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The Role of Consumer Copayments for Health Care: Lessons from the RAND Health Insurance Experiment and Beyond

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Medical expenses are one of the most important risks that American households face today. For almost 6% of U.S. families, for example, there is a more than a $5,000 increase in medical spending from one year to the next. As a result, most Americans insure their medical spending. Eighty-four percent of the U.S. population has health insurance, either from private or public sources.[1]

Health insurance plans have several common features. Individuals, or someone on their behalf (such as employers or the government), pay monthly insurance premiums, in return for which the insurance entity pays for some share of their medical costs. The share that is not paid by the insurer is the patient's "co-insurance" amount, and is borne by the individual. A central question for designing health insurance plans is: how large should such a co-insurance amount be? This question has been an important source of debate among both academics and health policy-makers.

There is a clear tradeoff as patient co-insurance amounts rise. On the one hand, co-insurance can induce patients to use care more efficiently. With no co-insurance costs, patients have no financial disincentive to forgo care, even if it is of dubious value; but once patients bear some of the economic costs of receiving medical care, they are more likely to use only those health care services that are worth the additional cost that they must pay. On the other hand, co-insurance amounts that are too high can lead individuals to avoid medical care which is actually necessary to their health and/or impose a substantial financial burden. Very high levels of co-insurance may undermine one of the primary reasons that people insure themselves in the first place – which is protection from financial ruin if they become seriously ill. Moreover, high co-insurance amounts place a financial burden on the poorest and sickest members of society.

Evaluating this tradeoff requires addressing several questions. First, to what extent do higher patient co-insurance charges reduce use of medical care? Second, to what extent is that reduction harmful in terms of personal health? Third, how do these effects vary by patient characteristics such as income and health status?

To obtain answers to these questions, researchers typically turn to the results of one of the most ambitious and important social experiments in U.S. history, the RAND Health Insurance Experiment (HIE). In the 1970s, the HIE randomly assigned several thousand families to insurance with varying levels of patient co-insurance, and then followed them over a five-year period to evaluate the effect on their medical utilization and health. The results of that study are still the gold standard for evaluating the answers to these questions. Yet these results are often misinterpreted to serve the interests of both sides in the health care debate. Those who favor more patient cost sharing highlight the conclusion from the HIE that for the typical person, co-insurance in a health plan did not adversely impact health. Those who favor less patient cost-sharing highlight the fact that for some populations, particularly low-income and less-healthy individuals, there were large negative impacts on health from introducing co-insurance.

[1] Medical spending fact from author's tabulations of Medical Expenditure Panel Survey (MEPS); health insurance fact from Employee Benefits Research Institute (2005).

The goal of this report is to cut through these conflicting interpretations of the RAND HIE to provide a comprehensive overview of what we learned from this ambitious social experiment. I also incorporate more recent evidence on the impacts of patient co-insurance, although that recent work is almost exclusively focused on prescription drugs. I discuss the clear conclusions that follow from these studies, and their implications for the design of health insurance plans. I conclude that a careful reading of the evidence from the HIE can guide one towards structuring health insurance in a manner which can achieve the gains of patient cost sensitivity while protecting vulnerable populations against risk.

Background: The Context and Structure of the HIE

The question of how patient co-insurance affects medical utilization has been a question of interest to policy-makers and researchers for many years. Initially, to address this issue, a series of studies compared the medical utilization and health of individuals having health plans with differing levels of patient co-insurance. But this work had a problem: individuals choose their health insurance plan, and thereby their level of co-insurance. Suppose that sicker individuals choose plans with low co-insurance, as seems likely. It would then appear that low co-insurance caused more medical utilization and worse health. But this would not result from the effect of the co-insurance; rather, it would simply reflect the choice of more generous insurance by sicker individuals.

In the wake of this unconvincing evidence, the federal government in the mid-1970s funded a massive social experiment to evaluate the impact of cost-sharing on demand. The HIE in 1974 began enrolling families in 6 locations around the U.S. Across all of these locations, 2,000 non-elderly families, containing about 5,800 persons, were recruited to participate.[2] Families who enrolled in the HIE were randomly assigned to plans with widely varying co-insurance and maximum out-of-pocket dollar expenditure (MDE) amounts. Five types of co-insurance arrangements were used: free care (no co-insurance); 25% co-insurance; 50% co-insurance; 95% co-insurance; and a deductible of $150/person, or $450/family ($600 and $1,800 in 2005 dollars, respectively) that applied to outpatient care only. For the plans with co-insurance, the MDE varied between 5%, 10%, and 15% of income, with a maximum of $1,000 ($4,000 in 2005 dollars). In other words, under all the plans, out-of-pocket expenditures never exceeded $1,000, no matter what the level of co-insurance was. All medical services were covered, although in some cases co-insurance rates were varied by service. Individuals were followed for up to five years after enrollment.

