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United States: Orienting Pay-for-Performance to Patients

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Highlights

Evidence from randomized controlled trials in the United States suggests that demand-side performance incentives have increased follow-up rates of patients wanting to learn the results of screening tests and take treatments requiring limited changes in behavior.

For interventions that require more than time-limited changes in behavior (such as smoking cessation), incentives may attract people to begin treatment, but as of yet there is scant evidence as to whether success rates are sustained once extrinsic rewards cease.

Experience and evidence from developed countries suggest that patient-targeted performance incentives may be especially effective in developing countries where financial obstacles are great, and additional income is highly valued.

The term *pay for performance* in the United States has become synonymous with supply-side incentives focused on providers, with the goal of improving the quality of care delivered by clinicians, hospitals, and health care systems. Relatively little attention has been paid to demand-side approaches to modifying health behavior.

The focus on supply-side approaches within the United States is striking because smoking, diet, sedentary lifestyles, and other individual behaviors account for a substantial portion of all health care costs and cause hundreds of thousands of deaths annually within the United States (DiMatteo 2004; Mokdad and others 2004). Although smoking is the leading cause of preventable mortality and accounts for approximately 435,000 deaths each year (Mokdad and others 2004), only 2 to 3 percent of smokers quit each year (Bartlett and others 1994; Hughes 2003). Poor control of blood pressure—the principal modifiable risk factor for stroke (SHEP, Cooperative Research Group 1991; Amery and others 1985), coronary heart disease, congestive heart failure, and end-stage renal disease (Klag and others 1996; American Heart Association 2002)—is seen in approximately 70 percent of the 50 million Americans who have hypertension (Klag and others 1996; McDonald, Garg, and Haynes 2002), and failure to adhere to medications is a common cause of poor control (Monane and others 1996; Eisen and others 1990; Nelson and others 1980). Reducing these and other preventable causes of morbidity and mortality depends on more effective strategies for changing health-related behavior.

Performance-based incentives targeted at patients might be particularly helpful in improving health in developing countries for a number of reasons. Far more medical expenditures are paid out of pocket in developing countries. In the United States the proportion is 13 percent—a stark contrast to the 38 to 84 percent in countries throughout much of the developing world (Pauly and others 2006), where the figures are much higher because of the general lack of social insurance, a private insurance market, or employer-based health coverage. Given the lower income levels in these countries and the high proportion of medical expenditures paid out of pocket, payments that are small by U.S. standards likely will have large effects on behaviors in less developed countries. A further reason for patient-targeted performance-based incentive approaches is that prevention and treatment of many of the diseases that afflict large numbers of patients in developing countries such as HIV/AIDS, malaria, and tuberculosis (TB) require some component of change in the behavior of patients (as well as providers) to reduce the high rate of disease.

However, applying these concepts to developing countries involves additional challenges. One is that the public sector plays a larger role in service delivery, and an incentive-based approach would need to be integrated into an often-dysfunctional system of public provision. Information and communication infrastructures are less well developed, making identification and longitudinal patient follow-up more challenging. Logistical challenges to access and differing cultural views on health

and western medical intervention may affect the population's ability and willingness to use health services in countries like the United States.

Here we focus on the applicability to developing countries of evidence from the United States on the utility of demand-side performance incentives in modifying patient health behavior. We discuss several considerations in designing patient-oriented pay-for-performance programs that may be important for developing countries.

