The High Cost of Cancer Treatments in Washington State

Scott Ramsey, MD, PhD
Director, Hutchinson Institute for Cancer Outcomes Research (HICOR

FRED HUTCH
CURES START HERE
Financial Relationships

• Grant Funding:
  - NCI, NHLBI, PCORI, CDC

• Consulting/Advisory Boards:
  - Bayer, Epigenomics, Genentech, Seattle Genetics
The Landscape of Cancer in the United States is Changing

• The annual number of new cases in the United States is expected to increase 75% by 2030
  — Population growth
  — Aging population

• Survival rates continue to climb for the most common cancers, in part due to improved treatments

• Rapidly rising healthcare costs compelling insurers to shift larger share of costs to patients
  — Affecting access to cancer care for lower income people
Monthly and Median Costs of Cancer Drugs at the Time of FDA Approval
1965 - 2015

Source: Peter B. Bach, MD, Memorial Sloan-Kettering Cancer Center
<table>
<thead>
<tr>
<th>Top 5 Expenditure</th>
<th>Total Medicare</th>
<th>Total Annual Spending Per</th>
<th>Average Annual Beneficiary Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cancer *</td>
<td>$3,179,922,015</td>
<td>$80,466</td>
<td>$7,226</td>
</tr>
<tr>
<td>Noncancer **</td>
<td>$13,114,862,964</td>
<td>$21,048</td>
<td>$1,286</td>
</tr>
<tr>
<td>Noncancer, sofosbuvir</td>
<td>$10,007,901,983</td>
<td>$2,796</td>
<td>$344</td>
</tr>
</tbody>
</table>

*Lenalidomide, imatinib, ipilimumab, sipuleucel-T, bexarotene

**Sofosbuvir, esomeprazole, rosuvastatin, apiprazole, fluticasone/salmeterol

Objectives for Measuring Cost

• Provide oncology community with **cost data to support decision-making** in cancer care

• Promote a dialogue about **value** in cancer care

• Cost is **one component of the value equation** – consider cost in the context of quality and outcomes
88,000+ cancer patients linked between the two data sources
With 35,000 patients enrolled at time of diagnosis
Phases of care

**TIME PERIOD**

**START:** 1 month prior to diagnosis

**END:** First of
- Beginning of treatment
- 2 months following diagnosis
- Death

**TIME PERIOD**

**START:** First treatment (surgery, chemotherapy, radiation therapy)

**END:** First of
- Beginning of treatment gap (gap must be at least 4 months)
- 12 months following initial treatment
- Death

**NOT MEASURED**

**TIME PERIOD**

**START:** 90 days prior to death

**END:** Date of death
How we measure cost

All insurance claims paid for the phase of care.

- Except where noted, cost represents the amount paid by insurers to providers.
- All numbers are inflation adjusted to 2015 dollars.
Cancer Patients in the Cost Analysis

- Age 18+
- Cancer: Breast, colorectal, non-small cell lung, leukemia, lymphoma
- First and only cancer
- Enrolled with a single (participating) insurance plan over the phase of care
Cost of Care by Phase

Average cost

* For some patients the end of life phase overlaps with the treatment phase.
Phases of care

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**TIME PERIOD**

**START:** 90 days prior to death

**END:** Date of death

**END OF LIFE**

**DATE OF DEATH**

**CONTINUING CARE**

**DATE OF DIAGNOSIS**

**DIAGNOSIS**

**30 DAYS**

**TREATMENT**
Treatment Components

Surgery: Specific surgical procedures for each cancer site (e.g. mastectomy)

Chemotherapy: Infusion services
- IV and oral chemotherapy drugs
Supportive care:
- colony stimulating factors
- blood transfusions
- antibiotics
- antivirals
- antifungals
- anti-nausea drugs

Radiation Therapy: All radiation oncology

Other: All other claims

All claims on the day of surgery, chemotherapy, or radiation therapy are considered part of the total cost of that treatment.
Treatment
Cost Components by Cancer Site and Stage

Radiation
Chemotherapy
Surgery
Other

In situ  Local  Regional  Distant  Local  Regional  Distant  Local  Regional  Distant  Acute  Chronic  Other  Hodgkin  Non-Hodgkin

N=7,998  N=4,760  N=1,335  N=936  N=212  N=753
Cost of Chemotherapy During Initial Treatment

![Cost of Chemotherapy Diagram](image)

- **Supportive care***
- **Infusion services**
- **Chemotherapy drugs**
- **Other**

<table>
<thead>
<tr>
<th>Type</th>
<th>Breast</th>
<th>Colorectal</th>
<th>Lung</th>
<th>Leukemia</th>
<th>Lymphoma</th>
</tr>
</thead>
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<tr>
<td>N</td>
<td>4,760</td>
<td>1,335</td>
<td>936</td>
<td>212</td>
<td>753</td>
</tr>
</tbody>
</table>

* Supportive care includes: colony stimulating factors, blood transfusions, antibiotics, antivirals, antifungals, and anti-nausea medications.
**Most Expensive Chemotherapy Drugs: 2007 and 2014**