The key feature of this experiment was that individuals were randomly assigned to the various health insurance plans with differing co-insurance and MDE amounts. As with medical

[2] In addition to those age 62 and older, the following groups were excluded from participation: non-elderly people enrolled in Medicare; people with incomes greater than $25,000 (equivalent to $110,000 in 2006 dollars); people participating in the Social Security Income (SSI) Program; veterans with service-connected disabilities; people eligible for the military medical system; and people residing indefinitely in institutions that provide their medical care (e.g., nursing homes, prisons). See Newhouse (1993), p. 405, for details.

trials, randomization assures that individuals are, on average, the same across each of the different plans. This means that differences in utilization and health across the plans clearly reflect differences in patient costs, not differences in patient characteristics as with the earlier studies of co-insurance effects.

What Did We Learn?

The RAND HIE provided convincing evidence on a number of important questions about health insurance plan design. In this section I summarize the key lessons:

Lesson #1: The Co-Insurance Rate Matters for Medical Utilization and Expenditures

The HIE clearly documented a sizeable impact of the variation in co-insurance rates on medical utilization and expenditures. The results of varying the co-insurance rate are summarized in Table 1, from Manning et al. (1988). Each of the columns represents a different amount of co-insurance: moving from free care (no co-insurance), to 25% co-insurance, to 50% co-insurance, and then to 95% co-insurance. The final column represents the plan with the individual outpatient deductible.

The first row shows that the co-insurance rate is highly influential on the likelihood that an enrollee will use any medical care. While 86.8% of those in the free care plan used care, only 78.8% of individuals did so when faced with a 25% co-insurance rate. Utilization continued to fall as co-insurance rates rise, with only 67.7% of individuals using medical care with a 95% co-insurance rate. The effect of the individual deductible lies in-between the effect of the 50% and 95% co-insurance rates.

The next two rows show results for two measures of outpatient utilization: the number of face-to-face visits and total outpatient expenditures. Once again, there is a sizeable reduction in utilization as co-insurance rates rise. With a 25% co-insurance rate, outpatient expenditures are already about 25% lower than with no-coinsurance. Moving from a 25% to a 95% co-insurance rate lowers spending by another 22%. The deductible plan outcome looks similar to that for the 50% co-insurance rate.

The next several rows focus on inpatient utilization. In this case, the relationship between co-insurance and utilization is less clear. Inpatient utilization is lower with some co-insurance than with free care, but inpatient utilization is only modestly lower at a 95% co-insurance rate than a 25% co-insurance rate. Interestingly, the plan with an outpatient deductible (but no co-insurance for inpatient care) still features lower inpatient utilization and expenditures.

The final row shows the impact on total expenditures of varying co-insurance amounts. The table shows that total expenditures fell by 15% in the 25% co-insurance plan, and by 30% in the 95% co-insurance plan, relative to free care. Thus, there is no question that co-insurance rates matter for medical spending. Randomly assigning individuals to plans with higher co-insurance rates led to sizeable declines in medical utilization.

Lesson #2: Co-Insurance Effects are Relatively Constant Across Services

Another important finding from the HIE is that the effects of co-insurance are not limited to physician visits, but show up in all types of care, ranging from dental care to prescription drugs to mental health. Moreover, the degree of responsiveness was very similar across most categories; for example, the reduction in prescription drug spending was very comparable to the reduction in outpatient care spending, with similar percentage reductions from high co-insurance plans relative to the free care plan.

In addition, the reduction in utilization in response to co-insurance does not appear to be particularly discriminatory: it reduces the use of both effective and ineffective care by about the same amount. RAND carefully divided outpatient care into "effective" and "ineffective" categories, ranging from most effective use of medical care (e.g., treatment of bronchitis or pneumonia) to least effective use of medical care (e.g., treatment for constipation or malaise). The study found that both types of care were equally responsive to co-insurance. For example, there was a very large effect on antibiotic use, but this effect was equal where antibiotic use was appropriate (bacterial conditions) and where it was not (viral conditions). Similarly, RAND divided hospitalizations into those that were "appropriate" and "inappropriate" (based on evaluating which patients would benefit from hospitalization), and once again found very similar effects in both categories. The one notable exception to this pattern was emergency room care. Emergency room care was also price sensitive, with ER use in the co-insurance plans about two-thirds as high as that in the free plans; however, urgent ER use (such as a fracture) was less sensitive to co-insurance than less urgent ER use (such as a sprain).