Direct Evidence

Tests of performance-based financial rewards within the United States have shown the greatest effectiveness for changing short-term health behaviors. Numerous randomized controlled trials of incentive-based interventions have successfully increased the rate of follow-up visits in contexts ranging from abnormal pap smears (Marcus and others 1998) to postpartum visits by adolescents (Stevens-Simon, O'Connor, and Bassford 1994) and to rates at which patients with HIV return to learn the results of their purified protein derivative (PPD) tests (Chaisson and others 1996). In another example, the rate at which intravenous drug users received all three doses of hepatitis B vaccine was significantly higher among subjects receiving monetary incentives (\$20 per month) than among those receiving outreach alone (69 and 23 percent, respectively, $p < 0.0001$; Seal and others 2002). Several studies show higher rates of tuberculin skin (PPD) test reading and completion of treatment among patients with tuberculosis. A randomized trial of 1,004 active or recent drug users found the rate of return for PPD test reading was 93 percent for those receiving \$10 cash, 85 percent for those offered \$5, 34 percent for those receiving motivational education, and 33 percent for those in the control group (Malotte, Rhodes, and Mais 1998). A monetary incentive of \$5 increased the rate of reporting for an initial TB evaluation appointment among homeless people with positive tuberculin skin tests to 84 percent from the 53 percent among subjects in usual care ($p < 0.001$) and the 75 percent among those assigned to a peer health adviser (Pilote and others 1996). Forty-four percent (nineteen of forty-three) completed six months of isoniazid therapy to 26 percent (ten of thirty-eight) in the usual care group ($p = 0.11$). The median number of months completed was five in the monetary incentive group, but only two in the peer health adviser group ($p = 0.005$) or the usual care group ($p = 0.04$; Tulskey and others 2000). These examples strongly suggest that this approach could be applied in developing countries, with probable large effects.

Performance-based financial incentives have been tested most extensively in substance abuse and have been successful in reducing rates of highly addictive behaviors such as alcohol, tobacco, and cocaine use (Higgins 1999; Higgins and Silverman 1999). Despite clear evidence from this literature (referred to as *contingency management*) that performance incentives have led to higher rates of retention in programs and abstinence (Higgins 1999), it is less clear that this approach is directly applicable to developing countries because these studies have been conducted in tightly controlled settings, such as drug treatment programs with frequent monitoring of subjects. One study, for example, randomized forty cocaine-using adults to either behavioral treatment or behavioral treatment plus vouchers exchangeable for retail items if urine samples were negative for cocaine during weeks one to twelve of the study (Higgins and others 1994). The groups were treated identically from weeks thirteen to twenty-four. Urine samples were collected three times a week, and subjects were eligible for progressively larger incentives the longer they stayed abstinent. The total potential value of the incentives was \$997.50. Seventy-five percent of the incentive group completed treatment, compared with only 40 percent of the control group ($p = 0.03$). The incentive group demonstrated longer continuous abstinence both when receiving incentives and when not receiving them ($p < 0.05$) and did not relapse at greater rates once the incentives were discontinued.

The contingency management literature is characterized by similar studies. The effectiveness of incentives is clear, but frequent drug-level monitoring makes the approach difficult to export to less monitored settings. The literature clearly shows that the magnitude of the effect increases with the size of the incentive (Stitzer and Bigelow 1983, 1984; Higgins, Bickel, and Hughes 1994) and that delays in payment reduce the efficacy of incentives (Roll, Reilly, and Johanson 2000). Applying these approaches to less highly controlled settings has not been well tested, however (Petry and Simcic 2002). Contingency management approaches can be effective, but the need for frequent monitoring makes it seem less likely that this literature is directly applicable to the context of behavioral change for diseases in less developed countries.

The literature on performance incentives and smoking cessation, which has some potential applicability to less developed countries, is also extensive. The most applicable studies on smoking cessation have been randomized trials of narrowly targeted populations. One of pregnant and postpartum women offered a \$50 voucher each month for saliva-cotinine-confirmed cessation by both the incentive group and their social supporters (Donatelle and others 2000). The incentive group had significantly higher quit rates during pregnancy than the control group

(32 and 9 percent, respectively, $p < 0.0001$). Eighty-seven percent had household incomes of less than \$20,000. In a population of patients at a U.S. Department of Veterans Affairs medical center, financial incentives worth \$200 increased cessation rates in the incentive group to 16.3 percent, compared with 4.6 percent in the control group ($p < 0.001$; Volpp and others 2006). The data from community settings are less useful because these studies have generally consisted of contests in which smokers were eligible to win prizes in a low-value lottery, often \$1 or less. A review of seventeen tobacco studies noted that mean quit rates averaged 34 percent at one-month follow-up and about 23 percent at one-year follow-up (Bains, Pickett, and Hoey 1998). Such programs generally attract only 1 to 2 percent of the population, however, and because quit rates are generally measured conditional on enrollment in the program, the high rates likely reflect the highly skewed sample. In addition, quit rates have tended to be based on self-reports, without biochemical confirmation and with no control group for comparison (Fiore and others 2000).

