Development of an Interactive Model of Financial Access to Cancer Therapy

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Background

- There is increasing focus on drug costs in the US as the overall cost of healthcare continues to rise, with cancer drugs being singled out for particular attention[1,2]

- Access to cancer therapy may be driven by many factors, both non-financial and financial[3-5]
  - Non-financial factors may include patient, family, and physician preferences, sociodemographic factors, cultural beliefs, and travel distances, among others
  - Financial factors may include site of care, drug costs, adequacy of insurance coverage, benefit designs, and patients' ability or willingness to pay for treatment

- A patient's out-of-pocket (OOP) expenditures relative to income may be a key measure of whether that patient has a high OOP healthcare cost burden

- Patients with high OOP burdens may be at risk for poor adherence to treatment plans and, therefore, worsened outcomes

Objectives

- To develop a flexible, policy-oriented, interactive model that will estimate the impact of specific cancer therapies on overall family OOP costs within the US healthcare system that:
  - Is based on credible publicly available data
  - Models various scenarios of financial assistance from outside sources, such as non-profit organizations that help patients pay for treatment
  - Can be applied to multiple cancers and can be updated as new data become available

Model Structure

- A general model structure was developed that traces the flow of patients along pathways of a decision tree (**Figure 1**)

- The main outcome was defined as the percentage of patients seeking treatment who could potentially leverage one or more payment sources to access or pay for treatment without spending more than a pre-specified percentage of family income

- This threshold was defined as the economic burden threshold (EBT)

- The time horizon is 1 year and is based on the 2006 US population, with costs/incomes reported in 2007 USD

Figure 1. Conceptual model diagram
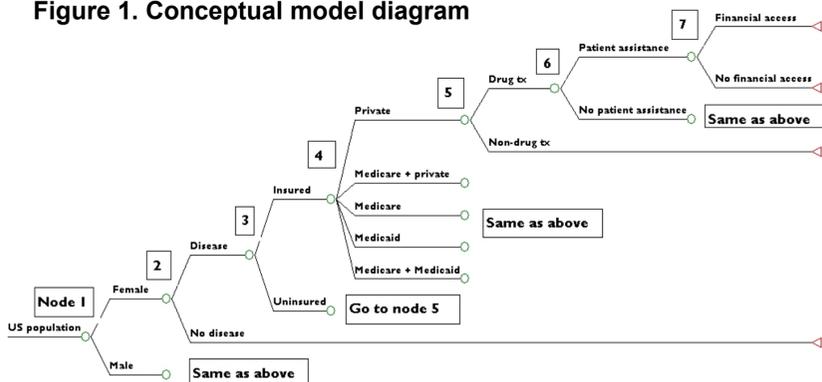
- Patients can be stratified by insurance status, payor, benefit design, and eligibility for patient assistance programs

- The tree ends with the percent of patients projected to spend less than the EBT after adding the cost of a new treatment to their pre-existing OOP spending

- A review of the literature identified 11 articles related to high OOP burden or underinsurance,* with 7 defining an EBT threshold as 10% of household income spent on OOP on healthcare, and 4 defining this threshold as 5% of household income for households with family income under 200% of the Federal Poverty Line (FPL) and 10% for households with family income of 200% of FPL or more

- The more conservative definition was used in the model as the EBT

- The 2007 FPL for a family of 4 with 2 children was $21,027[6]

Data Inputs

- Data sources identified as representative of the target patient population and containing variables of interest were:
  - The Surveillance, Epidemiology, and End Results (SEER) database
  - The Medical Expenditure Panel Survey (MEPS)

- SEER and MEPS were compared to other data sources (Global Oncology Monitor Survey, Supportive Oncology Services Survey, US Census, Kaiser Foundation Survey) with respect to age (**Table 1**), income (**Table 2**), and payor type (**Table 3**)

Table 1. Age distributions among different data sources

	GOM*	SEER	MEPS	SOS*
<45 years	17%	5%	10%	15%
45 to 54 years	28%	16%	17%	29%
55 to 64 years	28%	25%	21%	27%
65+ years	27%	54%	52%	29%

* Global Oncology Monitor (GOM) and Supportive Oncology Services (SOS) surveys focused on community oncology practice setting

Data Inputs, cont.

