Methodology for Estimating the Extent of Financial Protection Afforded by Employer-Sponsored Private Health Insurance Plans

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Funded by the Commonwealth Fund, Watson Wyatt Worldwide (WWW) and the Health Research and Educational Trust (HRET) have been analyzing the financial protection afforded by employer-sponsored health insurance plans across states and firm sizes. This analysis draws on HRET health plan surveys for 2001 and 2003, Medical Expenditure Panel Survey-Insurance Component (MEPS-IC) data for 2002, and the MEPS Household data for 2000. Prior to simulating the health plan expeditures and member out-of-pocket costs, each of these databases were scrutinized to ensure that all of the necessary data elements are present and reasonable.

This paper describes the data preparation that has been performed on the above databases, as well as the logic that Watson Wyatt used to simulate payment of medical claims. Because simulations are performed across three different years, hundreds of counties, and four types of plan designs, it was necessary to calibrate the medical charges to realistic levels prior to the simulation. This paper summarizes the logic used in this calibration process as well as several assumptions that have significant impact on the valuations.

HRET and MEPS-IC Survey Edits

To simulate the payment of medical claims, we need complete information on fundamental plan designs and member cost-sharing provisions. This section describes the review process and resulting edits/imputations that were performed on the HRET and MEPS-IC health benefits surveys. Unless otherwise noted, the discussion and tables refer to preparation of data from the HRET surveys. The process of preparing MEPS-IC data was generally very similar unless otherwise noted and discussed. Tables summarizing the effects of MEPS-IC data preparation have not been released from the Census Research Data Center.

I. Classification of Plans Prior to Edits and Imputations

Our first step in processing the plan data is to classify plans according to whether they are HMO, POS, PPO or conventional plans. This information is collected in the HRET surveys, but the MEPS-IC did not ask this question directly. Consequently, it was necessary to first identify plans that offered both in-network and out-of-network services, and then classify those with a gatekeeper as POS plans and other network-based plans as PPO plans. Conventional plans were identified as those with full access to all providers and HMOs were identified as those with access to only a limited provider panel. We did not distinguish exclusive provider organizations (EPOs) from HMOs.

We then identified the types of member cost sharing provisions included in each plan, using this information to direct subsequent data edits and imputations. When a coinsurance is reported for office visits, for example, we check for the existence of a member coinsurance percent and an out-of-pocket maximum. When a response indicates that copays are collected for office visits, we check for a reasonable value on the physician visit copay field. We impute values that have been reported as "don't know" or missing, and adjust values that seem unreasonable.

The plans were classified for imputation purposes based on the following possible responses regarding cost sharing for an office visit with a preferred provider:

a) **Copay plan –** Most of these are traditional copay plans with no other cost sharing requirement for an office visit. Some plans with an office copay also report a non-zero deductible, which must be met before a copay may be collected. In any case, a missing copay amount is flagged for imputation, but no deductibles are imputed since they are not expected to accompany a copayment.

b) **Coinsurance only plan –** These are traditional coinsurance plans that do not require copays. Such a cost sharing arrangement typically includes a deductible and out-of-pocket maximum, and if any of these three provisions are missing, they are flagged for imputation.

c) **Copay and Coinsurance plans –** These plans claim to collect both copay and coinsurance for an office visit. While this is plausible, it is highly unlikely that a plan would impose a deductible, a copayment, *and* coinsurance for the same service. We edit the data to allow only two of these three cost sharing provisions on any service. The logic is as follows:

- If a non-zero deductible is reported with only a copay or only coinsurance, no imputation is done.
- If a non-zero deductible is reported with both coinsurance and copay, the deductible will not be imposed in the simulation of payments.
- If a non-zero deductible is reported with neither coinsurance nor copay, only a coinsurance rate will be imputed
- Both a missing copay and coinsurance are imputed only when there is no deductible.

As with a traditional coinsurance plan, the presence of a coinsurance rate warrants an imputation of the out-of-pocket maximum as needed.

d) **Neither copay nor coinsurance plans –** These plans almost always report a non-zero deductible. Only one of 52 HRET plans in this category in 2000 failed to report a non-zero deductible. Since the deductible is the sole form of cost sharing for these plans, it is flagged for imputation when missing.

e) **Unknown** - Few plans fail to report any form of cost sharing. Little is known about these plans and cost sharing provisions are imputed based on the presence of a non-zero deductible and out-of-pocket max, and plan type in the absence of these provisions.

Table 1
Classification of HRET Plans by
Type of Cost Sharing, 2000 and 2003

Plan Structure	CON		PPO		POS		HMO		TOTAL	
	2000	2003	2000	2003	2000	2003	2000	2003	2000	2003
copay+coins	0	7	159	58	63	17	0	8	222	90
coinsurance	337	133	279	230	54	24	0	9	670	396
copay	0	50	573	871	491	398	727	599	1,791	1,918
neither	0	17	27	60	25	18	0	22	52	117
unknown	0	3	7	8	7	7	0	4	14	22
total	337	210	1,045	1,227	640	464	727	642	2,749	2,543

Note that Table 1 does not classify plans by the presence of a deductible. The presence of a deductible was not a criteria for purposes of imputation.

II. Cost Sharing Edits and Imputations

Once variables have been flagged for imputation, an appropriate value must be determined.

Coinsurance for Office Visits

Member coinsurance rates greater than 50 percent were edited and restated as 100 percent minus the reported rate. In other words, a reported member coinsurance rate of 80 percent would be restated as 20 percent. No plans were affected by this check in 2000 or 2003.