Apart from this exception, however, the HIE found fairly non-specific effects of co-insurance relative to a free care plan: care of all types, effective/appropriate and ineffective/inappropriate, is reduced roughly equally. Moreover, the study also found significant reductions in preventive care, such as immunizations for children and pap smears for older women. This raises the important concern that co-insurance plans may adversely impact health while they save money.

Lesson #3: Higher Co-Insurance Rates Don't Have Adverse Health Consequences for the Average Person

Perhaps the most striking conclusion from the HIE is that while higher co-insurance rates lead to lower levels of both effective and ineffective medical utilization, they do not have an adverse impact on health outcomes for the average person.

A strength of the RAND analysis is the collection of an impressive battery of physiological measures of health, including measures of: respiratory system functioning (e.g., shortness of breath and chronic phlegm production); circulatory system functioning (e.g., ECG abnormalities and blood pressure); musculoskeletal system functioning (e.g., walking speed and grip strength); gastrointestinal system functioning (e.g., ulcers and dyspepsia); vision/hearing; endocrine system functioning (e.g., glucose and abnormal thyroid); other systems (e.g.,

hemoglobin); and health practices (e.g., weight/height index, lack of physical activity, smoking). In order to ensure sufficient power to detect small effects on these measures of health, the investigators compared those in the free care plan with all others in plans that have co-insurance at any level.

The results of this detailed analysis are clear: there are no "substantial benefits" from being on the free-care plan for the typical enrollee in the experiment (Newhouse, 1993). For few outcomes were there statistically significant differences between the free care and co-insurance plans, and those differences that existed were actually more likely to favor the co-insurance plans than the free care plan. For example, those on the free care plan saw a significant reduction in blood pressure and significant improvement in vision. At the same time, those on the free-care plan saw a rise in the severity of hay fever, dyspepsia, hearing, and thyroid abnormalities. This is not an implausible finding: it is certainly possible that excessive care under the free care plan was actually doing more harm than good. Extending the results to other domains of health measurement does not change this conclusion. For example, those on the free care plan were *more* likely to complain of painful medical symptoms than were those on the cost-sharing plan.

Given the mix of positive and negative results, the analysts of the HIE found it useful to summarize the results in two ways. One was to create general indices of health based on these physiological measures. There were no significant differences across the free care and co-insurance plans for any of these general indices. The other was to create a value for "predicted risk of dying," based on changes in health status. This index uses models of mortality to predict how changes in health impact the odds of death, thereby weighting much more heavily outcomes such as higher blood pressure than outcomes such as hay fever. Once again, however, there was absolutely no difference, on average, in the risk of dying between those on the free care and co-insurance plans.

This result is quite powerful. It suggests that, at least at the time of the experiment, the typical enrollee in the study was on the "flat of the medical effectiveness curve," the portion where additional care was not buying medically effective care. Thus, care could fall significantly without adverse health consequences for the average person.

Lesson #4: Differential Effects on the Sick and Poor

Even if co-insurance doesn't increase adverse health outcomes for the average person, it is possible that such effects could appear for the lowest income persons in the sample, for whom co-insurance might pose the highest financial barrier to care, or for the least healthy persons in the sample, for whom reduced medical care might be most harmful. Fortunately, the HIE oversampled low-income populations, and HIE analysts (as summarized in Newhouse, 1993) devoted considerable resources to separately analyzing effects on low-income groups and those in poor health.

The main conclusion from the HIE is that, for the person in average health, there are not very large differences between the poor and the rich in terms of utilization effects or health outcomes. As would be expected, lower income groups were somewhat more sensitive to co-

insurance for the use of outpatient care, but they were actually less sensitive in the use of inpatient care, and there were comparable effects on emergency room care and antibiotic use. Thus, averaging across all spending, the responsiveness of medical spending was actually somewhat larger for higher income groups.

This outcome is partly due to the fact that the out-of-pocket exposure of enrollees, through the MDE, was income related. The poor were much more likely to hit their out-of-pocket maximum, and, as discussed below, once individuals hit their MDE, they behaved very similarly to those in the free care plan. Thus, this study understates the differences in copayment effects between high and low income groups. This understatement may not be very large, however: for the outpatient deductible plan, where the costs were identical for both high and low income groups, there was little differential effect on their utilization.

For some types of use, however, there were noticeable differential effects on rich and poor. For dental care, there was a much larger reduction in visits in response to co-insurance among lower income groups than among higher income groups, although the effects on total dental expenditures were comparable. And for poor children there is a much larger reduction in effective care than in ineffective care: poor children in the co-insurance plan were only 56% as likely to get effective care as in the free plan, while higher income children in the co-insurance plan were 85% as likely to get effective care. For adults there is no differential effect on effective versus ineffective care between low and higher income persons.

