an 8% real discount rate "... should be used for purposes of a base case analysis" (page 11). Similarly, BC Hydro's policy is to apply an 8% real, pre-tax discount rate in evaluation of future investment options, as set out in its Resource Acquisition Policy (June, 1994). The 8% real discount rate is generally consistent with the discount rate concept set out in the provincial guidelines on cost-benefit analysis.

Discount rates under the Law and Equity Act are applied in personal injury and fatal accident cases before the Courts. The 3.5% real discount rate is intended to reflect the long-term rate-of-return on secure investments in the economy. The BC Government Bond yield (currently about 4.5% real) is intended to reflect the cost of new borrowing to the Province. The 8% real discount rate for capital projects (e.g., highways and ferries, hydroelectric dams, etc.) sets a stringent standard for capital-intensive use of government resources, based on the social opportunity cost of capital in the private sector (i.e., highest alternative use of investment capital).

2.9 Sensitivity Analysis

Sensitivity analysis is important because it examines the changes in cost-benefit results when key assumptions underlying the analysis are varied. Sensitivity analysis is usually structured in order to assess the project's "upside" and "downside" potential or risk.

In this study, the thrust of sensitivity analysis is to determine how alternative assumptions affect overall net benefits from Lovaas treatment. The principal sensitivity parameters in this analysis include the outcome distributions in both "with" and "without" Lovaas treatment scenarios, the cost of Lovaas early intensive intervention, the actual current

[10] The nominal yield on BC Government Bonds (maturing June, 2029) is currently 6.55% (Global and Mail, December 7, 1999). Canada's long term inflation rate, taken as the difference between long term nominal and real return bonds, is about 2%. This provides for a real BC Government Bond yield of about (1.0655) ÷ (1.02) = 4.5% (rounded).

provincial government funding for services relative to Base Case level, the cost level, the effectiveness of the Lovaas treatment and the discount rate.

2.10 Potential Benefits of Lovaas Treatment Excluded from Cost-Benefit Analysis

You have advised that untreated autism and ASD can give rise to a number of social impacts and social costs, including the following:

(i). withdrawal of parent(s) from workforce (and reduction in labour income and GDP) in order to care for the child;

(ii). high incidence rate of marital breakdown;

(iii). significant numbers of homeless people;

(iv). high crime rates;

(v). high health care costs for parents (i.e., due to stress, migraines, depressions, etc.)

Lovaas intensive treatment has the potential to significantly improve the functioning of individuals with autism or ASD. As a result, Lovaas treatment can potentially reduce the above-noted social impacts and social costs.

At this time, the cost-benefit analysis has not attempted to quantify the potential social cost savings with Lovaas treatment for the above noted effects.

3.0 Cost-Benefit Results

3.1 Base Case

The preceding sections have outlined the approach to and estimation of net benefits or costs from the Lovaas treatment. This section presents cost-benefit results and tests the sensitivity of these results to varying key assumptions.

The cost-benefit analysis estimates net benefits (cost savings) from the Lovaas treatment to British Columbia. These include future cost savings and additional lifetime labour income.

Present values of per capita service costs under the "with" and "without" treatment scenarios are provided in Tables 4 and 5, attached. These are the building blocks for this cost-benefit analysis.

The Base Case results of the cost-benefit analysis are summarized in Table 6. Results are presented for the analysis using two measures of project efficiency: net benefits and internal rate-of-return with the former measure calculated at discount rates specified in the Law and Equity Act.

In the Base Case, net benefits per child from the Lovaas treatment in 2000 constant dollars are estimated to be $1,005,600 excluding wage income and $1,150,000 including wage income. The internal rate-of-return is estimated to be 42% excluding wage income[11].

3.2 Sensitivity Analysis

Sensitivity testing has been undertaken to examine the impact on net benefits from Lovaas treatment of changing assumptions made about certain variables. Results from altering various assumptions are provided in Tables 7 to 12, attached.

The sensitivity testing procedure has been to adjust each of the key assumptions made in the Base Case and then re-run the model to examine the impact of each change in assumptions on the net benefits from Lovaas treatment. It must be emphasized that the primary focus of the sensitivity analysis was to identify variables that could reduce project net benefits. Emphasis on scenarios that reduce net benefits should not be taken to mean that such scenarios are more probable than alternate scenarios which would increase net benefits. Indeed, numerous plausible scenarios could be developed that would result in higher net benefits than have been reported herein. The focus on "downward" sensitivity testing addresses the "robustness" of Base Case results under less favourable conditions.

Each of the sensitivity tests, with the exception of discount rate, has been discounted at the rates specified in the Law and Equity Act.

Sensitivity analyses in Tables 7 to 12 include the following:

(a) Cost Savings of Lovaas Treatment By Outcome Distributions (Table 7)

Table 7 calculates the cost savings (benefits) of Lovaas treatment by changes in the outcome distribution for the "with" treatment scenario, the "without" treatment scenario and both scenarios simultaneously.

[11] Including lifetime wage income only increases the internal rate-of-return by less than one percentage point, as such, all internal rate-of-returns calculated in this study are based on cost savings excluding wage income.

Variation in the "with" treatment outcome distributions explores the range in success rate of the treatment. Variation in the "without" treatment outcomes explores the range of condition that untreated individuals will likely experience. Combination sensitivities explore both issues simultaneously.

(b) Cost Savings of Lovaas Treatment By Variation in Lovaas Early Intervention Cost (Table 8)

Table 8 explores the sensitivity of cost savings and internal rate-of-return to increased/decreased investment in early intensive Lovaas treatment.

(c) Cost Savings of Lovaas Treatment By Variation in Government Funding Relative to The Base Case Level (Table 9)

Table 9 explores the sensitivity of cost savings and internal rate-of-return to increased/decreased government funding for services relative to the assumed level in Base Case.

(d) Cost Savings of Lovaas Treatment By Variation in Cost Percentage of Outcome 2 Relative to Outcome 3 (Table 10)

Table 10 explores the sensitivity of cost savings and internal rate-of-return to decreased/increased relative cost between Outcome 2 and Outcome 3 in both "with" and "without" treatment scenarios.

(e) Cost Savings of Lovaas Treatment By Variation in The Effectiveness of Lovaas Treatment (Table 11)

Table 11 explores the sensitivity of cost savings and internal rate-of-return to increased effectiveness of the Lovaas treatment in terms of service required following the treatment.

(f) Cost Savings of Lovaas Treatment By Variation in The Discount Rate (Table 12)

Table 12 explores the sensitivity of cost savings to various real discount rates.

3.3 Supplementary Estimates

Tables 13 to 20 in the Appendix provide supplementary information with regard to some fundamental estimates used in our cost-benefit analysis. Tables 13 and 14 provide multipliers used in the present value estimates of future cost of services (health and education) for male and female, respectively. Tables 15 to 20 provide earnings

projections for the average BC male/female with various education attainments or alternate specifications. For analysis purposes, we have assumed reference dates (i.e., date of birth, date of valuation[12]) such that the hypothetical candidate is exactly 3-year-old at the valuation date.

4.0 Conclusions

The principal conclusion from this preliminary cost-benefit analysis is that the cost savings from Lovaas treatment substantially exceed the early intensive treatment cost for a candidate 3-year old child with autism or ASD. This conclusion holds for a wide range of cost assumptions and discount rates.

Columbia Pacific has developed a computerized cost-benefit model for this assignment. The model can be applied to alternative key assumptions at your request.

We trust this assessment is useful in addressing the efficiency associated with Lovaas treatment for autism and ASD.

Yours truly,

Douglus G. Hildebrand
Director

Att.

[12] You have advised us that the trial date is in April, 2000, as such, we assume a valuation date of April 1, 2000 in our calculation .

APPENDIX A
Index of Tables 1- 20

Table 1 Estimated Costs For The "With" Lovaas Treatment Scenario

Cost Item	Outcome 1: Normal			Outcome 2: Semi-dependent			Outcome 3: Very Dependent		
	Annual Amount	Starting Age	Ending Age	Annual Amount	Starting Age	Ending Age	Annual Amount	Starting Age	Ending Age
Child Care									
Early Intensive Intervention	$65,000	3	6	$65,000	3	6	$65,000	3	6
Respite Services	$0	N/A	N/A	$2,590	6	19	$3,700	6	19
Behaviour Support	$0	N/A	N/A	$5,810	6	19	$8,300	6	19
Supported Childcare	$0	N/A	N/A	$6,720	6	12	$9,600	6	18
Placement (after age 6)	$0	N/A	N/A	$22,680	N/A	N/A	$32,400	6	19
Education									
Normal	$4,000	6	19	$0	N/A	N/A	$0	N/A	N/A
Low incidence/high cost	$0	N/A	N/A	$27,650	6	19	$0	N/A	N/A
Intensive Special	$0	N/A	N/A	$0	N/A	N/A	$39,500	6	19
Adult Care									
Day Program	$0	N/A	N/A	$18,480	19	LFT	$36,400	19	LFT
Residential (Family Home)	$0	N/A	N/A	$71,820	19	LFT	$0	N/A	N/A
Residential (Group Home)	$0	N/A	N/A	$0	N/A	N/A	$102,600	19	LFT

LFT: lifetime

Table 2 Estimated Costs For The "Without" Lovaas Treatment Scenario

Cost Item	Outcome 2: Semi-dependent			Outcome 3: Very Dependent		
	Annual Amount	Starting Age	Ending Age	Annual Amount	Starting Age	Ending Age
Child Care						
Respite Services	$2,590	3	19	$3,700	3	19
Behaviour Support	$5,810	3	19	$8,300	3	19
Supported Childcare	$6,720	3	12	$9,600	3	18
Placement	$22,680	3	19	$32,400	3	19
Education						
Normal	$0	N/A	N/A	$0	N/A	N/A
Low incidence/high cost	$27,650	6	19	$0	N/A	N/A
Intensive Special	$0	N/A	N/A	$39,500	6	19
Adult Care						
Day Program	$18,480	19	LFT	$26,400	19	LFT
Residential (Family Home)	$71,820	19	LFT	$0	N/A	N/A
Residential (Group Home)	$0	N/A	N/A	$102,600	19	LFT

LFT: lifetime

Table 3 Expected Annual Costs and Cost Savings - Base Case

	Costs for With Lovaas Treatment				Costs for Without Lovaas Treatment			Annual Cost Savings
	Annual Amount				Annual Amount			
Age Range	Normal	Semi-Dependent	Very Dependent	Expected Annual Cost	Semi-Dependent	Very Dependent	Expected Annual Cost	
	40%	50%	10%	100%	50%	50%	100%	
3 - 6	65,000	65,000	65,000	65,000	37,800	54,000	45,900	-19,100
6 - 12	4,000	65,450	93,500	43,675	65,450	93,500	79,475	35,800
12 - 18	4,000	58,730	93,500	40,315	58,730	93,500	76,115	35,800
18 - 19	4,000	58,730	83,900	39,355	58,730	83,900	71,315	31,960
19 +	0	90,300	129,000	58,050	90,300	129,000	109,650	51,600

Table 4 Present Value of Service Costs By Sex and Outcome - "With" Lovaas Treatment Scenario

Incidence Ratio	Male 80%					Female 20%					Both Sex 100%
Outcome 1: Normal											
	Annual Amount	Starting Age	Ending Age	Multiplier	Present Value	Annual Amount	Starting Age	Ending Age	Multiplier	Present Value	Present Value
Child Care											
Early Intensive Intervention	65,000	3	6	2.849	185,185	65,000	3	6	2.8494	185,208	185,189
Education											
Normal	4,000	6	19	9.433	37,732	4,000	6	19	9.4399	37,760	37,738
Adult Care	0	N/A	N/A			0	N/A	N/A			
Wage, Net EI and Other Non-Wage Benefits	29,731	19	65	17.587	522,877	16,219	19	65	17.970	291,454	476,592
Total (Excluding Wage and Benefits)					222,917					222,968	222,927
Total (Including Wage and Benefits)					(299,960)					(68,486)	(253,665)
Outcome 2: Semi-dependent											
		Starting Age	Ending Age	Multiplier	Present Value		Starting Age	Ending Age	Multiplier	Present Value	Present Value
Child Care											
Early Intensive Intervention	65,000	3	6	2.849	185,185	65,000	3	6	2.849	185,208	185,189
Respite Services	2,590	6	19	9.433	24,431	2,590	6	19	9.440	24,449	24,435
Behaviour Support	5,810	6	19	9.433	54,806	5,810	6	19	9.440	54,846	54,814
Supported Childcare	6,720	6	12	4.884	32,817	6,720	6	12	4.885	32,827	32,819
Placement	22,680	6	19	9.433	213,940	22,680	6	19	9.440	214,097	213,972
Education											
Special	27,650	6	19	9.433	260,822	27,650	6	19	9.440	261,013	260,860
Adult Care											
Day Program	18,480	19	107	13.919	257,229	18,480	19	107	14.522	268,372	259,457
Residential (Family Home)	71,820	19	107	13.919	999,684	71,820	19	107	14.522	1,042,993	1,008,346
Wage, EI and Other Non-Wage Benefits	24,347	21	65	16.291	396,637	9,814	21	65	16.668	163,585	350,027
Total (Excluding Wage and Benefits)					2,028,915					2,083,805	2,039,893
Total (Including Wage and Benefits)					1,632,277					1,920,220	1,689,866
Outcome 3: Very Dependent											
	Annual Amount	Starting Age	Ending Age	Multiplier	Present Value	Annual Amount	Starting Age	Ending Age	Multiplier	Present Value	Present Value
Child Care											
Early Intensive Intervention	65,000	3	6	2.849	185,185	65,000	3	6	2.849	185,208	185,189
Respite Services	3,700	6	19	9.433	34,902	3,700	6	19	9.440	34,928	34,907
Behaviour Support	8,300	6	19	9.433	78,294	8,300	6	19	9.440	78,351	78,305
Supported Childcare	9,600	6	18	8.850	84,956	9,600	6	18	8.855	85,007	84,966
Placement	32,400	6	19	9.433	305,629	32,400	6	19	9.440	305,853	305,674
Education											
Intensive Special	39,500	6	19	9.433	372,603	39,500	6	19	9.440	372,876	372,658
Adult Care											
Day Program	26,400	19	107	13.919	367,470	26,400	19	107	14.522	383,389	370,653
Residential (Group Home)	102,600	19	107	13.919	1,428,120	102,600	19	107	14.522	1,489,989	1,440,494
Wage, EI and Other Non-Wage Benefits	7,674	21	65	16.291	125,019	4,649	21	65	16.668	77,486	115,512
Total (Excluding Wage and Benefits)					2,857,159					2,935,601	2,872,847
Total (Including Wage and Benefits)					2,732,140					2,858,116	2,757,335

Table 5 Present Value of Service Costs By Sex and Outcome - "Without" Lovaas Treatment Scenario

Incidence Ratio	Male 80%					Female 20%					Both Sex 100%
Outcome 2: Semi-dependent											
		Starting Age	Ending Age	Multiplier	Present Value		Starting Age	Ending Age	Multiplier	Present Value	Present Value
Child Care											
Respite Services	2,590	3	19	12.282	31,810	2,590	3	19	12.289	31,829	31,814
Behaviour Support	5,810	3	19	12.282	71,358	5,810	3	19	12.289	71,401	71,367
Supported Childcare	6,720	3	12	7.732	51,962	6,720	3	12	7.734	51,975	51,965
Placement	22,680	3	19	12.282	278,556	22,680	3	19	12.289	278,720	278,589
Education											
Special	27,650	6	19	9.433	260,822	27,650	6	19	9.440	261,013	260,860
Adult Care											
Day Program	18,480	19	107	13.919	257,229	18,480	19	107	14.522	268,372	259,457
Residential (Family Home)	71,820	19	107	13.919	999,684	71,820	19	107	14.522	1,042,993	1,008,346
Wage, EI and Other Non-Wage Benefits	24,347	21	65	16.291	396,637	9,814	21	65	16.668	163,585	350,027
Total (Excluding Wage and Benefits)					1,951,422					2,006,303	1,962,398
Total (Including Wage and Benefits)					1,554,785					1,842,718	1,612,371
Outcome 3: Very Dependent											
	Annual Amount	Starting Age	Ending Age	Multiplier	Present Value	Annual Amount	Starting Age	Ending Age	Multiplier	Present Value	Present Value
Child Care											
Respite Services	3,700	3	19	12.282	45,443	3,700	3	19	12.289	45,470	45,449
Behaviour Support	8,300	3	19	12.282	101,941	8,300	3	19	12.289	102,001	101,953
Supported Childcare	9,600	3	18	11.699	112,306	9,600	3	18	11.704	112,361	112,317
Placement	32,400	3	19	12.282	397,937	32,400	3	19	12.289	398,172	397,984
Education											
Intensive Special	39,500	6	19	9.433	372,603	39,500	6	19	9.440	372,876	372,658
Adult Care											
Day Program	26,400	19	107	13.919	367,470	26,400	19	107	14.522	383,389	370,653
Residential (Group Home)	102,600	19	107	13.919	1,428,120	102,600	19	107	14.522	1,489,989	1,440,494
Wage, EI and Other Non-Wage Benefits	7,674	21	65	16.291	125,019	4,649	21	65	16.668	77,486	115,512
Total (Excluding Wage and Benefits)					2,825,820					2,904,259	2,841,507
Total (Including Wage and Benefits)					2,700,801					2,826,773	2,725,995

Table 6 Cost Savings of Lovaas Treatment - Base Case

	Excluding Wage Income			Including Wage Income		
	Male	Female	Both Sex	Male	Female	Both Sex
Incidence Ratio	80%	20%	100%	80%	20%	100%
PV of "without" Lovass Treatment	2,388,621	2,455,281	2,401,953	2,127,793	2,334,745	2,169,183
PV of "with" Lovaas Treatment	1,389,340	1,424,650	1,396,402	969,369	1,218,527	1,019,201
Cost Savings	999,281	1,030,631	1,005,551	1,158,424	1,116,218	1,149,983
Internal Rate of Return			42.28%			42.31%

Note: In Base Case, the assumed outcome distribution for "with" Lovaas treatment is:
40% Normal (Outcome 1), 50% Semi-dependent (Outcome 2),10% Very Dependent (Outcome 3)
the assumed outcome distribution for "without" treatment scenario is:
50% Semi-dependent (Outcome 2) and 50% Very Dependent (Outcome 3)

Table 7 Cost Savings of Lovaas Treatment By Outcome Distributions

	Excluding Wages				
"With" Lovaas	"Without" Lovaas Outcome 2 (Semi-dependent)				
Outcome 1 (Normal)	40%	50%	60%	75%	80%
20%	730,069	642,158	554,247	422,380	378,425
30%	911,765	823,854	735,943	604,077	560,121
40%	1,093,462	1,005,551	917,640	785,774	741,818
50%	1,275,158	1,187,247	1,099,336	967,470	923,515
60%	1,456,855	1,368,944	1,281,033	1,149,167	1,105,211

	Including Wages				
"With" Lovaas	"Without" Lovaas Outcome 2 (Semi-dependent)				
Outcome 1 (Normal)	40%	50%	60%	75%	80%
20%	872,639	761,277	649,914	482,871	427,189
30%	1,066,992	955,630	844,267	677,224	621,542
40%	1,261,345	1,149,983	1,038,620	871,577	815,896
50%	1,455,698	1,344,336	1,232,973	1,065,930	1,010,249
60%	1,650,051	1,538,689	1,427,326	1,260,283	1,204,602

Note: Shaded cells correspond to results in the Base Case Scenario

In "with" Lovaas treatment scenario, the percentage of Outcome 3 (Very Dependent) remains at 10% while the percentage of the other two outcomes vary

In "without" Lovaas treatment scenario, the percentage of both outcomes vary

Table 8 Cost Savings of Lovaas Treatment By Variation in Lovaas Early Intervention Cost

	Lovaas Investment		Cost Savings		IRR
Lovaas Intervention Cost	Annual Amount	Present Value	Excluding Wage	Including Wage	Excluding Wage
130%	84,500	240,746	949,994	1,094,426	24.87%
120%	78,000	222,228	968,513	1,112,945	28.68%
110%	71,500	203,708	987,032	1,131,464	34.06%
100%	65,000	185,189	1,005,551	1,149,983	42.28%
90%	58,500	166,670	1,024,070	1,168,502	56.62%

Note: Shaded cells correspond to results in the Base Case
IRR is calculated when wage income is not included, including wage income tends to increase IRR slightly.

Table 9 Cost Savings of Lovaas Treatment By Variation in Government Funding Relative to The Base Case Level

	Cost Savings		IRR
Funding Percentage of Each Services	Excluding Wage	Including Wage	Excluding Wage
110% of Childcare, 110% of Education, 110% of Adult Care	1,124,625	1,269,057	54.88%
100% of Childcare, 100% of Education, 100% of Adult Care	1,005,551	1,149,938	45.28%
90% of Childcare, 90% of Education, 90% of Adult Care	886,477	1,030,909	33.35%
80% of Childcare, 80% of Education, 80% of Adult Care	767,403	911,835	26.63%
70% of Childcare, 70% of Education, 70% of Adult Care	648,329	792,761	21.34%
90% of Childcare, 80% of Education, 110% of Adult Care	1,017,972	1,162,404	32.48%

Note: Shaded cells correspond to results in the Base Case
IRR is calculated when wage income is not included, including wage income tends to increase IRR slightly

Table 10 Cost Savings of Lovaas Treatment By Variation in Cost Percentage of Outcome 2 Relative to Outcome 3

Cost Percentage of Outcome 2 Relative to Outcome 3	Cost Savings		IRR
	Excluding Wage	Including Wage	Excluding Wage
50%	990,166	1,134,598	35.20%
60%	997,858	1,142,290	38.38%
70%	1,005,551	1,149,983	42.28%
80%	1,013,243	1,157,675	47.15%

Note: In this sensitivity analysis, service costs for Outcome 2 (or 3) in both scenarios are set at the same level. While service costs for Outcome 3 remain at 100%, the cost percentage of Outcome 2 relative to Outcome 3 vary simultaneously in both scenarios

Shaded cells correspond to results in the Base Case

IRR is calculated when wage income is not included, including wage income tends to increase IRR slightly.

3687

Ex. B to Affidavit of Douglas G. Hildebrand dated March 23, 2000

3151

Table 11 Cost Savings of Lovaas Treatment By Variation in The Effectiveness of Lovaas Treatment

Service Costs Level	Cost Savings		IRR
	Excluding Wage	Including Wage	Excluding Wage
"With" Lovaas Outcome 2 @ 70%, "With" Lovaas Outcome 3 @ 100%, "Without" Lovaas Outcome 2 @ 70%, "Without" Lovaas Outcome 3 @ 100%	1,005,554	1,149,983	42.28%
"With" Lovaas Outcome 2 @ 65%, "With" Lovaas Outcome 3 @ 95%, "Without" Lovaas Outcome 2 @ 70%, "Without" Lovaas Outcome 3 @ 100%,	1,085,229	1,229,660	44.62%
"With" Lovaas Outcome 2 @ 60%, "With" Lovaas Outcome 3 @ 95%, "Without" Lovaas Outcome 2 @ 70%, "Without" Lovaas Outcome 3 @ 100%,	1,151,468	1,295,900	46.51%
"With" Lovaas Outcome 2 @ 55%, "With" Lovaas Outcome 3 @ 95%, "Without" Lovaas Outcome 2 @ 70%, "Without" Lovaas Outcome 3 @ 100%,	1,217,707	1,362,139	48.37%
"With" Lovaas Outcome 2 @ 50%, "With" Lovaas Outcome 3 @ 90%, "Without" Lovaas Outcome 2 @ 70%, "Without" Lovaas Outcome 3 @ 100%,	1,297,385	1,441,817	50.53%

Note: In this sensitivity analysis, the service costs of "with" Lovaas vary while those of "without" remain at the Base Case level. The service costs for Outcome 3 in the "without" Lovaas treatment scenario is set at 100%, and the service costs in the other outcomes ("with" Lovaas Outcome 2 and Outcome 3, "without" Lovass Outcome 2) are all at a certain percentage of service costs for "without" Lovaas Outcome 3.

Shaded cells correspond to results in the Base Case

IRR is calculated when wage income is not included, including wage income tends to increase IRR slightly.

Table 12 Cost Savings of Lovaas Treatment By Variation in The Discount Rate

Discount Rate	Cost Savings	
	Excluding Wage	Including Wage
3.5%/2.5%*	1,006,351	1,149,983
4.5%	772,893	848,087
8.0%	369,768	395,612

Note: * These are the discount rates specified in the Law and Equity Act.
Shaded cells correspond to results in the Base Case.