For those few plans where coinsurance was flagged for imputation, we imputed values to match the distribution of the non-zero observed values. Table 2 provides the frequency of this imputation, by plan type:

Table 2:
Frequency of Coinsurance Imputation by Plan Type and Year, HRET Surveys

	Conventional	PPO	POS	HMO	ALL
records imputed, 2000	3.3%	0.8%	0.6%	0.0%	**0.8%**
records imputed, 2003	4.3%	0.7%	0.9%	0.2%	**0.9%**

Copays for Office Visits

All office visit copay rates were checked to ensure that they did not exceed $100. If a reported copay exceeded this amount (i.e., it was more than two digits) we truncated the amount down to two digits. No plans were affected by this check in 2000 and 2003. For the small percentage of plans with a missing copay amount in 2000 and 2003, we imputed values to match the distribution of the non-zero observed values. Table 3 provides the frequency of this imputation, by plan type:

Table 3:
Frequency of Copay Imputation by Plan Type and Year, HRET Surveys

	Conventional	PPO	POS	HMO	ALL
records imputed, 2000	0.0%	0.9%	2.0%	1.0%	1.1%
records imputed, 2003	1.0%	0.7%	8.2% [1]	2.0%	2.4%

Converting Ranges to Point Estimates

The HRET 2000 survey collects out-of-pocket maximums and benefit maximums in ranges, but a single value is needed to simulate the payment of medical claims. The HRET ranges were used to group the values reported in our Comparison[2] database, and the Comparison mean was computed and rounded to the nearest $10 for each range. Table 4 lists the ranges and associated means:

[1] Note: This relatively high percentage reflects 38 plans, 32 of which responded in question F6 that a copay was collected for office visits, but failed to report the copay amount. The response to F6 for the remaining six plans is unknown, so these were flagged for imputation of copay amount since this is the most common type of office visit cost-sharing for POS plans.

[2] Comparison is a benefit survey of large employer plans that Watson Wyatt conducts each year. This survey was used to develop imputation logic and assumptions when similar detail was not available from the HRET surveys.

Table 4:
Mean Comparison OOP Maximum and
Lifetime Benefit Maximum by HRET Range

HRET 2000	**Comparison 2000**
Ranges for OOP Max	Mean Value
$999 or less	$610
$1,000-$1,499	$1,050
$1,500-$1,999	$1,540
$2,000-$2,499	$2,000
$2,500-$2,999	$2,520
$3,000 or more	$3,760
$9,999,999	9,999,999 (unlimited)
Ranges for Lifetime Benefit Max	Mean Value
$250,000 or less	$250,000
$250,001-$999,999	$632,140
1 million or more	$1,542,400
$9,999,999	9,999,999 (unlimited)

Deductibles

As with copays and coinsurance, the imputed values of the annual deductible are based on valid, reported values within the file. The reported values were first checked for reasonableness and no edits were performed. For example, only 6 of the HRET plans from calendar year 2000 reported annual deductibles greater than $1,000 and none exceeded $5,000.

In 2000, seven plans reported an annual deductible less than $50, which was considered the minimum reasonable value for this provision. The reported deductibles were multiplied by a factor of 10 until they equaled or exceeded $50. For example, a deductible of $1 and another reported as $10 are both restated as $100.

For the small percentage of plans flagged in 2000, we imputed values to match the distribution of the non-zero observed values in each imputation cell. No records were flagged for imputation of deductible in 2003.

Tables 5 and 6 present the frequency of deductible imputations in 2000 and 2003, as well as the percentage of plans with any imputation of a deductible, coinsurance or copay. In 2000 only 2.3% of the database had one of these variables imputed, and in 2003 3.3% of the records were imputed for at least one of these variables.

Table 5:
Frequency of Imputations on Copay, Coinsurance and Deductible (HRET 2000)

Plan Type	Plans	Coinsurance Imputed	Copay Imputed	Deductible Imputed	At Least One Imputed
Conventional	337	3.3 %	0.0 %	4.5 %	6.2 %
PPO	1045	0.8 %	0.9 %	0.3 %	1.8 %
POS	640	0.6 %	2.0 %	0.2 %	2.7 %
HMO	727	0.0 %	1.0 %	0.0 %	1.0 %
Total Plans	2749	0.8 %	1.1 %	0.7 %	**2.3 %**

Table 6:
Frequency of Imputations on Copay, Coinsurance and Deductible (HRET 2003)

Plan Type	Plans	Coinsurance Imputed	Copay Imputed	Deductible Imputed	At Least One Imputed
Conventional	210	4.3 %	1.0 %	0.0 %	5.3 %
PPO	1227	0.7 %	0.7 %	0.0 %	1.4 %
POS	464	0.9 %	8.2 %	0.0 %	9.1 %
HMO	642	0.2 %	2.0 %	0.0 %	2.2 %
Total Plans	2543	1.0 %	2.4 %	0.0 %	**3.3 %**

Out-of-pocket Maximum and Benefit Maximum

OOP Max, 2000

POS plans sometimes require coinsurance rather than copays. HRET collected both cost sharing provisions in 2003, but it did not did not collect out-of-pocket maximum for POS plans in 2000. Consequently, we imputed OOP maximums for POS plans in 2000 where coinsurance applies,

based on the level of OOP maximum reported by PPO and conventional plans in calendar year 2000.

An out-of-pocket maximum less than 1.5 times the deductible was considered unreasonable and flagged for imputation. In 2000, there were 12 such plans. There is a positive relationship between OOP maximum and deductible levels. To maintain this relationship in our imputation, the plans reporting values for deductible and OOP maximum were categorized by deductible amount as follows: $0, $50-$199, $200-$399, $400-$599, $600-$999, $1000+. Records requiring imputation of OOP maximum were categorized the same way, and an imputation calculation was performed within each category. Missing values were imputed to match the distribution of the observed values.

