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Potential Applications of Conditional Cash Transfers for Prevention of Sexually Transmitted Infections and HIV in Sub-Saharan Africa

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Abstract

A growing number of developing countries have introduced conditional cash transfer programs that provide money to poor families with certain contingencies attached—such as requiring school attendance or regular immunization and health check-ups. As the popularity of conditional cash transfer programs has grown, experimentation with potential applications in other areas of health, such as sexual and reproductive health, and HIV prevention, in particular, has also increased. Evaluations of conditional cash transfer programs have focused almost exclusively on uptake of health and educational services, which make relatively low demands of participants compared with more complex interventions, which require the cessation of risky behaviors, such as smoking, obesity, and substance abuse. The literature on contingency management—based on the principle that behavioral change occurs when appropriate behaviors are reinforced and rewarded—provides a richer picture of the complexity of the use of conditionality to encourage healthy behavioral change. This paper examines developing countries' experiences with conditional cash transfer programs and the results of trials in clinical settings on the efficacy of contingency management, and addresses their relevance for designing conditional cash transfer programs to address risky sexual behavior and promote the prevention of sexually transmitted infections and HIV in Sub-Saharan Africa.

This paper—a product of the Human Development and Public Services Team, Development Research Group—is part of a larger effort in the team to better understand the issues related to prevention and treatment of HIV/AIDS. Policy Research Working Papers are also posted on the Web at http://econ.worldbank.org. The authors may be contacted at carol.medlin@gatesfoundation.org and ddewalque@worldbank.org.

Potential Applications of Conditional Cash Transfers for Prevention of Sexually Transmitted Infections and HIV in Sub-Saharan Africa*

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Introduction

Conditional cash transfer (CCT) programs which provide cash to poor households in exchange for their active participation in educational and health care services have proven remarkably popular among developing country governments, sweeping the globe from Mexico to several other Latin American countries, including Colombia, Honduras, Jamaica, and Nicaragua, and much more recently, to Africa. The principle of conditionality – which may be applied differently in practice, but generally requires families to send their children to school or to receive a range of health care services, such as nutritional counseling, childhood vaccination programs, etc. – distinguishes CCT programs from the more traditional social assistance programs which provide cash or vouchers directly to poor or otherwise distressed families with no strings attached. The CCT programs emphasize the use of market-oriented "demand-side" interventions as an instrument for longer-term human capital investments (Rawlings and Rubio, 2005, Fiszbein and Schady, 2008). Ideally, they are designed to complement, rather than replace, the more familiar "supply-side" investments which channel resources directly towards schools, clinics, and service providers.

The CCT programs that have received the most attention are those having an explicit orientation toward poverty alleviation, involving both educational and health components as part of a broader, long-term strategy of human capital investments. Such programs have been thoroughly evaluated, and, on the whole, have been found to be effective at raising levels of household consumption and increasing uptake rates of a wide-range of preventive health care services (and education). Specifically with regard to health outcomes, several studies have also shown an impact on anthropometric outcomes, such as improvement in the nutritional status of newborns and infants (Colombia), height gains among children aged 12 to 36 months (Mexico), and decreases in stunting and the proportion of underweight children aged 0 to 5 years (Nicaragua). However, researchers acknowledge it is difficult to attribute specific component parts of the program to specific outcomes based on the existing evidence; for example, improved nutritional status may be the result of nutritional supplements, better diets resulting from improvements in household income, increased knowledge on the part of mothers attending health education meetings, or a combination of all of these (Lagarde, Haines, and Palmer, 2007; Gertler 2004).

Nonetheless, the substantial evidence demonstrating positive effects on the uptake of health care services and a range of critical health outcomes in many different countries and socioeconomic settings has triggered significant interest in exploring potential applications of CCTs to other areas of health, including HIV prevention. Nowhere is this more the case than in Sub-Saharan Africa, where interest in replicating the results such programs has spawned experimentation and pilot projects to support the care of AIDS orphans (Tanzania), and the uptake of STI/HIV prevention services (Malawi). These ventures, observed in combination with the experiences of programs in other countries seeking to use CCTs to increase contraceptive use and to discourage second pregnancies, particularly among adolescent girls, raise the question of whether CCTs may be usefully applied to improve outcomes in sexual and reproductive health, generally, and in particular as a tool to prevent STI/HIV transmission, and whether it is ethical to do so.

The social, economic, and human costs of the AIDS epidemic in Sub-Saharan Africa are staggering (Eiss and Glass, 2007), and innovative solutions to stem the tide of the epidemic are desperately needed. In 2007, an estimated 22.5 million people were living with HIV, and 1.7 million individuals were newly infected. However, despite isolated, and often temporary, successes, behavioral change interventions promoting safer sexual behavior have proven remarkably ineffective at stemming the tide of the epidemic.

Existing CCT programs provide powerful evidence into the linkages between incentives (and financial incentives, in particular) and behavior change. In addition, they provide compelling evidence that such programs can have a direct impact on selected health outcomes at a large-scale, and over an extended period of many years. However, there remain questions about the importance of the conditionality to the effectiveness of such programs, and little has been done in the way of in-depth examination of the conditionality requirement. For a richer exploration, it is necessary to turn to the CM literature which addresses risky health behaviors such as substance abuse, smoking, and over-eating.