For the typical poor person, however, there is once again no evidence that the reduction in utilization had an adverse impact on health. For both adults and for children, there is no systematic pattern of worse health in response to co-insurance for poor or rich families. This finding is surprising for children, and suggests once again that even the "effective" care reduced for this group did not have a discernable impact on their health.

The story is somewhat different when the data are divided into those at high and low risk of illness. For each of the physiological measures of poor health, the HIE divided the sample into those in the lowest 25% of individuals in that category (e.g., the at-risk group for blood pressure would be those in the highest 25% of blood pressures) and examined the impacts separately on those groups. Once again, the results across different domains of health were mixed, as for the general population. There was, however, a sufficiently larger effect on more significant health outcomes, such as high blood pressure: those in poor health were at a significantly higher risk of dying in the co-insurance plans than in the free care plan.

These differences are heightened when the data are divided further to examine those who are *both* low income (bottom 20% of the income distribution) and at risk (least healthy 25% of the sample). In particular, low income individuals with high blood pressure saw large declines in their blood pressure on the free care plan relative to the co-insurance plans, and low income/chronically ill individuals on the free care plan showed improvements in respiratory functioning and in vision and dental health relative to the co-insurance plans. These findings must be interpreted with some caution, as they are not statistically significant, but the effects are large enough to warrant concern. For example, the results indicate that low-income high-risk individuals saw a 14% rise in their predicted odds of death from the higher blood pressure under

the cost-sharing plans. For higher-income high risk individuals, the effects were more modest, but still notable, with a 6% rise in the predicted odds of death.

The lesson from the health outcome results is clear. For individuals who were not already high-risk, there was little benefit to health from free care. For high-risk individuals, however, particularly if they were low income, there were important benefits to health from free care.

Other Findings of Interest

The HIE was such a rich experiment that it produced a variety of additional findings that can inform the design of health insurance plans:

- Role of the MDE: RAND focused in particular on the utilization of those who approach and exceed their MDE during the year. They found that individuals exceeding this level increased their spending, although it remained below the spending of those on the free care plan. This suggests that the value of cost sharing is limited when applied to people with fairly high medical spending if out-of-pocket limits are in place. This is important because a substantial portion of total health expenditures are made by a relatively few people with high medical spending. Much of their spending may occur after they have reached insurance out-of-pocket limits.[3]

- No Offset Effects: One common rationale for low patient co-insurance is the existence of so-called "offset effects," whereby high co-insurance, by causing individuals to forgo efficacious preventive care, will raise costs through inappropriate care later on (particularly at the hospital). If this hypothesis were true, then we would expect to see that the outpatient deductible plan caused an increase in hospitalizations relative to the free care plan because the outpatient deductible plan discouraged outpatient care relative to the free care plan, while both plans had no cost sharing for a hospital stay. As Table 1 shows, however, this was not the case: inpatient utilization was actually lower under the outpatient deductible plan. There is no evidence for offset effects.[4]

- No Evidence for "Short Run Bias": One concern with the HIE results is that they only follow individuals for a limited period of time. If underutilization of effective care has long-run impacts on health not measured during this window, then it could understate the adverse consequences of co-insurance. RAND carried out a small test

[3] The MDE effects explain a potential mystery from Table 1: why are the effects of moving from free care to a 25% co-insurance rate roughly similar to moving from a 25% co-insurance rate to a 95% co-insurance rate, when the latter move seems much larger? The answer is that at the 95% co-insurance rate, many individuals hit their MDE, and thereafter have a co-insurance rate of zero. In fact, averaging across all expenditures, the actual co-insurance rate on average in the 95% plan was only twice as large as in the 25% plan, which is very consistent with the pattern of results in Table 1.

[4] There is no evidence for offset effects in the co-insurance plans either, but this evidence is harder to evaluate because those plans were raising the cost of inpatient care as well.

of this proposition by comparing individuals who were enrolled in the HIE for three versus five years. At least in terms of medical utilization, there was no important difference between these two groups, suggesting that the limited time frame was not an important issue.

Summary

In summary, the lessons from the HIE are very clear: higher co-insurance rates, with an out-of-pocket limit, can significantly reduce health care use without sacrificing health outcomes for the typical person. The results are surprisingly robust and hold across many subsamples of the data: rich and poor, sick and healthy, adult and child. The one clear negative impact on health occurs only for those who are at high medical risk, particularly if they are also of lower income. This effect, while not statistically significant, is very large, and suggests the value of considering targeted co-insurance approaches that minimize the costs to this group. Such approaches are described further below.