The frequency of the OOP max imputation (2000), as well as the cumulative effect with imputations to copay, coinsurance and deductible, is summarized in Table 7:

Table 7:
Frequency of Imputations on Copay, Coinsurance, Deductible and OOP Maximum (HRET 2000)

Plan Type	Copay, Coinsurance, or Deductible Imputed	OOP Max imputed	At Least One Provision Imputed
CON	6.2%	2.4%	8.6%
HMO	1.0%	0.0%	1.0%
POS	2.7%	15.0%	16.9%
PPO	1.8%	0.4%	2.2%
TOTAL	2.3%	3.9%	**6.1%**

Since the OOP maximum was not collected in 2003, it was imputed for all plans with coinsurance.

Adjustment to 2000 OOP MAX

The HRET 2000 survey asked all Conventional and PPO plans to report whether the OOP max included member cost-sharing associated with the deductible. If the plan reported that the deductible does not count toward the OOP maximum, we recalculated the OOP maximum as follows:

New OOP Max = OOPmax + deductible

The simulation logic then assumes that the plan's annual deductible is counted toward the revised OOP max. This edit, not shown in tables, affected 16% of all plans in 2000. No out-of-pocket maximums were both imputed and adjusted.

OOP Max, 2003

Because the 2003 survey did not include the out-of-pocket maximum or the question regarding whether or not the deductible counted toward it, plans from the 2003 data were selected for imputation of out-of-pocket maximums based on the presence of office or hospital coinsurance. To maintain consistency with 2000 data, 9% of plans reporting coinsurance were assigned an unlimited out-of-pocket maximum.[3]

Once flagged for imputation, plans in 2003 were categorized by deductible amount as follows: $0, $50-$199, $200-$399, $400-$599, $600-$999, $1000+; an imputation calculation was performed within each category, using the mean and standard deviation of all records within each range in 2000. Missing values were imputed, by deductible category, to match the distribution of the observed values.

Applying these maximums by deductible range to 2003 plans resulted in a 2% (weighted) increase in out-of-pocket maximum for all plans. The Comparison data show an 8% increase in out-of-pocket maximum between 2000 and 2003, based on 546 plans. The Mercer 2002 Study reports an increase in median in-network out-of-pocket maximum for PPO plans from $1,250 in

[3] While this is unusual, it is credible that smaller firms would not have a limit on out-of-pocket expense. Roughly 60% of the firms reporting coinsurance and unlimited out-of-pocket maximum had fewer than 200 employees, and 75% fewer than 1000 employees.

2000 to $1,350, an 8% increase. In light of these comparisons, imputed out-of-pocket maximums for 2003 were inflated to achieve an 8% trend from 2000 to 2003.

Benefit Max

Benefit maximums are intended to limit the plan's total liability, typically over the lifetime of the beneficiary. HRET did not collect a benefit maximum for POS and HMO plans in 2000, and the benefit maximum was missing for 17.5% of conventional plans and 11.4% of PPO plans. For each of these plan types, the majority of valid responses fall into the "million or more" category, consistent with the Comparison data[4]. Consequently, we imputed a benefit maximum of "one million or more" for all coinsurance plans that did not report a lifetime benefit maximum. Since no charges in the MEPS Household file approach this range, imputing these missing benefit maximums as "one million or more" will have little effect on the actuarial value of the plan.

Since benefit maximum was not collected in 2003, this provision is imputed for all plans using the same distribution that resulted for all plans in 2000: 87% in the "one million or more" range, 10% unlimited, 2% in the $250,001-$999,999 range, and only 1% as $250,000 or less.

Cost sharing for services other than office visits

Cost sharing for services other than office visit is determined as follows and reflects our best approximation of plan value:

- inpatient hospital copays are imputed in 2000 (collected in 2003);
- coinsurance for office visits is applied across all service categories, unless a separate hospital coinsurance was reported (2003) or a copay has been reported/imputed for that service category; and
- an emergency room copay was imputed if the plan reported an office visit copay.

Inpatient Hospital Coinsurance

In 2003 HRET collected separate hospital coinsurance for all plan types, but this question was not asked in 2000. In the majority of plans reporting office visit cost coinsurance for 2003, the

[4] Watson Wyatt COMPARISON Statistical Summary, 2001/2002, Watson Wyatt Worldwide, 2003.

hospital coinsurance rates are usually the same. The Comparison data confirm that plans with a coinsurance for office visits typically apply the same coinsurance to inpatient hospital and other services.[5] However, among plans *without* physician office coinsurance, 11% reported separate hospital coinsurance in 2003. Using the HRET 2003 data, together with trends observed in the Comparison data, we estimated the prevalence of hospital coinsurance for HRET 2000. In HRET 2000, 2.5% of plans without physician coinsurance were flagged for imputation of separate hospital coinsurance. The imputation of hospital coinsurance:

- Excluded plans for which a separate hospital copay was imputed (see next section);
- Included only plans already reporting an OOP maximum, to avoid further imputation of that variable;
- Excluded plans reporting a hospital copay/deductible, as these plans already had some form of inpatient cost sharing.

This imputation affected 48 plans in 2000. Values were imputed to match the distribution of non-zero observed values in 2000.

Inpatient Hospital Copays

HRET collected inpatient cost-sharing provisions in 2003, and 33.5% of the plans reported a per-admission copay. Since hospital copays were not collected in the 2000 survey, we used Comparison data to estimate the frequency of hospital copays in 2000. Table 8 stratifies Comparison plans for large employers (1000 or more employees) based on whether or not the plan imposes an annual deductible.

[5] Among Comparison plans reporting coinsurance for office visits and hospital stays, 98% in 2000 and 94% in 2003 reported the same rate for both services.