3153

Table 13
Cost of Care Multipliers - Male
Assuming a Normal Life Expectancy

Age	Year	Annual Cost Of $1000 (1)	Mid-Year Calculated Survival Ratio (2)	Mid-Year Discount Factor @ 3.5%	Adjusted & Discounted Cost	Cumulative Adjusted & Discounted Cost	Multiplier: From Trial To Birthday	Multiplier: From Birthday To L.E.
3	2000 (3)	$1,000	0.9998	0.9829	983	$983	$0	26,201
4	2001	1,000	0.9995	0.9497	949	1,932	983	25,219
5	2002	1,000	0.9993	0.9176	917	2,849	1,932	24,269
6	2003	1,000	0.9991	0.8866	886	3,735	2,849	23,352
7	2004	1,000	0.9990	0.8566	856	4,590	3,735	22,467
8	2005	1,000	0.9988	0.8276	827	5,417	4,590	21,611
9	2006	1,000	0.9987	0.7996	799	6,216	5,417	20,784
10	2007	1,000	0.9986	0.7726	771	6,987	6,216	19,986
11	2008	1,000	0.9984	0.7465	745	7,732	6,987	19,214
12	2009	1,000	0.9982	0.7212	720	8,452	7,732	18,469
13	2010	1,000	0.9979	0.6968	695	9,148	8,452	17,749
14	2011	1,000	0.9975	0.6733	672	9,819	9,148	17,053
15	2012	1,000	0.9970	0.6505	649	10,468	9,819	16,382
16	2013	1,000	0.9962	0.6285	626	11,094	10,468	15,733
17	2014	1,000	0.9954	0.6072	604	11,699	11,094	15,107
18	2015	1,000	0.9944	0.5867	583	12,282	11,699	14,503
19	2016	1,000	0.9934	0.5669	563	12,845	12,282	13,919
20	2017	1,000	0.9924	0.5477	544	13,389	12,845	13,356
21	2018	1,000	0.9913	0.5292	525	13,913	13,389	12,813
22	2019	1,000	0.9902	0.5113	506	14,419	13,913	12,288
23	2020	1,000	0.9890	0.4940	489	14,908	14,419	11,782
24	2021	1,000	0.9879	0.4773	472	15,380	14,908	11,293
25	2022	1,000	0.9868	0.4611	455	15,835	15,380	10,822
26	2023	1,000	0.9856	0.4456	439	16,274	15,835	10,367
27	2024	1,000	0.9845	0.4305	424	16,698	16,274	9,928
28	2025	1,000	0.9834	0.4159	409	17,107	16,698	9,504
29	2026	1,000	0.9822	0.4019	395	17,501	17,107	9,095
30	2027	1,000	0.9810	0.3883	381	17,882	17,501	8,700
31	2028	1,000	0.9798	0.3751	368	18,250	17,882	8,319
32	2029	1,000	0.9785	0.3625	355	18,604	18,250	7,952
33	2030	1,000	0.9772	0.3502	342	18,947	18,604	7,597
34	2031	1,000	0.9759	0.3384	330	19,277	18,947	7,255
35	2032	1,000	0.9745	0.3269	319	19,595	19,277	6,924
36	2033	1,000	0.9730	0.3159	307	19,903	19,595	6,606
37	2034	1,000	0.9714	0.3052	296	20,199	19,903	6,298
38	2035	1,000	0.9698	0.2949	286	20,485	20,199	6,002
39	2036	1,000	0.9681	0.2849	276	20,761	20,485	5,716
40	2037	1,000	0.9663	0.2753	266	21,027	20,761	5,440
41	2038	1,000	0.9645	0.2659	257	21,283	21,027	5,174
42	2039	1,000	0.9625	0.2570	247	21,531	21,283	4,918
43	2040	1,000	0.9604	0.2483	238	21,769	21,531	4,670
44	2041	1,000	0.9581	0.2399	230	21,999	21,769	4,432
45	2042	1,000	0.9556	0.2318	221	22,221	21,999	4,202
46	2043	1,000	0.9528	0.2239	213	22,434	22,221	3,981

3154

Table 13
Cost of Care Multipliers - Male
Assuming a Normal Life Expectancy

Age	Year	Annual Cost Of $1000 (1)	Mid-Year Calculated Survival Ratio (2)	Mid-Year Discount Factor @ 3.5%	Adjusted & Discounted Cost	Cumulative Adjusted & Discounted Cost	Multiplier: From Trial To Birthday	Multiplier: From Birthday To L.E.
47	2044	1,000	0.9498	0.2163	205	22,639	22,434	3,767
48	2045	1,000	0.9464	0.2090	198	22,837	22,639	3,562
49	2046	1,000	0.9427	0.2020	190	23,028	22,837	3,364
50	2047	1,000	0.9387	0.1951	183	23,211	23,028	3,174
51	2048	1,000	0.9342	0.1885	176	23,387	23,211	2,991
52	2049	1,000	0.9293	0.1822	169	23,556	23,387	2,814
53	2050	1,000	0.9240	0.1760	163	23,719	23,556	2,645
54	2051	1,000	0.9180	0.1700	156	23,875	23,719	2,482
55	2052	1,000	0.9114	0.1643	150	24,025	23,875	2,326
56	2053	1,000	0.9042	0.1587	144	24,168	24,025	2,177
57	2054	1,000	0.8962	0.1534	137	24,306	24,168	2,033
58	2055	1,000	0.8874	0.1482	132	24,437	24,306	1,896
59	2056	1,000	0.8778	0.1432	126	24,563	24,437	1,764
60	2057	1,000	0.8671	0.1383	120	24,683	24,563	1,638
61	2058	1,000	0.8555	0.1337	114	24,797	24,683	1,518
62	2059	1,000	0.8428	0.1291	109	24,906	24,797	1,404
63	2060	1,000	0.8290	0.1248	103	25,009	24,906	1,295
64	2061	1,000	0.8142	0.1206	98	25,108	25,009	1,192
65	2062	1,000	0.7983	0.1165	93	25,201	25,108	1,094
66	2063	1,000	0.7813	0.1125	88	25,288	25,201	1,001
67	2064	1,000	0.7630	0.1087	83	25,371	25,288	913
68	2065	1,000	0.7435	0.1051	78	25,450	25,371	830
69	2066	1,000	0.7227	0.1015	73	25,523	25,450	752
70	2067	1,000	0.7005	0.0981	69	25,592	25,523	678
71	2068	1,000	0.6771	0.0948	64	25,656	25,592	610
72	2069	1,000	0.6522	0.0915	60	25,715	25,656	546
73	2070	1,000	0.6260	0.0885	55	25,771	25,715	486
74	2071	1,000	0.5983	0.0855	51	25,822	25,771	430
75	2072	1,000	0.5694	0.0826	47	25,869	25,822	379
76	2073	1,000	0.5393	0.0798	43	25,912	25,869	332
77	2074	1,000	0.5080	0.0771	39	25,951	25,912	289
78	2075	1,000	0.4756	0.0745	35	25,987	25,951	250
79	2076	1,000	0.4425	0.0720	32	26,018	25,987	215
80	2077	1,000	0.4087	0.0695	28	26,047	26,018	183
81	2078	1,000	0.3746	0.0672	25	26,072	26,047	154
82	2079	1,000	0.3404	0.0649	22	26,094	26,072	129
83	2080	1,000	0.3066	0.0627	19	26,113	26,094	107
84	2081	1,000	0.2734	0.0606	17	26,130	26,113	88
85	2082	1,000	0.2412	0.0585	14	26,144	26,130	71
86	2083	1,000	0.2104	0.0566	12	26,156	26,144	57
87	2084	1,000	0.1813	0.0546	10	26,166	26,156	45
88	2085	1,000	0.1542	0.0528	8	26,174	26,166	36
89	2086	1,000	0.1292	0.0510	7	26,181	26,174	27
90	2087	1,000	0.1067	0.0493	5	26,186	26,181	21

Table 13
Cost of Care Multipliers - Male
Assuming a Normal Life Expectancy

Age	Year	Annual Cost Of $1000 (1)	Mid-Year Calculated Survival Ratio (2)	Mid-Year Discount Factor @ 3.5%	Adjusted & Discounted Cost	Cumulative Adjusted & Discounted Cost	Multiplier: From Trial To Birthday	Multiplier: From Birthday To L.E.
91	2088	1,000	0.0867	0.0476	4	26,190	26,186	16
92	2089	1,000	0.0692	0.0460	3	26,193	26,190	11
93	2090	1,000	0.0542	0.0445	2	26,196	26,193	8
94	2091	1,000	0.0416	0.0429	2	26,197	26,196	6
95	2092	1,000	0.0313	0.0415	1	26,199	26,197	4
96	2093	1,000	0.0230	0.0401	1	26,200	26,199	3
97	2094	1,000	0.0165	0.0387	1	26,200	26,200	2
98	2095	1,000	0.0115	0.0374	0	26,201	26,200	1
99	2096	1,000	0.0078	0.0362	0	26,201	26,201	1
100	2097	1,000	0.0051	0.0349	0	26,201	26,201	0
101	2098	1,000	0.0033	0.0338	0	26,201	26,201	0
102	2099	1,000	0.0020	0.0326	0	26,201	26,201	0
103	2100	1,000	0.0012	0.0315	0	26,201	26,201	0
104	2101	1,000	0.0007	0.0304	0	26,201	26,201	0
105	2102	1,000	0.0002	0.0294	0	26,201	26,201	0
106	2103	1,000	0.0002	0.0284	0	26,201	26,201	0
107	2104	1,000	0.0002	0.0275	0	26,201	26,201	0

Total: Trial to Age 55	**$23,875**
Total: Trial to Age 60	**$24,563**
Total: Trial to Age 65	**$25,108**
Total: Trial to Life Expectancy	**$26,201**
Age At Trial Date	**3.0**
Life Expectancy At Trial (Remaining Years)	**72.2**

(1) Constant 2000 Dollars.
(2) Based on Canadian Male Survival Rates
(3) Period From April 1, 2000 (Trial Date).

Table 14
Cost of Care Multipliers - Female
Assuming a Normal Life Expectancy

Age	Year	Annual Cost Of $1000 (1)	Mid-Year Calculated Survival Ratio (2)	Mid-Year Discount Factor @ 3.5%	Adjusted & Discounted Cost	Cumulative Adjusted & Discounted Cost	Multiplier: From Trial To Birthday	Multiplier: From Birthday To L.E.
3	2000 (3)	$1,000	0.9999	0.9829	983	$983	$0	26,812
4	2001	1,000	0.9997	0.9497	949	1,932	983	25,829
5	2002	1,000	0.9995	0.9176	917	2,849	1,932	24,879
6	2003	1,000	0.9994	0.8866	886	3,735	2,849	23,962
7	2004	1,000	0.9992	0.8566	856	4,591	3,735	23,076
8	2005	1,000	0.9991	0.8276	827	5,418	4,591	22,220
9	2006	1,000	0.9990	0.7996	799	6,217	5,418	21,393
10	2007	1,000	0.9989	0.7726	772	6,989	6,217	20,595
11	2008	1,000	0.9988	0.7465	746	7,734	6,989	19,823
12	2009	1,000	0.9986	0.7212	720	8,455	7,734	19,077
13	2010	1,000	0.9985	0.6968	696	9,150	8,455	18,357
14	2011	1,000	0.9983	0.6733	672	9,822	9,150	17,661
15	2012	1,000	0.9980	0.6505	649	10,472	9,822	16,989
16	2013	1,000	0.9977	0.6285	627	11,099	10,472	16,340
17	2014	1,000	0.9974	0.6072	606	11,704	11,099	15,713
18	2015	1,000	0.9970	0.5867	585	12,289	11,704	15,107
19	2016	1,000	0.9966	0.5669	565	12,854	12,289	14,522
20	2017	1,000	0.9963	0.5477	546	13,400	12,854	13,957
21	2018	1,000	0.9959	0.5292	527	13,927	13,400	13,412
22	2019	1,000	0.9956	0.5113	509	14,436	13,927	12,885
23	2020	1,000	0.9952	0.4940	492	14,928	14,436	12,376
24	2021	1,000	0.9948	0.4773	475	15,402	14,928	11,884
25	2022	1,000	0.9944	0.4611	459	15,861	15,402	11,409
26	2023	1,000	0.9940	0.4456	443	16,304	15,861	10,951
27	2024	1,000	0.9936	0.4305	428	16,732	16,304	10,508
28	2025	1,000	0.9932	0.4159	413	17,145	16,732	10,080
29	2026	1,000	0.9928	0.4019	399	17,544	17,145	9,667
30	2027	1,000	0.9923	0.3883	385	17,929	17,544	9,268
31	2028	1,000	0.9918	0.3751	372	18,301	17,929	8,883
32	2029	1,000	0.9913	0.3625	359	18,660	18,301	8,511
33	2030	1,000	0.9908	0.3502	347	19,007	18,660	8,151
34	2031	1,000	0.9902	0.3384	335	19,342	19,007	7,804
35	2032	1,000	0.9896	0.3269	324	19,666	19,342	7,469
36	2033	1,000	0.9889	0.3159	312	19,978	19,666	7,146
37	2034	1,000	0.9881	0.3052	302	20,280	19,978	6,833
38	2035	1,000	0.9873	0.2949	291	20,571	20,280	6,532
39	2036	1,000	0.9864	0.2849	281	20,852	20,571	6,241
40	2037	1,000	0.9854	0.2753	271	21,123	20,852	5,960
41	2038	1,000	0.9844	0.2659	262	21,385	21,123	5,688
42	2039	1,000	0.9833	0.2570	253	21,638	21,385	5,427
43	2040	1,000	0.9821	0.2483	244	21,881	21,638	5,174
44	2041	1,000	0.9807	0.2399	235	22,117	21,881	4,930
45	2042	1,000	0.9791	0.2318	227	22,344	22,117	4,695
46	2043	1,000	0.9774	0.2239	219	22,562	22,344	4,468

Table 14
Cost of Care Multipliers - Female
Assuming a Normal Life Expectancy

Age	Year	Annual Cost Of $1000 (1)	Mid-Year Calculated Survival Ratio (2)	Mid-Year Discount Factor @ 3.5%	Adjusted & Discounted Cost	Cumulative Adjusted & Discounted Cost	Multiplier: From Trial To Birthday	Multiplier: From Birthday To L.E.
47	2044	1,000	0.9755	0.2163	211	22,773	22,562	4,249
48	2045	1,000	0.9734	0.2090	203	22,977	22,773	4,038
49	2046	1,000	0.9711	0.2020	196	23,173	22,977	3,835
50	2047	1,000	0.9686	0.1951	189	23,362	23,173	3,639
51	2048	1,000	0.9658	0.1885	182	23,544	23,362	3,450
52	2049	1,000	0.9628	0.1822	175	23,720	23,544	3,267
53	2050	1,000	0.9595	0.1760	169	23,888	23,720	3,092
54	2051	1,000	0.9558	0.1700	163	24,051	23,888	2,923
55	2052	1,000	0.9519	0.1643	156	24,207	24,051	2,761
56	2053	1,000	0.9476	0.1587	150	24,358	24,207	2,604
57	2054	1,000	0.9429	0.1534	145	24,502	24,358	2,454
58	2055	1,000	0.9377	0.1482	139	24,641	24,502	2,309
59	2056	1,000	0.9321	0.1432	133	24,775	24,641	2,170
60	2057	1,000	0.9261	0.1383	128	24,903	24,775	2,037
61	2058	1,000	0.9195	0.1337	123	25,026	24,903	1,909
62	2059	1,000	0.9123	0.1291	118	25,144	25,026	1,786
63	2060	1,000	0.9046	0.1248	113	25,256	25,144	1,668
64	2061	1,000	0.8962	0.1206	108	25,364	25,256	1,555
65	2062	1,000	0.8870	0.1165	103	25,468	25,364	1,447
66	2063	1,000	0.8772	0.1125	99	25,567	25,468	1,344
67	2064	1,000	0.8665	0.1087	94	25,661	25,567	1,245
68	2065	1,000	0.8549	0.1051	90	25,751	25,661	1,151
69	2066	1,000	0.8424	0.1015	86	25,836	25,751	1,061
70	2067	1,000	0.8289	0.0981	81	25,917	25,836	976
71	2068	1,000	0.8143	0.0948	77	25,994	25,917	894
72	2069	1,000	0.7985	0.0915	73	26,068	25,994	817
73	2070	1,000	0.7814	0.0885	69	26,137	26,068	744
74	2071	1,000	0.7627	0.0855	65	26,202	26,137	675
75	2072	1,000	0.7426	0.0826	61	26,263	26,202	610
76	2073	1,000	0.7208	0.0798	58	26,321	26,263	548
77	2074	1,000	0.6973	0.0771	54	26,374	26,321	491
78	2075	1,000	0.6719	0.0745	50	26,425	26,374	437
79	2076	1,000	0.6447	0.0720	46	26,471	26,425	387
80	2077	1,000	0.6157	0.0695	43	26,514	26,471	341
81	2078	1,000	0.5850	0.0672	39	26,553	26,514	298
82	2079	1,000	0.5525	0.0649	36	26,589	26,553	259
83	2080	1,000	0.5183	0.0627	32	26,621	26,589	223
84	2081	1,000	0.4827	0.0606	29	26,651	26,621	190
85	2082	1,000	0.4459	0.0585	26	26,677	26,651	161
86	2083	1,000	0.4082	0.0566	23	26,700	26,677	135
87	2084	1,000	0.3700	0.0546	20	26,720	26,700	112
88	2085	1,000	0.3318	0.0528	18	26,738	26,720	92
89	2086	1,000	0.2939	0.0510	15	26,753	26,738	74
90	2087	1,000	0.2569	0.0493	13	26,765	26,753	59

3158

Table 14
Cost of Care Multipliers - Female
Assuming a Normal Life Expectancy

Age	Year	Annual Cost Of $1000 (1)	Mid-Year Calculated Survival Ratio (2)	Mid-Year Discount Factor @ 3.5%	Adjusted & Discounted Cost	Cumulative Adjusted & Discounted Cost	Multiplier: From Trial To Birthday	Multiplier: From Birthday To L.E.
91	2088	1,000	0.2214	0.0476	11	26,776	26,765	46
92	2089	1,000	0.1877	0.0460	9	26,784	26,776	36
93	2090	1,000	0.1565	0.0445	7	26,791	26,784	27
94	2091	1,000	0.1279	0.0429	5	26,797	26,791	20
95	2092	1,000	0.1025	0.0415	4	26,801	26,797	15
96	2093	1,000	0.0802	0.0401	3	26,804	26,801	11
97	2094	1,000	0.0613	0.0387	2	26,807	26,804	7
98	2095	1,000	0.0456	0.0374	2	26,808	26,807	5
99	2096	1,000	0.0329	0.0362	1	26,810	26,808	3
100	2097	1,000	0.0230	0.0349	1	26,810	26,810	2
101	2098	1,000	0.0155	0.0338	1	26,811	26,810	1
102	2099	1,000	0.0101	0.0326	0	26,811	26,811	1
103	2100	1,000	0.0063	0.0315	0	26,811	26,811	0
104	2101	1,000	0.0037	0.0304	0	26,811	26,811	0
105	2102	1,000	0.0013	0.0294	0	26,812	26,811	0
106	2103	1,000	0.0013	0.0284	0	26,812	26,812	0
107	2104	1,000	0.0013	0.0275	0	26,812	26,812	0

Total: Trial to Age 55	**$24,051**
Total: Trial to Age 60	**$24,775**
Total: Trial to Age 65	**$25,364**
Total: Trial to Life Expectancy	**$26,812**
Age At Trial Date	**3.0**
Life Expectancy At Trial (Remaining Years)	**78.4**

(1) Constant 2000 Dollars.
(2) Based on Canadian Female Survival Rates
(3) Period From April 1, 2000 (Trial Date).

Table 15
Earnings Projection for the Average BC Male with All Levels of Schooling
Adjusted for: Labour Force Withdrawal (Average); Educ. Unempl. Rates; Educ. Part-Time Rates;
Labour Market Entry on July 1, 2016
Normal Life Expectancy for Mr.

Age	Year		Full-Time, Full-Year, Income	Labour Force Part'pn Rate	Unem-ployment Rate	Part-Time Factor	LMC Adjusted Income	Canadian Male Survival Rates	Discount Rate (2) 2.50%	Fully Adjusted & Discounted Income	Cumulative Adjusted & Discounted Income
18	2015		0	75.4%	18.7%	45.4%	0	0.9947	0.6862	0	0
19	2016		11,042	79.7%	17.8%	38.1%	4,479	0.9937	0.6695	2,980	2,980
20	2017		23,166	84.0%	16.8%	30.8%	11,193	0.9926	0.6531	7,257	10,236
21	2018		24,309	88.3%	15.9%	23.6%	13,797	0.9916	0.6372	8,717	18,954
22	2019		25,710	91.6%	15.0%	17.8%	16,460	0.9904	0.6217	10,135	29,088
23	2020		27,885	92.0%	14.1%	16.6%	18,380	0.9893	0.6065	11,029	40,117
24	2021		30,059	92.3%	13.2%	15.3%	20,393	0.9882	0.5917	11,924	52,041
25	2022		32,234	92.7%	12.3%	14.1%	22,501	0.9870	0.5773	12,821	64,862
26	2023		34,409	93.0%	11.5%	12.8%	24,705	0.9859	0.5632	13,718	78,580
27	2024		36,367	93.3%	10.7%	11.7%	26,747	0.9848	0.5495	14,473	93,053
28	2025		37,679	93.3%	10.4%	10.9%	28,058	0.9837	0.5361	14,795	107,847
29	2026		38,992	93.4%	10.1%	10.2%	29,395	0.9825	0.5230	15,104	122,952
30	2027		40,304	93.4%	9.8%	9.4%	30,758	0.9813	0.5102	15,401	138,352
31	2028		41,616	93.5%	9.5%	8.6%	32,148	0.9801	0.4978	15,685	154,037
32	2029		42,906	93.5%	9.2%	8.1%	33,462	0.9789	0.4856	15,907	169,944
33	2030		44,130	93.4%	9.1%	8.0%	34,483	0.9776	0.4738	15,972	185,915
34	2031		45,353	93.4%	8.9%	8.0%	35,508	0.9762	0.4622	16,023	201,938
35	2032		46,577	93.4%	8.7%	8.0%	36,536	0.9748	0.4510	16,062	218,000
36	2033		47,800	93.3%	8.5%	8.0%	37,568	0.9733	0.4400	16,088	234,088
37	2034		48,891	93.3%	8.3%	8.0%	38,479	0.9718	0.4292	16,051	250,139
38	2035		49,584	93.1%	8.1%	7.9%	39,020	0.9702	0.4188	15,853	265,992
39	2036		50,278	92.8%	8.0%	7.9%	39,559	0.9685	0.4086	15,653	281,646
40	2037		50,971	92.6%	7.8%	7.9%	40,099	0.9668	0.3986	15,452	297,098
41	2038		51,665	92.4%	7.6%	7.9%	40,638	0.9649	0.3889	15,249	312,346
42	2039		52,293	92.2%	7.5%	7.8%	41,134	0.9630	0.3794	15,029	327,375
43	2040		52,727	91.9%	7.4%	7.5%	41,503	0.9609	0.3701	14,762	342,137
44	2041		53,160	91.5%	7.3%	7.2%	41,873	0.9587	0.3611	14,496	356,633
45	2042		53,594	91.2%	7.1%	6.9%	42,241	0.9562	0.3523	14,230	370,863
46	2043		54,027	90.8%	7.0%	6.6%	42,609	0.9535	0.3437	13,964	384,827
47	2044		54,530	90.5%	6.9%	6.4%	42,957	0.9505	0.3353	13,692	398,518
48	2045		55,240	90.1%	6.9%	6.6%	43,245	0.9472	0.3271	13,401	411,919
49	2046		55,951	89.7%	6.9%	6.8%	43,526	0.9436	0.3192	13,109	425,028
50	2047		56,661	89.2%	6.9%	6.9%	43,801	0.9397	0.3114	12,816	437,844
51	2048		57,371	88.8%	6.9%	7.1%	44,069	0.9353	0.3038	12,522	450,366
52	2049		57,665	88.0%	7.0%	7.2%	43,798	0.9306	0.2964	12,079	462,445
53	2050		56,715	85.8%	7.4%	7.0%	41,955	0.9253	0.2891	11,225	473,670
54	2051		55,764	83.7%	7.7%	6.7%	40,152	0.9195	0.2821	10,415	484,085
55	2052		54,814	81.5%	8.1%	6.5%	38,389	0.9131	0.2752	9,647	493,732
56	2053		53,864	79.4%	8.4%	6.3%	36,666	0.9060	0.2685	8,920	502,652
57	2054		52,965	76.3%	8.7%	6.1%	34,655	0.8982	0.2620	8,154	510,806
58	2055		52,221	70.8%	8.8%	5.9%	31,717	0.8896	0.2556	7,211	518,017
59	2056		51,478	65.2%	8.9%	5.6%	28,841	0.8802	0.2493	6,329	524,346
60	2057		50,734	59.6%	9.0%	5.4%	26,028	0.8698	0.2432	5,507	529,853
61	2058		49,990	54.0%	9.1%	5.1%	23,278	0.8584	0.2373	4,742	534,595
62	2059		49,313	48.4%	9.1%	5.5%	20,508	0.8459	0.2315	4,017	538,611
63	2060		48,835	42.6%	8.5%	7.6%	17,591	0.8325	0.2259	3,308	541,919
64	2061		48,357	36.8%	8.0%	9.7%	14,800	0.8179	0.2204	2,668	544,587
65	2062	(1)	11,850	33.2%	7.6%	10.9%	3,235	0.8023	0.2170	563	545,150
Average (2000 $)			$43,324	87.2%	9.3%	9.6%	$30,996	X Actuarial Mult.		17.587	$545,150

	Future Period
Adjusted Earnings	$545,150
Net Employment Insurance	$3,115
Non-Wage Benefits	$32,709
Subtotal	$580,974

(1) Period To Age 65 (April 1, 2062)
(2) Impact of 1% Real Wage Growth Allowance: 29.6%

Table 16
Earnings Projection for the Average BC Male Working in Low Skill Occupations
Contingencies for the Average BC Male with a Grades 9-10 Education Level
Adjusted for: Labour Force Withdrawal (Average); Educ. Unempl. Rates; Educ. Part-Time Rates;
Labour Market Entry on July 1, 2018
Normal Life Expectancy for Mr.

Age	Year	Full-Time, Full-Year, Income	Labour Force Part'pn Rate	Unem-ployment Rate	Part-Time Factor	LMC Adjusted Income	Canadian Male Survival Rates	Discount Rate (2) 2.50%	Fully Adjusted & Discounted Income	Cumulative Adjusted & Discounted Income
18	2015	0	61.7%	29.7%	36.9%	0	0.9947	0.6862	0	0
19	2016	0	67.8%	30.4%	29.6%	0	0.9937	0.6695	0	0
20	2017	0	74.0%	31.0%	22.2%	0	0.9926	0.6531	0	0
21	2018	12,180	80.2%	31.6%	14.9%	5,682	0.9916	0.6372	3,590	3,590
22	2019	25,837	84.9%	31.7%	9.3%	13,576	0.9904	0.6217	8,359	11,949
23	2020	27,072	85.0%	30.2%	8.9%	14,645	0.9893	0.6065	8,787	20,736
24	2021	28,306	85.2%	28.6%	8.4%	15,757	0.9882	0.5917	9,213	29,950
25	2022	29,541	85.3%	27.1%	8.0%	16,912	0.9870	0.5773	9,637	39,586
26	2023	30,775	85.5%	25.5%	7.6%	18,112	0.9859	0.5632	10,057	49,643
27	2024	31,851	85.7%	24.2%	7.1%	19,235	0.9848	0.5495	10,408	60,051
28	2025	32,453	86.3%	23.6%	6.5%	20,021	0.9837	0.5361	10,557	70,608
29	2026	33,055	86.9%	23.0%	5.9%	20,829	0.9825	0.5230	10,703	81,311
30	2027	33,656	87.5%	22.4%	5.2%	21,660	0.9813	0.5102	10,845	92,157
31	2028	34,258	88.1%	21.8%	4.6%	22,513	0.9801	0.4978	10,984	103,140
32	2029	34,802	88.6%	21.1%	4.2%	23,282	0.9789	0.4856	11,068	114,208
33	2030	35,172	88.6%	20.3%	4.5%	23,740	0.9776	0.4738	10,996	125,204
34	2031	35,542	88.7%	19.4%	4.7%	24,202	0.9762	0.4622	10,921	136,125
35	2032	35,912	88.8%	18.5%	5.0%	24,667	0.9748	0.4510	10,844	146,968
36	2033	36,282	88.8%	17.7%	5.2%	25,135	0.9733	0.4400	10,764	157,732
37	2034	36,552	88.7%	17.0%	5.4%	25,439	0.9718	0.4292	10,611	168,344
38	2035	36,524	88.0%	17.0%	5.4%	25,241	0.9702	0.4188	10,255	178,599
39	2036	36,496	87.3%	17.0%	5.3%	25,044	0.9685	0.4086	9,910	188,508
40	2037	36,467	86.6%	16.9%	5.3%	24,846	0.9668	0.3986	9,574	198,083
41	2038	36,439	85.9%	16.9%	5.2%	24,648	0.9649	0.3889	9,249	207,332
42	2039	36,451	85.4%	16.8%	5.0%	24,603	0.9630	0.3794	8,989	216,321
43	2040	36,584	85.2%	16.4%	4.0%	25,014	0.9609	0.3701	8,897	225,218
44	2041	36,716	85.0%	16.0%	3.1%	25,429	0.9587	0.3611	8,803	234,021
45	2042	36,849	84.9%	15.6%	2.1%	25,847	0.9562	0.3523	8,707	242,728
46	2043	36,981	84.7%	15.2%	1.2%	26,268	0.9535	0.3437	8,609	251,337
47	2044	37,112	84.6%	14.7%	0.7%	26,594	0.9505	0.3353	8,476	259,813
48	2045	37,234	84.6%	14.2%	1.5%	26,620	0.9472	0.3271	8,249	268,062
49	2046	37,357	84.6%	13.7%	2.3%	26,643	0.9436	0.3192	8,024	276,086
50	2047	37,480	84.6%	13.2%	3.2%	26,663	0.9397	0.3114	7,801	283,888
51	2048	37,603	84.6%	12.6%	4.0%	26,679	0.9353	0.3038	7,581	291,468
52	2049	37,525	84.0%	12.3%	4.5%	26,421	0.9306	0.2964	7,287	298,755
53	2050	36,849	81.8%	12.3%	4.1%	25,359	0.9253	0.2891	6,785	305,540
54	2051	36,173	79.6%	12.3%	3.7%	24,314	0.9195	0.2821	6,306	311,846
55	2052	35,497	77.4%	12.3%	3.3%	23,285	0.9131	0.2752	5,851	317,698
56	2053	34,821	75.2%	12.4%	2.9%	22,273	0.9060	0.2685	5,418	323,116
57	2054	34,253	72.2%	12.4%	2.6%	21,070	0.8982	0.2620	4,958	328,074
58	2055	34,007	66.6%	12.6%	2.6%	19,272	0.8896	0.2556	4,382	332,455
59	2056	33,761	61.1%	12.8%	2.7%	17,504	0.8802	0.2493	3,841	336,296
60	2057	33,515	55.5%	12.9%	2.7%	15,766	0.8698	0.2432	3,336	339,632
61	2058	33,269	50.0%	13.1%	2.7%	14,058	0.8584	0.2373	2,864	342,496
62	2059	32,562	44.3%	13.1%	2.7%	12,215	0.8459	0.2315	2,392	344,888
63	2060	30,480	38.5%	12.5%	2.5%	9,998	0.8325	0.2259	1,880	346,768
64	2061	28,398	32.6%	11.9%	2.4%	7,955	0.8179	0.2204	1,434	348,202
65	2062 (1)	6,681	28.9%	11.6%	2.3%	1,669	0.8023	0.2170	291	348,492
Average (2000 $)		$33,759	82.5%	19.2%	4.9%	$21,392	X Actuarial Mult.		16.291	$348,492

	Future Period
Adjusted Earnings	$348,492
Net Employment Insurance	$27,235
Non-Wage Benefits	$20,910
Subtotal	$396,637

(1) Period To Age 65 (April 1, 2062)
(2) Impact of 1% Real Wage Growth Allowance: 29.4%

Table 17
Earnings Projection for the Average BC Male Working at Minimum Wage
Contingencies for the Average BC Male with a Grades 9-10 Education Level
Adjusted for: Labour Force Withdrawal (Average); Educ. Unempl. Rates; Educ. Part-Time Rates;
Labour Market Entry on July 1, 2018
Normal Life Expectancy for Mr.