<table>
<thead>
<tr>
<th>Drug Name</th>
<th>Average Total Spend Across Treatment Phase*</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trastuzumab</td>
<td>$55,434</td>
<td></td>
</tr>
<tr>
<td>Rituximab</td>
<td>$39,413</td>
<td></td>
</tr>
<tr>
<td>Oxaliplatin</td>
<td>$39,372</td>
<td></td>
</tr>
<tr>
<td>Bevacizumab</td>
<td>$35,420</td>
<td></td>
</tr>
<tr>
<td>Docetaxel</td>
<td>$17,592</td>
<td></td>
</tr>
<tr>
<td>Paclitaxel</td>
<td>$5,728</td>
<td></td>
</tr>
<tr>
<td>Carboplatin</td>
<td>$1,217</td>
<td></td>
</tr>
<tr>
<td>Fluorouracil</td>
<td>$869</td>
<td></td>
</tr>
<tr>
<td>Doxorubicin</td>
<td>$631</td>
<td></td>
</tr>
<tr>
<td>Leucovorin</td>
<td>$595</td>
<td></td>
</tr>
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<table>
<thead>
<tr>
<th>Drug Name</th>
<th>Average Total Spend Across Treatment Phase*</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trastuzumab</td>
<td>$86,837</td>
<td></td>
</tr>
<tr>
<td>Bevacizumab</td>
<td>$57,500</td>
<td></td>
</tr>
<tr>
<td>Pertuzumab</td>
<td>$51,304</td>
<td></td>
</tr>
<tr>
<td>Rituximab</td>
<td>$46,694</td>
<td></td>
</tr>
<tr>
<td>Pemetrexed</td>
<td>$27,921</td>
<td></td>
</tr>
<tr>
<td>Oxaliplatin</td>
<td>$11,027</td>
<td></td>
</tr>
<tr>
<td>Docetaxel</td>
<td>$7,334</td>
<td></td>
</tr>
<tr>
<td>Cyclophosphamide</td>
<td>$4,250</td>
<td></td>
</tr>
<tr>
<td>Paclitaxel</td>
<td>$3,350</td>
<td></td>
</tr>
<tr>
<td>Irinotecan</td>
<td>$1,641</td>
<td></td>
</tr>
</tbody>
</table>

* *Treatment Phase defined as time from initiation of first treatment to beginning of first treatment gap OR 12 months after treatment. All costs expressed in 2015 dollars.
Clinic Cost Profiles

- Oncology clinics in Western Washington
- Included in the comparison if the clinic had at least 30 patients with that cancer type in our dataset
Clinic Profiles: Colorectal Cancer

**CASE MIX BY CLINIC**
Regional clinics with at least 30 patients

**COST OF TREATMENT BY CLINIC**
Average cost, by treatment type
Clinic Profiles: Lung Cancer

CASE MIX BY CLINIC
Regional clinics with at least 30 patients

COST OF TREATMENT BY CLINIC
Average cost, by treatment type

- Local
- Regional
- Distant

- Radiation
- Chemotherapy
- Surgery
- Other
Phases of care

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**DATE OF DIAGNOSIS**

**30 DAYS**

**DATE OF DEATH**

**90 DAYS**

**END OF LIFE**
Results:

End of Life Phase

Regional results for metrics from the end of life phase

Use of chemotherapy or radiation therapy in last 30 days of life

- Mean: 25.9%
- 25th percentile: 14.3%
- 75th percentile: 33.8%

Use of advanced imaging in the 30 days of life

- Mean: 48.8%
- 25th percentile: 40.0%
- 75th percentile: 58.6%

Inpatient admissions in last 30 days of life

- Mean: 57.6%
- 25th percentile: 54.3%
- 75th percentile: 70.0%

Emergency department visits in last 30 days of life

- Mean: 13.6%
- 25th percentile: 11.7%
- 75th percentile: 20.3%
End-of-Life
Average cost, solid tumors only, last 90 days

N=1,655
Estimated Out-of-Pocket Costs

**BREAKDOWN OF WHO PAYS FOR CARE**

- Charged by Provider
  - Estimated patient out of pocket*
  - Paid by insurer

- Allowed
  - Total amount paid provider

*Includes deductible, co-pay and co-insurance

The difference between the allowed amount and amount paid by insurer
Estimated Out-of-Pocket Costs

Included in estimated out-of-pocket costs:
- Deductible
- Co-pays
- Co-insurance

Medical cost to the patient may be lower if:
- The patient has more than one insurance coverage
- The provider reduces or does not bill the patient

Medical costs to the patient may be higher due to:
- Medical costs not covered by insurance
- Loss of income due to the inability to work
Estimated Out-Of-Pocket Costs
Treatment Phase
Average Cost, by Cancer Site and Stage

![Bar graph showing average costs by cancer site and stage for different treatment phases.](graph.png)
Limitations of Insurance Claims Costs

- Only show what was paid for by insurance
- Do not reflect full patient financial burden
- Claims data show utilization, not clinical rationale or test results
- Measuring long periods of treatment may not be possible as patients are more likely to change their health care coverage.
- Commercially insured population only
Conclusions

• Chemotherapy is the largest component of treatment phase for all except local stage cancers

• Variability in chemotherapy use across providers suggests room for improvement in prescribing practices

• At End-of-Life chemotherapy use is contributing to costs with little benefit to patient – another area for improvement

• Out-of-pocket cost burden to patients is substantial