Table 8:
Percentage of Large Comparison Employers
Reporting Per Admission Hospital Copays, 2000 and 2003

Annual Deductible	Number of Plans		% Reporting Hospital Copay	
	comparison 2000	comparison 2003	comparison 2000	comparison 2003
YES	250	263	7.6%	8.4%
NO	408	409	**29.9%**	**31.1%**
TOTAL	658	672	21.4%	22.2%

The 2003 Comparison survey estimated 22.2% of plans had a per-admission copay, considerably lower than the HRET estimate of 33.5%, but Comparison used a consistent set of questions in both years and showed no major change from 2000 to 2003. Applying the Comparison trends to the HRET survey data from 2003, 32.2% of the HRET 2000 plans (885 plans) were assigned a separate hospital copay, to provide an appropriate progression to 33.5% in 2003.

The HRET 2003 survey reports 91% of the plans with separate hospital copays also have office visit copays. Additionally, this office copay is accompanied by an annual deductible one third of the time. So, imputed hospital copays are restricted in 2000 to plans with an office copay, with one third of the assignments to plans that had an annual deductible.

The office copay is used to determine the magnitude of the hospital copay. Plans reporting both provisions in HRET 2003 report a hospital copay that is, on the average, 13 times larger than the office copay.[6]

[6] It should be noted that this factor is determined after checking the reasonableness of the hospital copays reported in 2003. Any copay of $1000 or more is checked against the annual deductible and presence of coinsurance. If there is no annual deductible and coinsurance, it is credible that the plan would impose such a high level of cost sharing for inpatient stays. However, if the copay exceeds a non-zero annual deductible then it is more likely that the copay was misreported. In such a case, the copay is truncated to a reasonable amount (from $1000 to $100 per admission, for example). Five plans in 2003 were affected.

Emergency Room Copays

An emergency room copay amount was imputed for all plans reporting an office visit copay. To determine the various copay amounts, the relativity between physician office visit copays and emergency room copays was examined in the Comparison 2000 and 2003 databases. The data revealed that the average emergency copay was four times the average office copay in each year. We used this factor to estimate the emergency room copays from the HRET office copays.

Family deductible and out-of-pocket maximum

In 2000 HRET collected family deductible only for conventional plans. The family deductible was considered reasonable if it was no more than 4 times greater than that for single coverage. In 2000 and 2003, no plans reported a family deductible that failed this test. Family provisions other than the family deductible for conventional plans are not present in the 2000 HRET data.[7] A family out-of-pocket maximum was not collected in either year.

We have imputed family deductibles and out-of-pocket maximums by analyzing the Comparison database to determine the magnitude of these family provisions relative to the corresponding individual provisions. Based on 293 plans in 2000 and 308 plans in 2003 with a non-zero single deductible and a family deductible greater than that for singles, the family deductible is an average 2.4 times greater than that of single coverage in both years.[8] Based on 471 plans in 2000 and 486 plans in 2003, the ratio for out-of-pocket maximum is 2.1 in both years.

These ratios did not vary significantly by plan type. We used these relativities to estimate the family deductible and out-of-pocket maximum for each plan that had such a provision for individual coverage.

However, in simulating the payment of "medical claims" from the MEPS household file, *we do not simulate payment for families separately from individuals*.

[7] Note that the 2003 HRET data include family deductibles for conventional and HMO plans.
[8] Note that this ratio was not used for conventional plans where the family provision was collected and the family deductible was not more than 4 times greater then that for single coverage.

III. Prescription Drug Benefits: Edits and Imputations

The cost-sharing provisions for prescription drug benefits are reported separately from those for medical benefits, and we generally assume that they are not integrated with the other cost-sharing provisions of the plan.[9]

Just over three percent of the plans responding to the 2000 HRET survey indicated they did not include a prescription drug benefit and about one percent indicated they did not know whether such a benefit was offered.

Table 9:
Prevalence of Prescription Drug Benefits in HRET Plans

	2000	2003
Rx coverage	95.9	98.9
No Rx coverage	3.5	1.1
Don't know	.6	0.0
Missing	0	0
TOTAL	100 %	100 %

For plans reporting coinsurance for drugs, the reasonableness of the rate was checked and restated where applicable. If a member coinsurance rate exceeded 50 percent it was restated as 100 percent minus the reported rate if determined to be inconsistent. In other words, a reported member coinsurance rate of 80 percent for drugs would be restated as 20 percent. This edit affected 15 plans in 2000 and no plans in 2003.

Similarly, drug copay amounts were checked for reasonableness and restated where applicable. It a copay exceeded $50 it was flagged and checked relative to copays for the other tiers, and

[9] The exception to this is that some plans indicated prescription drug copayments count toward the overall plan out-of-pocket maximum. This is incorporated into our simulation logic, but it does not influence our data edits and imputations that are discussed in this section.

truncated when determined to be inconsistent. For example, a copay of $50 for generic drugs is checked against the tier two and tier three copays of $15 and $30, and then restated as $5. This edit affected three plans in 2000, and none in 2003.

The MEPS household "claims" database used for this project does not distinguish whether individual prescriptions were filled as generic, formulary or non-formulary. Consequently we used the following assumptions concerning the relative frequency of cost associated with each of these three prescription drug categories:[10]

Table 10:
Prescription Drug Utilization and Cost
Assumptions by Tier, 2000 and 2003:

	Percent of Fills	Mean Cost per Fill
2000		
1. Generic	38%	$15.14
2. Preferred	45%	$64.43
3. Non-preferred	17%	$47.67
	100%	
2003		
1. Generic	40%	$19.33
2. Preferred	45%	$84.33
3. Non-preferred	15%	$62.22
	100%	

Using these assumptions together with the prescription drug cost sharing provisions reported in the HRET surveys, we estimated a benefit rate for prescription drugs. This benefit rate was then applied at the person level to estimate the percentage of covered charges that would be paid by the health plan.