Age	Year		Full-Time, Full-Year, Income	Labour Force Part'pn Rate	Unem-ployment Rate	Part-Time Factor	LMC Adjusted Income	Canadian Male Survival Rates	Discount Rate (2) 2.50%	Fully Adjusted & Discounted Income	Cumulative Adjusted & Discounted Income
18	2015		0	61.7%	29.7%	36.9%	0	0.9947	0.6862	0	0
19	2016		0	67.8%	30.4%	29.6%	0	0.9937	0.6695	0	0
20	2017		0	74.0%	31.0%	22.2%	0	0.9926	0.6531	0	0
21	2018		7,170	80.2%	31.6%	14.9%	3,344	0.9916	0.6372	2,113	2,113
22	2019		14,300	84.9%	31.7%	9.3%	7,514	0.9904	0.6217	4,626	6,740
23	2020		14,300	85.0%	30.2%	8.9%	7,736	0.9893	0.6065	4,642	11,381
24	2021		14,300	85.2%	28.6%	8.4%	7,960	0.9882	0.5917	4,654	16,036
25	2022		14,300	85.3%	27.1%	8.0%	8,187	0.9870	0.5773	4,665	20,701
26	2023		14,300	85.5%	25.5%	7.6%	8,416	0.9859	0.5632	4,673	25,374
27	2024		14,300	85.7%	24.2%	7.1%	8,636	0.9848	0.5495	4,673	30,047
28	2025		14,300	86.3%	23.6%	6.5%	8,822	0.9837	0.5361	4,652	34,699
29	2026		14,300	86.9%	23.0%	5.9%	9,011	0.9825	0.5230	4,630	39,329
30	2027		14,300	87.5%	22.4%	5.2%	9,203	0.9813	0.5102	4,608	43,937
31	2028		14,300	88.1%	21.8%	4.6%	9,397	0.9801	0.4978	4,585	48,522
32	2029		14,300	88.6%	21.1%	4.2%	9,566	0.9789	0.4856	4,548	53,069
33	2030		14,300	88.6%	20.3%	4.5%	9,652	0.9776	0.4738	4,471	57,540
34	2031		14,300	88.7%	19.4%	4.7%	9,737	0.9762	0.4622	4,394	61,934
35	2032		14,300	88.8%	18.5%	5.0%	9,822	0.9748	0.4510	4,318	66,252
36	2033		14,300	88.8%	17.7%	5.2%	9,907	0.9733	0.4400	4,242	70,494
37	2034		14,300	88.7%	17.0%	5.4%	9,952	0.9718	0.4292	4,151	74,646
38	2035		14,300	88.0%	17.0%	5.4%	9,883	0.9702	0.4188	4,015	78,661
39	2036		14,300	87.3%	17.0%	5.3%	9,813	0.9685	0.4086	3,883	82,543
40	2037		14,300	86.6%	16.9%	5.3%	9,743	0.9668	0.3986	3,754	86,298
41	2038		14,300	85.9%	16.9%	5.2%	9,673	0.9649	0.3889	3,630	89,928
42	2039		14,300	85.4%	16.8%	5.0%	9,652	0.9630	0.3794	3,526	93,454
43	2040		14,300	85.2%	16.4%	4.0%	9,778	0.9609	0.3701	3,478	96,932
44	2041		14,300	85.0%	16.0%	3.1%	9,904	0.9587	0.3611	3,429	100,360
45	2042		14,300	84.9%	15.6%	2.1%	10,031	0.9562	0.3523	3,379	103,739
46	2043		14,300	84.7%	15.2%	1.2%	10,158	0.9535	0.3437	3,329	107,068
47	2044		14,300	84.6%	14.7%	0.7%	10,247	0.9505	0.3353	3,266	110,334
48	2045		14,300	84.6%	14.2%	1.5%	10,223	0.9472	0.3271	3,168	113,502
49	2046		14,300	84.6%	13.7%	2.3%	10,199	0.9436	0.3192	3,072	116,574
50	2047		14,300	84.6%	13.2%	3.2%	10,173	0.9397	0.3114	2,977	119,550
51	2048		14,300	84.6%	12.6%	4.0%	10,146	0.9353	0.3038	2,883	122,433
52	2049		14,300	84.0%	12.3%	4.5%	10,068	0.9306	0.2964	2,777	125,210
53	2050		14,300	81.8%	12.3%	4.1%	9,841	0.9253	0.2891	2,633	127,843
54	2051		14,300	79.6%	12.3%	3.7%	9,612	0.9195	0.2821	2,493	130,336
55	2052		14,300	77.4%	12.3%	3.3%	9,380	0.9131	0.2752	2,357	132,693
56	2053		14,300	75.2%	12.4%	2.9%	9,147	0.9060	0.2685	2,225	134,918
57	2054		14,300	72.2%	12.4%	2.6%	8,797	0.8982	0.2620	2,070	136,988
58	2055		14,300	66.6%	12.6%	2.6%	8,104	0.8896	0.2556	1,842	138,831
59	2056		14,300	61.1%	12.8%	2.7%	7,414	0.8802	0.2493	1,627	140,458
60	2057		14,300	55.5%	12.9%	2.7%	6,727	0.8698	0.2432	1,423	141,881
61	2058		14,300	50.0%	13.1%	2.7%	6,042	0.8584	0.2373	1,231	143,112
62	2059		14,300	44.3%	13.1%	2.7%	5,364	0.8459	0.2315	1,051	144,162
63	2060		14,300	38.5%	12.5%	2.5%	4,691	0.8325	0.2259	882	145,044
64	2061		14,300	32.6%	11.9%	2.4%	4,006	0.8179	0.2204	722	145,766
65	2062	(1)	3,526	28.9%	11.6%	2.3%	881	0.8023	0.2170	153	145,920
Average (2000 $)			$14,300	82.2%	19.7%	5.1%	$8,957	X Actuarial Mult.		16.291	$145,920

	Future Period
Adjusted Earnings	$145,920
Net Employment Insurance	$12,017
Non-Wage Benefits	$8,755
Subtotal	$166,692

(1) Period To Age 65 (April 1, 2062)
(2) Impact of 1% Real Wage Growth Allowance: 28.9%

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Table 18
Earnings Projection for the Average BC Female with All Levels of Schooling
Adjusted for: Labour Force Withdrawal (Average); Educ. Unempl. Rates; Educ. Part-Time Rates;
Labour Market Entry on July 1, 2016
Normal Life Expectancy for Ms.

Age	Year	Full-Time, Full-Year, Income	Labour Force Part'pn Rate	Unem-ployment Rate	Part-Time Factor	LMC Adjusted Income	Canadian Female Survival Rates	Discount Rate (2) 2.50%	Fully Adjusted & Discounted Income	Cumulative Adjusted & Discounted Income
18	2015	0	69.7%	16.2%	44.8%	0	0.9971	0.6862	0	0
19	2016	8,811	72.7%	14.9%	38.4%	3,355	0.9967	0.6695	2,239	2,239
20	2017	18,643	75.6%	13.7%	32.0%	8,279	0.9964	0.6531	5,388	7,627
21	2018	19,711	78.6%	12.5%	25.5%	10,099	0.9960	0.6372	6,409	14,036
22	2019	20,913	80.8%	11.4%	20.5%	11,900	0.9956	0.6217	7,366	21,402
23	2020	22,514	80.7%	11.0%	19.5%	13,005	0.9953	0.6065	7,850	29,252
24	2021	24,116	80.5%	10.6%	18.6%	14,138	0.9949	0.5917	8,323	37,575
25	2022	25,717	80.4%	10.2%	17.7%	15,300	0.9945	0.5773	8,784	46,359
26	2023	27,318	80.3%	9.8%	16.7%	16,491	0.9941	0.5632	9,233	55,593
27	2024	28,718	80.1%	9.5%	16.2%	17,465	0.9937	0.5495	9,536	65,129
28	2025	29,517	79.6%	9.4%	16.9%	17,705	0.9933	0.5361	9,428	74,556
29	2026	30,316	79.2%	9.4%	17.5%	17,934	0.9929	0.5230	9,313	83,869
30	2027	31,115	78.7%	9.3%	18.2%	18,152	0.9924	0.5102	9,192	93,061
31	2028	31,914	78.2%	9.3%	18.9%	18,358	0.9920	0.4978	9,065	102,126
32	2029	32,618	77.8%	9.2%	19.4%	18,585	0.9915	0.4856	8,949	111,074
33	2030	33,036	78.0%	8.9%	19.4%	18,906	0.9909	0.4738	8,876	119,951
34	2031	33,455	78.1%	8.6%	19.5%	19,229	0.9903	0.4622	8,803	128,753
35	2032	33,873	78.3%	8.4%	19.5%	19,555	0.9897	0.4510	8,728	137,481
36	2033	34,291	78.4%	8.1%	19.6%	19,882	0.9890	0.4400	8,652	146,133
37	2034	34,655	78.6%	7.8%	19.5%	20,226	0.9883	0.4292	8,580	154,713
38	2035	34,857	79.0%	7.6%	19.0%	20,617	0.9875	0.4188	8,526	163,239
39	2036	35,058	79.4%	7.3%	18.6%	21,014	0.9866	0.4086	8,470	171,709
40	2037	35,260	79.8%	7.0%	18.1%	21,416	0.9857	0.3986	8,414	180,123
41	2038	35,461	80.1%	6.7%	17.6%	21,823	0.9847	0.3889	8,356	188,479
42	2039	35,673	80.4%	6.5%	17.2%	22,199	0.9836	0.3794	8,284	196,763
43	2040	35,912	80.2%	6.5%	16.6%	22,467	0.9824	0.3701	8,169	204,932
44	2041	36,152	80.0%	6.4%	16.0%	22,735	0.9810	0.3611	8,054	212,986
45	2042	36,392	79.8%	6.3%	15.5%	23,004	0.9795	0.3523	7,938	220,924
46	2043	36,632	79.7%	6.2%	14.9%	23,274	0.9779	0.3437	7,822	228,746
47	2044	36,796	79.1%	6.2%	14.6%	23,337	0.9760	0.3353	7,637	236,384
48	2045	36,736	77.6%	6.3%	14.7%	22,778	0.9739	0.3271	7,257	243,641
49	2046	36,676	76.1%	6.4%	14.9%	22,223	0.9717	0.3192	6,892	250,533
50	2047	36,616	74.5%	6.5%	15.1%	21,673	0.9692	0.3114	6,541	257,073
51	2048	36,556	73.0%	6.6%	15.3%	21,127	0.9665	0.3038	6,203	263,276
52	2049	36,392	71.0%	6.7%	15.3%	20,410	0.9635	0.2964	5,828	269,105
53	2050	35,921	67.4%	6.8%	15.0%	19,182	0.9603	0.2891	5,326	274,431
54	2051	35,450	63.9%	6.9%	14.7%	17,975	0.9567	0.2821	4,851	279,282
55	2052	34,979	60.3%	7.1%	14.4%	16,788	0.9529	0.2752	4,403	283,684
56	2053	34,508	56.8%	7.2%	14.1%	15,623	0.9486	0.2685	3,979	287,664
57	2054	34,002	52.9%	7.3%	13.8%	14,379	0.9440	0.2620	3,556	291,220
58	2055	33,391	48.2%	7.4%	13.6%	12,869	0.9390	0.2556	3,088	294,308
59	2056	32,781	43.5%	7.5%	13.5%	11,402	0.9335	0.2493	2,654	296,962
60	2057	32,171	38.7%	7.6%	13.3%	9,979	0.9276	0.2432	2,252	299,213
61	2058	31,560	34.0%	7.7%	13.1%	8,599	0.9211	0.2373	1,880	301,093
62	2059	30,872	29.4%	7.8%	12.8%	7,302	0.9141	0.2315	1,546	302,638
63	2060	29,951	25.4%	7.7%	12.1%	6,164	0.9065	0.2259	1,262	303,901
64	2061	29,030	21.3%	7.6%	11.3%	5,065	0.8983	0.2204	1,003	304,903
65	2062 (1)	7,016	18.8%	7.6%	10.9%	1,085	0.8893	0.2170	209	305,113
Average (2000 $)		$30,832	73.2%	8.4%	17.9%	$16,979	X Actuarial Mult.		17.970	$305,113

	Future Period
Adjusted Earnings	$305,113
Net Employment Insurance	$418
Non-Wage Benefits	$18,307
Subtotal	$323,837

(1) Period To Age 65 (April 1, 2062)
(2) Impact of 1% Real Wage Growth Allowance: 28.6%

Table 19
Earnings Projection for the Average BC Female Working in Low Skill Occupations
Contingencies for the Average BC Female with a Grades 9-10 Education Level
Adjusted for: Labour Force Withdrawal (Average); Educ. Unempl. Rates; Educ. Part-Time Rates;
Labour Market Entry on July 1, 2018
Normal Life Expectancy for Ms.

Age	Year		Full-Time, Full-Year, Income	Labour Force Part'pn Rate	Unem-ployment Rate	Part-Time Factor	LMC Adjusted Income	Canadian Female Survival Rates	Discount Rate (2) 2.50%	Fully Adjusted & Discounted Income	Cumulative Adjusted & Discounted Income
18	2015		0	49.2%	29.8%	57.6%	0	0.9971	0.6862	0	0
19	2016		0	50.9%	30.2%	47.7%	0	0.9967	0.6695	0	0
20	2017		0	52.7%	30.6%	37.8%	0	0.9964	0.6531	0	0
21	2018		8,102	54.5%	31.0%	27.9%	2,196	0.9960	0.6372	1,394	1,394
22	2019		17,202	55.9%	31.0%	20.3%	5,285	0.9956	0.6217	3,271	4,665
23	2020		18,132	56.1%	29.8%	19.6%	5,741	0.9953	0.6065	3,466	8,131
24	2021		19,063	56.3%	28.5%	18.9%	6,218	0.9949	0.5917	3,660	11,791
25	2022		19,993	56.5%	27.2%	18.2%	6,715	0.9945	0.5773	3,855	15,646
26	2023		20,924	56.6%	26.0%	17.5%	7,233	0.9941	0.5632	4,050	19,696
27	2024		21,676	56.9%	25.0%	17.1%	7,666	0.9937	0.5495	4,186	23,882
28	2025		21,896	57.4%	24.9%	17.5%	7,785	0.9933	0.5361	4,145	28,027
29	2026		22,117	57.9%	24.7%	18.0%	7,904	0.9929	0.5230	4,104	32,131
30	2027		22,337	58.3%	24.6%	18.4%	8,023	0.9924	0.5102	4,063	36,194
31	2028		22,558	58.8%	24.5%	18.8%	8,142	0.9920	0.4978	4,021	40,214
32	2029		22,762	59.4%	24.1%	18.9%	8,324	0.9915	0.4856	4,008	44,222
33	2030		22,918	60.2%	23.0%	18.1%	8,696	0.9909	0.4738	4,083	48,305
34	2031		23,074	61.1%	22.0%	17.4%	9,081	0.9903	0.4622	4,157	52,462
35	2032		23,229	61.9%	20.9%	16.6%	9,478	0.9897	0.4510	4,230	56,692
36	2033		23,385	62.7%	19.9%	15.9%	9,887	0.9890	0.4400	4,302	60,994
37	2034		23,538	63.4%	18.9%	15.1%	10,275	0.9883	0.4292	4,359	65,353
38	2035		23,684	63.8%	18.3%	14.4%	10,567	0.9875	0.4188	4,370	69,723
39	2036		23,830	64.2%	17.7%	13.7%	10,866	0.9866	0.4086	4,380	74,102
40	2037		23,976	64.6%	17.1%	13.0%	11,171	0.9857	0.3986	4,389	78,491
41	2038		24,122	65.0%	16.4%	12.3%	11,482	0.9847	0.3889	4,396	82,887
42	2039		24,225	65.2%	15.7%	11.9%	11,724	0.9836	0.3794	4,375	87,262
43	2040		24,200	64.8%	14.6%	12.3%	11,741	0.9824	0.3701	4,269	91,531
44	2041		24,174	64.3%	13.4%	12.7%	11,756	0.9810	0.3611	4,164	95,696
45	2042		24,148	63.9%	12.3%	13.1%	11,767	0.9795	0.3523	4,061	99,757
46	2043		24,122	63.5%	11.2%	13.5%	11,776	0.9779	0.3437	3,958	103,714
47	2044		24,106	62.8%	10.3%	13.7%	11,719	0.9760	0.3353	3,835	107,550
48	2045		24,116	61.2%	10.1%	13.6%	11,470	0.9739	0.3271	3,654	111,204
49	2046		24,127	59.7%	10.0%	13.4%	11,218	0.9717	0.3192	3,479	114,683
50	2047		24,138	58.1%	9.8%	13.3%	10,964	0.9692	0.3114	3,309	117,992
51	2048		24,148	56.5%	9.6%	13.2%	10,708	0.9665	0.3038	3,144	121,136
52	2049		24,172	54.7%	9.5%	12.9%	10,424	0.9635	0.2964	2,977	124,113
53	2050		24,235	52.3%	9.4%	12.4%	10,059	0.9603	0.2891	2,793	126,906
54	2051		24,298	49.9%	9.4%	11.8%	9,685	0.9567	0.2821	2,614	129,520
55	2052		24,362	47.5%	9.3%	11.3%	9,303	0.9529	0.2752	2,440	131,960
56	2053		24,425	45.1%	9.2%	10.8%	8,913	0.9486	0.2685	2,270	134,230
57	2054		24,381	42.2%	9.2%	10.1%	8,402	0.9440	0.2620	2,078	136,308
58	2055		24,019	38.0%	9.1%	9.0%	7,553	0.9390	0.2556	1,813	138,120
59	2056		23,656	33.9%	9.0%	8.0%	6,707	0.9335	0.2493	1,561	139,681
60	2057		23,294	29.7%	9.0%	6.9%	5,863	0.9276	0.2432	1,323	141,004
61	2058		22,931	25.5%	8.9%	5.8%	5,022	0.9211	0.2373	1,098	142,102
62	2059		22,449	21.6%	8.7%	5.3%	4,201	0.9141	0.2315	889	142,991
63	2060		21,609	18.6%	8.0%	6.3%	3,456	0.9065	0.2259	708	143,699
64	2061		20,769	15.5%	7.4%	7.3%	2,760	0.8983	0.2204	546	144,245
65	2062	(1)	4,992	13.6%	7.0%	8.0%	580	0.8893	0.2170	112	144,357
Average (2000 $)			$22,458	55.8%	18.7%	15.0%	$8,661	X Actuarial Mult.		16.668	$144,357

	Future Period
Adjusted Earnings	$144,357
Net Employment Insurance	$10,566
Non-Wage Benefits	$8,661
Subtotal	$163,585

(1) Period To Age 65 (April 1, 2062)
(2) Impact of 1% Real Wage Growth Allowance: 29.6%

Table 20
Earnings Projection for the Average BC Female Working in Low Skill Occupations
Contingencies for the Average BC Female with a Grades 9-10 Education Level
Adjusted for: Labour Force Withdrawal (Average); Educ. Unempl. Rates; Educ. Part-Time Rates;
Labour Market Entry on July 1, 2018
Normal Life Expectancy for Ms.

Age	Year		Full-Time, Full-Year, Income	Labour Force Part'pn Rate	Unem-ployment Rate	Part-Time Factor	LMC Adjusted Income	Canadian Female Survival Rates	Discount Rate (2) 2.50%	Fully Adjusted & Discounted Income	Cumulative Adjusted & Discounted Income
18	2015		0	49.2%	29.8%	57.6%	0	0.9971	0.6862	0	0
19	2016		0	50.9%	30.2%	47.7%	0	0.9967	0.6695	0	0
20	2017		0	52.7%	30.6%	37.8%	0	0.9964	0.6531	0	0
21	2018		8,102	54.5%	31.0%	27.9%	2,196	0.9960	0.6372	1,394	1,394
22	2019		17,202	55.9%	31.0%	20.3%	5,285	0.9956	0.6217	3,271	4,665
23	2020		18,132	56.1%	29.8%	19.6%	5,741	0.9953	0.6065	3,466	8,131
24	2021		19,063	56.3%	28.5%	18.9%	6,218	0.9949	0.5917	3,660	11,791
25	2022		19,993	56.5%	27.2%	18.2%	6,715	0.9945	0.5773	3,855	15,646
26	2023		20,924	56.6%	26.0%	17.5%	7,233	0.9941	0.5632	4,050	19,696
27	2024		21,676	56.9%	25.0%	17.1%	7,666	0.9937	0.5495	4,186	23,882
28	2025		21,896	57.4%	24.9%	17.5%	7,785	0.9933	0.5361	4,145	28,027
29	2026		22,117	57.9%	24.7%	18.0%	7,904	0.9929	0.5230	4,104	32,131
30	2027		22,337	58.3%	24.6%	18.4%	8,023	0.9924	0.5102	4,063	36,194
31	2028		22,558	58.8%	24.5%	18.8%	8,142	0.9920	0.4978	4,021	40,214
32	2029		22,762	59.4%	24.1%	18.9%	8,324	0.9915	0.4856	4,008	44,222
33	2030		22,918	60.2%	23.0%	18.1%	8,696	0.9909	0.4738	4,083	48,305
34	2031		23,074	61.1%	22.0%	17.4%	9,081	0.9903	0.4622	4,157	52,462
35	2032		23,229	61.9%	20.9%	16.6%	9,478	0.9897	0.4510	4,230	56,692
36	2033		23,385	62.7%	19.9%	15.9%	9,887	0.9890	0.4400	4,302	60,994
37	2034		23,538	63.4%	18.9%	15.1%	10,275	0.9883	0.4292	4,359	65,353
38	2035		23,684	63.8%	18.3%	14.4%	10,567	0.9875	0.4188	4,370	69,723
39	2036		23,830	64.2%	17.7%	13.7%	10,866	0.9866	0.4086	4,380	74,102
40	2037		23,976	64.6%	17.1%	13.0%	11,171	0.9857	0.3986	4,389	78,491
41	2038		24,122	65.0%	16.4%	12.3%	11,482	0.9847	0.3889	4,396	82,887
42	2039		24,225	65.2%	15.7%	11.9%	11,724	0.9836	0.3794	4,375	87,262
43	2040		24,200	64.8%	14.6%	12.3%	11,741	0.9824	0.3701	4,269	91,531
44	2041		24,174	64.3%	13.4%	12.7%	11,756	0.9810	0.3611	4,164	95,696
45	2042		24,148	63.9%	12.3%	13.1%	11,767	0.9795	0.3523	4,061	99,757
46	2043		24,122	63.5%	11.2%	13.5%	11,776	0.9779	0.3437	3,958	103,714
47	2044		24,106	62.8%	10.3%	13.7%	11,719	0.9760	0.3353	3,835	107,550
48	2045		24,116	61.2%	10.1%	13.6%	11,470	0.9739	0.3271	3,654	111,204
49	2046		24,127	59.7%	10.0%	13.4%	11,218	0.9717	0.3192	3,479	114,683
50	2047		24,138	58.1%	9.8%	13.3%	10,964	0.9692	0.3114	3,309	117,992
51	2048		24,148	56.5%	9.6%	13.2%	10,708	0.9665	0.3038	3,144	121,136
52	2049		24,172	54.7%	9.5%	12.9%	10,424	0.9635	0.2964	2,977	124,113
53	2050		24,235	52.3%	9.4%	12.4%	10,059	0.9603	0.2891	2,793	126,906
54	2051		24,298	49.9%	9.4%	11.8%	9,685	0.9567	0.2821	2,614	129,520
55	2052		24,362	47.5%	9.3%	11.3%	9,303	0.9529	0.2752	2,440	131,960
56	2053		24,425	45.1%	9.2%	10.8%	8,913	0.9486	0.2685	2,270	134,230
57	2054		24,381	42.2%	9.2%	10.1%	8,402	0.9440	0.2620	2,078	136,308
58	2055		24,019	38.0%	9.1%	9.0%	7,553	0.9390	0.2556	1,813	138,120
59	2056		23,656	33.9%	9.0%	8.0%	6,707	0.9335	0.2493	1,561	139,681
60	2057		23,294	29.7%	9.0%	6.9%	5,863	0.9276	0.2432	1,323	141,004
61	2058		22,931	25.5%	8.9%	5.8%	5,022	0.9211	0.2373	1,098	142,102
62	2059		22,449	21.6%	8.7%	5.3%	4,201	0.9141	0.2315	889	142,991
63	2060		21,609	18.6%	8.0%	6.3%	3,456	0.9065	0.2259	708	143,699
64	2061		20,769	15.5%	7.4%	7.3%	2,760	0.8983	0.2204	546	144,245
65	2062	(1)	4,992	13.6%	7.0%	8.0%	580	0.8893	0.2170	112	144,357
Average (2000 $)			$22,458	55.8%	18.7%	15.0%	$8,661	X Actuarial Mult.		16.668	$144,357

	Future Period
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(1) Period To Age 65 (April 1, 2062)
(2) Impact of 1% Real Wage Growth Allowance: 29.6%

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By hand

March 17, 2000
Our file: 215199
Your file 8777-96618

This is Exhibit "C" referred to in the affidavit of Douglas G. Hildebrand sworn before me, at Vancouver, BC this 23rd day of March 20 00
A COMMISSIONER FOR TAKING AFFIDAVITS FOR BRITISH COLUMBIA

Harper Grey Easton
Barristers and Solicitors
3100 - 650 West Georgia St.
P.O. Box 11504
Vancouver , B.C.
V6B 4P7

Attention of Ms. Birgitta von Krosigk

Dear Sirs/Mesdames:

Re: Cost Benefit Analysis of Lovaas Treatment

Further to our preliminary report of December 7, 1999, "Cost-Benefit Analysis of Lovaas Treatment for Autism and Autism Spectrum Disorder (ASD)", we respond to the critique of our report attached to the Affidavit of Ms. Carolyn Green (February 2000).