Reviews have suggested that patient-targeted trials have generally been successful. A review from 1997 concluded that ten of eleven studies reviewed demonstrated that financial incentives promoted compliance better than any other tested alternative, which is particularly striking because all but one of the interventions provided incentives worth less than \$50 (Giuffrida and Torgerson 1997). Most of these studies were geared toward keeping appointments and increasing immunization rates, but three successfully addressed health outcomes of blood pressure control, cocaine dependency, and obesity. A more recent review (Kane and others 2004) also highlights several areas in which further research is needed: the size of incentive needed to yield a major sustained effect, sustainability (because only four of forty-seven studies reviewed checked for long-term results and all of the measures that had improved significantly in the short term had returned to their original levels), and cost-effectiveness. Because only a small minority (seven of the forty-seven) included the necessary calculations, little is known about the cost-effectiveness of performance incentives (Kane and others 2004). Many of the ineffective interventions offered incentives worth less than \$10 (Curry, Wagner, and Grothaus 1991). These reviews highlight both the strengths and limitations of this field: there is strong evidence for much broader implementation of interventions targeted at modifying short-term behaviors. More study is needed, however, on the effectiveness of different approaches in modifying longer-term behaviors, the responsiveness of behaviors to different incentives, and the cost-effectiveness of different approaches.

One of the key empirical questions that require further investigation is whether behaviors will revert to baseline once payment stops. Two studies suggest that this could be a challenge. A small trial of fifty-five HIV patients found significant increases in adherence to antiretroviral medication (70 to 88 percent at week one) in the patients randomized to receive \$2 per dose taken within two hours of the prescribed time. However, these improvements were not sustained when payment stopped after the fourth week (Rigsby and others 2000). When incentives were discontinued in a trial of smoking cessation, the difference at seventy-five days of 16.3 to 4.6 percent ($p < 0.0001$) narrowed to 6.5 to 4.6 percent at six months ($p = 0.57$; Volpp and others 2006). Incentives may provide extrinsic motivation during the intervention, but intrinsic motivation may not sustain the desired behavior (Curry, Wagner, and Grothaus 1991). The important question remains: how best to design performance-based approaches that achieve sustained behavioral change or that target behaviors where only short-term change is required.

Indirect Evidence

Non-performance-based financial incentives are both common and *prima facie* evidence that incentive-based approaches are important drivers of health behavior. Most of these incentives are manipulations of price rather than explicit rewards or penalties for specific behaviors, but we can also draw inferences in thinking about ways to modify health behavior in less developed countries.

Increases in excise taxes on tobacco products arguably have been the most successful approach to increasing the rate of tobacco cessation and discouraging people from beginning to smoke. A 10 percent increase in price results in about a 4 percent decrease in overall cigarette consumption (Chaloupka and Warner 2000). Higher prices for cigarettes make smokers less likely to smoke, which, though it now seems self-evident, had at one time been considered an unlikely presumption because of how highly addictive nicotine is (Grossman and others 1993; Chaloupka and Grossman 1996). It is also clear that full insurance coverage for tobacco cessation services increases both the use of services and the quit rates (Curry and others 1998). These studies show that smokers respond as rationally to differences in price as consumers of other goods and services. This suggests that incentive-based approaches can be effective when there is an addictive component and when there is not.