Of course, the HIE evidence is subject to at least three important limitations. First, this was only a short run study. Within the 3 to 5-year time frame of the study, free care did not produce measured benefits relative to the co-insurance plans, but for children in particular a longer follow-up may be required to find health effects (particularly given the reduction in preventive care in the co-insurance plans). Second, these effects only hold in a world of (often quite low) maximum limits to out-of-pocket medical exposure. There is now a large literature which consistently documents the enormous negative implications of being uninsured on health care outcomes. Uninsured individuals who face unlimited exposure to medical costs are no longer on the "flat of the curve": they are clearly forgoing care which matters in a real way for health care. The HIE also varied out-of-pocket limits by income, a feature typically not found in private insurance policies today.

Finally, the nature of medical care in the era of the HIE was very different than it is today. The past 30 years have seen enormous advances in treatment effectiveness for a variety of conditions, ranging from heart attacks to depression. This may imply that the care that is reduced in today's medical environment is more important for health outcomes than in the 1970s. At the same time, however, treatment in general has become much more expensive and intensive, so it could also be that the care that is reduced by cost sharing is still on the flat of the effectiveness curve. Thus, there is substantial uncertainty in extending the results of the RAND study to the 21st century.

More Recent Studies

As is clear from the discussion above, the RAND HIE was a phenomenally important study that has continued to influence the way we think about health care delivery thirty years later. Nevertheless, there are concerns about the applicability of the HIE in our new managed care environment. In this section, I therefore briefly review what we have learned since the HIE. Subsequent studies to the HIE have largely confirmed its conclusions on medical utilization responsiveness to prices for the non-elderly; if anything, they suggest effects which may be somewhat higher than those from the HIE. Unfortunately, however, there has yet to be a follow-up to the HIE which measures as effectively the impact of co-insurance on patient health.

There are relatively few studies on co-insurance effects for outpatient and inpatient care. Cherkin, Grothaus and Wagner (1989) studied the introduction of a $5 copayment rate for state employees enrolled in an HMO in Washington state in the mid-1980s, relative to federal employees; they find a sizeable reduction in office visits. Selby, Fireman and Swain (1996) examined the introduction of an emergency room copayment for some firms insured by the Kaiser Permanente HMO plan in the early 1990s, relative to a control group of those firms who did not see this copayment increase. They find a significant decline in emergency room utilization, with no evidence of adverse impacts on health. Eichner (1996) studied the impact on utilization in a fee-for-service plan, using the fact that adults in a family face different prices as injuries to their children push them above out-of-pocket cost-sharing limits, and he finds an elasticity of spending of -0.3 to -0.4.

There has been a larger literature devoted to estimating the effects of co-insurance for prescription drugs on utilization. Studies such as those by Goldman et al. (2004) and Landsman et al. (2005) find that prescription drug use is price sensitive, with low elasticities of around -0.1 for drugs used to maintain chronic conditions (such as ACE inhibitors or statins), but much higher elasticities of around -0.3 to -0.4 for drugs used for acute conditions (such as Cox-2 inhibitors for pain management).[5] A higher elasticity suggests patients are more likely to respond to increases in cost sharing by reducing utilization.

There is less work on the elderly, but a new study by Chandra, Gruber and McKnight (2006) finds that outpatient care use by the elderly is price-responsive as well. This study follows the experience of elderly enrollees in the supplemental insurance plan offered by CalPERS to former state employees in California. They find that an increase in copayment from $0 to $10 for office visits lowered the rate of office visits by 18% among the elderly, and that a rise in prescription drug copayments of $6 on average (which represented roughly a doubling of drug copayments) lowered prescription drug utilization by 7%-19%. Thus, the conclusion that medical utilization is price sensitive holds the test of time.

[5] Recent work by Goldman et al. (2006) claims that higher copayments for prescription drugs leads to more hospitalizations, but this claim is based on combining the fact that higher copayments leads to less drug utilization with an estimate of the relationship between drug utilization and hospitalization. But the latter is simply based on comparing hospitalization rates among those who do and do not comply with their drug regimes. This may not reflect the reduction in drug use due to copayments so much as the type of individuals who do and do not comply.

The major limitation of the more recent literature, however, is that there is relatively little evidence on whether the care being reduced in today's medical environment is "more effective," so that health is worsened as a result. The existing evidence, however, confirms the conclusion from the HIE that reduced care is harmful for those in poor health. For example, Hiesler et al. (2004) and Piette et al. (2004) use survey data on patient "cost-related prescription drug underuse" to show that health is worse among those who report such cost-related underuse. Scheon et al. (2001) find that providing free prescription drugs to uninsured indigent patients with heart disease resulted in improved heart health. Tamblyn et al. (2001) studied the introduction of a cost-sharing policy for prescription drugs in Quebec in 1996 for the elderly and low-income families on welfare, and found that cost sharing led to a decline in use of both essential and non-essential drugs, although the effects were larger for non-essential drugs. They found a sizeable increase in adverse events and emergency room utilization associated with the reduction in essential drugs. Finally, Chandra, Gruber and McKnight (2006) find that increases in physician and prescription drug copayments have little effect on hospital use for the average elderly person (mimicking the "lack of offset" finding from the HIE), but that for chronically ill patients there is a significant offsetting rise in hospital admissions as physician and drug use falls.