The critique is entitled "Critical Appraisal of Submitted Cost-Benefit Models of 'Lovaas' Early Intensive Behavioural Intervention for Autism" (February, 2000) and is co-authored by Ms. Carolyn Green, Dr. Ken Bassett and Dr. Arminée Kazanjian, all of the B.C. Office of Health Technology Assessment (BCOHTA), University of British Columbia. Hereinafter we refer to the critique as Green et al for identification purposes.

We commence our reply with general comments, followed by specific comments on each section of the critique in chronological order (i.e., starting at page 1 through to page 18).

I. General Comments in Reply

1. As economists, we are in no position to comment on the medical/health effectiveness of Lovaas Treatment per se – we leave that issue to the medical specialists. Our cost-benefit analysis (CBA) does, however, explore a wide

range in effectiveness outcomes through sensitivity analysis. Our sensitivity testing was deliberately skewed towards the "downside" (i.e., scenarios which reduced net benefits relative to "most likely" or base case assumptions) in order to address the "robustness" of results.

2. Green et al maintain that our range in effectiveness assumptions should have been extended even further in the less favourable direction. For example, Green et al suggest that some proportion of children with autism should be assumed normal "without Lovaas", and that greater-than-10% of children "with Lovaas" should be assumed very dependent.[1] Our computer-based CBA model can be easily applied to explore even less favourable effectiveness assumptions. The suggestion by Green et al of zero difference in effectiveness between the "with Lovaas" and "without Lovaas" is, however, extreme. The result of such a scenario is self-evident, but the effectiveness assumption is contrary to the Jacobsen et al and Lovaas research which we were directed to assume within a British Columbia context.

3. Our cost assumptions were developed largely from review of material provided by the provincial government and by counsel. Variation in cost assumptions was also explored in sensitivity testing and we welcome any suggestions regarding alternate cost assumptions. We note that Green et al did not provide any comments on specific cost levels to assume.

4. To assist reviewers of our preliminary CBA, we will provide under separate letter two items: (1) a description of cost information from various sources which can be compared to our cost assumptions and which therefore provides context; and (2) CBA results for alternate effectiveness scenarios which reflect Green et al's comments.

5. We agree with Green et al that Drummond et al provide an excellent framework for economic evaluation techniques. As indicated below, we basically find Drummond et al to be supportive of our analysis, as distinct from the misinterpretations provided by Green et al.

II. Executive Summary Section (pages 1-2)

1. Green et al suggest the effectiveness assumptions are skewed in favour of Lovaas treatment. As Green et al appear to substantially dispute the

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[1]/ Green et al indicate at page 1 that our CBA assumed an effectiveness range of 40% to 80% for the "very dependent" state without Lovaas treatment. This is incorrect. The 40% to 80% range pertained to the "semi-dependent" state without Lovaas treatment. The range for the "very dependent" state without Lovaas treatment was 20% to 60%.

effectiveness of Lovaas treatment, this comment is to be expected. Effectiveness of treatment is a matter for medical/health specialists.

2. Green et al are critical of the cost assumptions and suggest costs should be based on actual measurements of functioning autism treatment programs. We note, however, that there already exists extensive cost information related to special needs individuals (including autistic persons) in British Columbia (moderately dependent, heavily dependent) in terms of their health, education and residential care requirements.

III. Section One-Introduction (Pages 3-5)

1.0 Economic Modelling Bias

1.1 We agree with the comments about models, potential for bias and the excerpt from Sheldon. Clinical trials are required, for example, prior to approval and commercialisation of a new drug treatment. The purpose of the Lovaas CBA (preliminary report) is to explore the treatment's potential economic merit vis à vis the existing approach to the disorder. The preliminary CBA report strikes us as appropriate within such a context.

2.0 Appropriateness of CBA Model

2.1 It is true that a cost-benefit study attempts to quantify in monetary terms the costs and benefits associated with each alternative. As Drummond et al outline in Chapter 7, the benefits of a health treatment option typically include the following:

(a) future health care costs avoided (or saved);
(b) increased productive output due to improved health status;
(c) intangible benefits which are the value of improved health per se to the individual consumer of the health care option.

2.2 Our CBA study quantified in monetary terms both cost saving (a) and wage income (b) benefits. This approach is consistent with Drummond et al's description of the Human Capital Approach (Section 7.2.1). Our method is also conservative in that no attempt was made to monetize intangible benefits of improved health (c), which, of course, would have increased the net benefits of Lovaas treatment in each scenario examined. Our decision not to monetize intangible benefits of improved health relates to the potential for double counting with (a) and (b), which Drummond et al discusses in Section 7.3. Hence our CBA restricts the monetary measure of willingness-to-pay (WTP) benefits to avoided costs and increased income productivity. Given

the double counting issue just noted and the very contentious issue of WTP approaches to monetizing intangible benefits of improved health (contingent valuation approach), our approach strikes us as appropriate in the context.[2]

2.3 Drummond et al also distinguish the typical assessment in which the costs and health benefits of the proposed option both increase, versus the atypical assessment (dominant case) in which costs of the proposed option are lower and health benefits increase (win-win). At page 142, Drummond et al say it is unnecessary to quantify health benefits in the dominant (win-win) case, for obvious reasons. Our CBA of Lovaas treatment was a dominant case – i.e., costs were lower and health benefits greater than the "no Lovaas" approach.

3.0 B.C. Government's Benefit-Cost Analysis Guidelines

3.1 Geen et al's comments on the B.C. Government's CBA guidelines are misplaced. The B.C. guidelines on CBA are consistent with Drummond et al's discussion on CBA. The B.C. Government's guidelines are reflective of guidelines published by the federal government and international lending institutions. Whilst the guidelines are not specifically targeted to health care, the concepts are generally accepted by economists.

IV. Sections Two-Three: Appraisal Methodology and Results (pages 6-11)

1.0 Appraisal Checklist

1.1 We have no difficulty with this 10-point checklist.

2.0 Well-Defined Question Posed? (#1)

2.1 We were asked to address a very specific question in our CBA: the costs and benefits of Lovaas treatment versus no Lovaas treatment. The no Lovaas treatment case was, of course, intended to reflect the *status quo* (or existing) approach to the disorder. We were not asked to address a range of other alternatives. The fact that other alternatives were not addressed does not invalidate the CBA methodology or results.

2.2 Green et al suggest alternatives should be compared to the "do nothing" option. This is appropriate when the "do nothing" option is viable (e.g., in a case evaluating alternate drug treatments where the consumer can choose the

---

[2] / *Another conservative feature of our CBA relates to benefit (b) increased productive output. We restricted our monetized benefit to wage earnings. As Drummond et al point out at page 210, a monetized benefit could be added to reflect increased productivity of household services. We frequently monetize the value of household services activity in serious personal injury cases along the lines suggested by Drummond et al (e.g., hourly replacement cost x number of hours of productive household work). In our CBA, however, we have not included the value of increased productive household work.*

"do nothing" option, i.e., it is feasible). In the case of autism, statutory or institutional mitigation comes into play. The "do nothing" case assumes that our society is prepared to "do nothing" for significantly handicapped individuals. Our comparative case for Lovaas treatment is the status quo scenario (without Lovaas) which involves the social costs of dealing with handicapped individuals. This approach appears to satisfy the intent of Drummond et al's references to "do nothing" and status quo in their Chapter 2.

3.0 Competing Alternatives (#2)

3.1 Green et al are critical of the lack of detail underlying the service requirements and costs of the two options addressed. Further detail will be provided under separate letter.

3.2 Green et al repeat the "textbook" need for the "do nothing" case as a benchmark. See response at 2.2.

4.0 Effectiveness Established? (#3)

4.1 Our CBA addressed a broad range of possible effectiveness outcomes for the "with Lovaas" and status quo cases. We also indicated that our base case (most likely) assumptions were drawn from Jacobsen et al and Lovaas research. Beyond that, we leave it to the medical/health specialists to address effectiveness issues.

5.0 All Costs/Consequences Identified (#4)

5.1 Further detail is requested and will be provided.

6.0 Costs/Consequences Measured Accurately in Physical Units (#5)

6.1 Issues raised concerning cost reliability, cost detail and range of effectiveness assumptions have been dealt with above.

6.2 Green et al suggest costs and consequences should be integrated into the measure of cost per quality-adjusted life years (QUALs). In essence, they suggest an alternate methodology to CBA be applied, namely cost-utility analysis (CUA) which is a variant of cost-effectiveness analysis (CEA). Under CUA/CEA methods, the consequences (health benefits) of a treatment option are not expressed in monetary terms, but are dealt with in physical units such as QUALs. The cost per QUALs are computed for each option and compared to establish the cost per QUALs gained.

6.3 We agree with Drummond et al and Green et al that CUA and CEA analyses can be useful and complementary to CBA in evaluating project options.

However, in the context of our evaluation, calculating the cost per QUAL has the following limitations:

- As Drummond et al say (see page 142), there is no need to bother calculating QUALs if it is a dominant assessment (i.e., lower cost and more effective – win/win case) such as our assessment. Calculation of QUALs in this context simply makes the dominant option even more attractive.
- Calculation of QUALs is obviously much more relevant to evaluating treatment options involving differences in life expectancy; in our assessment, life expectancy is assumed to be the same for both options.

6.4 As an exercise and for purposes of illustration only, we have calculated the cost per QUALs following the method set out by Drummond et al in Chapter 6. We re-express the discounted cost of "without" and "with" Lovaas treatment (excluding wage income) on a cost per QUALs basis. The assumptions are as follows:

- Weights for normal, semi-dependent and very dependent states are set at 1.0, 0.85 and 0.65 respectively; these are arbitrary weights, but generally reflect the data in Table 6.7 of Drummond et al;
- The expected weight for the "with" and "without" Lovaas treatment cases are calculated at 0.89 and 0.75 respectively assuming our Base Case effectiveness outcomes;
- From Tables 13 and 14 of our report, the discounted value of life-years (unadjusted for quality) is about 26.3 at 3.5% real assuming an 80/20 incidence rate for males/females;
- discounted QUALs are calculated, therefore, at about 23.4 and 19.7 for the "with" and "without" Lovaas treatment cases respectively;
- on this basis the cost per QUALs gained is estimated as follows (per child):

Scenario	Discounted Cost	Discounted Cost per QUALs
(a) Without Lovaas	$2.4 million	$121,800
(b) With Lovaas	$1.4 million	$ 59,800
(c) Cost Saving	$1.0 million	$ 62,000 gained
(d) Ratio (a) to (b)	1.714	2.037

The above illustration indicates that inclusion of health benefits as measured by QUALs increases the relative merit of Lovaas treatment. This is evident from the benefit/cost ratio (ratio of avoided cost to cost) which increases from about 1.7 (unadjusted for life quality) to 2.0 (adjusted for life quality). In conclusion on this point, we note that there is contention amongst economists as to quantification of

QUALs (i.e., just as there is in valuing an individual's health benefits in monetary terms) as noted by Drummond et al in Chapter 6.

7.0 Costs/Consequences Valued Credibly (#6)

7.1 Issues already addressed.

8.0 Costs/Consequences Adjusted for Differential Timing (#7)

8.1 No apparent disagreement on discounting.

9.0 Incremental Analysis Done? (#8)

9.1 Issues already addressed.

10.0 Allowance Made for Uncertainty (#9)

10.1 Issues already addressed.

11.0 Include All Issues of Concern (#10)

11.1 Our CBA was a focussed assessment. Clearly there are issues of concern for many stakeholders that go beyond this narrowly focussed analysis. This does not, however, invalidate the study's findings.

V. Summary and Conclusions (pages 17-18)

The points made in summary and conclusion have already been addressed. As stated above, alternate effectiveness assumptions can be made and CBA results efficiently calculated with our computerised model. Further detail on costs can be provided, and CBA results can be generated with alternate cost assumptions as well. Other criticisms advanced by Green et al stem from their literal, textbook interpretations of Drummond et al, which, we have pointed out, have frequently been misinterpretations.

This concludes our reply.

Yours very truly,

Douglas G. Hildebrand
Director

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Delivered by Hand

March 20, 2000

This is Exhibit" D "referred to in the affidavit of Douglas G. Hildebrand sworn before me, at Vancouver BC this 23rd day of March 2000
A COMMISSIONER FOR TAKING AFFIDAVITS FOR BRITISH COLUMBIA

Our File: 215199
Your File: 8777-96618

Harper Grey Easton
Barristers and Solicitors
3100 – 650 West Georgia St.
P. O. Box 11504
Vancouver BC V6B 4P7

Attention of Ms. Birgitta von Krosigk

Dear Sirs/Mesdames:

Re: Cost Benefit Analysis of Lovaas Treatment

Further to our letter to you dated March 17, 2000, we respond to issues in Green et al's (February 2000) critique which we did not address in the earlier letter, namely, (1) cost information and (2) CBA results for alternative effectiveness scenarios which reflect Green et al's comment.

1.0 Description of Cost Information

In Sections 2.2 and 2.3 of our preliminary report, we briefly introduced the broad cost categories and mentioned principal sources of data used in the CBA. In the attached Data Appendix, we provide some further information with regard to cost derivation and data sources.

As indicated on Page 6 of our preliminary report, except for Lovaas early intervention and costs for Outcome 1 in the "with" treatment scenario, service costs for Outcome 2 are assumed to be 70% of those for Outcome 3. Hence, our descriptions in the Data Appendix focus on the costs for Outcome 3 unless otherwise noted.

2.0 CBA Results for Alternative Effectiveness Scenarios Based on Green et al's Comments

Green et al maintain that our range in effectiveness assumptions should have been extended further in the less favourable direction. For example, Green et al suggest that greater-than-10% of children "with Lovaas" should be assumed very dependent and that some proportion of children with autism should be assumed normal "without Lovaas". As indicated in our letter of March 17, 2000, as economists, we are not in a position to comment on the effectiveness of Lovaas treatment. In our preliminary analysis, we applied a computer model to explore the most likely scenarios based on Jacobson (1996)[1]. Our model can certainly be used to investigate any other possible scenarios, such as those suggested by Green et al. Examining these alternative scenarios, however, does not reflect our opinion with regard to the likelihood of their occurrence, an issue which can only be addressed by medical and health specialists.

In this section, we explore the impact on net benefits from Lovaas treatment by considering various alternative effectiveness scenarios. To achieve this, we take a three-step approach:

> Step 1: All else equal (to what we assumed in the preliminary report), we increase the proportion of children "with" Lovaas treatment but remain very dependent;
>
> Step 2: All else equal, we increase the proportion of children "without" Lovaas treatment but achieve normal functioning;
>
> Step 3: We simultaneously increase both the proportion of children "with" treatment but remain very dependent and the proportion of children "without" Lovaas treatment but achieve normal functioning.

Before we conduct step 1, we need to make some supplementary cost assumptions to facilitate our analysis.

➢ Cost Assumptions for Children "Without" Lovass Achieving Normal Functioning

On Page 9 of Green et al's critique, it was pointed out that "as many as 20% of children labelled 'autistic' achieved education and employment without the significant public expenditures that this model [our CBA model] attributes to all children not receiving Lovaas treatment". Our supplementary cost assumptions for the "without" treatment

[1] John W. Jacobson et al, *Financial Cost and Benefits of Intensive Early Intervention for Young Children with Autism – Pennsylvania Model Achieving Cost Savings.*

scenario are provided in Table 2A, attached. The difference between Table 2A and Table 2 of our preliminary report is that cost assumptions for Outcome 1 (Normal) have been added in Table 2A.

As no substantial expenditures in education and adult care are expected for children "without" treatment who achieve normal functioning, we assume costs incurred by children achieving normal functioning are the same "with" or "without" Lovaas treatment beyond age 6. From age 3 to age 6, costs incurred by children achieving normal functioning "without" treatment are assumed to be the same as costs incurred by children "without" treatment who belong to the semi-dependent category.

Table 3A, attached, provides a revised comparison of annual costs for "with" and "without" Lovaas treatment by age range and outcome. Although weights for each outcome in Table 3A are the same as in the Base Case of our preliminary report, expected annual cost savings can be estimated by assuming any specific weight for each outcome (as illustrated in Tables 3B and 3C, which will be discussed later in Section 2.2).

➢ Effectiveness Assumptions

In Section 3.2 of our preliminary report, we carried out a series of sensitivity analyses, the first of which was "Cost Savings of Lovaas Treatment by Outcome Distributions" (Table 7 of preliminary report). Table 7 calculated the cost savings (benefits) of Lovaas treatment by changes in the outcome distribution for the "with" Lovaas treatment scenario, the "without" Lovaas treatment scenarios and both scenarios simultaneously.

Variations in the "with" treatment outcomes were assumed as follows in our previous report:

(i) 10% of children "with" treatment will remain very dependent;

(ii) 20% - 60% achieve normal functioning;

(iii) (i) and (ii) imply that 30% - 70% of children are assumed to be semi-dependent.

Variations in the "without" treatment outcomes were assumed as follows in Table 7 of the preliminary report:

(a) 0% of children "without" treatment will achieve normal functioning;

(b) 40% - 80% achieve semi-dependent;

(c) (a) and (b) imply that 20% - 60% of children are assumed to remain very dependent.

In the following, we vary these assumptions step by step to explore the impact on our CBA results. Our sensitivity testing in the downward (less favourable) direction extends to the point of zero difference in effectiveness between the "with" and "without" scenarios.

2.1 Increasing the proportion of "Very Dependent" under "With" Lovaas

Green et al suggest that our assumption that only 10% of children "with" treatment remain very dependent (assumption (i) above) is overly optimistic. In Tables 7A and 7B, attached, we re-run the model allowing a higher proportion of children "with" treatment in the very dependent category.

Table 7A: Cost Savings of Lovaas Treatment By Outcome Distribution where **20%** of children "with" treatment are assumed to remain very dependent; detailed assumptions are listed in the table below:

Outcome	"With" Lovaas	"Without" Lovaas
Normal	20% - 60%	0%
Semi-dependent	20% - 60%	40% - 80%
Very Dependent	**20%**	20% - 60%

Table 7 of our preliminary CBA report indicated a net benefit of Lovaas treatment of about $1.01 million (excluding wages) per child, with an associated internal-rate-of-return of 42% for the Base Case. The Target Sensitivity Case[2] (shaded cell) in Table 7A shows that increasing the percentage of children "with" Lovaas who remain very dependent to 20% yields a net benefit from Lovaas treatment of $0.83 million (excluding wages), with an associated internal-rate-of-return of 35%. Sensitivity test results for various cases other than the Target Sensitivity Case are provided in cells surrounding the shaded cell in Table 7A.

[2] Target Sensitivity Case is defined as the case when the median "with" Lovaas outcome distribution and the median "without" Lovaas outcome distribution occur simultaneously. For example in Table 7A, when the "with" Lovaas outcome distribution varies from 20/60/**20** (normal/semi-dependent/very dependent, with the very dependent set at a constant 20% in Table 7A) to 60/20/**20**, the median "with" Lovaas distribution will be 40/40/**20**. Similarly, when the "without" Lovaas outcome distribution varies between 0/40/60 to 0/80/20, the median "without" Lovaas distribution will be 0/60/40. Similar concept is followed in Tables 7 (B–E). Results for Target Sensitivity Case are shaded and the corresponding internal-rate-of-return (excluding wages) is calculated in each table.

Table 7B: Cost Savings of Lovaas Treatment By Outcome Distribution where **30%** of children "with" treatment are assumed to remain very dependent; detailed assumptions are listed in the table below:

Outcome	"With" Lovaas	"Without" Lovaas
Normal	20% - 60%	0%
Semi-dependent	10% - 50%	40% - 70%
Very Dependent	**30%**	30% - 60%

The Target Sensitivity Case in Table 7B shows that increasing the percentage of children "with" Lovaas who remain very dependent to 30% yields a net benefit from Lovaas treatment of $0.75 million (excluding wages), with an associated internal-rate-of-return of 32%. Sensitivity test results for various cases other than the Target Sensitivity Case are provided in cells surrounding the shaded cell in Table 7B.

2.2 Increasing the proportion of "Normal" under "Without" Lovaas

Green et al suggest that the assumption that 0% of children "without" treatment appear in the normal functioning category (our assumption (a) above) seems to be biased in favour of Lovaas treatment. They indicate that about 10-20% of a population of children with autism achieve employment independent of specific treatment program. In Tables 7C and 7D, attached, we re-run the model allowing a higher proportion of children "without" treatment in the normal functioning category.

Table 7C: Cost Savings of Lovaas Treatment By Outcome Distribution where **10%** of children "without" treatment are assumed to achieve normal functioning; detailed assumptions are listed in the table below:

Outcome	"With" Lovaas	"Without" Lovaas
Normal	20% - 60%	**10%**
Semi-dependent	30% - 70%	40% - 80%
Very Dependent	10%	10% - 50%

The Target Sensitivity Case in Table 7C shows that increasing the percentage of children "without" Lovaas who obtain normal functioning to 10% yields a net benefit from Lovaas treatment of $0.65 million (excluding wages), with an associated internal-rate-of-return of 28%. Sensitivity test results for various cases other than the Target Sensitivity Case are provided in cells surrounding the shaded cell in Table 7C.

Table 7D: Cost Savings of Lovaas Treatment By Outcome Distribution where **20%** of children "without" treatment are assumed to achieve normal functioning; detailed assumptions are listed in the table below:

Outcome	"With" Lovaas	"Without" Lovaas
Normal	20% - 60%	**20%**
Semi-dependent	30% - 70%	40% - 70%
Very Dependent	10%	10% - 40%

The Target Sensitivity Case in Table 7D shows that increasing the percentage of children "without" Lovaas who obtain normal functioning to 20% yields a net benefit from Lovaas treatment of $0.38 million (excluding wages), with an associated internal-rate-of-return of 22%. For cases surrounding the Target Sensitivity Case in Table 7D, net benefits from Lovaas treatment remain positive except in one case, when the "with" and "without" Lovaas outcome distributions are exactly the same (i.e., there is zero difference in effectiveness between the "with" and "without" treatment scenarios).

This can be explained by the attached Table 3B, where this specific case is explored in terms of annual cost comparison. The net loss is simply the present value of the incremental cost of "with" Lovaas vs "without" Lovaas over the three-year intervention period.

2.3 Increasing the proportion of "Very Dependent" under "With" Lovaas and the proportion of "Normal" under "Without" Lovaas

Table 7E: Cost Savings of Lovaas Treatment By Outcome Distribution where **30%** of children "with" treatment are assumed to remain very dependent and **20%** of children "without" treatment are assumed to achieve normal functioning; detailed assumptions are listed in the table below:

Outcome	"With" Lovaas	"Without" Lovaas
Normal	20% - 60%	**20%**
Semi-dependent	10% - 50%	40% - 50%
Very Dependent	**30%**	30% - 40%

The Target Sensitivity Case in Table 7E shows that increasing the percentage of children "without" Lovaas who obtain normal functioning to 20% and simultaneously increasing the percentage of children "with" Lovaas but remain very dependent to 30% yields a net benefit from Lovaas treatment of $0.30 million (excluding wages), with an associated internal-rate-of-return of 16%. For cases surrounding the Target Sensitivity Case in Table 7E, net benefits from Lovaas treatment remain positive except in one case, when the

"with" and "without" Lovaas outcome distributions are exactly the same (i.e., there is zero difference in effectiveness between the "with" and "without" treatment scenarios).

This can be explained by the attached Table 3C, where this specific case is explored in terms of annual cost comparison. The net loss is simply the present value of the incremental cost of "with" Lovaas vs "without" Lovaas over the three-year intervention period.

2.4 CBA Results of Additional (Downward) Sensitivity Tests

To facilitate the comparison of the Base Case result of our preliminary report with the Target Sensitivity Case results under the alternative scenarios examined in Sections 2.1 – 2.3, Table I below provides a summary of the related results contained in the associated tables.

Table I Net Benefits From Lovaas - Base Case vs Target Sensitivity Cases

Table	Net Benefits (Millions)*	IRR
7	$1.01	42.28%
7A	$0.83	34.97%
7B	$0.75	32.38%
7C	$0.65	27.81%
7D	$0.38	22.19%
7E	$0.30	16.19%

*: *Excluding Wages*

From Tables 7 (A-E) and Table I, we observe the following:

(a) Extending the sensitivity analysis further in the less favourable direction results in reduced net benefits from Lovaas treatment, however, in all of the Target Sensitivity Cases of Tables 7(A-E), net benefits remain substantially positive;

(b) When the surrounding cases in all five tables (Tables 7 (A-E)) are considered, only two yield negative benefits, which occur under the extreme assumption that there is zero difference in effectiveness between the "with" and "without" treatment scenarios;

(c) Of all these alternative scenarios, the internal-rate-of-return for the Target Sensitivity Case remains significantly higher than any of the hurdle rates[3] used in our preliminary CBA study.

Hence, skewing the sensitivity analysis even further towards the "downside" scenarios consolidates the "robustness" of our preliminary CBA results. This conclusion holds before considering the positive effect of increased quality-of-life discussed in Section 6 of our earlier reply to Green et al.

This concludes our supplementary reply.

Yours truly,

Douglas G. Hildebrand
Director

Att.

[3] Discussed in detail in Section 2.8.2 of our preliminary report.