The most common use of incentives within U.S. health care settings has been financial and negative: incentives requiring patients to pay more across the board. These, such as copayments for medications, are common in employer-sponsored

health insurance to reduce the use of services. Such untargeted incentives are used to discourage patients and physicians from relying on expensive drugs and ideally would only reduce the rate of inappropriate use of services. An extensive literature, however, documents less than ideal effects: significant reductions in the use of prescription drugs in response to relatively small increases in copayments, including for conditions such as hypertension for which daily medication is important (Leibowitz, Manning, and Newhouse 1985; Soumerai and others 1993; Joyce and others 2002; Steinman, Sands, and Covinsky 2001). This can contribute to worse health outcomes (Tamblyn and others 2001; Lurie and others 1984), particularly among low-income patients and those in poor health. The literature also shows reductions in the use of services, which seem to have little effect on health for populations that are neither poor nor at elevated risk (Newhouse 1996).

Less is known about the effects of targeted lowering of copayments as a tool to increase the use of beneficial or cost-effective services. This could be achieved by providing rewards that effectively lower the price of services, which could improve health cost-effectively (Coffield and others 2001). Such an approach is a form of benign moral hazard, in which enhanced coverage of services leads to higher use rates, but the higher rates are desired because the service is cost-effective in achieving better outcomes (Pauly and Held 1990). For example, full insurance coverage is associated with higher use rates of smoking cessation programs (2.4 percent with reduced coverage, 10 percent with full coverage) and higher quit rates (0.7 percent a year with reduced insurance coverage, 2.8 percent with full coverage; Curry and others 1998). The higher quit rates achieved with full coverage cost about \$0.22 to \$0.34 per enrollee per month. Although the cost savings from higher cessation rates might exceed the price to subsidize coverage of cessation, the focus should be on the fact that subsidization or rewards for such services are plausibly more cost-effective than many other commonly covered services.

Considerations

We draw on the U.S. experience to discuss several important issues related to designing and implementing incentive programs that need to be considered carefully in the context of less developed countries.

Priorities

Incentive programs should be considered based on public health consequences of the behavior, financial consequences of the behavior, the degree to which the behavior can be modified cost-effectively, and the duration of payments.

In the context of motivating adherence to treatment regimens, incentives are particularly compelling for diseases that pose significant health risks to a larger population. Tuberculosis is a clear example. Failure to adhere to therapy leads to prolonged infectivity through casual contact, generates transmissible drug-resistant pathogens, and dramatically increases the associated health costs. HIV transmission is analogous to TB transmission in some respects (Bangsberg, Mundy, and Tulsy 2001). Not adhering to therapy may also increase infectivity of both sensitive and drug-resistant viruses.

The financial consequences of detrimental health-related behaviors can take two forms: medical expenditures and workplace absenteeism and productivity. The Centers for Disease Control and Prevention has estimated that the economic costs of smoking in the United States total \$3,391 per smoker per year and that more than half of this is lost productivity (CDC 2002). These figures were computed using data on changes in life expectancy and lifetime earnings, so they do not include the value of lost work time from smoking-related disability, absenteeism, and smoking breaks. Such savings are likely dwarfed in relative terms by the economic costs of HIV, malaria, and other common diseases in less developed countries that have an even higher disease burden than tobacco addiction.

The potential applicability of incentives to lowering the rates of unhealthy behaviors is relevant only if these behaviors can be modified cost-effectively. The incentives themselves can be cost-effective if used to modify health-related behaviors that frequently lead to expensive complications. The existing literature suggests that a wide range of behaviors can be modified with relatively inexpensive incentives (Giuffrida and Torgerson 1997). Smoking is an example of a disease that leads to expensive complications but for which cost-effective interventions are available but underused. Each year in the United States, \$75 billion in medical services and an estimated \$92 billion in lost productivity are attributable to smoking (CDC 2005). A wide range of cessation interventions have been found to have cost-effectiveness ratios below \$20,000 per life-year saved, a much more favorable ratio than many health care services typically covered by health insurance and well below the commonly used coverage threshold of \$50,000 to \$100,000 per quality-adjusted life-year (Chernew, Hirth, and Cutler 2003). Blood pressure control has been shown to be highly cost-effective in reducing cardiovascular risk (Field and others 1995; Maynard 1992; Tsevat and others 1991), primarily because the multiple downstream effects of uncontrolled hypertension lead to large economic and social costs (Pardell and others 2000; McMurray 1999). The cost per life-year gained from treating hypertension may be as low as about \$800, one of the lowest

cost-effectiveness ratios observed for any medical treatment (Johannesson and others 1993).