In summary, more recent work in a wide variety of settings and for a wide variety of subpopulations has confirmed the main conclusion of the HIE: higher patient co-payments reduced medical utilization. There has been less work, unfortunately, on the more intriguing HIE findings on health status, but the available studies suggest that there may be adverse health consequences for reducing prescription drug use, particularly among the chronically ill.

An important set of studies addresses another issue that was not included in RAND: limitations on service availability as a means of cost control. Suoumerai et al. (1991) found that a cap in New Hampshire on the number of prescriptions allowed to Medicaid patients significantly reduced prescription drug utilization, and increased admissions to hospitals and nursing homes, among those taking multiple drugs. When this cap was lifted and replaced with a $1 copayment, however, these effects disappeared. More recently, Hsu et al. (2006) compared the outcomes of Medicare beneficiaries whose insured drug expenditures were capped at $1,000 and those who had uncapped expenditures. They found that those with capped expenditures spent 31% less on drugs, but that total spending was only 1% lower, resulting from higher use of the emergency room and the hospital. They also found that the chronically ill were much less likely to adhere to drug regimens, and that as a result their physiological outcomes (such as higher blood pressure) were much worse; they even found that death rates were higher under the drug cap. These results clearly illustrate, for prescription drugs at least, that hard caps of this type can have important adverse effects on health.

Implications of the RAND HIE Evidence for Insurance Design

This powerful evidence from the HIE, as confirmed in more recent studies, has important implications for health care policy today. In this section, I review those implications, drawing in large parts on the insights of Newhouse (1993). The goal in this section is to clearly lay out the implications that follow from an objective analysis of this body of evidence.

Cost Sharing Can Reduce Spending Without Affecting Health for the Typical Person

The lessons from RAND are key: subject to out-of-pocket limits, patient co-insurance can reduce medical utilization without adversely affecting health for the typical person. This implies that plans with no patient cost sharing at all, or so called "first dollar insurance coverage," are rarely appropriate. Even for poor individuals, some limited co-insurance can be effective in lowering medical utilization without sacrificing health. As discussed below, however, some form of income-related limit on out-of-pocket expenses is necessary to protect those with few resources, and co-insurance should be targeted to where care is least effective.

Income-Related Cost-Sharing Limit is Ideal

An important component of the HIE structure was the use of income-related out-of-pocket limits or MDE. The use of these income-related MDE likely explains the limited effect of co-insurance on the poor, since they were limited in their ultimate exposure to health costs. Ideally, such income-related cost-sharing limits should be incorporated into health insurance more broadly.

There are two difficult issues that arise in practice with income-related cost sharing. The first is the appropriate level for limits on out-of-pocket spending as a share of income. There is really no right answer here; this is a question of the equity implications of higher limits versus the gains of reduced medical expenditures. It is worth noting in this context that even a limit as high as 5% of family income would reduce the medical expenditure risk of a large share of families in the U.S. According to data from the 2003 Medical Expenditure Panel Survey (MEPS), 25.5% of all families, and 20.0% of privately insured families, already spend more than 5% of their income on out-of-pocket medical costs. Thus, even fairly high limits on out-of-pocket spending as a share of income would still reduce risk for many families in the U.S. (so long as those out-of-pocket limits included all services, not just covered services).

The second issue is administrative difficulties. Enforcement of income-related out-of-pocket limits may be difficult for private insurance companies that do not have access to carefully reported income data; and even if they did, it could raise privacy concerns. Such a policy could be readily administered by the government, in coordination with the tax system, but this raises much larger issues about whether insurance should be publicly or privately provided. In any case, if the government switched to such a system for its insurance plans, it could play a leadership role for a move in the private sector, much as government introduction of prospective payment under the Medicare PPS system inspired such payment approaches in the private sector.

Alternatively, private plans could capture much of the benefit of this system through a simpler structure with several categories of out-of-pocket maxima. As one example of such a schedule, insurers could set maxima of: $0 for those with less than $10,000 of income; $750 for those with income of $10,000 to $20,000; $1,500 for those with income of $20,000 to $30,000; $2,000 for those with income of $30,000 to $40,000; $2,500 for those with income of $40,000 to $50,000; and $3,000 for those with income above $50,000. When individuals sign up for insurance at the end of a calendar year, they would be asked to report their income for the year, and the out-of-pocket maximum would be based on this. There could be some ability to verify which "bucket" individuals reside in based on their earnings at their firm, for example.