Data Appendix: Description of Cost Derivation and Data Sources for Costs Used in CBA Study of Lovaas Treatment

Cost Item	Cost Used in CBA (Bolded Figures)	Detailed Cost Derivation	Data Source
Child Care			
Early Intensive Intervention (Lovaas Treatment Cost)	**$65,000**	Sum of the four major categories, rounded to the nearest $1,000 (For all 3 "with" treatment" Outcomes).	Therapists and consultant's service charges are based on information from B.C. families currently running programs in B.C. (as provided through counsel); Traveling expenses include airline ticket, hotel accommodations, car rentals and food/meals; Teaching materials include arrangement cost for professional workshops and seminars, etc.
	$28,080	- Junior Therapists @ $15/hour for 36 hours/week, 52 weeks/year	
	$7,800	- Senior Therapists @ $25/hour for 6 hours/week, 52 weeks/year	
	$16,500	- Consultant @1,500/day for minimum of 9 days/year, plus a minimum of $3,000 travel expenses/year	
	$13,095	- Teaching Materials @25% of the total of Therapists and Consultant service charges	
Respite Services	$3,700	Mid-point of cost range $3,200 and $4,100, rounded to the nearest $100.	Cost ranges are based on information from B.C. families currently running programs in B.C. (as provided through counsel)
Behaviour Support	$8,300	Directly based on cost amount provided, rounded to the nearest $100.	Based on information from B.C. families currently running programs in B.C. (as provided through counsel)
Supported Childcare	$9,600	Directly based on cost amount provided, rounded to the nearest $100.	Based on information from B.C. families currently running programs in B.C. (as provided through counsel)
Placement	$32,400	Based on the lower range of $2,700 - $7,500 monthly costs, for 12 months	Cost ranges are monthly residential costs per child based on Gateway Task Force Report, October 1997
Education			
Normal	$4,000	Based on cost amount provided. (For Outcome 1 only)	Ministry of Attorney General, Legal Service Branch, October 15, 1999 (Page 2)
Low incidence/high cost	$27,650	@ 70% of the cost quoted for 'Intensive Special' (For Outcome 2 only)	
Intensive Special	$39,500	$16,500 + A top-up amount, Top-up Amount = ($18,000 +$28,000)/2	$16,500 is the grant per child with autism or ASD provided by government, based on inofrmation provided by Ministry of Attorney General, Legal Service Branch, October 15, 1999 (Page 3); top-up amount is based on information provided by counsel
Adult Care			
Day Program	$26,400	@ $2,200/month for12 months	Based on information contained in the survey conducted by the Ministry of Children and Families Tab 4, Graph 3: Residential Services 1998/99, Types of Services and Associated Cost per day; Gateway Contracts - Residential
Residential (Family Home)	$71,820	@ 70% of the cost quoted for 'Residential (Group Home)' (For Outcome 2 only)	
Residential (Group Home)	$102,600	Sum of two kinds of residential placement for adults, namely, family homes ($22,630) and group home ($80,003), rounded to the nearest $100.	Both figures are based on information contained in the survey conducted by the Ministry of Children and Families Tab 4, Graph 4: Residential Services, Staffed Group Homes vs. Family Care

Table 2A Estimated Costs For The "Without" Lovaas Treatment Scenario

Cost Item	Outcome 1: Normal			Outcome 2: Semi-dependent			Outcome 3: Very Dependent		
	Annual Amount	Starting Age	Ending Age	Annual Amount	Starting Age	Ending Age	Annual Amount	Starting Age	Ending Age
Child Care									
Respite Services	$2,590	3	6	$2,590	3	19	$3,700	3	19
Behaviour Support	$5,810	3	6	$5,810	3	19	$8,300	3	19
Supported Childcare	$6,720	3	6	$6,720	3	12	$9,600	3	18
Placement	$22,680	3	6	$22,680	3	19	$32,400	3	19
Education									
Normal	$4,000	6	19	$0	N/A	N/A	$0	N/A	N/A
Low incidence/high cost	$0	N/A	N/A	$27,650	6	19	$0	N/A	N/A
Intensive Special	$0	N/A	N/A	$0	N/A	N/A	$39,500	6	19
Adult Care									
Day Program	$0	N/A	N/A	$18,480	19	LFT	$26,400	19	LFT
Residential (Family Home)	$0	N/A	N/A	$71,820	19	LFT	$0	N/A	N/A
Residential (Group Home)				$0	N/A	N/A	$102,600	19	LFT

LFT: lifetime

Table 3A Expected Annual Costs and Cost Savings - Base Case

	Costs for With Lovaas Treatment				Costs for Without Lovaas Treatment				Annual Cost Savings
	Annual Amount				Annual Amount				
Age Range	Normal	Semi-Dependent	Very Dependent	Expected Annual Cost	Normal	Semi-Dependent	Very Dependent	Expected Annual Cost	
Weight	40%	50%	10%	100%	0%	50%	50%	100%	
3 - 6	65,000	65,000	65,000	**65,000**	37,800	37,800	54,000	**45,900**	**-19,100**
6 - 12	4,000	65,450	93,500	**43,675**	4,000	65,450	93,500	**79,475**	**35,800**
12 - 18	4,000	58,730	93,500	**40,315**	4,000	58,730	93,500	**76,115**	**35,800**
18 - 19	4,000	58,730	83,900	**39,355**	4,000	58,730	83,900	**71,315**	**31,960**
19 +	0	90,300	129,000	**58,050**	0	90,300	129,000	**109,650**	**51,600**

Table 3B Expected Annual Costs and Cost Savings

- Outcome Distribution as 20/70/10 for both "with" and "without" Lovaas Treatment

	Costs for With Lovaas Treatment				Costs for Without Lovaas Treatment				Annual Cost Savings	PV Cost Savings
	Annual Amount				Annual Amount					
Age Range	Normal	Semi-Dependent	Very Dependent	Expected Annual Cost	Normal	Semi-Dependent	Very Dependent	Expected Annual Cost		
Weight	20%	70%	10%	100%	20%	70%	10%	100%		
3 - 6	65,000	65,000	65,000	**65,000**	37,800	37,800	54,000	**39,420**	-25,580	-72,879
6 - 12	4,000	65,450	93,500	**55,965**	4,000	65,450	93,500	**55,965**	**0**	**0**
12 - 18	4,000	58,730	93,500	**51,261**	4,000	58,730	93,500	**51,261**	**0**	**0**
18 - 19	4,000	58,730	83,900	**50,301**	4,000	58,730	83,900	**50,301**	**0**	**0**
19 +	0	90,300	129,000	**76,110**	0	90,300	129,000	**76,110**	**0**	**0**

Table 3C Expected Annual Costs and Cost Savings

- Outcome Distribution as 20/50/30 for both "with" and "without" Lovaas Treatment

	Costs for With Lovaas Treatment				Costs for Without Lovaas Treatment				Annual Cost Savings	PV Cost Savings
	Annual Amount				Annual Amount					
Age Range	Normal	Semi-Dependent	Very Dependent	Expected Annual Cost	Normal	Semi-Dependent	Very Dependent	Expected Annual Cost		
Weight	20%	50%	30%	100%	20%	50%	30%	100%		
3 - 6	65,000	65,000	65,000	**65,000**	37,800	37,800	54,000	**42,660**	-22,340	-63,648
6 - 12	4,000	65,450	93,500	**61,575**	4,000	65,450	93,500	**61,575**	0	0
12 - 18	4,000	58,730	93,500	**58,215**	4,000	58,730	93,500	**58,215**	0	0
18 - 19	4,000	58,730	83,900	**55,335**	4,000	58,730	83,900	**55,335**	0	0
19 +	0	90,300	129,000	**83,850**	0	90,300	129,000	**83,850**	0	0

Table 7A Cost Savings of Lovaas Treatment By Outcome Distributions

Target Sensitivity Case (Shaded)			
"With" Lovaas		"Without" Lovaas	
40%	Normal	0%	Normal
40%	Semi-dependent	60%	Semi-dependent
20%	Very Dependent	40%	Very Dependent

Excluding Wages

"With" Lovaas Outcome Distribution	"Without" Lovaas Outcome Distribution				
	0/40/60	0/50/50	0/60/40	0/70/30	0/80/20
20/60/20	646,773	558,862	470,951	383,040	295,129
30/50/20	828,470	740,559	652,648	564,737	476,826
40/40/20	1,010,166	922,255	834,344	746,434	658,523
50/30/20	1,191,863	1,103,952	1,016,041	928,130	840,219
60/20/20	1,373,559	1,285,649	1,197,738	1,109,827	1,021,916

Including Wages

"With" Lovaas Outcome Distribution	"Without" Lovaas Outcome Distribution				
	0/40/60	0/50/50	0/60/40	0/70/30	0/80/20
20/60/20	765,892	654,530	543,167	431,805	320,442
30/50/20	960,245	848,883	737,520	626,158	514,796
40/40/20	1,154,598	1,043,236	931,873	820,511	709,149
50/30/20	1,348,951	1,237,589	1,126,226	1,014,864	903,502
60/20/20	1,543,304	1,431,942	1,320,580	1,209,217	1,097,855

Note: IRR for the Target Sensitivity Case = 34.97%

Table 7B Cost Savings of Lovaas Treatment By Outcome Distributions

Target Sensitivity Case (Shaded)			
"With" Lovaas		"Without" Lovaas	
40%	Normal	0%	Normal
30%	Semi-dependent	60%	Semi-dependent
30%	Very Dependent	40%	Very Dependent

Excluding Wages

"With" Lovaas Outcome Distribution	"Without" Lovaas Outcome Distribution			
	0/40/60	0/50/50	0/60/40	0/70/30
20/50/30	563,478	475,567	387,656	299,745
30/40/30	745,174	657,263	569,352	481,442
40/30/30	926,871	838,960	751,049	663,138
50/20/30	1,108,567	1,020,657	932,746	844,835
60/10/30	1,290,264	1,202,353	1,114,442	1,026,531

Including Wages

"With" Lovaas Outcome Distribution	"Without" Lovaas Outcome Distribution			
	0/40/60	0/50/50	0/60/40	0/70/30
20/50/30	659,145	547,783	436,420	325,058
30/40/30	853,498	742,136	630,773	519,411
40/30/30	1,047,851	936,489	825,127	713,764
50/20/30	1,242,204	1,130,842	1,019,480	908,117
60/10/30	1,436,557	1,325,195	1,213,833	1,102,470

Note: IRR for the Target Sensitivity Case = 32.38%

Table 7C Cost Savings of Lovaas Treatment By Outcome Distributions

Target Sensitivity Case (Shaded)			
"With" Lovaas		"Without" Lovaas	
40%	Normal	10%	Normal
50%	Semi-dependent	60%	Semi-dependent
10%	Very Dependent	30%	Very Dependent

Excluding Wages

"With" Lovaas Outcome Distribution	"Without" Lovaas Outcome Distribution				
	10/40/50	10/50/40	10/60/30	10/70/20	10/80/10
20/70/10	460,461	372,550	284,639	196,728	108,817
30/60/10	642,158	554,247	466,336	378,425	290,514
40/50/10	823,854	735,943	648,032	560,121	472,211
50/40/10	1,005,551	917,640	829,729	741,818	653,907
60/30/10	1,187,247	1,099,336	1,011,426	923,515	835,604

Including Wages

"With" Lovaas Outcome Distribution	"Without" Lovaas Outcome Distribution				
	10/40/50	10/50/40	10/60/30	10/70/20	10/80/10
20/70/10	566,923	455,561	344,199	232,836	121,474
30/60/10	761,277	649,914	538,552	427,189	315,827
40/50/10	955,630	844,267	732,905	621,542	510,180
50/40/10	1,149,983	1,038,620	927,258	815,896	704,533
60/30/10	1,344,336	1,232,973	1,121,611	1,010,249	898,886

Note: IRR for the Target Sensitivity Case = 27.81%

Table 7D Cost Savings of Lovaas Treatment By Outcome Distributions

Target Sensitivity Case (Shaded)			
"With" Lovaas		"Without" Lovaas	
40%	Normal	20%	Normal
50%	Semi-dependent	50%	Semi-dependent
10%	Very Dependent	30%	Very Dependent

Excluding Wages

"With" Lovaas Outcome Distribution	"Without" Lovaas Outcome Distribution			
	20/40/40	20/50/30	20/60/20	20/70/10
20/70/10	190,854	102,943	15,032	-72,879
30/60/10	372,550	284,639	196,728	108,817
40/50/10	554,247	466,336	378,425	290,514
50/40/10	735,943	648,032	560,121	472,211
60/30/10	917,640	829,729	741,818	653,907

Including Wages

"With" Lovaas Outcome Distribution	"Without" Lovaas Outcome Distribution			
	20/40/40	20/50/30	20/60/20	20/70/10
20/70/10	261,208	149,846	38,483	-72,879
30/60/10	455,561	344,199	232,836	121,474
40/50/10	649,914	538,552	427,189	315,827
50/40/10	844,267	732,905	621,542	510,180
60/30/10	1,038,620	927,258	815,896	704,533

Note: IRR for the Target Sensitivity Case = 22.19%

Table 7E Cost Savings of Lovaas Treatment By Outcome Distributions

Target Sensitivity Case (Shaded)			
"With" Lovaas		"Without" Lovaas	
40%	Normal	20%	Normal
30%	Semi-dependent	50%	Semi-dependent
30%	Very Dependent	30%	Very Dependent

	Excluding Wages	
"With" Lovaas	"Without" Lovaas Outcome Distribution	
Outcome Distribution	20/40/40	20/50/30
20/50/30	24,263	-63,648
30/40/30	205,959	118,048
40/30/30	387,656	299,745
50/20/30	569,352	481,442
60/10/30	751,049	663,138

	Including Wages	
"With" Lovaas	"Without" Lovaas Outcome Distribution	
Outcome Distribution	20/40/40	20/50/30
20/50/30	47,714	-63,648
30/40/30	242,067	130,705
40/30/30	436,420	325,058
50/20/30	630,773	519,411
60/10/30	825,127	713,764

Note: IRR for the Target Sensitivity Case = 16.19%

3120

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DOUGLAS G. HILDEBRAND, B.A. (Economics), M.B.A.

A. Overview Résumé – Litigation Economics

Mr. Hildebrand holds a B.A. Economics (with Distinction) from the University of Saskatchewan (1969) and a Master of Business Administration (M.B.A.) from the University of British Columbia (1971).

During the 1968 to 1972 period, Mr. Hildebrand held economic research positions with the federal government and the University of British Columbia. Since 1972, Mr. Hildebrand has been practising as a Senior Economic Consultant based in Vancouver, and has been practising at the Partner level since 1975. He has been Director of Columbia Pacific Group, a management and economic consulting firm, since 1980.

A primary area of practice includes economic and financial assessments for litigation, regulatory and project approval purposes (courts, administrative and regulatory tribunals, arbitration hearings, government review agencies). Mr. Hildebrand's consulting activities include assessment of damages in personal injury and fatality cases; and economic assessments of major projects and policies (e.g., cost-benefit analysis), including major project facility applications before Canadian regulatory authorities and review agencies.

Mr. Hildebrand has undertaken over 1,000 assignments since the mid-1980s involving economic and financial assessments of damage claims for personal injury and fatality cases. Assessments have included earnings projections for educational referent groups and a broad range of occupations inclusive of statistical labour market contingencies; income allocations in fatality cases for the purpose of determining loss of financial support; assessment of household services; income and cost of care multipliers; present value of care costs; management fee and tax gross-up simulations; critique of expert reports; and expert testimony in B.C. Supreme Court on numerous occasions.

Mr. Hildebrand is a member of professional economist associations including member and Past President of the Association of Professional Economists of British Columbia.

Mr. Hildebrand is also trained as a commercial arbitrator/mediator, practises as a mediator of personal injury cases and is a member of the BC Arbitration and Mediation Institute and the Commercial Mediation Association.

This is Exhibit A *"referred to in the affidavit of* Douglas G. Hildebrand *sworn before me, at* Vancouver, BC *this* 23rd *day of* March *20* 00

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3121 :

DOUGLAS G. HILDEBRAND – Résumé (Cont'd.)

B. Cost-Benefit Analysis Experience

Mr. Hildebrand is experienced in undertaking cost-benefit analysis (CBA) and/or discounted-cash-flow (DCF) analysis of proposed capital projects and policies covering most key sectors of the economy.

CBA assessments have been undertaken by Mr. Hildebrand in accordance with provincial (British Columbia) and/or federal government guidelines on cost-benefit analysis. Net benefits have been determined and tested under a range of assumptions including costs, discount rates, markets (volume, prices) and environmental externalities (e.g., air pollution). Adjustments have been applied to labour and non-market resources, where appropriate, ("shadow prices") in the valuation of costs and benefits. Examples of CBA and related economic/financial assessments undertaken by Mr. Hildebrand include the following:

Representative Projects – Economic/Financial Analysis

- Cost-Benefit Analysis of the Vancouver Island Natural Gas Pipeline	Inland Natural Gas Co. Ltd.
- Cost-Benefit Analysis of Oil Transportation Projects	TransMountain Oil Pipeline Co.
- Cost-Benefit Analysis of Aluminum Smelter and Hydro Power Complex	Aluminum Company of Canada, Ltd
- Cost-Benefit Analysis of Railway Bridge Options (with Crippen)	Public Works Canada
- Cost-Benefit Analysis of Relocating Rail Lines in Vancouver's Urban Core	City of Vancouver
- Cost-Benefit Analysis of Natural Gas Vehicle Use	BC Hydro
- Cost-Benefit Analysis of Natural Gas Exports	Pan Alberta Gas

DOUGLAS G. HILDEBRAND – Résumé (Cont'd.)

Representative Projects – Economic/Financial Analysis

- Cost-Benefit Analysis of Natural Gas Processing Facilities in Northeast B.C.	Westcoast Energy Inc.
- Cost-Benefit analysis of a Hydroelectric Project	B.C. Hydro
- Cost-Benefit Analysis of Airport Road/Ferry Improvements	City of Prince Rupert
- Financial (DCF) Valuation of the Line Creek Coal Mine	Shell Canada Resources
- Financial (DCF) Valuation of the Quintette Coal Mine	Denison Mines Ltd.
- Financial (DCF) Valuation of the Balmer and Greenhills Coal Mines	Westar Mining Ltd.
- Financial (DCF) Valuation of Ridley Terminals	Ridley Terminals Inc.
- Cost-Benefit Valuation of the UBC Co-generation Project	University of British Columbia
- Cost-Benefit Valuation of Electricity Exports from B.C.	B.C. Utilities Commission
- Cost-Benefit Valuation of Private Hydro Projects in B.C.	Iskut Pulpower; Canadian/French Consortium
- Cost-Benefit Valuation of Gold-Copper Mine in B.C.	Private Mining Company
- Financial (DCF) Valuation of Independent Power Producer	Private Arbitration
- Cost-Benefit Valuation of Non-Power Uses of Hydroelectric Reservoir	BC Hydro
- Financial Impact of Container Port Expansion at Roberts Bank	Vancouver Port Corp; Corporation of Delta
- Cost-Benefit Analysis of Strategies to Enhance Pacific Rim Traffic Links through Vancouver International Airport	Transport Canada

C. *Expert Witness Appearances – Economic/Financial Analysis*

- B.C. Supreme Court (numerous appearances)
- Federal Court of Canada
- Superior Court, State of Washington
- Assessment Appeal Board of B.C.
- Expropriation Compensation Board of B.C.
- B.C. Utilities Commission
- Manitoba Public Utilities Board
- National Energy Board
- National Farm Products Marketing Council
- Private Commercial Arbitrations
- Environmental Assessment Hearing

Title 20—DEPARTMENT OF INSURANCE, FINANCIAL INSTITUTIONS AND PROFESSIONAL REGISTRATION

Division 2063—Behavior Analyst Advisory Board

Chapter 1—General Rules

PROPOSED RULE

20 CSR 2063-1.005 Behavior Analyst Advisory Board

AUTHORITY: sections 337.305 and 337.310, RSMo.

PURPOSE: Pursuant to section 337.310, RSMo, this rule outlines policies and procedures for the Behavior Analyst Advisory Board.

(1) The purpose of the board is to regulate the practice of behavior analysis concerning the health, safety, and welfare of the inhabitants of this state; to protect the property of the inhabitants of this state from damage or destruction through the dangerous, dishonest, incompetent, or unlawful practice of behavior analysis; and to implement and sustain a system for the examination and regulation of licensed behavior analysts and assistant behavior analysts in this state.

(2) The board shall meet at least quarterly. Additional meetings may be held at the discretion of the board; however, the board shall inform the division of those meetings and the notice of the meeting will be posted in compliance with Chapter 610, RSMo.

(3) Each year, the board shall elect a chair and vice-chair. The chair presides at meetings and works with the executive director on coordinating the board's affairs. If the chair is unable to attend a meeting, the vice-chair shall preside at the meeting.

(4) The board shall act through its executive director who is appointed by the director of the Division of Professional Registration. The executive director shall be responsible for keeping the minutes of board proceedings and perform other duties as requested by the board.

(5) A quorum of the board shall consist of a majority of its members.

(6) Board meetings will generally consist of reviewing applications, interviewing applicants, reviewing complaints and inquiries, determining disciplinary actions regarding licensed behavior analysts or assistant behavior analysts, making recommendations to staff concerning the conduct and management of board affairs, and other board matters.

(7) Unless otherwise provided by statute or regulation, the board shall be generally guided by and conduct its meetings according to Robert's Rules of Order.

(8) Any person requiring information, an application, or complaint form involving the practice of behavior analysis as regulated by the board may contact the board.

Title 20—DEPARTMENT OF INSURANCE, FINANCIAL INSTITUTIONS AND PROFESSIONAL REGISTRATION

Division 2063—Behavior Analyst Advisory Board

Chapter 1—General Rules

PROPOSED RULE

20 CSR 2063-1.010 Definitions

AUTHORITY: section 337.310, RSMo

PURPOSE: This rule establishes various definitions and terms used in these rules.

(1) Applicant – An individual applying for licensure as a behavior analyst or assistant behavior analyst.

(2) Certifying entity – Behavior Analyst Certification Board (BACB)®, approved by committee.

(3) Committee – State Committee of Psychologists.

(4) Division – Division of Professional Registration.

(5) Department – Department of Insurance, Financial Institutions and Professional Registration.

(6) Family care safety registry – The registry established by the Missouri Department of Health and Senior Services pursuant to section 210.903, RSMo.

Title 20—DEPARTMENT OF INSURANCE, FINANCIAL INSTITUTIONS AND PROFESSIONAL REGISTRATION

Division 2063—Behavior Analyst Advisory Board

Chapter 1—General Rules

PROPOSED RULE

20 CSR 2063-1.015 Fees

AUTHORITY: section 337.310, 337.315, 337.320 and 337.340, RSMo

PURPOSE: This rule establishes and fixes the various fees and charges authorized by Chapter 337, RSMo.

(1) The following fees are established for the Behavior Analyst Board and are payable to the State Committee of Psychologists:

(A) Application for Behavior Analysts	$150
(B) Application for Assistant Behavior Analyst	$150
(C) Biennial Renewal Fee	$150
(D) Delinquency Fee (in addition to the Renewal Fee)	$50
(E) Inactive Renewal Fee License	$50
(F) Inactive Reactivation Fee (section 337.320.80)	$100
(G) Insufficient Fee Check Service Charge	$25

(2) All fees are nonrefundable.

(3) The provisions of this rule are declared severable. If any fee fixed by this rule is held invalid by a court of competent jurisdiction or by the Administrative Hearing Commission, the remaining provisions of this rule shall remain in full force and effect, unless otherwise determined by a court of competent jurisdiction or by the Administrative Hearing Commission.

Title 20—DEPARTMENT OF INSURANCE, FINANCIAL INSTITUTIONS AND PROFESSIONAL REGISTRATION

Division 2063—Behavior Analyst Advisory Board

Chapter 1—General Rules

PROPOSED RULE

20 CSR 2063-1.020 Policy for Handling Release of Public Records

AUTHORITY: section 337.310 and 610.010–610.030, RSMo

PURPOSE: This rule sets forth the board's written policy in compliance with sections 610.010–610.030, RSMo regarding the release of information on any meeting, record or vote of the board.

(1) The Behavior Analyst Advisory Board is a public governmental body as defined in Chapter 610, RSMo and adopts the following as its written policy for compliance with the provisions of that chapter. This policy is open to public inspection and implements the provisions of Chapter 610, RSMo regarding the release of information of any meeting, record or vote of the board which is not closed pursuant to the provisions of Chapter 610, RSMo.

(2) All public records of the Behavior Analyst Advisory Board shall be open for inspection and copying by any member of the general public during normal business hours (8:00 a.m. to 5:00 p.m., Monday through Friday, holidays excepted) upon a minimum of a three (3)-day notice and appointment except for those records closed pursuant to section 610.021, RSMo. All public meetings of the Behavior Analyst Advisory Board not closed pursuant to the provisions of section 610.021, RSMo, will be open to any member of the public.

(3) The Behavior Analyst Advisory Board establishes the executive director of the board or his/her authorized representative as the custodian of its records as required by section 610.023, RSMo. The executive director or his/her authorized representative is responsible for the maintenance of the board's records and is responsible for responding to requests for access to public records.

(4) Whenever a request for inspection of public records is made and the individual inspecting the records requests copies of the records, the board may charge a reasonable fee for the cost for inspecting and copying the records. The fees charged by the board shall be as follows:

(A) A fee for copying public records shall not exceed the actual cost of the document search and duplication;

(B) The board may require payment for the fees prior to making the copies; and

(C) Fees collected shall be remitted to the director of revenue for deposit to the credit of the State Committee of Psychologists' Fund.

(5) Whenever a request for access to public records is made and the custodian believes that access is not required under the provisions of Chapter 610, RSMo, the custodian shall consult with the Office of the Attorney General before making a determination whether to deny access to the records. In the event that contact by the custodian with the Office of the Attorney General is not practicable or is impossible, the custodian may make a decision whether to deny access. However, in those events, the custodian shall consult with the Office of the Attorney General concerning the decision within five (5) working days of the decision. Whenever the decision is made to deny access, the custodian will comply with the requirements in section 610.023, RSMo concerning informing the individual requesting access to the records. Whenever the custodian denies access to the records, the custodian shall supply to members of the board copies of the written response conveying the denial to the requesting individual. At the next meeting of the board, the board shall either affirm the decision of the custodian or reverse the decision of the custodian. In the event that the board decides to reverse the decision of the custodian, the board shall direct the custodian to so advise the person requesting access to the information and supply the access to the information during regular business hours at the convenience of the requesting party.

(6) The custodian shall maintain a file which will retain copies of all written requests for access to records and responses to these requests through the current audit period. The file shall be maintained as a public record of the board open for inspection by any member of the general public during regular business hours.

Title 20—DEPARTMENT OF INSURANCE, FINANCIAL INSTITUTIONS AND PROFESSIONAL REGISTRATION

Division 2063—Behavior Analyst Advisory Board

Chapter 2 - Licensure Requirements

PROPOSED RULE

20 CSR 2063-2.005 Application for Licensure.

AUTHORITY: 337.315 and 337.345, RSMo Supp. 2010

PURPOSE: This rule outlines the procedures to apply for licensure and temporary permits for behavior analysts and assistant behavior analysts.

(1) Applications for licensure pursuant to section 337.315, RSMo, shall be submitted on the form which may be obtained by contacting the Behavior Analyst Advisory Board.

(2) Behavior Analyst License:

(A) Applicants applying for licensure as a behavior analyst shall submit:

1. A completed application for licensure must be typewritten or printed in black ink, signed, and notarized.
2. The appropriate licensure fee pursuant to 20 CSR 2238-8.020;
3. One (1) recent photograph, pursuant to section 337.315.1, RSMo, of the applicant's head and shoulders (commonly known as passport style) that fairly depicts the applicant's appearance;
4. Proof of submission of fingerprints to the Missouri State Highway Patrol's approved vendor for both a Missouri State Highway Patrol and Federal Bureau of Investigation (FBI) fingerprint background check. Any fees due for fingerprint background checks shall be paid by the applicant.
5. Proof of having passed an examination and been certified as a board certified behavior analyst from a certifying entity as defined pursuant to 20 CSR 2063-1.010;
6. Proof of active status as a board certified behavior analyst; and

7. Verification of licensure in any other state in which the applicant holds a license as a behavior analyst. Verification of licensure must be received by the board directly from the issuing state agency.