The higher risk of adverse health outcomes in populations with higher levels of disease acuity suggests that incentive interventions should focus on modifying behavior in high-risk patients, such as encouraging the use of bed nets in endemic malaria areas or condoms among the sexually active in Sub-Saharan Africa. Whether this is true depends on the degree of behavioral change in response to interventions in these populations compared to lower-risk populations. Ideally, efforts of both lower and higher intensity would be directed at different populations, because different types of interventions could complement one another and the intensity of the intervention will depend on the resources available. What is not known is whether incentives can be systematically used to enhance the use of such services and whether the incentives themselves will be cost-effective.

Empirical evidence in favor of programs with time-limited interventions is much stronger than that for programs with longer-term interventions. Feasibility is greatest with those that target increasing vaccinations for influenza, hepatitis B, or other infectious diseases, which generally require only one to three points of contact. Incentive-based approaches to increasing the completion of tuberculosis treatment have also been effective, because, although they require months, most patients are cured. Incentives to improve health-related behavior for chronic diseases, such as HIV or hypertension, are less favorable in this regard.

Approaches

Different approaches can be taken to encourage healthy behaviors. One is to use differential risk rating, tying insurance premiums to personal health behavior. This is an option only in systems with a high proportion of people with private health insurance, however. Another is to offer price discounts for highly cost-effective services to encourage their use. The third is to offer rewards that encourage specific behaviors. It seems possible that unbundling rewards may have larger effects than lowering insurance premiums because of endowment effects and status quo bias. Ideally these approaches would be tested head to head. Given the low incomes in less developed countries, however, it seems likely that both would be highly effective.

Nature of Incentive

Noncash incentives are often used because of concerns that giving money to those with substance abuse problems is an unseemly risk. Some evidence, however, indicates that an equivalent amount of cash might be more effective. A randomized

trial of 1,078 active drug users found that the rate of return for PPD skin test reading was 95 percent for those receiving \$10 cash, 86 percent for those receiving grocery store coupons, 83 percent for those receiving either bus tokens or fast-food coupons, 47 percent for those receiving an educational session, and 49 percent for those receiving simply encouragement. Differences between the cash incentive and the grocery store coupon were significant (chi-square 9.5, $p = 0.002$) as were those between cash and the bus pass or food coupon (chi-square 15.4, $p < 0.0001$; Malotte, Hollingshead, and Rhodes 1999). In a study that examined attendance at an AIDS prevention program, a shift from monetary payments to vouchers for food or gifts led to a substantial decline in attendance (Dern and others 1994). Cash payments have the added benefit of letting the subject decide how to spend the money, and, as in the context of Christmas presents (Waldfogel 1993), subjects may value gifts at substantially less than the amount spent on them, making noncash incentive payments considerably less efficient. A further advantage to cash is that considerable staff time is needed if in-kind gifts are provided in lieu of cash.

Administration

Turnover in private insurance markets and among employers is one reason for underinvestment in prevention within the United States. Insurers and employers are reluctant to invest in prevention if the savings in future medical expenditures accrue to someone else. Such programs will likely be broadly adopted only if doing so makes financial sense for employers and insurers. The potential in less developed countries for employers to contribute to health promotion efforts may be greater because of the clear implications of many common diseases such as malaria and HIV for absenteeism and productivity for firms.