These administrative issues highlight an important point made by Newhouse (1993): if income protection is a concern, it is most appropriately accomplished through a cap on total out-of-pocket expenses rather than through exemptions from each co-insurance charge based on income. The administrative burden is much smaller with income-related limits, because many more families are affected by initial co-insurance than by the limits on out-of-pocket payments.

Target Co-Insurance to Promote Effective Health Care Use

Even with income-related out-of-pocket limits, the HIE found that there were negative health implications for sick populations, particularly if they were low-income. Moreover, even though it did not show up in the five years of the experiment, the reduction in preventive care utilization, particularly for children, is worrisome for long-run health.

Thus, a final lesson from the HIE and subsequent studies is that co-insurance policies should be actively targeted to promote effective health care use. An excellent example is the finding in the HIE of elevated blood pressure for low-income hypertensives. As Newhouse (1993) points out, much of the costs here arose because patients never were diagnosed with hypertension. For example, they find that more than half of the benefit from the free care plan for high blood pressure was available from a one-time screening examination, which they report would cost a fraction of the cost of providing free care to all.

This suggests that the type of "evidence-based medicine" which is now being applied to supply-side incentives (such as in defining "pay for performance" regimes for providers) could also be applied on the demand side as well. Indeed, in recent years some private insurers (and the Medicare program) have waived patient co-payments for preventive services such as mammograms and colon cancer examinations in order to encourage patient use. More generally, co-insurance structures could be designed so that care that is known to be effective in particular populations, or preventive care known to be effective in the broader population, is covered in those populations with lower or no co-insurance. This is particularly true for the chronically ill populations studied in Chandra, Gruber and McKnight (2006) for whom higher inpatient costs partially offset the gains to reduced outpatient and prescription drug costs. This issue is also discussed at length in Fendrick et al. (2001).

The downside of such an approach, however, is that it raises a whole host of daunting administrative issues. While there is consensus on cost-effectiveness in some domains (such as

the use of statins to lower blood pressure), there is a lack of consensus in many others. Depending on the context, opening up co-insurance regimes to subjective definitions of "cost-effectiveness" could become a politicized process that ends up doing more harm than good. If insurance design is to go down this road, it is important to set up an objective means of assessing cost-effectiveness.

Problems with Current Approaches

This evidence also highlights problems with two current proposed approaches to increasing cost-sensitivity of consumers in health care (and lowering health insurance premiums). One is caps on service utilization. The evidence is clear, at least for the case of prescription drugs, that such caps do more harm than good. If caps are to be contemplated, at a minimum they should be designed in a flexible manner that allows for "escape valves" for the chronically ill.

The second is Health Savings Accounts (HSA) linked to high deductible plans. As highlighted in Furman (2006), high deductible plans are far from the optimal type of insurance arrangement suggested by the RAND HIE. For low-income consumers, the deductibles are too high and don't sufficiently protect them against financial risk. For high-income consumers, these deductibles are often too low, as those consumers know at the beginning of the year that they will exceed the deductible, so they proceed to ignore it in their medical decision-making. Thus, while there are many other arguments for and against HSAs, a key point to recognize is that all cost-sharing for patients is not created equal: high deductible plans are an inferior structure to plans with income-related (and perhaps health condition-related) patient copayments.

Conclusion

The RAND HIE was one of the most important and influential social experiments in our nation's history. By tackling a contentious yet central policy issue, the HIE provided a valuable set of evidence that delivers clear lessons for health insurance design. The right way to design health insurance has three features: co-insurance for the typical patient; an income-related out-of-pocket limit; and evidence-based design of co-insurance that targets co-insurance to places where care is least effective. In practice, each of these raises administrative issues that get more daunting as one moves through the list. But in principle, at least, a clear reading of this literature gives us a natural starting point for designing appropriate health insurance benefits.

References

Chandra, Amitabh, Jonathan Gruber and Robin McKnight (2006). "Medical Price Sensitivity and Optimal Health Insurance for the Elderly," mimeo, MIT.

Cherkin, Daniel, Louis Grothaus and Edward Wagner (1989). "The Effect of Office Visit Copayments on Utilization in a Health Maintenance Organization," *Medical Care*, 27, 1036-1045.

Eichner, Matthew (1996). "Incentives, Price Expectations and Medical Expenditures: An Analysis of Claims Under Employer-Provided Health Insurance," mimeo, MIT.

Employee Benefits Research Institute (2005). "Sources of Health Insurance and Characteristics of the Uninsured: Analysis of the March 2005 Current Population Survey". Washington, D.C.: EBRI Issue Brief Number 287.