For those plans reporting don't know/missing on the prescription drug question, and for those that reporting a drug plan but failing to report complete cost-sharing details (10% in 2000, 2.5%

[10] Estimates of typical drug cost and utilization norms for calendar years 2000 and 2003 were furnished by Keith Weaver, a pharmacy benefit expert in Watson Wyatt's Minneapolis office. Almost all modern plans include a mail service option and about 15 percent of the pharmacy volume for the pre-65 population is delivered through mail service. These cost and utilization norms include adjustments for the mail service component of pharmacy benefit programs.

in 2003), we imputed blended drug coinsurance rates to match the distribution of the blended drug coinsurance rates computed as described above.

For the 3.5% of plans not offering drug coverage in 2000 (and 1.1% in 2003), the member coinsurance rate is set to 100 percent.

Finally, out-of-pocket prescription drug expense is applied to the plan deductible and out-of-pocket maximum only when:

- the drug plan is not carved out (as indicated by a negative response to questions C22, E21, F23 and D20);
- the cost-sharing for drug is coinsurance-based and the coinsurance rate is the same as for medical services. (This characterizes a "traditional" conventional plan.)

The 2002 MEPS-IC survey of health plans included an indicator for whether the plan included a prescription drug benefit, but no information regarding the member cost sharing provisions for prescription drugs. Considering that prescription drugs comprise a significant and growing share of overall medical costs, we used the HRET survey from 2003 to estimate plan-specific benefit rates for prescription drugs. This was done with a regression model that used various characteristics of the medical plan, including the medical benefit rate, medical cost sharing provisions, region, and plan type, to predict the percentage of covered prescription drug expense paid by the prescription drug plan.

MEPS 2000 Claims Preparation

I. Identifying the Covered Population

The MEPS household survey from calendar year 2000 provides the medical claimants used for simulating the health plan expenditures and the out-of-pocket costs that would occur for a cross section of adults under various employer-sponsored health plans. Only adults with employer provided insurance were included in the claims database. Exhibit 1 summarizes how various

categories of individuals in the MEPS survey population were included or excluded from the MEPS file used in simulation:

Exhibit 1:
Classification of Individuals in the 2000 MEPS-HC File

MEPS – HC DATABASE	RECORDS REMAINING	POPULATION REMAINING	COMMENTS
Begin with entire file.	**25,096**	**278,405,516**	
Drop all who do not have employer-sponsored health insurance.	13,761	167,861,943	Identify policyholders and attempt to match each dependent to the highest earning policy holder by whom they are covered.
Remove: • **118 people who cannot be associated with a policyholder within the file;** • **607 policy holders age 65+ and their 232 associated dependents;** • **45 dependents age 65+ who are associated with policy holders under 65.** **Assign each individual the weight of their policy holder.**	12,759	153,112,805 people	If collapsed to the contract level: • The resulting 6,495 records would represent 81,120,201 contracts • Contracts would be 44% family (assuming no double coverage), 56% individual. • Average insurance family size (excluding units consisting of a single individual), would be 3.11.
Drop children.	9,519	116,974,484 adults	Separate files maintained for persons and families, but simulation will focused on adults.

II. Charge Calibration

MEPS household data provides data on expenditures and utilization for the following services, which were included in this simulation:

- hospital inpatient care
- emergency room and other outpatient care

- office based visits to physicians, physician assistants, chiropractors, nurse practitioners, optometrists, physical/occupational therapists
- prescription drugs
- home health and other medical supplies/equipment

Dental services, long term care and administrative costs were not included. MEPS expenditure variables were combined into higher level service categories, both for the purposes of paying claims under various plan provisions, and for calibrating charges to benchmarks developed from the National Health Accounts.

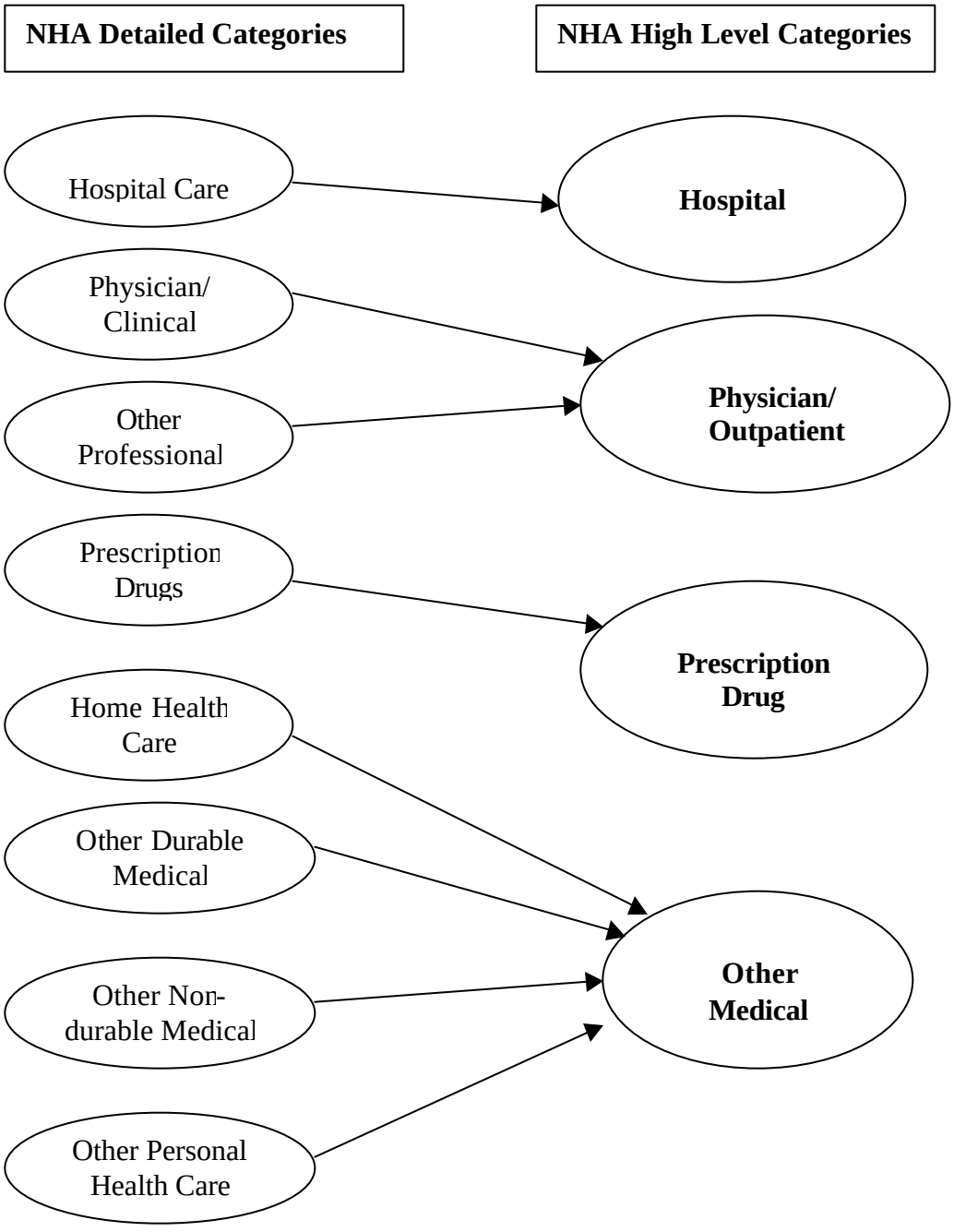
In order to simulate the payment of claims in various years of interest, we must first calibrate the MEPS "claims" for the pre-65 adult population. Benchmarks for total acute care and for particular service categories are used to calibrate the medical claims database derived from MEPS 2000. Benchmarks for total acute care (and specific categories) are derived from the National Health Accounts, 2000-2003. NHA reports aggregate expenditures for the following ten service categories:

1. Hospital care
2. Physician and clinical services
3. Dental services
4. Other professional services
5. Home health care
6. Prescription drugs
7. Other non-durable medical products
8. Durable medical equipment
9. Nursing home care
10. Other personal health care

Dental services, nursing home care, and administrative costs are out of scope for our study, and are excluded from calibration benchmarks.

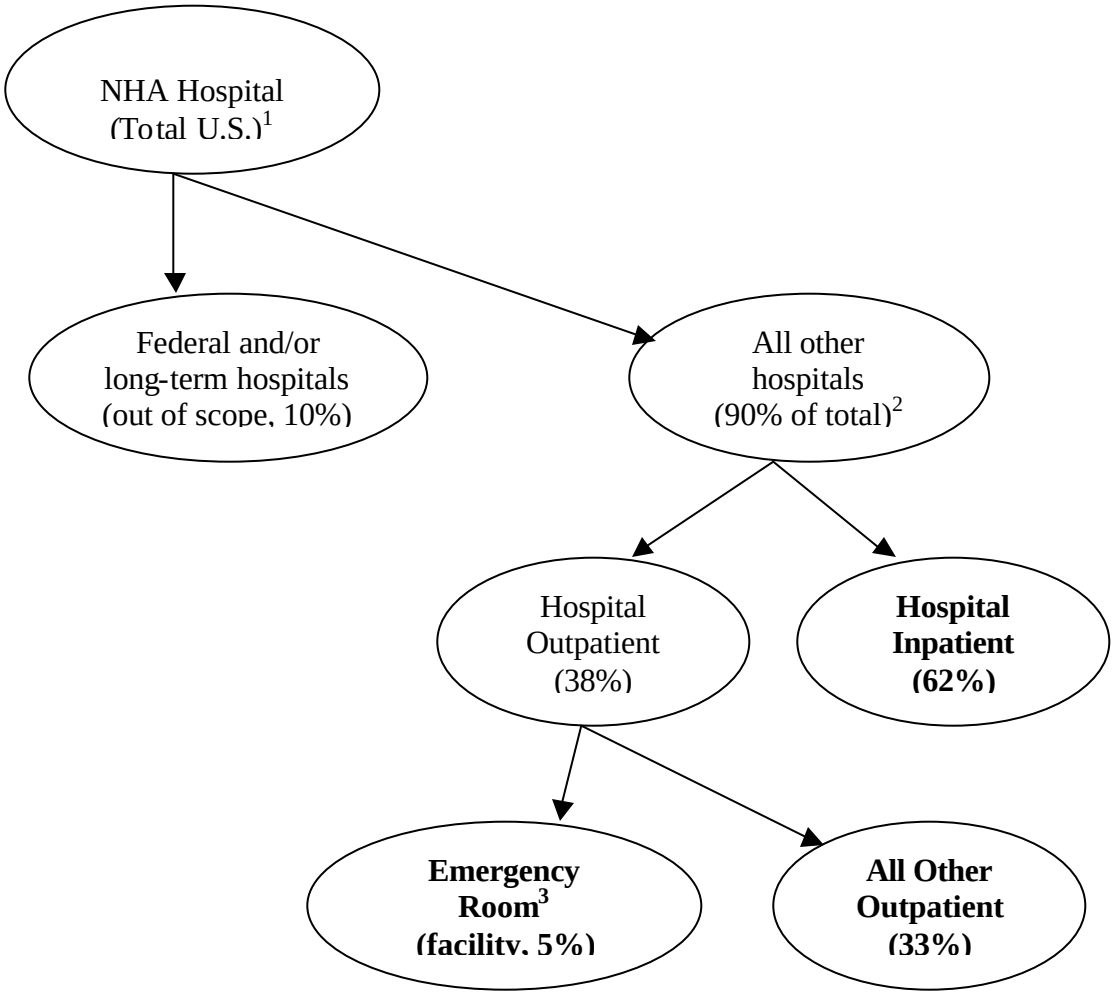
We derived per-capita expenditure estimates by dividing aggregate expenditures for each service category by the population estimates provided by CMS. This yields per-capita expenditures for all age groups. We then developed estimates of per capita spending for pre-65 adults using age-specific population estimates from CMS together with age-specific cost relativities developed from MEPS and other sources. The pre-65 per-capita expenditures are then aggregated into four higher level service categories as presented in Exhibit 2:

Exhibit 2:
Aggregation of NHA Expenditure Categories



Next, hospital expenditures are differentiated as shown in Exhibit 3.