Incentive programs are applied most favorably in cases with high short-term payoffs (better asthma management), a compelling public health rationale because of contagious disease (multidrug-resistant TB), or within health systems or insurers with low turnover (such as Medicare). Employers with low turnover could consider adopting such policies on either an individual or a group basis. When there are enough externalities either in terms of public health (multidrug-resistant TB) or financial consequences (smoking), if turnover between firms creates a free-rider problem, consideration could be given to mandating coverage across all insurers or employers within a region.

Sustainability

For sustained change in health behaviors, an important decision is whether payments need to be continued indefinitely or whether incentives can be dropped.

Motivational theory and previous empirical work suggest that incentives may bring people into treatment but do not necessarily lead to higher success rates (Curry, Wagner, and Grothaus 1991). It is generally thought that sustained behavioral change is unlikely without some intrinsic motivation.

Context

Incentive approaches in the United States for diseases such as tuberculosis, which kills almost 3 million people a year, mostly in low-income countries, are directly applicable to less developed countries. Treatment completion rates in general are not high, however. Even within the United States, about 44 percent of TB patients do not complete therapy (CDC, American Thoracic Society, and Infectious Diseases Society of America 2005). This can result in prolonged infectiousness, relapse, drug resistance, and death. Other leading killers in less developed countries, such as HIV and malaria, may require new approaches. Using incentives for ongoing behavior to reduce risks or increase compliance with HIV treatment regimens is an important area for further research.

Equity-Fairness

Incentives are most efficient if targeted at those whose behavior needs to change. This targeting can raise equity and fairness issues if those who are already practicing desired behavior feel that incentives penalize them for good behavior. One approach to consider is to give members of a given community points to lose for unhealthy behavior. An argument can also be made, from the standpoints of both cost and personal risk, that everyone in a given collective (HIV-negative individuals) potentially benefits when higher-risk individuals (HIV-positive individuals who do not adhere to safe practices) change their behavior.

Managing Data

Systems need to be set up to identify the appropriate participants, deliver the promised incentives, account for the flow of dollars, and measure the effects on use and outcomes. Mechanisms are needed to verify that the behaviors in question did, in fact, change and to ensure that the dollars flow in a timely manner to those who modify the desired behavior. Less will be demanded of the data infrastructure in setting up such programs for one-time behaviors such as influenza vaccines, in which compliance and payment can be measured at the point of service. Verifying behavioral change becomes increasingly difficult with the degree to

which the behavior is not observed. Attendance for vaccines or postpartum visits is easy to measure, but verification of the use of mosquito netting is harder to ascertain other than through random audits. How best to measure adherence given differences in local customs and cultures needs to be considered carefully.

Rigorous Evaluation

It is essential that any new efforts be tested through rigorous quasi-experimental or experimental designs so that the effectiveness and cost-effectiveness of these early efforts can be measured. It is of central importance to the further improvement of existing approaches to build into the design of pay-for-performance programs rigorous evaluation of their impact as well as ongoing qualitative assessments so that potential problems can be identified and proactively addressed.

Conclusions

There are several conclusions to draw. Patient-targeted pay for performance is effective in changing short-term behavior. Whether this approach is cost-effective is still unclear, but several comparative studies indicate that it is significantly more so than other commonly used approaches, such as education or peer support.

This suggests an initial focus on increasing the use of services that are known to be beneficial and cost-effective but that require few points of contact. Examples include childhood immunizations, PPD test reading, and distribution of malaria nets. Incentives to improve adherence to a time-limited course of treatment for diseases such as tuberculosis in which lack of treatment poses a clear risk to the health of others would be another logical target. Incentives to increase the use of medications for chronic diseases such as HIV would also be important, but probably would entail indefinite price reductions to ensure adherence.

The high proportion of medical expenditures that are paid out of pocket in developing countries is evidence enough that cost of services is a major issue of access. Patient-targeted performance incentives would help to reduce these barriers and could complement provider-targeted incentives. Extremely high expenditures and misaligned incentives in the United States have generally not produced high rates of healthy behavior, and this is a lesson for developing countries. Consideration should be given to building private-public partnerships in part because employers would benefit greatly from reducing absenteeism as a result of the many diseases endemic within much of the population.

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