(3) Assistant Behavior Analyst License.

(A) Applicants applying for licensure as an assistant behavior analyst shall submit:

1. A completed application for licensure must be typewritten or printed in black ink, signed, and notarized.
2. The appropriate licensure fee pursuant to 20 CSR 2238-8.020;
3. One (1) a recent photograph, pursuant to section 337.315.1, RSMo, of the applicant's head and shoulders (commonly known as passport style) that fairly depicts the applicant's appearance;
4. Proof of submission of fingerprints to the Missouri State Highway Patrol's approved vendor for both a Missouri State Highway Patrol and Federal Bureau of Investigation (FBI) fingerprint background check. Any fees due for fingerprint background checks shall be paid by the applicant.
5. Proof of having passed an examination and been certified as a board certified assistant behavior analyst from a certifying entity as defined pursuant to 20 CSR 2063-1.010;
6. Proof of active status as a board certified assistant behavior analyst;
7. Verification of licensure in any other state in which the applicant holds a license as an assistant behavior analyst. Verification of licensure must be received by the board directly from the issuing state agency; and
8. Proof the applicant will be directly supervised by a licensed behavior analyst on a form provided by the board.

(4) Temporary License.

(A) Applicants who are licensed in another state requesting a temporary license shall:

1. Meet the respective requirements of section (2) or (3) of this rule;
2. Submit a copy of a valid license issued in another state; and
3. Have no disqualifying criminal history appear on the family care safety registry.

(B) Temporary licenses shall expire upon issuance of a license or denial of the application but no later than ninety days from issuance of the temporary license.

(C) Holders of a temporary license requesting an extension shall submit a written request to the committee. As provided by section 337.315.4, RSMo the temporary license may be extended one time by the committee.

(5) The applicant shall be informed in writing of the decision regarding the application for licensure.

(6) The board or committee may delegate the preliminary review of license applications to the executive director.

Title 20—DEPARTMENT OF INSURANCE, FINANCIAL INSTITUTIONS AND PROFESSIONAL REGISTRATION

Division 2063—Behavior Analyst Advisory Board

Chapter 2 - Licensure Requirements

PROPOSED RULE

20 CSR 2063-2.010 Renewal of License, Inactive License, and Reactivation of License

AUTHORITY: sections 337.320 and 337.030, RSMo

PURPOSE: This rule establishes the obligation of licensees for renewal of their licenses.

(1) Renewal of License.

(A) Failure of a licensee to receive the notice and application to renew the license shall not excuse the licensee from the requirement of section 337.315, RSMo to renew the license.

(B) Any licensee who fails to renew the license within the sixty (60)-day period set forth in section 337.320.3., RSMo shall not perform any act for which a license is required.

(C) Any licensee who fails to renew his/her license by October 31 of each even-numbered year and, within two (2) years of the registration renewal date, wishes to restore his/her license, shall:

1. Submit a completed application;

2. Pay the renewal fee and delinquent fee; and

3. Submit proof of active certification and fulfillment of all requirements for renewal and recertification with the certifying entity as defined pursuant to 20 CSR 2063-1.010.

(2) Inactive License.

(A) Licensees who request to be classified as inactive pursuant to section 337.320.7, RSMo, shall:

1. Submit a completed application on a form provided by the committee; and

2. Pay the inactive renewal fee as provided in 20 CSR 2063-1015.

(B) Holders of an inactive license need not complete the continuing education requirement pursuant to section 337.320.7, RSMo.

(C) Holders of an inactive license.

1. Failure of a licensee to receive the notice and application to renew the inactive license shall not excuse the licensee from the requirement of section 337.315, RSMo to renew the license.

2. Any license who fails to renew the inactive license within the sixty (60)-day period set forth in section 337.320.3., RSMo cannot practice and the license shall lapse.

(3) Reactivation of License:

(A) Individuals who request to reactivate the inactive license shall:

1. Submit a complete application on a form provided by the committee;

2. Pay the reactivation fee as provided in 20 CSR 2063-1015; and

3. Submit proof of current certification from a certifying body as established in 20 CSR 2063-1.010.

Title 20—DEPARTMENT OF INSURANCE, FINANCIAL INSTITUTIONS AND PROFESSIONAL REGISTRATION

Division 2063—Behavior Analyst Advisory Board

Chapter 2 - Licensure Requirements

PROPOSED RULE

20 CSR 2063-2.020 Notification of Change of Address

AUTHORITY: section 337.310, RSMo.

PURPOSE: This rule establishes the obligation of licensees to inform the Behavior Analyst Advisory Board of their changes of address.

(1) Within thirty (30) days of the effective date of the change, a licensee must inform the board of all changes in the mailing address as it appears on the licensee's license by contacting the Behavior Analyst Advisory Board.

Title 20—DEPARTMENT OF INSURANCE, FINANCIAL INSTITUTIONS AND PROFESSIONAL REGISTRATION

Division 2063—Behavior Analyst Advisory Board

Chapter 2 - Licensure Requirements

PROPOSED RULE

20 CSR 2063-2.025 Replacement of License

AUTHORITY: section 337.320.5, RSMo

PURPOSE: This rule establishes the procedures for replacing renewal licenses.

(1) A licensee whose license is lost, destroyed or mutilated or who requires replacement as a result of an incorrect address or name change, or who requires additional certificates may obtain a duplicate certificate, without charge, upon receipt of a statement indicating the need for the duplicate.

Title 20—DEPARTMENT OF INSURANCE, FINANCIALINSTITUTIONS AND PROFESSIONAL REGISTRATION

Division 2063—Behavior Analyst Advisory Board

Chapter 3 – Certifying Entities

PROPOSED RULE

20 CSR 2063-3.010 Certifying Entities

AUTHORITY: section 337.310.1, RSMo

(1) A certifying entity shall be accredited to certify practitioners of applied behavior analysis by a nationally recognized agency including but not limited to:

(A) National Commission for Certifying Agencies; or

(B) American National Standards Institute.

Title 20—DEPARTMENT OF INSURANCE, FINANCIAL INSTITUTIONS AND PROFESSIONAL REGISTRATION

Division 2063—Behavior Analyst Advisory Board

Chapter 4 – Education and Training Requirements

PROPOSED RULE

20 CSR 2063-4.005 Education Requirements.

AUTHORITY 337.3310.1 (3)

PURPOSE: This rule establishes the educational and training requirements for licensed behavior analysts and licensed assistant behavior analysts pursuant to section 337.310, RSMo.

(1) Applicants for licensure as a behavior analyst or assistant behavior analyst shall meet the educational, training requirements and supervised clinical practicum experience required for eligibility to sit for the certification examination for their respective level offered by the certifying entity as defined in 20 CSR 2063-1010.

Title 20—DEPARTMENT OF INSURANCE, FINANCIAL INSTITUTIONS AND PROFESSIONAL REGISTRATION

Division 2063—Behavior Analyst Advisory Board

Chapter 4 – Education and Training Requirements

PROPOSED RULE

20 CSR 2063-4.010 Continuing Education Requirements.

PUPPOSE: This rule establishes continuing education requirements for licensed behavior analysts and licensed assistant behavior analysts.

(1) Any licensee applying for the renewal of a behavior analyst license or assistant behavior analyst license shall meet the continuing education requirements for their respective level as required by the certifying entity, as defined in 20 CSR 2063-1010 in order to maintain active certification.

Title 20—DEPARTMENT OF INSURANCE, FINANCIAL INSTITUTIONS AND PROFESSIONAL REGISTRATION

Division 2063—Behavior Analyst Advisory Board

Chapter 5 - Supervision

PROPOSED RULE

20 CSR 2063-5.010 Supervision of Assistant Behavior Analysts.

Authority 337. 310.1

PURPOSE: This rule establishes the characteristics of supervision for assistant behavior analysts.

(1) An assistant behavior analyst shall assist a behavior analyst in the delivery of applied behavior analysis in compliance with all state and federal statutes, regulations, and rules.

(2) The assistant behavior analyst may only perform services under the direct supervision of a behavior analyst.

(A) The manner of supervision shall depend on the treatment setting, patient/client caseload, and the competency of the assistant behavior analyst as determined by the supervising behavior analyst. At a minimum, supervision shall include consultation of the assistant behavior analyst with the supervising behavior analyst prior to the initiation of any patient's/client's treatment plan and modification of treatment plan.

(B) More frequent face-to-face supervision may be necessary as determined by the behavior analyst or assistant behavior analyst dependent on the level of expertise displayed by the assistant behavior analyst, the practice setting, and/or the complexity of the patient/client caseload.

(C) Supervision shall be an interactive process between the behavior analyst and assistant behavior analyst. It shall be more than peer review or co-signature. The interactive

process shall include but is not limited to the patient/client assessment, reassessment, treatment plan, intervention, discontinuation of intervention, and/or treatment plan.

(D) The supervising behavior analyst or the supervisor's designee must be available for immediate consultation with the assistant behavior analyst. The supervisor need not be physically present or on the premises at all times.

(3) The supervising behavior analyst has the overall responsibility for providing the necessary supervision to protect the health and welfare of the patient/client receiving treatment from an assistant behavior analyst. The supervising behavior analyst shall:

(A) Be licensed by the board as a behavior analyst who is certified by the certifying entity;

(B) As of January 1, 2012 have a minimum of one (1) year experience as a licensed behavior analyst. Prior to January 1, 2012, the supervising behavior analyst shall have a minimum of one (1) year of certification as a certified behavior analyst and shall obtain licensure prior to January 1, 2012;

(C) Not be under restriction or discipline from any licensing board or jurisdiction;

(D) Not have more than ten (10) full-time equivalent (FTE) assistant behavior analysts under his/her supervision at one time without prior approval by the board;

(E) Provide at least two (2) hours for every eighty (80) hours worked shall be face to face, direct supervision. Supervision in a group may be for not more than one (1) hour each one hundred (160) hours worked;

(F) Be responsible for all referrals of the patient/client;

(G) Be responsible for completing the patient's evaluation/assessment. The assistant behavior analyst may contribute to the screening and/or evaluation process by gathering data, administering standardized tests and reporting observations. The assistant behavior analyst may not evaluate independently or initiate treatment before the supervising behavior analyst's evaluation/assessment;

(H) Be responsible for developing and modifying the patient's treatment plan. The treatment plan must include goals, interventions, frequency, and duration of treatment. The assistant behavior analyst may contribute to the preparation, implementation and documentation of the treatment plan. The supervising behavior analyst shall be responsible for the outcome of the treatment plan and assigning of appropriate intervention plans to the assistant behavior analyst within the competency level of the assistant behavior analyst;

(I) Be responsible for developing the patient's discharge plan. The assistant behavior analyst may contribute to the preparation, implementation and documentation of the discharge plan. The supervising behavior analyst shall be responsible for the outcome of the discharge plan and assigning of appropriate tasks to the assistant behavior analyst within the competency level of the assistant behavior analyst;

(J) Ensure that all patient/client documentation becomes a part of the permanent record; and

(K) At least one on-site observation per client per month.

(4) The supervising behavior analyst has the overall responsibility for providing the necessary supervision to protect the health and welfare of the patient/client receiving treatment from an assistant behavior analyst. However, this does not absolve the assistant behavior analyst from his/her professional responsibilities. The assistant behavior analyst shall exercise sound judgment and provide adequate care in the performance of duties. The assistant behavior analyst shall:

(A) Not initiate any patient/client treatment program or modification of said program until the behavior analyst has evaluated, established a treatment plan and consulted with the assistant behavior analyst;

(B) Not perform an evaluation/assessment, but may contribute to the screening and/or evaluation process by gathering data, administering standardized tests and reporting observations;

(C) Not analyze or interpret evaluation data;

(D) Track the need for reassessment and report changes in status that might warrant reassessment or referral;

(E) Immediately suspend any treatment intervention that appears harmful to the patient/client and immediately notify the behavior analyst; and

(F) Ensure that all patient/client documentation prepared by the assistant behavior analyst becomes a part of the permanent record.

(5) The supervisor shall ensure that the assistant behavior analyst provides applied behavior analysis as defined in section 337.300, RSMo appropriate to and consistent with his/her education, training, and experience.

Title 20—DEPARTMENT OF INSURANCE, FINANCIAL INSTITUTIONS AND PROFESSIONAL REGISTRATION

Division 2063—Behavior Analyst Advisory Board

Chapter 6 – Standards of Practice

PROPOSED RULE

337.310.1 The board shall recommend to the committee rules to be promulgated pertaining to:

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20 CSR 2235-5.030 Ethical Rules of Conduct

PURPOSE: This rule complies with section 337.310, RSMo which allows the committee through the division to promulgate ethical principles governing the practice of behavior analysis.

(1) General Principles.

(A) Purpose. The ethical rules of conduct constitute the standards against which the required professional conduct of a behavior analyst or assistant behavior analyst is measured.

(B) Scope. Behavior analysts or assistant behavior analysts shall be governed by these ethical rules of conduct whenever providing applied behavior analysis in any context. These ethical rules of conduct shall apply to the conduct of all licensees and applicants, including the applicant's conduct during the period of education, training and employment which is required for licensure. The term behavior analyst or assistant behavior analyst, as used within these ethical rules of conduct, shall be interpreted accordingly whenever applied behavior analysis is being provided in any context.

(C) Responsibility for Own Actions. Behavior analysts or assistant behavior analysts, when functioning as a licensed behavior analyst or assistant behavior analyst, shall be fully responsible for his/her own professional decisions and professional actions.

(D) Violations. A violation of these ethical rules of conduct constitutes unprofessional conduct and is sufficient reason for disciplinary action or denial of original licensure, reinstatement or renewal of licensure.

(2) Definitions.

(A) Client - The term client as used here is broadly applicable to whomever the behavior analyst provides services whether an individual person (service recipient), parent or guardian of a service recipient, an institutional representative, a public or private agency, a firm or corporation.

(B) Confidential information—means information revealed by an individual(s) or otherwise obtained by a behavior analyst or assistant behavior analyst, where there is a reasonable expectation that because of the relationship between the individual(s) and the behavior analyst or assistant behavior analyst, or the circumstances under which the information was revealed or obtained, the information shall not be disclosed by the behavior analyst or assistant behavior analyst without the informed written consent of the individual(s). When a corporation or other organization is the client, rules of confidentiality apply to information pertaining to the organization, including personal information about individuals when obtained in the proper course of that contract. That information about individuals is subject to confidential control of the organization, not of the individual, and can be made available to the organization, unless there is reasonable expectation by that individual that information was obtained in a separate professional relationship with that individual and is therefore subject to confidentiality requirements in itself.

(C) Court order—means the written or oral communication of a member of the judiciary, or other court magistrate or administrator, if that authority has been lawfully delegated to that magistrate or administrator.

(D) Licensed—means licensed, certified, or any other term when such term identifies a person whose professional behavior is subject to regulation by the committee or board.

(E) Professional relationship—means a mutually agreed upon relationship between a behavior analyst or assistant behavior analyst and a client(s) for the purpose of the client(s) obtaining the behavior analyst's or assistant behavior analyst's professional expertise.

(F) Professional service—means all actions of the behavior analyst or assistant behavior analyst in the context of a professional relationship with a client.

(3) Competence.

(A) Limits on Practice. Behavior analysts shall provide services, teach, and conduct research only within the boundaries of their competence, based on their education, training, supervised experience, or appropriate professional experience. If important aspects of the client's problems fall outside the boundaries of competency, then the behavior analyst or assistant behavior analyst shall assist his/her client in obtaining additional professional consultation.

(B) Reliance on Scientific Knowledge. Behavior analysts or assistant behavior analysts shall rely on scientifically and professionally derived knowledge when making scientific or professional judgments in human service provision, or when engaging in scholarly or professional endeavors.

(C) Maintaining Competency. Behavior analysts or assistant behavior analysts shall maintain current competency in the areas in which they practice, through continuing education, consultation, other training, or any combination of these, in conformance with current standards of scientific and professional knowledge.

(D) Adding New Services and Techniques. Behavior analysts or assistant behavior analysts shall provide services, teach, or conduct research in new areas or involving new techniques only after first undertaking appropriate study, training, supervision, and/or consultation from persons who are competent in those areas or techniques.

(E) Accurate Representation. Behavior analysts or assistant behavior analysts shall accurately represent their areas of competence, education, training, experience, and professional affiliations to the committee, the board, the public, and colleagues.

(F) Professional Development. Behavior analysts or assistant behavior analysts who engage in assessment, therapy, teaching, research, organizational consulting, or other professional activities shall maintain a reasonable level of awareness of current scientific and professional information in their fields of activity, and undertake ongoing efforts to maintain competence in the skills they use by reading the appropriate literature, attending conferences and conventions, participating in workshops, and/or maintaining Behavior Analyst Certification Board certification.

(G) Integrity.

(a) Behavior analysts or assistant behavior analysts shall be truthful and honest. Behavior analysts or assistant behavior analysts shall follow through on obligations and professional commitments with high quality work and refrain from making professional commitments that he/she cannot keep.

(b) The behavior analysts' or assistant behavior analysts' behavior shall conform to the legal and moral codes of the social and professional community of which the behavior analyst or assistant behavior analyst is a member.

(c) The activity of a behavior analyst or assistant behavior analyst falls under these rules only if the activity is part of his or her work-related functions or the activity is behavior analytic in nature.

(d) If behavior analysts' or assistant behavior analysts' ethical responsibilities conflict with law, behavior analysts or assistant behavior analysts shall make known their commitment to these rules and take steps to resolve the conflict in a responsible manner in accordance with law.

(H) Professional and Scientific Relationships.

(a) Behavior analysts or assistant behavior analysts shall provide behavioral assessment, therapeutic, teaching, research, supervisory, consultative, or other behavior analytic services only in the context of a defined, remunerated professional or scientific relationship or role.

(b) When behavior analysts or assistant behavior analysts provide assessment, evaluation, treatment, supervision, teaching, consultation, research, or other behavior analytic services to an individual, a group, or an organization, they shall use language that is fully understandable to the recipient of those services. They shall provide appropriate information prior to service delivery about the nature of such services and appropriate information later about results and conclusions.

(c) Where differences of age, gender, race, ethnicity, national origin, religion, sexual orientation, disability, language, or socioeconomic status significantly affect behavior analysts' or assistant behavior analysts' work concerning particular individuals or groups, behavior analysts shall obtain the training, experience, consultation, or supervision necessary to ensure the competence of their services, or they make appropriate referrals.

(d) In their work-related activities, behavior analysts or assistant behavior analysts shall not engage in discrimination against individuals or groups based on age, gender, race, ethnicity, national origin, religion, sexual orientation, disability, socioeconomic status, or any basis proscribed by law.

(e) Behavior analysts or assistant behavior analysts shall not knowingly engage in behavior that is harassing or demeaning to persons with whom they interact in their work based on factors such as those persons' age, gender, race, ethnicity, national origin, religion, sexual orientation, disability, language, or socioeconomic status, in accordance with law.

(f) Behavior analysts or assistant behavior analysts shall recognize that their personal problems and conflicts may interfere with their effectiveness. Behavior analysts or assistant behavior analysts shall refrain from providing services when their personal circumstances may compromise delivering services to the best of their abilities.

(4) Maintenance and Retention of Records.

(A) The behavior analyst or assistant behavior analyst rendering professional individual services to a client (or a dependent), or services billed to a third party payer, shall maintain professional records that include:

1. Name of the client and other identifying information such as address, telephone number, age, and/or sex;
2. The presenting problem(s) or purpose or diagnosis;
3. Any assessment including test results or other evaluative results obtained and any basic test data from which they were derived;
4. The date and description of each contact or service provided or pertaining to the client;
5. The nature, type and goals of any applied behavior analysis interventions;

6. The fee arrangement and documentation of discussion with the client(s) prior to initiation of services;
7. A copy of all test or other evaluative reports prepared as part of the professional relationship;
8. Notation and results of formal consults with other providers;
9. Notation of referrals given or recommended to the client;
10. Any releases executed by the client;
11. Records shall contain data relating to financial transactions between the behavior analyst or assistant behavior analyst and client, including fees assessed and collected;
12. Written informed consent must be obtained concerning all aspects of services including assessment and therapy;
13. An assistant behavior analyst must include on the informed consent the fact that the licensee is working under the supervision of a licensed behavior analyst. The informed consent form must identify the supervising behavior analyst; and
14. Entries in the records must be made within ten (10) days following each consultation or rendition of service. Entries that are made after the date of service must indicate the date entries are made, as well as the date of service.

(B) Behavior analysts shall create, maintain, disseminate, store, retain, and dispose of records and data relating to their research, practice, and other work in accordance with applicable laws or regulations and corporate policy and in a manner that permits compliance with the requirements of these rules.

(C) To meet the requirements of these rules, but not necessarily for other legal purposes, behavior analysts or assistant behavior analysts shall assure that all data entries in the professional records are maintained for a period of not fewer than five (5) years after the last date of service rendered, or not less than the time required by other regulations, if that is longer.

1. The behavior analyst shall store and dispose of written, electronic and other records in such a manner as to ensure their confidentiality. The behavior analyst shall maintain the confidentiality of all applied behavior analysis records in the behavior analyst's possession or under the behavior analyst's control except as otherwise provided by

law or pursuant to authorization of a client specifically requesting or authorizing release or disclosure of the client's applied behavior analysis records; and

2. For each person professionally supervised, the behavior analyst shall maintain, for a period of not less than five (5) years after the last date of supervision, a record of the supervisory session that shall include the type, place, and general content of the session, as well as other information required by these rules, other law or good practice.

(5) Continuity of Care.

(A) The behavior analyst shall make prior arrangements for another appropriate professional(s) to be available for consultation during periods of his/her extended absences from professional availability. Behavior analysts or assistant behavior analysts shall inform the client of available emergency services for use during those times when s/he cannot be reached. These periods include, but are not limited to, after-office hours, weekends, holidays or vacations.

(B) The behavior analyst shall make provisions for the transfer or disposal of all written or electronic records of the client in the event of the behavior analyst's or assistant behavior analyst's death or incapacitation. The arrangement for transfer or disposal shall be in writing and signed by all necessary parties.

(6) Multiple Relationships.

(A) Impaired Behavior Analyst or Assistant Behavior Analyst. Behavior analysts or assistant behavior analysts shall not undertake or continue a professional relationship with a client when the competency of the behavior analyst or assistant behavior analyst is, or could reasonably be expected to be, impaired due to mental, emotional, physiologic, pharmacologic or substance abuse conditions. If a condition develops after a professional relationship has been initiated, the behavior analyst or assistant behavior analyst shall terminate the relationship in an appropriate manner, shall notify the client in writing of the termination and shall assist the client in obtaining services from another professional.

(B) Multiple Relationship Affecting Behavior Analyst's or Assistant Behavior Analyst's Judgment. Behavior analysts or assistant behavior analysts shall not undertake or continue a professional relationship with a client when the objectivity or competency of

the behavior analyst or assistant behavior analyst is, or could reasonably be expected to be impaired because of the behavior analyst's or assistant behavior analyst's present or previous familial, social, sexual, emotional, financial, supervisory, political, administrative or legal relationship with the client or a relevant person associated with or related to the client. If a dual relationship develops or is discovered after the professional relationship has been initiated, the behavior analyst or assistant behavior analyst shall terminate the professional relationship in an appropriate manner, shall notify the client in writing of this termination and shall assist the client in obtaining services from another professional.

(C) Prohibited Relationships.

1. Behavior analysts or assistant behavior analysts, in interacting with any current client or with a client to whom the behavior analyst or assistant behavior analyst has at anytime within the previous twenty-four (24) months rendered applied behavior analysis shall not enter into a financial or other potentially exploitative relationship with him/her/them.
2. The behavior analyst or assistant behavior analyst, in interacting with any current client or with a person to whom the behavior analyst or assistant behavior analyst at any time within the previous sixty (60) months has rendered applied behavior analysis, shall not—
   A. Engage in sexual intercourse, which includes any genital contact of the behavior analyst or assistant behavior analyst with the client or the client with the behavior analyst or assistant behavior analyst. This specifically prohibits sexual intercourse, sodomy—oral, anal copulation, or both; or any penetration of the anal opening by any one (1) part or object;
   B. Engage in kissing with the mouth, lips or tongue of the behavior analyst or assistant behavior analyst with the client or the client with the behavior analyst or assistant behavior analyst;
   C. Touching or caressing by either the behavior analyst or assistant behavior analyst or client of the other person's breasts, genitals or buttocks;
   D. Engage in any deliberate or repeated comments, gestures or physical contact of a sexual nature that exploits the professional relationship with the client;

E. Terminate a therapeutic relationship with a client, for the purpose, expressed or implied, of having a sexual relationship with that person;

F. Exhibitionism and voyeurism—exposing one's self or encouraging another to expose him/herself for the purpose of sexual gratification; or

G. Engage in any verbal or physical behavior toward him/her which is sexually seductive, demeaning, or harassing.

3. Prohibited exploitation in professional relationships. Behavior analysts or assistant behavior analysts shall not exploit, sexually or otherwise, his/her professional relationship with clients, supervisees, students, employees, research participants or others.

(7) Client Welfare.

(A) Responsibility to Clients.

1. Behavior analysts or assistant behavior analysts have a responsibility to operate in the best interest of clients.

2. The behavior analyst's or assistant behavior analyst's responsibility is to all parties affected by behavioral services

(B) Providing Explanation of Procedures.

1. The behavior analyst or assistant behavior analyst shall give a truthful, understandable and reasonably complete account of the client's condition to the client or the parent of minor children or legal guardian. The behavior analyst or assistant behavior analyst shall keep the client fully informed as to the purpose and nature of any evaluation, treatment or other procedures, and of the client's right to freedom of choice regarding services provided.

2. When a behavior analyst or assistant behavior analyst agrees to provide services to a person or entity at the request of a third party, the behavior analyst or assistant behavior analyst shall explain and document the nature of the relationships with all individuals or organizations involved. This includes the role of the behavior analyst or assistant behavior analyst, who is the client, the probable uses of the services provided or the information obtained, and any known or probable limits to confidentiality.

(C) Interrupting or Terminating Services.

1. Behavior analysts or assistant behavior analysts shall make reasonable efforts to plan for facilitating care in the event that behavior analytic services are interrupted by factors such as the behavior analyst's illness, impending death, unavailability, or relocation or by the client's relocation or financial limitations.
2. When entering into employment or contractual relationships, behavior analysts or assistant behavior analysts shall provide for orderly and appropriate resolution of responsibility for client care in the event that the employment or contractual relationship ends, with paramount consideration given to the welfare of the client.
3. Approving Interventions. **e**Behavior analysts or assistant behavior analysts shall obtain the client's or client-surrogate's approval in writing of the behavior intervention procedures before implementing them.
4. Behavior analysts or assistant behavior analysts shall not abandon clients. Applied behavior analysis services can only be terminated when it becomes reasonably clear that the client no longer needs the service, is not benefiting, or is being harmed by continued service and the behavior analyst establishes understandable and objective (i.e., measurable) criteria for the termination of the program and describes them to the client or client-surrogate. The relationship shall be terminated when the established criteria for termination are attained, as in when a series of planned or revised intervention goals has been completed.
5. Prior to termination for whatever reason, except where precluded by the client's conduct, behavior analysts or assistant behavior analysts shall discuss the client's views and needs, provide appropriate pre-termination services, suggest alternative service providers as appropriate, and take other reasonable steps to facilitate transfer of responsibility to another provider if the client needs one immediately.

