

Building an Out-of-Pocket Cost (OOPC) Calculator for Medical Expenses using the Medical Expenditure Panel Survey (MEPS)

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ABSTRACT

Shopping for health insurance can be difficult for consumers. How do you weigh up all the different premiums, copayments, coinsurance, deductibles, and maximum out-of-pocket payments, along with the unpredictability of your future health care needs? Healthcare.gov has an out-of-pocket costs (OOPC) calculator for consumers on the federally-facilitated exchange to use. However, if an employer or other entity wanted to replicate the OOPC calculator for their employees to use to compare health insurance plans it would be expensive as healthcare.gov uses a commercial claims database as the basis for its estimates. I sought to find a suitable publicly available and free data source that could be used as the basis for an OOPC calculator. The Medical Expenditure Panel Survey (MEPS) is administered by the Agency for Healthcare Research and Quality (AHRQ) and provides nationally-representative estimates of health expenditure and utilization for the noninstitutionalized, nonmilitary population of the United States. MEPS data is free and publicly available and could be the basis for an OOPC calculator. This paper tests the viability and suitability of MEPS data for this purpose by comparing a MEPS based calculator to the OOPC calculator on healthcare.gov¹.

INTRODUCTION

It can be difficult for consumers shopping for health insurance to compare plans. The same issues arise whether you are choosing between options provided by your employer or shopping for a plan on the federally-facilitated exchange (healthcare.gov). The main piece of information available for health insurance plans is the health insurance premium. However, this does not tell the whole story and is not a good basis for choosing a plan. Aside from different premiums, plans can have different cost-sharing characteristics: copayments, coinsurance, deductibles, or maximum out-of-pocket payments. In addition, copayments and coinsurance can vary across different types of services and even different drugs. An estimate of expected out-of-pocket costs (OOPC) for each plan would help consumers compare plans. A combination of the premium for each plan and the corresponding expected OOPC would give consumers a better estimate of the total amount of money they will have to pay for their health care in the coming year and make it easier to choose a suitable plan. OOPC calculators like this exist, for example, on healthcare.gov, the official site of the Affordable Care Act, where consumers can purchase health insurance on the federally-facilitated exchange. On healthcare.gov consumers can choose from an array of plans that are labelled Platinum, Gold, Silver, and Bronze based on the plan benefit package (PBP), the associated cost-sharing structure, and the anticipated share of health care costs that the consumer will be responsible for. However, the OOPC there uses health care utilization and cost data from a commercial claims database (the database includes employer-based health insurance plans with 50 million members) as the basis for its estimates and therefore would be expensive for an employer or other entity to replicate. I sought to find a suitable publicly available and free data source that could be used as the basis for an OOPC calculator. A resulting calculator could be used to compare any set of health insurance plans, say, those offered to employees of a large corporation or university, or in any health insurance marketplace, including state-based marketplaces. The Medical Expenditure Panel Survey (MEPS) is administered by the Agency for Healthcare Research and Quality (AHRQ) and provides nationally-representative estimates of health expenditure and utilization for the noninstitutionalized, nonmilitary population of the United States. MEPS includes data from approximately 35,000 individuals each year. MEPS data is free and publicly available and could be the basis for an OOPC calculator. This paper tests the viability and suitability of MEPS data for this purpose by comparing a MEPS based calculator to the OOPC calculator on healthcare.gov.

It is important to note that the purpose of this OOPC calculator is to provide a tool to compare plans and not to predict future health care needs and the associated costs. The value of the calculator is that it can simplify the complex cost-sharing structure of the PBPs to facilitate the comparison of multiple health

insurance plans. The large variation in the healthcare needs of individuals makes predicting future utilization very difficult and any attempt to do it with precision would involve a complex model based on a detailed medical history. Fortunately this level of precision is not needed to compare plans. A rough estimate of health care utilization, maybe one based on the past year, can yield OOPC estimates that illustrate the differences in cost-sharing across plans and can be combined with the corresponding premiums to allow the consumer to make a more meaningful comparison of plans. Estimates based on higher and lower utilization can be calculated to explore different scenarios and guide decision-making. An OOPC calculator can be a valuable tool for a consumer trying to find the plan that is most suitable for them and their family.