Fendrick, A. Mark, Dean G. Smith, Michael E. Chernew and Sonali N. Shah (2001). "A Benefit-Based Copay for Prescription Drugs: Patient Contribution Based on Total Benefits, Not Drug Acquisition Costs," *American Journal of Managed Care*, 7, 861-867.

Furman, Jason (2006). "Two Wrongs Do Not Make a Right," forthcoming, *National Tax Journal.*

Goldman, Dana et al. (2004). "Pharmacy Benefits and the Use of Drugs by the Chronically Ill," *Journal of the American Medical Association*, 291, 2344-2350.

Goldman, Dana, Geoffrey Joyce and Pinar Karaca-Mandic (2006). "Varying Pharmacy Benefits With Clinical Status: The Case of Cholesterol-Lowering Therapy," *American Journal of Managed Care*, 12, 21-28.

Hiesler, Michele et al. (2004). "The Health Effects of Restricting Prescription Medication Use Because of Cost," *Medical Care*, 42, 626-634.

Hsu, John et al. (2006). "Unintended Consequences of Caps on Medicare Drug Benefits," *New England Journal of Medicine*, 354, 2349-2359.

Landsman (2005). "Impact of 3-Tier Pharmacy Benefit Design and Increased Consumer Cost-Sharing on Drug Utilization," *American Journal of Managed Care*, 11, 621-628.

Manning, Willard et al. (1988). *Health Insurance and the Demand for Medical Care: Evidence from a Randomized Experiment*. RAND Corporation, Santa Monica, CA.

Newhouse, Joseph and the Insurance Experiment Group (1993). *Free For All? Lessons from the RAND Health Insurance Experiment*. Cambridge, MA: Harvard University Press.

Piette, John, Todd Wagner, Michael Potter and Dean Schillinger (2004). "Health Insurance Status, Cost-Related Medication Underuse, and Outcomes Among Diabetes Patients in Three Systems of Care," *Medical Care*, 42, 102-109.

Schoen, Marieke et al. (2001). "Impact of the Cost of Prescription Drugs on Clinical Outcomes in Indigent Patients with Heart Disease," *Pharmacotherapy*, 12, 1455-1463.

Selby, Joe, Fruce Fireman and Bix Swain (1996). "Effect of a Copayment on use of the Emergency Department in a Health Maintenance Organization," *New England Journal of Medicine*, 334, 635-641.

Soumerai, Stephen et al. (1991). "Effects of Medicaid Drug-Payment Limits on Admission to Hospitals and Nursing Homes," *New England Journal of Medicine*, 325, 1072-1077.

Tamblyn, Robyn et al. (2001). "Adverse Events Associated with Prescription Drug Cost-Sharing Among Poor and Elderly Persons," *Journal of the American Medical Association*, 285, 421-429.

Table 1: Summary of RAND HIE Findings **Sample Means for Annual Use of Medical Services Per Capita, By Plan** (standard errors in parentheses)					
	Free Care	25%	50%	95%	Individual Deductible
Probability of Any Medical (%)	86.8 (0.82)	78.8 (1.38)	77.2 (2.26)	67.7 (1.76)	72.3 (1.54)
Face-to-Face Visits (#)	4.55 (0.17)	3.33 (0.19)	3.03 (0.22)	2.73 (0.18)	3.02 (0.17)
Outpatient Expenditures (1984 $)	340 (10.9)	260 (14.7)	224 (16.8)	203 (12.0)	235 (11.9)
Probability of Any Inpatient Admissions (%)	10.3 (0.45)	8.4 (0.61)	7.2 (0.77)	7.9 (0.55)	9.6 (0.55)
Total Admissions (#)	0.128 (0.0070)	0.105 (0.0090)	0.092 (0.0116)	0.099 (0.0078)	0.115 (0.0076)
Inpatient Expenditures (1984 $)	409 (32.0)	373 (43.1)	450 (139)	315 (36.7)	373 (41.5)
Total Expenditures (1984 $)	749 (38.7)	634 (52.8)	674 (143.5)	518 (44.8)	608 (46.0)

Notes: All standard errors are corrected for intertemporal and intrafamily correlation. Dollars are expressed in June 1984 dollars. Visits are face-to-face contacts with M.D., D.O., or other health providers; excludes visits for only radiology, anesthesiology, or pathology services. Visits and expenses exclude dental care and outpatient psychotherapy.

Source: Willard Manning et al. *Health Insurance and the Demand for Medical Care: Evidence from a Randomized Experiment*. February 1988, Table 4.1, p.19. Permission granted by the RAND Corporation, Santa Monica, CA.

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