(D) Unnecessary Service. The behavior analyst or assistant behavior analyst shall not exploit clients by providing unnecessary applied behavior analysis.

(E) Stereotyping. Behavior analysts or assistant behavior analysts shall not impose on the client any stereotypes of behavior, values or roles related to age, gender, religion, race, disability, nationality or sexual preference which would interfere with the objective provision of psychological services to the client. Behavior analysts or assistant behavior

analysts shall obtain training, experience or behavior analysis to assure competent service or research relating to these persons.

(F) Sexual or Other Multiple Relations With a Client. The behavior analyst or assistant behavior analyst shall not enter into a sexual or other multiple relationship with a client, as specified in subsections (6)(B) and (C) of these ethical rules of conduct.

(G) Solicitation of Business by Clients. Behavior analysts or assistant behavior analysts providing services to an individual client shall not induce that client(s) to solicit business on behalf of the behavior analyst or assistant behavior analyst.

(H) Referrals on Request. Behavior analysts or assistant behavior analysts shall make an appropriate referral to another professional when requested to do so by the client.

(I) Offering Services to Clients of Others. In deciding whether to offer services to someone already receiving similar services elsewhere, behavior analysts or assistant behavior analysts shall carefully consider the treatment issues and the potential client's welfare. Behavior analysts or assistant behavior analysts shall discuss these issues with the client to minimize the probable risks of confusion and conflict, and proceed with caution and sensitivity to the therapeutic issues.

(J) Rights and Prerogatives of Clients.

1. Behavior analysts or assistant behavior analysts shall support individual rights under the law.
2. The client must be provided on request an accurate, current set of the behavior analyst's or assistant behavior analyst's credentials.
3. Permission for electronic recording of interviews and service delivery sessions is secured from clients and relevant staff of all other settings. Consent for different uses must be obtained specifically and separately.
4. Clients must be informed of their rights, and about procedures to complain about professional practices of the behavior analyst.
5. Behavior analysts or assistant behavior analysts shall comply with all requirements for criminal background checks.

(K) Welfare of Clients.

1. Clarifying expectations. Behavior analysts or assistant behavior analysts shall document that the client has been informed as to the purpose and nature of an

evaluation, treatment or educational procedure as well as reasonable alternatives in language commensurate with the individual's level of comprehension.

2. Minors and those with diminished capacity. Whenever possible, behavior analysts or assistant behavior analysts shall obtain informed consent from children and from individuals with diminished mental capacity regarding their participation in applied behavior analysis services. If they object to participation, Behavior analysts or assistant behavior analysts shall consider the individual's basic rights in light of those factors such as age, maturity and the judgment of the individual's parents or legal guardians. Behavior analysts' or assistant behavior analysts' decisions shall be based upon the best interests of the individual.

3. Voluntary and mandatory procedures. Behavior analysts or assistant behavior analysts shall inform recipients as to the voluntary or mandatory nature of the assessment, treatment, educational or training procedure. When a procedure is voluntary, behavior analysts or assistant behavior analysts shall inform the clients or student of their freedom of choice and any alternatives to participation.

4. Electronic recording and filming. Behavior analysts or assistant behavior analysts shall obtain permission from clients and students prior to the use of observation or electronic taping, recording or filming procedures.

5. Access to confidential information of others. When the possibility exists that others may obtain access to confidential information, behavior analysts or assistant behavior analysts shall explain this possibility, together with plans for protecting confidentiality, to clients or students as part of the procedure for obtaining informed consent.

(8) Welfare of Supervisees and Students. Welfare of Supervisees and Students. The behavior analyst shall not harass or exploit a supervisee or student in any way—sexually, financially or otherwise. The behavior analyst as a teacher shall recognize that the primary obligation is to help others acquire knowledge and skill. The behavior analyst shall maintain high standards of scholarship by presenting applied behavior analysis information objectively, fully and accurately. The teaching duties of the behavior analyst

shall be performed on the basis of careful preparation so that the instruction is accurate, current and scholarly.

(9) Protecting Confidentiality of Clients.

(A) Maintaining Confidentiality.

1. Behavior analysts or assistant behavior analysts have a primary obligation and shall take reasonable precautions to respect the confidentiality of those with whom they work or consult, recognizing that confidentiality may be established by law, institutional rules, or professional or scientific relationships.
2. Clients have a right to confidentiality. Unless it is not feasible or is contraindicated, the discussion of confidentiality occurs at the outset of the relationship and thereafter as new circumstances may warrant.
3. In order to minimize intrusions on privacy, behavior analysts or assistant behavior analysts shall include only information germane to the purpose for which the communication is made in written and oral reports, consultations, and the like.
4. Behavior analysts or assistant behavior analysts shall discuss confidential information obtained in clinical or consulting relationships, or evaluative data concerning patients, individual or organizational clients, students, research participants, supervisees, and employees, only for appropriate scientific or professional purposes and only with persons clearly concerned with such matters.

(B) Disclosure of Confidential Information. Behavior analysts or assistant behavior analysts also may disclose confidential information with the appropriate consent of the individual or organizational client (or of another legally authorized person on behalf of the client), unless prohibited by law.

(C) Disclosures Without Consent. Behavior analysts or assistant behavior analysts may disclose confidential information without the consent of the individual only as mandated by law, or where permitted by law for a valid purpose, such as (1) to provide needed professional services to the individual or organizational client, (2) to obtain appropriate professional consultations, (3) to protect the client or others from harm, or (4) to obtain payment for services, in which instance disclosure is limited to the minimum that is necessary to achieve the purpose.

(D) Limited Access to Client Records. Behavior analysts or assistant behavior analysts shall limit access to client records and shall assure that all persons working under his/her authority comply with the requirements for confidentiality of client material.

(E) Disguising Confidential Information. For any confidential information used in teaching, research or writing, behavior analysts or assistant behavior analysts shall insure that the reported material is appropriately disguised to prevent client identification.

(F) Observation and Electronic Recording. Behavior analysts or assistant behavior analysts shall ensure that diagnostic interviews or therapeutic sessions with a client are observed or electronically recorded only with the informed written consent of the client.

(G) Confidentiality After Termination of Professional Relationship. Behavior analysts or assistant behavior analysts shall continue to treat client records as confidential information after the professional relationship between the behavior analyst or assistant behavior analysts and the client has ceased.

(10) Integrity and Representation of Title and Services.

(A) Display of License. Behavior analysts or assistant behavior analysts shall display prominently on the premises of the professional practice the behavior analyst's or assistant behavior analyst's current Missouri license to practice applied behavior analysis or carry the current license on their person at all times.

(B) Use of Appropriate Title. When representing him/herself to the public through advertisements, including telephone listings, business cards, letterhead and other public announcements, Behavior analysts or assistant behavior analysts shall use a title which accurately reflects professional education, training and experience. This title shall be clearly presented as to denote the actual status and training of the person. Initials of titles are not appropriate for use unless authorized by sections 337.300 to 337.345, RSMo or 20 CSR 2063.

(C) Accurate Representation of Services. When announcing or advertising professional services, behavior analysts or assistant behavior analysts may list the following information to describe the provider and services provided: name, highest relevant academic degree earned from a regionally accredited institution, date, type and level of certification or licensure, Behavior Analyst Certification Board® membership status, address, telephone number, office hours, a brief listing of the types of applied behavior

anlaysis services offered, an appropriate presentation of fee information, foreign languages spoken and a policy with regard to third-party payments.

(D) Accurate Representation of Qualifications. Behavior analysts or assistant behavior analysts shall not misrepresent directly or by implication his/her professional qualifications, such as, education, experience or areas of competence.

(E) Accurate Representation of Affiliations. Behavior analysts or assistant behavior analysts shall not misrepresent directly or by implication his/her affiliations, or the purposes or characteristics of institutions and organizations with which the behavior analyst or assistant behavior analyst is associated.

(F) False or Misleading Information. Behavior analysts or assistant behavior analysts shall not include false or misleading information in public statements concerning applied behavior analysis services offered. Public statements include, but are not limited to, communication by means of periodical, book, list, directory, television, radio or motion picture. They shall not contain:

1. A false, fraudulent, misleading, deceptive or unfair statement;
2. A misrepresentation of fact or a statement likely to mislead or deceive because in context it makes only a partial disclosure of relevant facts;
3. A testimonial from a client regarding the quality of a behavior analyst's or assistant behavior analyst's services or products;
4. A statement intended or likely to create false or unjustified expectations of favorable results;
5. A statement implying unusual, unique or one-of-a-kind abilities;
6. A statement intended or likely to appeal to a client's fears, anxieties or emotions concerning the possible results of failure to obtain the offered services;
7. A statement concerning the comparative desirability of offered services; or
8. A statement of direct solicitation of individual clients.

(G) Accurate Representation of Services or Products. Behavior analysts or assistant behavior analysts shall not associate with or permit his/her name to be used in connection with any services or products in such a way as to misrepresent—

1. The services or products;
2. The degree of his/her responsibility for the services or products; or

3. The nature of his/her association with the services or products.

(H) Correction of Misrepresentation by Others. Behavior analysts or assistant behavior analysts shall correct others who misrepresent his/her professional qualifications or affiliations.

(I) Accurate Claims. Behavior analysts or assistant behavior analysts shall take credit only for work actually done, including publication credit.

(J) Publication Credit. Publication credit shall accurately reflect the relative contribution of the individuals involved, regardless of professional status. A student generally is listed as the principal author of any multiple-authored article based primarily on the student's thesis or dissertation. Minor contributions to publications shall be acknowledged in footnotes or in an introductory statement.

(K) Acknowledging All Sources. Plagiarism in either written or oral form is unethical. Acknowledgment through specific citations shall be made for unpublished as well as published material that has directly influenced the research or writing.

(L) Fabrication of Data. A behavior analyst or assistant behavior analyst shall not fabricate data. If a behavior analyst or assistant behavior analyst discovers significant errors in their published data, they shall take reasonable steps to correct these errors in a correction, retraction, erratum or other appropriate publication means.

(11) Remuneration.

(A) Fees, Financial Arrangements and Terms of Consultation.

1. As early as is feasible in a professional or scientific relationship, Behavior analysts or assistant behavior analysts and the client or other appropriate recipient of behavior analytic services shall reach an agreement specifying compensation and billing arrangements.

2. Behavior analysts' or assistant behavior analysts' fee practices shall be consistent with law and behavior analysts or assistant behavior analysts shall not misrepresent their fees. If limitations to services can be anticipated because of limitations in financing, this shall be discussed with the patient, client, or other appropriate recipient of services as early as is feasible.

3. Prior to the implementation of services Behavior analysts or assistant behavior analysts shall provide in writing the terms of consultation with regard to specific

requirements for providing services and the responsibilities of all parties (a contract or Declaration of Professional Services).

(B) Accuracy in Reports to Those Who Pay for Services. In their reports to those who pay for services or sources of research, project, or program funding, behavior analysts or assistant behavior analysts shall accurately state the nature of the research or service provided, the fees or charges, and where applicable, the identity of the provider, the findings, and other required descriptive data.

(C) Referrals and Fees. When a behavior analyst pays, receives payment from, or divides fees with another professional other than in an employer-employee relationship, the referral shall be disclosed to the client.

(D) Improper Arrangements.

1. Behavior analysts or assistant behavior analysts shall neither derive nor solicit any form of monetary profit or personal gain as a result of his/her professional relationship with clients or immediate exclients, beyond the payment of fees for applied behavior analysis services rendered. However, unsolicited token gifts from a client are permissible.
2. Behavior analysts or assistant behavior analysts shall not use his/her professional relationship with clients or immediate ex-clients to derive personal gain, other than through fees for professional services, for him/herself, or for any other person, or for any organization from the sale or promotion of a non-related product or service.
3. Behavior analysts or assistant behavior analysts shall neither give nor receive any commission, rebate or other form of remuneration for referral of a client for professional services.
4. Behavior analysts or assistant behavior analysts shall not bill for services that are not rendered. However, s/he may bill for missed appointments which the client did not cancel in advance, if this is part of the financial arrangements made in accordance with paragraph (11)(A)1. of this rule.

(E) Third-Party Requests for Services.

1. When behavior analysts or assistant behavior analysts agree to provide services to a person or entity at the request of a third party, the behavior analyst or assistant

behavior analyst shall clarify to the extent feasible, at the outset of the service, the nature of the relationship with each party. This clarification includes the role of the behavior analyst or assistant behavior analyst (such as therapist, organizational consultant, or expert witness), the probable uses of the services provided or the information obtained, and the fact that there may be limits to confidentiality.

2. If there is a foreseeable risk of behavior analysts or assistant behavior analysts being called upon to perform conflicting roles because of the involvement of a third party, the behavior analyst or assistant behavior analyst shall clarify the nature and direction of his or her responsibilities, keep all parties appropriately informed as matters develop, and resolve the situation in accordance with these rules.

(12) Assessment Procedures.

(A) Accepting Clients. Behavior analysts or assistant behavior analysts shall accept as clients only those individuals or entities (agencies, firms, etc.) whose behavior problems or requested service are commensurate with the behavior analyst's or assistant behavior analyst's education, training, and experience. In lieu of these conditions, behavior analysts or assistant behavior analysts must function under the supervision of or in consultation with a behavior analyst whose credentials permit working with such behavior problems or services.

(B) Consultation.

1. Behavior analysts or assistant behavior analysts shall arrange for appropriate consultations and referrals based principally on the best interests of their clients, with appropriate consent, and subject to other relevant considerations, including applicable law and contractual obligations.
2. When indicated and professionally appropriate, behavior analysts or assistant behavior analysts shall cooperate with other professionals in order to serve their clients effectively and appropriately. Behavior analysts or assistant behavior analysts shall recognize that other professions have ethical codes that may differ in their specific requirements from these rules.

(C) Competent Use of Assessment Techniques. The behavior analyst and assistant behavior analyst shall use, administer and interpret applied behavior analysis assessment

techniques competently and maintain current knowledge about research developments and revisions concerning the techniques that are used.

(D) Behavior Assessment.

1. Assessing Behaviors. Behavior analysts or assistant behavior analysts who use behavioral assessment techniques shall do so for purposes that are appropriate in light of research. Behavior analysts or assistant behavior analysts shall recommend seeking a medical consultation if there is any reasonable possibility that a referred behavior is a result of a medication side effect or some biological cause.

(a) Behavior analysts' or assistant behavior analysts' assessments, recommendations, reports, and evaluative statements shall be based on information and techniques sufficient to provide appropriate substantiation for their findings.

(b) Behavior analysts or assistant behavior analysts shall refrain from misuse of assessment techniques, interventions, results, and interpretations and take reasonable steps to prevent others from misusing the information these techniques provide.

(b) Behavior analysts or assistant behavior analysts shall recognize limits to the certainty with which judgments or predictions can be made about individuals.

(c) Behavior analysts or assistant behavior analysts shall not promote the use of behavioral assessment techniques by unqualified persons, i.e., those who are unsupervised by experienced professionals and have not demonstrated valid and reliable assessment skills.

(E) Behavioral Assessment Approval. Behavior analysts or assistant behavior analysts shall obtain the client's or client-surrogate's approval in writing of the behavior assessment procedures before implementing them. As used here, client-surrogate refers to someone legally empowered to make decisions for the person(s) whose behavior the program is intended to change; examples of client-surrogates include parents of minors, guardians, and legally designated representatives

(F) Functional Assessment.

1. Behavior analysts or assistant behavior analysts shall conduct a functional assessment, as defined below, to provide the necessary data to develop an effective behavior change program.

2. Functional assessment includes a variety of systematic information-gathering activities regarding factors influencing the occurrence of a behavior (e.g., antecedents, consequences, setting events, or motivating operations) including interview, direct observation, and experimental analysis.

(G) Explaining Assessment Results. Unless the nature of the relationship is clearly explained to the person being assessed in advance and precludes provision of an explanation of results (such as in some organizational consultation, some screenings, and forensic evaluations), behavior analysts or assistant behavior analysts shall ensure that an explanation of the results is provided using language that is reasonably understandable to the person assessed or to another legally authorized person on behalf of the client. Regardless of whether the interpretation is done by the behavior analyst, or assistant behavior analyst, or others, behavior analysts or assistant behavior analyst shall take reasonable steps to ensure that appropriate explanations of results are given.

(H) Treatment Efficacy.

(a) The behavior analyst shall always have the responsibility to recommend scientifically supported most effective treatment procedures. Effective treatment procedures have been validated as having both long-term and short-term benefits to clients and society.

(b) Clients have a right to effective treatment (i.e., based on the research literature and adapted to the individual client).

(c) Behavior analysts or assistant behavior analysts shall be responsible for review and appraisal of likely effects of all alternative treatments, including those provided by other disciplines and no intervention.

(d) In those instances where more than one scientifically supported treatment has been established, additional factors may be considered in selecting interventions, including, but not limited to, efficiency and cost-effectiveness, risks and side-effects of the interventions, client preference, and practitioner experience and training.

(I) Confidential Information. Behavior analysts or assistant behavior analysts shall treat an assessment result or interpretation regarding an individual as confidential information.

(J) Communication of Results. Behavior analysts or assistant behavior analysts shall accompany communication of results of assessment procedures to the client, parents, legal guardians or other agents of the client by adequate interpretive aids or explanations.

(K) Reservations Concerning Results. Behavior analysts or assistant behavior analysts shall include in his/her report of the results of an assessment procedure any deficiencies of the assessment norms for the individual assessed and any relevant reservations or qualifications which affect the validity, reliability or other interpretation of results.

(L) Protection of Integrity of Assessment Procedures. Behavior analysts or assistant behavior analysts shall not reproduce or describe in popular publications, lectures or public presentations, psychological tests or other assessment devices in ways that might invalidate them.

(M) Information for Professional Users. Behavior analysts or assistant behavior analysts offering an assessment procedure or automated interpretation service to other professionals shall accompany this offering by a manual or other printed material which fully describes the development of the assessment procedure or service, the rationale, evidence of validity and reliability, and characteristics of the normative population. Behavior analysts or assistant behavior analysts shall explicitly state the purpose and application for which the procedure is recommended and identify special qualifications required to administer and interpret it properly. Behavior analysts or assistant behavior analysts shall ensure that the advertisements for the assessment procedure or interpretive services are factual and descriptive.

(13) Violations of Law.

(A) Violations of Applicable Statutes. Behavior analysts or assistant behavior analysts shall not violate any applicable statute or administrative rule regarding the practice of behavior analysis.

(B) Use of Fraud, Misrepresentation or Deception. Behavior analysts or assistant behavior analysts shall not use fraud, misrepresentation or deception in:

1. Obtaining a behavior analyst or assistant behavior analyst license;
2. Passing a behavior analyst or assistant behavior analyst licensing examination;
3. Assisting another to obtain a behavior analyst or assistant behavior analyst license or to pass a behavior analyst or assistant behavior analyst licensing examination;
4. Billing clients or third-party payors;
5. Providing behavior analysis service;
6. Reporting the results of applied behavior analysis evaluations or services; or

7. Conducting any other activity related to the practice of applied behavior analysis.

(14) Aiding Unauthorized Practice.

(A) Aiding Unauthorized Practice. Behavior analysts or assistant behavior analysts shall not aid or abet another person in misrepresenting his/her professional credentials or in illegally engaging in the practice of applied behavior analysis.

(B) Employing Other Licensed Professionals. A behavior analyst or assistant behavior analyst may employ or utilize the services of other licensed professionals in his/her practice so long as this professional is acting within the terms and scope of his/her respective license.

(C) Delegating Professional Responsibility. Behavior analysts or assistant behavior analysts shall not delegate professional responsibilities to a person not qualified, not appropriately credentialed to provide those services, or both.

(D) Providing Supervision. Behavior analysts or assistant behavior analysts shall exercise appropriate supervision over supervisees, as set forth in the regulations of the board.

1. In academic and supervisory relationships, behavior analysts or assistant behavior analysts shall establish timely and specific processes for providing feedback to students and supervisees. Information regarding the process shall be provided to the student and supervisees at the beginning of supervision.

2. Behavior analysts or assistant behavior analysts shall evaluate students and supervisees on the basis of their actual performance on relevant and established program requirements.

(15) Resolving Issues.

(A) Reporting of Violations to Board. Behavior analysts or assistant behavior analysts who has knowledge or believes in good faith that there has been a violation of the statutes or rules of the board shall inform the board in writing. When the information regarding that violation is obtained in a professional relationship with a client, behavior analysts or assistant behavior analysts shall report it only with the written permission of the client. Nothing in this rule shall relieve a behavior analyst or assistant behavior analyst of the duty to file any report required by applicable statutes. Failure to report a violation of the statutes and/or rules, is in itself, an ethics violation.

(B) Providing Information to Client. When a behavior analyst or assistant behavior analyst learns from a client of a possible violation of the statutes or rules of the board, or when a behavior analyst or assistant behavior analyst receives a request from a client for information on how to file a complaint with the board, behavior analysts or assistant behavior analysts have an obligation to inform the client of the standards of applied behavior analysis and how to file a complaint with the board.

(C) Cooperating with the Board. Behavior analysts or assistant behavior analysts shall cooperate with the Behavior Analyst Advisory Board by responding personally or through his/her attorney to inquiries.

(D) Circumventing Disciplinary Rules. Behavior analysts or assistant behavior analysts shall not circumvent a disciplinary rule of professional conduct through actions of another.

(16) Individual Behavior Change Program.

(A) Describing Program Objectives. The behavior analyst shall describe, in writing, the objectives of the behavior change program to the client or client-surrogate (see below) before attempting to implement the program. And to the extent possible, a risk-benefit analysis should be conducted on the procedures to be implemented to reach the objective.

(B) The Behavior Analyst and the Individual Behavior Change Program. The behavior analyst shall:

1. Design a program that is based on behavior analytic principles, including assessments of effects of other intervention methods;

2. Involve the client or the client-surrogate in the planning of such programs;

3. Obtain the consent of the client; and

4. Respects the right of the client to terminate services at any time.

(C) Describing Conditions for Program Success. The behavior analyst or assistant behavior analyst shall describe to the client or client-surrogate the environmental conditions that are necessary for the program to be effective.

(D) Environmental Conditions that Preclude Implementation. If environmental conditions preclude implementation of a behavior analytic program, behavior analysts or assistant behavior analysts shall recommend that other professional assistance (i.e., assessment, consultation or therapeutic intervention by other professionals) be sought.

(E) Environmental Conditions that Hamper Implementation. If environmental conditions hamper implementation of the behavior analytic program, behavior analysts or assistant behavior analysts shall seek to eliminate the environmental constraints, or identify in writing the obstacles to doing so.

(F) Reinforcement/Punishment. Behavior analysts or assistant behavior analysts shall recommend reinforcement rather than punishment whenever possible. If punishment procedures are necessary, behavior analysts or assistant behavior analysts must always include reinforcement procedures for alternative behavior in the program.

(G) Avoiding Harmful Reinforcers. Behavior analysts or assistant behavior analysts shall minimize the use of items as potential reinforcers that maybe harmful to the long-term health of the client or participant (e.g., cigarettes, sugar or fat-laden food), or that may require undesirably marked deprivation procedures as motivating operations.

(H) On-Going Data Collection. Behavior analysts or assistant behavior analysts shall collect data, or ask the client, client-surrogate, or designated others to collect data needed to assess progress within the program.

(I) Program Modifications. Behavior analysts or assistant behavior analysts shall modify the program on the basis of data.

(J) Program Modifications Consent. Behavior analysts or assistant behavior analysts shall explain program modifications and the reasons for the modifications to the client or client-surrogate and obtains consent to implement the modifications.

(K) Least Restrictive Procedures. Behavior analysts or assistant behavior analysts shall review and appraise the restrictiveness of alternative interventions and recommend the least restrictive procedures likely to be effective in dealing with a behavior problem.

(17) The Behavior Analyst as Teacher and/or Supervisor. Behavior analysts shall delegate to their employees, supervisees, and research assistants only those responsibilities that such persons can reasonably be expected to perform competently.

(A) Designing Competent Training Programs and Supervised Work Experiences. Behavior analysts who are responsible for education and training programs and supervisory activities shall seek to ensure that the programs and supervisory activities:

1. Are competently designed
2. Provide the proper experiences; and
3. Meet the requirements for licensure, certification, or other goals for which claims are made by the program or supervisor.

(B) Limitations on Training. Behavior analysts shall not teach the use of techniques or procedures that require specialized training, licensure, or expertise in other disciplines to individuals who lack the prerequisite training, legal scope of practice, or expertise, except as these techniques may be used in behavioral evaluation of the effects of various treatments, interventions, therapies, or educational methods.

(C) Providing Course or Supervision Objectives. The behavior analyst shall provide a clear description of the objectives of a course or supervision, preferably in writing, at the beginning of the course or supervisory relationship.

(D) Describing Course Requirements. The behavior analyst shall provide a clear description of the demands of the supervisory relationship or course (e.g., papers, exams, projects, reports, intervention plans, graphic displays and face to face meetings) preferably in writing at the beginning of the supervisory relationship or course.

(E) Describing Evaluation Requirements. The behavior analyst shall provide a clear description of the requirements for the evaluation of student/supervisee performance at the beginning of the supervisory relationship or course.

(F) Providing Feedback to Students/Supervisees. The behavior analyst shall provide feedback regarding the performance of a student or supervisee at least once per two weeks or consistent with BACB requirements.

(G) Feedback to Student/Supervisees. The behavior analyst shall provide feedback to the student/supervisee in a way that increases the probability that the student/supervisee will benefit from the feedback.

(H) Reinforcing Student/Supervisee Behavior. The behavior analyst shall use positive reinforcement as frequently as the behavior of the student/supervisee and the environmental conditions allow.

(I) Utilizing Behavior Analysis Principles in Teaching. The behavior analyst shall utilize as many principles of behavior analysis in teaching a course as the material, conditions, and academic policies allow.

(J) Requirements of Supervisees. The behavior analyst's behavioral requirements of a supervisee must be in the behavioral repertoire of the supervisee. If the behavior required is not in the supervisee's repertoire, the behavior analyst shall attempt to provide the conditions for the acquisition of the required behavior, and refer the supervisee for remedial skill development services, or provide them with such services, permitting them to meet at least minimal behavioral performance requirements.

(K) Training, Supervision, and Safety. Behavior analysts shall provide proper training, supervision, and safety precautions to their employees or supervisees and take reasonable steps to see that such persons perform services responsibly, competently, and ethically. If institutional policies, procedures, or practices prevent fulfillment of this obligation, behavior analysts shall attempt to modify their role or to correct the situation to the extent feasible.

(18) The Behavior Analyst and the Workplace. The behavior analyst shall adhere to job commitments, assesses employee interactions before intervention, work within his/her scope of training, develop interventions that benefit employees, and resolve conflicts within these rules.

(A) Job Commitments. The behavior analyst shall adhere to job commitments made to the employing organization.

(B) Assessing Employee Interactions. The behavior analyst shall assess the behavior-environment interactions of the employees before designing behavior analytic programs.