METHODS

In order to estimate the out-of-pocket costs a consumer will pay based on any health insurance plan you first need to estimate a person's future utilization of each type of health care service and the associated costs. This could include doctor visits, laboratory tests, drug prescriptions, and inpatient hospital stays. Then you apply the plan-specific cost-sharing characteristics to each of the expected health care services/events in order to estimate the amount that the consumer will pay and combine the payments from all services/events to estimate the consumer's total responsibility or the total OOPC. I used the MEPS data for 2013 and restricted the population to those aged under 65 in order to focus on consumers purchasing insurance on healthcare.gov or in the private, non-Medicare market.

MEPS is a set of large-scale surveys of families, individuals, and their medical providers across the United States. According to AHRQ, MEPS is the most complete source of data on the cost and use of health care and health insurance coverage available in the US. MEPS collects data on the specific health services that Americans use, how frequently they use them, the cost of these services, and how they are paid for. MEPS collects data from a sample of families and individuals in selected communities across the United States, drawn from a nationally representative subsample of households that participated in the prior year's National Health Interview Survey (conducted by the National Center for Health Statistics). Data from medical providers is used to supplement information received from families and individuals. MEPS has separate event files for prescribed medicines, dental visits, hospital inpatient stays, emergency room visits, outpatient visits, office-based medical provider visits, home health, and other medical expenses.² The dental and home health files were not used in this analysis as dental visits and home health services are not covered by the majority of plans on healthcare.gov and are often not covered by private insurance plans. Other items excluded from the analysis were glasses, contact lenses, hearing devices, home renovations, and any event with \$0 as the paid amount. MEPS data includes both charges and payments for each event. Paid amounts were used in the analysis as they better reflect the costs that cost-sharing payments are based on. MEPS provides weights for each individual in the sample that can be used to calculate nationally representative estimates.

When health insurance plans construct PBPs there can be a lot of variation in the coverage of services and in the cost-sharing arrangements across services. For example, a patient may pay a fixed amount towards inpatient facility charges for each day of their stay, while they have a \$30 copayment for a doctor's office visit, pay 20% coinsurance for outpatient surgery, and pay 100% for non-covered chiropractic services. Therefore, it was necessary to construct health care domains to account for these variations. The health care domains are detailed in Table 1 below.

Domain	Definition
Inpatient facility charges	“room rate” and other charges excluding separately billed physician charges
Inpatient professional charges	separately billed physician charges associated with an inpatient stay
Ambulance services	transportation by ambulance and associated costs
Chiropractor	office-based chiropractor visit
CT scan or MRI	outpatient or office-based CT scan or MRI
Diagnostic cardiology	outpatient or office-based EKG
Dialysis	outpatient kidney dialysis
Durable medical equipment	orthopedic items, disposable supplies etc.
ER facility charges	charges excluding separately billed physician charges associated with an ER visit
ER professional charges	separately billed physician charges associated with an ER visit
Optometrist	office-based optometrist visit
Chemotherapy	outpatient chemotherapy
Laboratory testing	office-based laboratory testing
Mental health	office-based psychotherapy/mental health counseling
Outpatient facility charges	charges excluding separately billed physician charges associated with an outpatient visit
Outpatient professional charges	separately billed physician charges associated with an outpatient visit
Preventative care	immunizations, screenings etc.
Primary care	office-based family practice/general practice/pediatrician visit
Rehabilitation	outpatient or office-based rehabilitation
Specialty care	office-based not family practice/general practice/pediatrician visit
Outpatient surgery	any outpatient procedure
Ultrasound	outpatient or office-based ultrasound or sonogram
X-ray	outpatient or office-based x-ray
Prescription drugs	all non-specialty drugs
Specialty drugs	all drugs, 30 day supply > \$2,000
Other	all other care

Table 1. Health Care Domains for Out-of-Pocket Cost Calculator

While it was not possible to fully replicate the health care domains used on healthcare.gov due to differences in the available data the MEPS domains were matched as closely as possible. For example, the OOPC on healthcare.gov has separate domains for generic and branded drugs but it was not possible to identify branded drugs in MEPS data.