Exhibit 3:
Allocation of NHA Hospital Expenditures
into Claims Payment Categories



[1]National Health Accounts include expenditures from federal and long term hospitals, including mental hospitals, which are not considered acute care medical services in MEPS. American Hospital Association statistics for total U.S. hospitals and non-federal, short-term hospitals are used to estimate the percentage of expenditures that are relevant to our study.

[2]Data from the American Hospital Association allow us to estimate the percentage of hospital net revenue attributable to inpatient vs. outpatient care. This percentage is used to allocate inpatient vs. outpatient expenditures from the NHA.

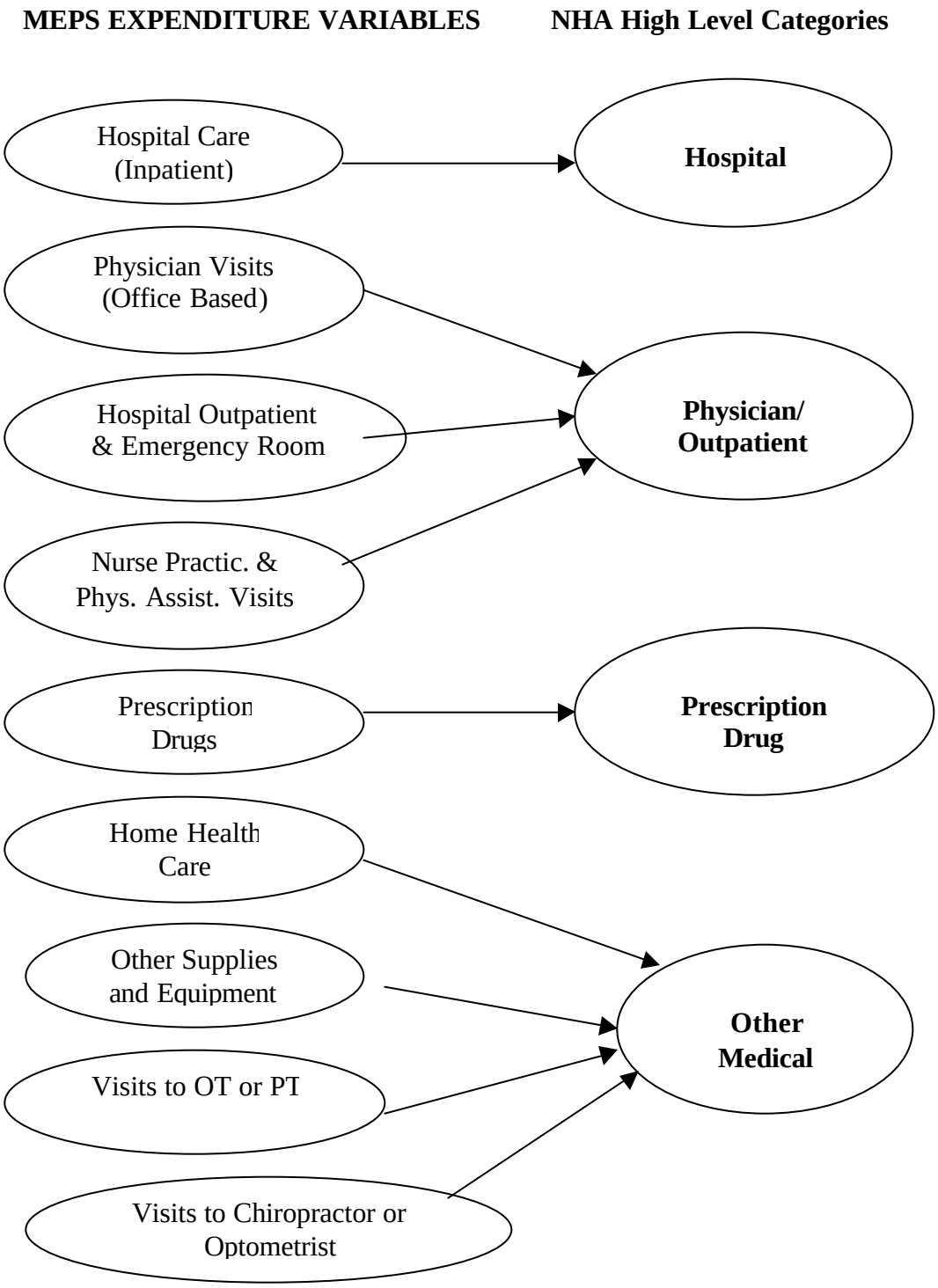
[3]Hospital emergency room expenditures are estimated as 7% of total hospital expenditures. MEPS data indicate that typically 75% of this amount is hospital facility expense, and 25% a separately billing physician. This 25% is not included in the hospital category, but is recorded and recombined with emergency room facility charges later. Once the emergency room facility expense is determined, the remaining outpatient charges are classified as "all other outpatient".