(C) Preparing for Consultation. The behavior analyst shall implement or consult on behavior management programs for which the behavior analyst has been adequately prepared.

(D) Employees' Interventions. The behavior analyst shall develop interventions that benefit the employees as well as management.

(E) Employee Health and Well Being. The behavior analyst shall develop interventions that enhance the health and well being of the employees.

(F) Conflicts with Organizations. If the demands of an organization with which behavior analysts are affiliated conflict with these rules, behavior analysts shall clarify the nature of the conflict, make known their commitment to these rules, and to the extent feasible, seek to resolve the conflict in a way that permits the fullest adherence to these rules.

(19) The Behavior Analyst's Ethical Responsibility to the Field of Behavior Analysis. Behavior analysts or assistant behavior analysts shall have a responsibility to support the values of the field, to disseminate knowledge to the public, to be familiar with these rules, and discourage misrepresentation by non-certified individuals.

(A) Affirming Principles. Behavior analysts or assistant behavior analysts shall uphold and advance the values, ethics, principles, and mission of the field of behavior analysis. Participation in both state and national or international behavior analysis organizations is strongly encouraged.

(B) Disseminating Behavior Analysis. Behavior analysts or assistant behavior analysts shall assist the profession in making behavior analysis methodology available to the general public.

(C) Being Familiar with These Rules. Behavior analysts or assistant behavior analysts must be familiar with these rules, other applicable ethics codes, and their application to behavior analysts' work. Lack of awareness or misunderstanding of a these rules is not itself a defense to a charge of unethical conduct.

(D) Discouraging Misrepresentation by Non-Certified Individuals. Behavior analysts or assistant behavior analysts shall discourage non-certified practitioners from misrepresenting that they are certified or licensed.

(20) The Behavior Analyst's Responsibility to Colleagues.

(A) Behavior analysts or assistant behavior analysts shall have an obligation to bring attention to and resolve ethical violations by colleagues.

(B) Ethical Violations by Behavioral and Non-behavioral Colleagues. When behavior analysts or assistant behavior analysts believe that there may have been an ethical violation by another behavior analyst or assistant behavior analyst, or non-behavioral colleague, they shall attempt to resolve the issue by bringing it to the attention of that individual if an informal resolution appears appropriate and the intervention does not violate any confidentiality rights that may be involved. If resolution is not obtained, and the behavior analyst or assistant behavior analyst believes a client's rights are being violated, the behavior analyst or assistant behavior analyst shall take additional steps as necessary for the protection of the client.

(21) The Behavior Analyst's Ethical Responsibility to Society. Behavior analysts or assistant behavior analysts shall promote the general welfare of society through the application of the principles of behavior.

(A) Promotion in Society. Behavior analysts or assistant behavior analysts shall promote the application of behavior principles in society by presenting a behavioral alternative to other procedures or methods.

(B) Scientific Inquiry. Behavior analysts or assistant behavior analysts shall promote the analysis of behavior as a legitimate field of scientific inquiry.

(C) Public Statements.

1. Behavior analysts or assistant behavior analysts shall comply with these rules in public statements relating to their professional services, products, or publications or to the field of behavior analysis. Public statements include but are not limited to:

a. Paid or unpaid advertising;

b. Brochures;

c. Printed matter;

d. Directory listings;

e. Personal resumes or curriculum vitae;

f. Interviews or comments for use in media; and

g. Statements in legal proceedings, lectures and public oral presentations, and published materials.

(D) Statements by Others.

1. Behavior analysts or assistant behavior analysts who engage others to create or place public statements that promote their professional practice, products, or activities shall retain professional responsibility for such statements.
2. Behavior analysts or assistant behavior analysts shall make reasonable efforts to prevent others whom they do not control (such as employers, publishers, sponsors, organizational clients, and representatives of the print or broadcast media) from making deceptive statements concerning behavior analysts' practices or professional or scientific activities.
3. If behavior analysts or assistant behavior analysts learn of deceptive statements about their work made by others, behavior analysts or assistant behavior analysts shall make reasonable efforts to correct such statements.
4. A paid advertisement relating to the behavior analyst's or assistant behavior analyst's activities must be identified as such, unless it is already apparent from the context.

(E) Media Presentations and Emerging Media-Based Services.

1. When a behavior analyst or assistant behavior analyst provides advice or comment by means of public lectures, demonstrations, radio or television programs, prerecorded tapes, printed articles, mailed material, or other media, behavior analysts or assistant behavior analysts shall take reasonable precautions to ensure that

   (a.) The statements are based on appropriate behavior analytic literature and practice;

   (b.) The statements are otherwise consistent with these rules, and

   (c.) The recipients of the information are not encouraged to infer that a relationship has been established with them personally.
2. When a behavior analyst or assistant behavior analyst delivers services, teaches or conducts research using existing or emerging media (e.g. Internet, e-learning, interactive multi-media), they shall consider any ethical challenges presented by

media-based delivery (e.g. privacy, confidentiality, evidence-based interventions, ongoing data collection and program modifications) and make every effort possible to adhere to the ethical standards described herein.

(F) Testimonials. Behavior analysts or assistant behavior analysts shall not solicit testimonials from current clients or patients or other persons who, because of their particular circumstances, are vulnerable to undue influence.

(G) In-Person Solicitation. Behavior analysts or assistant behavior analysts shall not engage, directly or through agents, in uninvited in-person solicitation of business from actual or potential users of services who, because of their particular circumstances, are vulnerable to undue influence, except that organizational behavior management or performance management services may be marketed to corporate entities regardless of their projected financial position.

(22) Behavior Analysts or Assistant Behavior Analysts and Research. Behavior analysts or assistant behavior analysts shall design, conduct, and report research in accordance with recognized standards of scientific competence and ethical research. Behavior analysts or assistant behavior analysts shall conduct research with human and non-human research participants according to the proposal approved by a local Human Research Committee, and/or Institutional Review Board.

(A) Behavior analysts or assistant behavior analysts shall plan their research so as to minimize the possibility that results will be misleading.

(B) Behavior analysts or assistant behavior analysts shall conduct research competently and with due concern for the dignity and welfare of the participants. Researchers and assistants are permitted to perform only those tasks for which they are appropriately trained and prepared.

(C) Behavior analysts or assistant behavior analysts shall be responsible for the ethical conduct of research conducted by them or by others under their supervision or control.

(D) Behavior analysts or assistant behavior analysts shall conduct applied research conjointly with provision of clinical or human services and shall obtain required external reviews of proposed clinical research and observe requirements for both intervention and research involvement by client-participants.

(E) In planning research, behavior analysts or assistant behavior analysts shall consider its ethical acceptability under these rules. If an ethical issue is unclear, behavior analysts or assistant behavior analysts shall seek to resolve the issue through consultation with institutional review boards, animal care and use committees, peer consultations, or other proper mechanisms.

(F) Behavior analysts or assistant behavior analysts engaged in study and research shall be guided by the conventions of the science of behavior including the emphasis on the analysis of individual behavior and shall strive to model appropriate applications in professional life.

(G) Behavior analysts or assistant behavior analysts shall take reasonable steps to avoid harming their clients, research participants, students, and others with whom they work, and to minimize harm where it is foreseeable and unavoidable. Harm is defined here as negative effects or side effects of behavior analysis that outweigh positive effects in the particular instance, and that are behavioral or physical and directly observable.

(H) Because behavior analysts' or assistant behavior analysts' scientific and professional judgments and actions affect the lives of others; therefore, they shall be alert to and guard against personal, financial, social, organizational, or political factors that might lead to misuse of their influence.

(I) Behavior analysts or assistant behavior analysts shall not participate in activities in which it appears likely that their skills or data will be misused by others, unless corrective mechanisms, e.g., peer or external professional or independent review, are available.

(J) Behavior analysts or assistant behavior analysts shall not exaggerate claims for effectiveness of particular procedures or of behavior analysis in general.

(K) If behavior analysts or assistant behavior analysts learn of misuse or misrepresentation of their individual work products, the behavior analyst or assistant behavior analyst shall take reasonable and feasible steps to correct or minimize the misuse or misrepresentation.

(L) Documenting Professional and Scientific Work.

1. Behavior analysts or assistant behavior analysts shall appropriately document their professional and scientific work in order to facilitate provision of services later by them or by other professionals, to ensure accountability, and to meet other requirements of institutions or the law.

2. When behavior analysts or assistant behavior analysts have reason to believe that records of their professional services will be used in legal proceedings involving recipients of or participants in their work, behavior analysts or assistant behavior analysts shall have a responsibility to create and maintain documentation in the kind of detail and quality that would be consistent with reasonable scrutiny in an adjudicative forum.
3. Behavior analysts or assistant behavior analysts shall obtain and document:
   (a) Institutional Review Board (IRB), and/or local Human Research Committee approval; and/or
   (b) Confirmation of compliance with institutional requirements when data gathered during their professional services will be submitted to professional conferences and peer reviewed journals.

(M) Using Confidential Information for Didactic or Instructive Purposes.

1. Behavior analysts or assistant behavior analysts shall not disclose in their writings, lectures, or other public media, confidential, personally identifiable information concerning their individual or organizational clients, students, research participants, or other recipients of their services that they obtained during the course of their work, unless the person or organization has consented in writing or unless there is other ethical or legal authorization for doing so.
2. Ordinarily, in such scientific and professional presentations, behavior analysts or assistant behavior analysts shall disguise confidential information concerning such persons or organizations so that they are not individually identifiable to others and so that discussions do not cause harm to identifiable participants.

(N) Conforming with Laws and Regulations. Behavior analysts or assistant behavior analysts shall plan and conduct research in a manner consistent with all applicable laws and regulations, as well as professional standards governing the conduct of research, and particularly those standards governing research with human participants and animal subjects. Behavior analysts or assistant behavior analysts shall also comply with other applicable laws and regulations relating to mandated reporting requirements.

(O) Informed Consent.

1. Using language that is reasonably understandable to participants, behavior analysts or assistant behavior analysts shall:
   (a) Inform participants of the nature of the research;
   (b) Inform participants that they are free to participate or to decline to participate or to withdraw from the research;
   (c) Explain the foreseeable consequences of declining or withdrawing;
   (d) Inform participants of significant factors that may be expected to influence their willingness to participate (such as risks, discomfort, adverse effects, or limitations on confidentiality, except as provided in 20 CSR 2063-_____); and
   (e) Explain other aspects about which the prospective participants inquire.
2. For persons who are legally incapable of giving informed consent, behavior analysts or assistant behavior analysts nevertheless shall
   (a) Provide an appropriate explanation;
   (b) Discontinue research if the person gives clear signs of unwillingness to continue participation; and
   (c) Obtain appropriate permission from a legally authorized person, if such substitute consent is permitted by law.

(P) Deception in Research.

1. Behavior analysts or assistant behavior analysts shall not conduct a study involving deception unless they have determined that the use of deceptive techniques is justified by the study's prospective scientific, educational, or applied value and that equally effective alternative procedures that do not use deception are not feasible.
2. Behavior analysts or assistant behavior analysts shall not deceive research participants about significant aspects that would affect their willingness to participate, such as physical risks, discomfort, or unpleasant emotional experiences.
3. Any other deception that is an integral feature of the design and conduct of an experiment shall be explained to participants as early as is feasible, preferably at the conclusion of their participation, but no later than at the conclusion of the research.

(Q) Informing of Future Use. Behavior analysts or assistant behavior analysts shall inform research participants of their anticipated sharing or further use of personally identifiable research data and of the possibility of unanticipated future uses.

(R) Minimizing Interference. In conducting research, Behavior analysts or assistant behavior analysts shall interfere with the participants or environment from which data are collected only in a manner that is warranted by an appropriate research design and that is consistent with behavior analysts' roles as scientific investigators.

(S) Commitments to Research Participants. Behavior analysts or assistant behavior analysts shall take reasonable measures to honor all commitments they have made to research participants.

(T) Ensuring Participant Anonymity. In presenting research, Behavior analysts or assistant behavior analysts shall ensure participant anonymity unless specifically waived by the participant or surrogate.

(U) Informing of Withdrawal. Behavior analysts or assistant behavior analysts shall inform the participant that withdrawal from the research may occur at any time without penalty except as stipulated in advance, as in fees contingent upon completing a project or credit for students who engaged in the research project.

(V) Debriefing. Behavior analysts or assistant behavior analysts shall inform the participant that debriefing will occur at the conclusion of the participant's involvement in the research.

(W) Answering Research Questions. Behavior analysts or assistant behavior analysts shall answer all questions of the participant about the research that are consistent with being able to conduct the research.

(X) Written Consent. Behavior analysts or assistant behavior analysts shall obtain the written consent of the participant or surrogate before beginning the research.

(Y) Extra Credit. If behavior analysts or assistant behavior analysts recruit participants from classes and the participants are provided additional credit for participating in the research, nonparticipating students must be provided alternative activities that generate comparable credit.

(Z) Paying Participants. Behavior analysts or assistant behavior analysts who pay participants for research involvement or uses money as a reinforcer shall obtain Institutional Review Board or Human Rights Committee approval of this practice and conform to any special requirements that may be established in the process of approval.

(AA) Withholding Payment. Behavior analysts or assistant behavior analysts who withhold part of the money earned by the participant until the participant has completed their research involvement shall inform the participant of this condition prior to beginning the experiment.

(BB) Grant Reviews. Behavior analysts or assistant behavior analysts who serve on grant review panels shall avoid conducting any research described in grant proposals that the behavior analyst reviewed, except as replications fully crediting the prior researchers.

(CC) Animal Research. Behavior analysts or assistant behavior analysts who conduct research involving animals shall treat them humanely and be in compliance with applicable animal welfare laws in their country.

(DD) Accuracy of Data. Behavior analysts or assistant behavior analysts shall not fabricate data or falsify results in their publications. If behavior analysts or assistant behavior analysts discover significant errors in their published data, the behavior analyst or assistant behavior analyst shall take reasonable steps to correct such errors in a correction, retraction, erratum, or other appropriate publication means.

(EE) Authorship and Findings. Behavior analysts or assistant behavior analysts shall not present portions or elements of another's work or data as their own, even if the other work or data source is cited occasionally, nor shall they omit findings that might alter others' interpretations of their work or behavior analysis in general.

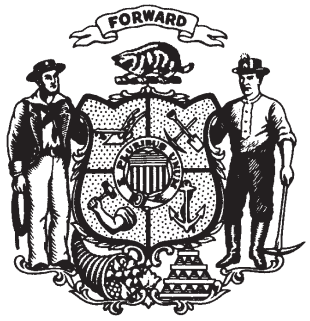
(FF) Acknowledging Contributions. In presenting research, behavior analysts or assistant behavior analysts shall acknowledge the contributions of others to the conduct of the research by including them as co-authors or footnoting their contributions.

(GG) Principal Authorship and Other Publication Credits. Principal authorship and other publication credits shall accurately reflect the relative scientific or professional contributions of the individuals involved, regardless of their relative status. Mere possession of an institutional position, such as Department Chair, does not justify authorship credit. Minor contributions to the research or to the writing for publications shall be appropriately acknowledged, such as in footnotes or in an introductory statement. Further, these rules recognize and require the ethical requirements for authorship and publication practices contained in the ethical code of the American Psychological Association.

(HH) Publishing Data. Behavior analysts or assistant behavior analysts shall not publish, as original data, data that have been previously published. This does not preclude republishing data when they are accompanied by proper acknowledgment.

(II) Withholding Data. After research results are published, behavior analysts or assistant behavior analysts shall not withhold the data on which their conclusions are based from other competent professionals who seek to verify the substantive claims through reanalysis and who intend to use such data only for that purpose, provided that the confidentiality of the participants can be protected and unless legal rights concerning proprietary data preclude their release.

State of Wisconsin



Date of enactment: **May 11, 2010**
2009 Senate Bill 667 Date of publication*: **May 25, 2010**

2009 WISCONSIN ACT 282

AN ACT ***to renumber*** subchapter III of chapter 440 [precedes 440.41], subchapter IV of chapter 440 [precedes 440.51], subchapter V of chapter 440 [precedes 440.60], subchapter VI of chapter 440 [precedes 440.70], subchapter VII of chapter 440 [precedes 440.88], subchapter VIII of chapter 440 [precedes 440.90], subchapter IX of chapter 440 [precedes 440.96], subchapter X of chapter 440 [precedes 440.97], subchapter XI of chapter 440 [precedes 440.98], subchapter XII of chapter 440 [precedes 440.9805] and subchapter XIII of chapter 440 [precedes 440.99]; ***to amend*** 157.055 (2) (intro.), 441.15 (2m), 448.03 (2) (a) and 632.895 (12m) (b) 4.; and ***to create*** 440.03 (13) (b) 15m., 440.08 (2) (a) 20m., subchapter III of chapter 440 [precedes 440.310] and 632.895 (12m) (b) 3m. of the statutes; **relating to:** licensure and regulation of behavior analysts, insurance coverage of the services of behavior analysts for autism treatment, providing an exemption from emergency rule procedures, granting rule−making authority, and providing a penalty.

The people of the state of Wisconsin, represented in senate and assembly, do enact as follows:

SECTION 1. 157.055 (2) (intro.) of the statutes, as affected by 2009 Wisconsin Act 42, is amended to read:

157.055 **(2)** (intro.) Notwithstanding ss. 69.18 (4), 445.04 (2), 445.14, 979.01 (3), (3m), and (4), 979.02, and 979.10, and subch. ~~VI~~ VII of ch. 440, during a period of a state of emergency related to public health declared by the governor under s. 323.10, a public health authority may do all of the following:

SECTION 2. 440.03 (13) (b) 15m. of the statutes is created to read:

440.03 **(13)** (b) 15m. Behavior analyst.

SECTION 3. 440.08 (2) (a) 20m. of the statutes is created to read:

440.08 **(2)** (a) 20m. Behavior analyst: December 15 of each even−numbered year.

SECTION 4. Subchapter III of chapter 440 [precedes 440.310] of the statutes is created to read:

CHAPTER 440
SUBCHAPTER III
BEHAVIOR ANALYSTS

440.310 Definitions. In this subchapter:

(1) "Behavior analyst" means a person who is certified by the Behavior Analyst Certification Board, Inc., as a board−certified behavior analyst and has been granted a license under this subchapter to engage in the practice of behavior analysis.

(2) "Practice of behavior analysis" means the design, implementation, and evaluation of systematic instructional and environmental modifications to produce socially significant improvements in human behavior, including the empirical identification of functional relations between behavior and environmental factors, known as functional assessment and analysis, including interventions based on scientific research and the direct observation and measurement of behavior and environment. "Practice of behavior analysis" does not include psychological testing, neuropsychology, psychotherapy,

* Section 991.11, WISCONSIN STATUTES 2007−08 : Effective date of acts. "Every act and every portion of an act enacted by the legislature over the governor's partial veto which does not expressly prescribe the time when it takes effect shall take effect on the day after its date of publication as designated" by the secretary of state [the date of publication may not be more than 10 working days after the date of enactment].

cognitive therapy, sex therapy, marriage counseling, psychoanalysis, hypnotherapy, and long−term counseling as treatment modalities.

440.311 Use of title; penalty. (1) No person may use the title "behavior analyst" or represent or imply that he or she is a behavior analyst unless the person is licensed under this subchapter. This section may not be construed to restrict the practice of behavior analysis by a licensed professional who is not a behavior analyst, if the services performed are within the scope of the professional's practice and are performed commensurate with the professional's training and experience, and the professional does not represent that he or she is a behavior analyst.

(2) Any person who violates sub. (1) may be fined not more than $250, imprisoned not more than 3 months in the county jail, or both.

440.312 Licensure. (1) Except as provided in sub. (2), the department shall grant a license as a behavior analyst to a person under this subchapter if all of the following apply:

(a) The person submits an application to the department on a form provided by the department.

(b) The person pays the initial credential fee determined by the department under s. 440.03 (9) (a).

(c) The person submits evidence satisfactory to the department that the person is a behavior analyst certified by the Behavior Analyst Certification Board, Inc., or its successor organization.

(2) The department may not grant a license under this subchapter to any person who has been convicted of an offense under s. 940.22, 940.225, 940.302 (2) (a) 1. b., 944.06, 944.15, 944.17, 944.30, 944.31, 944.32, 944.33, 944.34, 948.02, 948.025, 948.051, 948.06, 948.07, 948.075, 948.08, 948.09, 948.095, 948.10, 948.11, or 948.12.

440.313 Renewal. (1) The renewal date for licenses granted under this subchapter is specified in s. 440.08 (2) (a). Renewal applications shall be submitted to the department on a form provided by the department and shall include the renewal fee determined by the department under s. 440.03 (9) (a).

(2) A behavior analyst shall, at the time that he or she applies for renewal of a license under sub. (1), submit proof satisfactory to the department that he or she is, at the time he or she applies for renewal, certified by the Behavior Analyst Certification Board, Inc., or its successor organization.

440.314 Rules. (1) The department may promulgate rules necessary to administer this subchapter, including rules of conduct by behavior analysts and by holders of temporary permits under sub. (2). Except as provided in subs. (2), (3), and (4), any rules regarding the practice of behavior analysis shall be consistent with standards established by the Behavior Analyst Certification Board, Inc., or its successor organization.

(2) (a) The department may promulgate rules authorizing the department to issue a temporary permit to a person who is certified by the Behavior Analyst Certification Board, Inc., or its successor organization authorizing the practice of behavior analysis by the person under the supervision of a behavior analyst licensed under s. 440.312 (1).

(3) The rules may not do any of the following:

(a) Require an applicant for a license under this subchapter to have education in addition to the education required by the Behavior Analyst Certification Board, Inc., or its successor organization.

(b) Require a behavior analyst to practice behavior analysis under the supervision of, or in collaboration with, another health care provider.

(c) Require a behavior analyst to enter into an agreement, written or otherwise, with another health care provider.

(d) Limit the location where a behavior analyst may practice behavior analysis.

440.315 Informed consent. A behavior analyst shall, at an initial consultation with a client, provide a copy of the rules promulgated by the department under this subchapter and shall disclose to the client orally and in writing all of the following:

(1) A summary of the behavior analyst's experience and training.

(2) Any other information required by the department by rule.

440.316 Disciplinary proceedings and actions. (1) Subject to the rules promulgated under s. 440.03 (1), the department may conduct investigations and hearings to determine whether a violation of this subchapter or any rule promulgated under this subchapter has occurred.

(2) Subject to the rules promulgated under s. 440.03 (1), the department may reprimand a behavior analyst or deny, limit, suspend, or revoke a license granted under this subchapter if the department finds that the applicant or the behavior analyst has done any of the following:

(a) Intentionally made a material misstatement in an application for a license or for renewal of a license.

(b) Subject to ss. 111.321, 111.322, and 111.34, practiced behavior analysis while his or her ability to engage in the practice was impaired by alcohol or other drugs.

(c) Advertised in a manner that is false or misleading.

(d) In the course of the practice of behavior analysis, made a substantial misrepresentation that was relied upon by a client.

(e) In the course of the practice of behavior analysis, engaged in conduct that evidences an inability to apply the principles or skills of behavior analysis.

(f) Obtained or attempted to obtain compensation through fraud or deceit.

(g) Allowed another person to use a license granted under this subchapter.

(h) Violated any law of this state or federal law that substantially relates to the practice of behavior analysis, violated this subchapter, or violated any rule promulgated under this subchapter.

(i) Engaged in unprofessional conduct.

(3) Subject to the rules promulgated under s. 440.03 (1), the department shall revoke a license granted under this subchapter if the behavior analyst is convicted of any of the offenses specified in 440.312 (2).

440.317 Advisory committee. The department may appoint an advisory committee under s. 440.042 to advise the department on matters relating to the regulation of behavior analysts.

SECTION 5. Subchapter III of chapter 440 [precedes 440.41] of the statutes is renumbered subch. IV of ch. 440.

SECTION 6. Subchapter IV of chapter 440 [precedes 440.51] of the statutes is renumbered subch. V of ch. 440.

SECTION 7. Subchapter V of chapter 440 [precedes 440.60] of the statutes is renumbered subch. VI of ch. 440.

SECTION 8. Subchapter VI of chapter 440 [precedes 440.70] of the statutes is renumbered subch. VII of ch. 440.

SECTION 9. Subchapter VII of chapter 440 [precedes 440.88] of the statutes is renumbered subch. VIII of ch. 440.

SECTION 10. Subchapter VIII of chapter 440 [precedes 440.90] of the statutes is renumbered subch. IX of ch. 440.

SECTION 11. Subchapter IX of chapter 440 [precedes 440.96] of the statutes is renumbered subch. X of ch. 440.

SECTION 12. Subchapter X of chapter 440 [precedes 440.97] of the statutes is renumbered subch. XI of ch. 440.

SECTION 13. Subchapter XI of chapter 440 [precedes 440.98] of the statutes is renumbered subch. XII of ch. 440.

SECTION 14. Subchapter XII of chapter 440 [precedes 440.9805] of the statutes is renumbered subch. XIII of ch. 440.

SECTION 15. Subchapter XIII of chapter 440 [precedes 440.99] of the statutes is renumbered subch. XIV of ch. 440.

SECTION 16. 441.15 (2m) of the statutes is amended to read:

441.15 **(2m)** Subsection (2) does not apply to a person granted a license to practice midwifery under subch. ~~XII~~ XIII of ch. 440.

SECTION 17. 448.03 (2) (a) of the statutes is amended to read:

448.03 **(2)** (a) Any person lawfully practicing within the scope of a license, permit, registration, certificate or certification granted to practice midwifery under subch. ~~XII~~ XIII of ch. 440, to practice professional or practical nursing or nurse−midwifery under ch. 441, to practice chiropractic under ch. 446, to practice dentistry or dental hygiene under ch. 447, to practice optometry under ch. 449, to practice acupuncture under ch. 451 or under any other statutory provision, or as otherwise provided by statute.

SECTION 18. 632.895 (12m) (b) 3m. of the statutes is created to read:

632.895 **(12m)** (b) 3m. A behavior analyst who is licensed under s. 440.312.

SECTION 19. 632.895 (12m) (b) 4. of the statutes, as created by 2009 Wisconsin Act 28, is amended to read:

632.895 **(12m)** (b) 4. A paraprofessional working under the supervision of a provider listed under subds. 1. to ~~3.~~ 3m.

SECTION 20. Nonstatutory provisions.

(1) The department of regulation may promulgate rules under section 440.314 of the statutes, as created by this act, as emergency rules under section 227.24 of the statutes. Notwithstanding section 227.24 (1) (c) and (2) of the statutes, emergency rules promulgated under this subsection may remain in effect until the effective date of permanent rules promulgated by the department under section 440.314 of the statutes, as created by this act. Notwithstanding section 227.24 (1) (a) and (3) of the statutes, the department is not required to provide evidence that promulgating a rule under this subsection as an emergency rule is necessary for the preservation of the public peace, health, safety, or welfare and is not required to provide a finding of emergency for a rule promulgated under this subsection.

SECTION 21. Initial applicability.

(1) If a disability insurance policy or a governmental self−insured health plan that is in effect on the effective date of this subsection contains a provision that is inconsistent with this act, this act first applies to that policy or plan on the date on which it is renewed.

SECTION 22. Effective dates. This act takes effect on the day after publication, except as follows:

(1) The creation of subchapter III of ch. 440 of the statutes takes effect on the 30th day after publication.