When a consumer visits healthcare.gov they select age group, sex, and an estimate of health care needs (low, medium, or high) for each member of their family. Following this model, all of the events were divided into groups based on age and sex. The age groups used were: 0-5, 6-17, 18-25, 26-34, 35-44, 45-54, and 55-64. Weighted averages of the frequency and cost for each event group/domain for all of the age/sex groups were calculated. These weighted averages were compared with the estimates used in the OOPC calculator on healthcare.gov.

In order to calculate OOPC estimates from the MEPS data individuals were then divided into deciles based on their total health care costs. Similar to healthcare.gov, deciles were chosen to represent low, medium, and high health care utilization. Plan cost-sharing characteristics for each plan on healthcare.gov were then applied to the costs associated with typical utilization within each domain for each age/sex/low/medium/high group to give an OOPC estimate for each group for each plan.

RESULTS

Despite the differences in the data fields available compared to the commercial claims database used by healthcare.gov the MEPS data provides sufficient detail to construct a viable OOPC calculator. This calculator can be used in combination with PBPs to estimate to a consumer's total outlay, premium plus OOPC, and facilitate the comparison of multiple plans a consumer is choosing between. In addition, the average healthcare costs by age and sex group for MEPS data were broadly similar to those used for the OOPC calculator on healthcare.gov across the health care domains. Overall utilization patterns are similar in the two data sources. Costs for children aged 5 and under are higher than those aged 6-17, likely due to newborn complications. Health care is more expensive in older females and increases with age, likely due to obstetrics and gynecology services. Conversely, health care costs for males hits a low in the 18-25 age group before steadily increasing with age. The 2013 MEPS sample included 32,712 individuals, see Table 2 below for a breakdown by age and sex.

Age	Female (%)	Male (%)	Total (%)
0-5	1633 (5.0)	1693 (5.2)	3326 (10.2)
6-17	3555 (10.9)	3518 (10.8)	7073 (21.6)
18-25	2150 (6.6)	2127 (6.5)	4277 (13.1)
26-34	2448 (7.5)	2192 (6.7)	4640 (14.2)
35-44	2515 (7.7)	2179 (6.7)	4694 (14.4)
45-54	2491 (7.6)	2232 (6.8)	4723 (14.4)
55-64	2167 (6.6)	1812 (5.5)	3979 (12.2)
Total	16959 (51.8)	15753 (48.2)	32712 (100)

Table 2. Medical Expenditure Panel Survey, Aged Under 65 - Age by Sex, 2013

CONCLUSION

MEPS data provides a viable framework for the construction of an OOPC calculator due to the level of detail in the MEPS event files. Though unable to fully replicate the health care domains used for the calculator on healthcare.gov the MEPS data can match much of the complexity of the PBPs. The inclusion of Medicaid recipients in MEPS means that the MEPS population is a little more similar to the populations served by federal or state-based exchanges than it is to a fully employer-based population, however, for the purpose of facilitating a more meaningful comparison of plans it is suitable for both populations.

The OOPC calculator based on MEPS data yields comparable results to a calculator based on commercial claims even though it is based on a much smaller sample. The similarity of the results is evidence that MEPS data is a suitable basis for a health insurance OOPC calculator. It is worth noting that the commercial claims database uses MEPS as the basis for its weights and while it is likely than any effect this might have on the similarity of the results is minimal it is likely that this would work in favor of MEPS.

Therefore, MEPS is a viable and suitable alternative to a commercial claims database for the development of a health insurance OOPC calculator, and it's free! There are many possible applications for this finding. Any state running its own health insurance exchange as part of the Affordable Care Act

could construct its own OOPC without having to purchase a large commercial claims database. Similarly, any employer that offers multiple health insurance options to its employees could construct an OOPC for the employees to use to help them compare plans.

REFERENCES

1. HealthCare.gov. Accessed October 5, 2017. <https://www.healthcare.gov/>.
2. Agency for Healthcare Research and Quality. "Medical Expenditure Panel Survey". Accessed October 5, 2017. <https://meps.ahrq.gov/mepsweb/>.

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