Table 2. Income distributions among different data sources

	US Census	MEPS	SOS*
Low (<200% FPL)	31%	26%	36%
Middle (200-399% FPL)	27%	31%	28%
High (400%+ FPL)	42%	44%	36%

*Denominator is those with known household income; includes early and late stage

Table 3. Payor distributions among different data sources

|	Kaiser*	MEPS	SOS**
Medicare only	14%	18%	25%
Medicaid only	—	2%	—
Private only	59%	41%	65%
Medicare & Medicaid	—	3%	—
Medicare & Private	—	29%	—
Other	—	2%	<1%
Uninsured	16%	6%	<1%
Medicaid, Duals & Other	12%	—	6%

*Based on the general population, not individuals with disease of interest
**Denominator is those with known payor; sites did not identify supplemental for Medicare

Model Outputs

- A sample graphic of the model output before introduction of the therapy of interest provides a breakdown of the proportion of patients below EBT as well as the relative size of each of the payor groups and the uninsured (**Figure 2**)

- Patients with insurance (public or private) account for 94.2% of the total patient population, with 53.6% having public insurance and 40.6% having private insurance

- Before the introduction of the cancer therapy of interest, 75.0% of all patients had OOP expenditures below the EBT, with 65.1% of patients with public insurance and 90.1% of patients with private insurance below the EBT

- The uninsured account for 6% of the total population, with 60.7% below the EBT

Figure 2. Financial access before introduction of new therapy
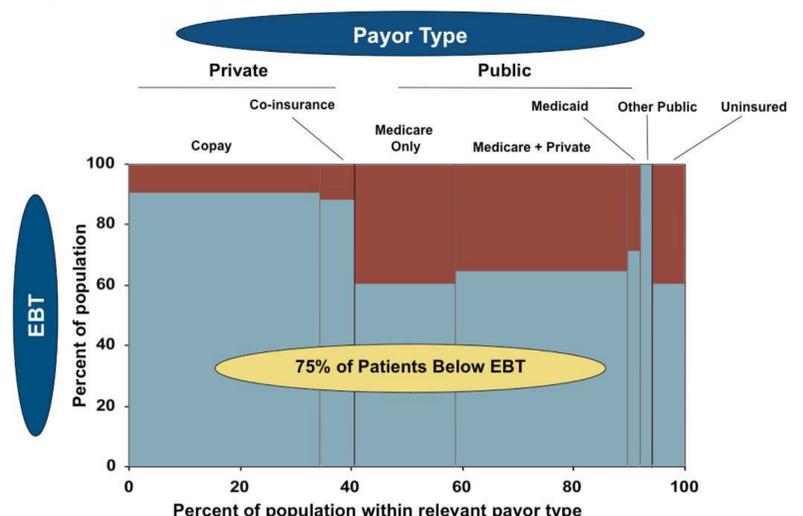
EBT – Economic burden threshold

Limitations and Conclusions

- The current model provides a systematic approach to estimating the burden of total family OOP healthcare expenditures in the US healthcare system

- Although this policy-oriented, interactive model is based on a systematic approach and incorporates representative data, there are limitations:
  - Uncertainty around the definition of high burden — the definitions of financial access used in the model may not reflect cancer patients' true willingness to pay for treatment
  - Data gaps as to the specific cost-sharing requirements for each of the payor types, the number of patients not receiving treatment because of financial barriers, and the number of patients who are aware of the patient assistance programs
  - No inclusion of indirect costs related to treatment resulting in OOP expenses, such as transportation, parking, and housing.

- Next steps include adding individual drugs to this baseline platform and estimating the incremental impact on OOP expenditures, additional analyses with Medicare specific datasets to identify the key drivers for the higher patient cost-sharing, evaluation of impact from changes to benefit design, and expansion into multiple disease areas

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*Additional references mentioned under Model Structure are available from authors.