At this point, the classifications for prescription drug, other medical, and hospital facility (inpatient, outpatient and emergency room) are complete. The remaining dollars are reclassified as follows:

- Inpatient physician expense is estimated using the ratio of inpatient facility expense to inpatient physician expense observed in the MEPS 2000 data;
- Inpatient physician expense is then subtracted from the total physician expense and combined with the inpatient hospital facility expense to derive the total hospital expense;
- The remaining physician outpatient dollars are combined with emergency room facility and outpatient facility expense and identified as physician/outpatient.

The following exhibit shows the mapping of MEPS expenditure variables into the four broad expenditure categories that were used for benchmarking expenditures to National Health Accounts.

Exhibit 4
Mapping of MEPS Expenditure Categories
for Purposes of Benchmarking to NHA Categories



The MEPS household expenditures for pre-65 adults were then calibrated to the benchmarks derived from the National Health Accounts, totaled for all service categories, and used as the basis to estimate a national average single adult premium. The resulting premium estimate was then compared with the national average premium from the HRET survey, which was almost 3 percent lower than the premium estimated from NHA. Consequently, the calibrated MEPS expenditures were reduced by this factor to align with the average premium reported by HRET.[11]

The final calibration factors that were applied to the MEPS household expenditure data are presented in the following exhibit along with the average total expense for pre-65 adults in 2000 and 2003.

Exhibit 5
Calibration Factors by Service Category for Years of Interest

Expense category	2000	2003
Hospital	1.372	1.850
Physician/Outpatient	1.778	2.408
Drug	1.114	1.834
Other medical	1.598	2.099
Mean covered expense/pre-65 adult	$2,517	$3,505

The MEPS household file, calibrated to the above calibration targets, serves as the "medical claims" database for simulation of plan medical expense and out-of-pocket expense.

Simulation Logic for Payment of Claims

The first step in the simulation program is to further calibrate the charges by type of plan and geographic location. The calibration process described above resulted in average covered charges of ~~$2,517~~ $2,606 in 2000 and ~~$3,505~~ $3,629 in 2003. Previous work by Watson Wyatt indicates that these underlying covered charges vary by plan design, reflecting the effects of

[11] Key assumptions in estimating the national average premium from NHA included the following: an average benefit rate of 85% and administrative costs equal to 12 percent of total premium.

various plan designs. Consequently, after determining the plan design, the simulation adjusts covered charges for each plan using the following adjustment factors:

HMO	POS	PPO	FFS
83.4%	91.9%	100.0%	114.8%

The simulation then checks the geographic location of the establishment offering the health plan and further adjusts the medical claims up or down using area cost factors derived from the Medicare Area Adjusted Per Capita Cost index reported in the Area Resource File. This adjustment occurs only for the MEPS-IC simulations and not in the HRET survey simulations.

We then simulate the payment of claims within each of the four service categories into which the MEPS household clams have been grouped for each adult. The general process is to evaluate one plan at a time, using the entire set of 9,519 adults to simulate payments for each plan. For each of these adults, the general logic of the simulation is as follows:

1. Simulate the payment of in-network covered medical charges. The simulation logic is as follows:
    - Allocate any deductible to service categories with covered medical charges.
    - Compute member out-of-pocket costs within each of the medical service categories, considering any deductible, coinsurance and copay related to the respective categories.
    - Constrain out-of-pocket costs with benefit maximums, if any exist.
    - Apply any benefit maximum.
2. Adjust the benefit rate to account for the utilization and plan design associated with out-of-network medical benefits. Neither the HRET survey data nor the MEPS-IC plan surveys include information about out-of-network plan provisions, so we analyzed Watson Wyatt's national medical claims database to determine the differential in plan medical benefit rates for in-network and out-of-network services. Our analysis indicated that out-of-network benefit rates are about 15 percent less than in-network benefit rates.

Our national claims database also allowed us to estimate the percentage of covered charges that are for out-of-network services under each plan type:

a.	HMO	2.7%
b.	POS	9.8%
c.	PPO	13.2%
d.	Conventional	91.6%[12]

These estimates of out-of-network covered charges and benefit rates allowed us to create adjustment factors to adjust downward the initial benefit rates that had been calculated for in-network plan provisions.

3. Estimate any additional out-of-pocket costs charges that are not covered charges, including out-of-network balance billing and in-network denied services. These charges that are not covered are only those associated with services normally insured by the medical plan. They include balance billing for out-of-network care where charges exceed fee limits, and charges for in-network services that the medical plan deemed not medically necessary. The assumptions for these estimates were developed after an analysis of Watson Wyatt's national claims database.

4. Estimate plan expense and member expense for prescription drugs. Unless otherwise indicated, we assume that prescription drug benefits are carved out and not subject to the other cost sharing provisions, such as deductibles and out-of-pocket maximums that apply to medical benefits.

5. After the total plan expense and OOP expense is calculated for each person, the results are summarized to the plan level using the person weights from the MEPS file to produce average covered charges, average OOP expense for covered charges and average total

[12] Our analysis found that even conventional plans provide some services through "in-network" providers. These are sometimes called "silent PPOs" because preferred providers are not identified to plan members. This distinction is ignored in our simulation of conventional plan benefit rates, because we made no adjustments to conventional plan benefit rates for services delivered through silent PPOs.

OOP expense including uncovered charges. Using these summary figures, we also calculate the benefit rate as the percentage of total medical and drug expense that is paid by the health plan.

We do not address pre-existing conditions and waiting periods, estimating plan benefits only for those employees eligible for full benefits. Although these plan limitations may have represented significant issues in the past, the Health Insurance Portability and Accountability Act greatly reduced the significance of any related member expenses.

The resulting estimates from our simulations have been compared with the member cost sharing levels identified in medical claims data and in Watson Wyatt's PreView Medical Benefits Model. These estimates are similar to those observed from these other sources.