In a similar manner as for the CCT poverty alleviation programs, CM relies on the mechanism of conditionality to elicit behaviors that are viewed to be in one's long-term interests (or, those of society's), and to discourage those behaviors that may be ultimately detrimental to one's own health and well-being that may not be easily perceived or experienced in the short term. However, while traditional CCT programs, or, those focused on improving uptake rates, require a "simple" behavioral response (e.g. involving a single finite action, such as attending a health clinic), the latter require a "complex" change (e.g. abstaining from a behavior that may be desirable, and habit-forming, in the short run, but in the long run is detrimental to one's health) (Kane and others 2004). Thus, with regard to the importance of the conditionality, per se, more might be gleaned from an examination of the evidence from contingency management rather than the CCTs.

The goal of this paper is to discuss potential applications of CCTs for HIV prevention, and sexual and reproductive health, more broadly, by reviewing lessons learned from the experiences of countries with large-scale anti-poverty programs, as well as clinical trials examining the use of contingency management to discourage unhealthy behaviors or "risky" behaviors that may have negative health consequences over the long-term. After presenting the conceptual foundations of CCT applied to risky sexual behavior, we examine the impact of traditional CCTs on uptake rates and health outcomes in Latin America, and discuss potential implications for African countries. Next, we review the evidence on the impact of CM interventions on reducing risky behaviors, such as substance abuse, smoking and over-eating, and on related behavioral and health outcomes. Finally, we discuss potential applications of CCTs to sexual and reproductive health, and discuss the specific challenges associated with the design, implementation, and evaluation of CCT programs for STI/HIV prevention.

Background

Globally, an estimated 33.2 million people were living with HIV at the end of 2007. That same year, an estimated 2.1 million people lost their lives to AIDS, and an estimated 2.5 million became newly infected. The global epicenter of the AIDS pandemic is in Africa, where an estimated 22.5 million people were living with HIV at the end of 2007, and approximately 1.7 million new infections occurred during that year (UNAIDS, 2007). Young people, aged 15-25, are at greatest risk. An estimated 10.3 million young people around the world are HIV infected, and more than half of all new infections, almost 7,000 daily, occur among this age group (UNAIDS, 2001).

The tragic reality is that many of these new infections could have been prevented. At its core, the global AIDS epidemic is fueled by risky sexual behavior. Over 80% of HIV infections occur through sexual contact with an infected partner (Askew and Berer, 2003), and could have been avoided through the adoption of safer sexual behaviors including condom use, reduction in the number and concurrency of sexual partners, or abstinence.

Mass information, education, and communication campaigns, typically the centerpiece of countries' AIDS prevention strategies, have been shown to have had relatively little impact on patterns of HIV transmission and the trajectory of the epidemic (Bertrand et al., 2006). Numerous studies have shown that information alone is typically insufficient to change risk behavior. However, accurate information is indisputably a basic ingredient in informed policy discourse, and information, education, and communication campaigns in conjunction with condom promotion and distribution likely results in higher condom use and significantly lower sexually transmitted infection (STI) incidence (Bertozzi et. al., 2006). Nonetheless, in many African countries, infection rates continue to rise even as awareness about risks and consequences of HIV infection has increased within the general population (World Bank, 2006).

Psycho-social interventions, such as peer-to-peer counseling, have had a significant and measurable impact on unsafe behaviors, but have not been shown to be cost-effective as a strategy for reaching young people (Hutton et al., 2003). These types of interventions may be costly when brought to scale due to the emphasis on an individualized or small group therapy approach, although there has been some experimentation with more easily scalable, community-based approaches. A multi-country trial of community-based voluntary counseling and testing approach is currently underway (Coates and Szekeres, 2006).

Other key AIDS prevention strategies do not depend on the wide-spread adoption of safe sexual practices. These largely clinic-based interventions include safe blood banks, STI screening and treatment, and prevention of mother-to-child transmission. It is likely that male circumcision will soon be added to this list, based on promising new evidence that was recently released and reported (Bailey et al., 2007; Gray et al., 2007). Such clinical and technologically-based approaches hold a great deal of promise; however, behavioral strategies must also be pursued. Current levels of investment in the development of new drugs, vaccines, and technologies have been at least partially fueled by the perception that behaviorally-focused approaches cannot be made to work, or are politically and socially unviable. However, biomedical advances such as a cure for AIDS or the development of an effective AIDS vaccine are, at best, many years away or

unattainable. Moreover, even once a clinic-based intervention, drug, or vaccine has been proven efficacious, changes in behavior are still needed to ensure access, uptake, and acceptability.

Consequently, greater attention is now being given to a focus on behavioral change as an important component of prevention strategies and activities. Many public health experts have argued that a more aggressive approach to behavior change in Africa is needed, pointing out that "instances where HIV infections appears to be falling … [were] linked to successful programs aimed at changing behavior, notably in Kenya, Uganda, and Zimbabwe" (Jack, 2007).

Conceptual Foundations

Conditional cash transfers offer an innovative alternative to traditional behavioral strategies, and therefore may have important applications to sexual and reproductive health, and HIV prevention, in particular.

The conceptual foundations of conditional cash transfers are rooted in traditional economic theory, which is based on the assumption that individuals make rational decisions that maximize their own individual well-being or "utility." The theory acknowledges that individuals face risky choices with benefits (e.g. personal enjoyment) and costs (e.g. health risks), and assumes that individuals will make sensible choices after taking these costs and benefits into careful consideration. The modeling of individual decision making in this manner has led to major new insights into apparently "irrational" risk-taking behavior, and has been used to explain risky occupational choices such as formal and informal sex work. For example, Gertler and others (2005) found in a study of Mexican sex workers that "risky sex" carries a 23 percent higher price tag than sex with condoms. In a study of informal sex workers in Western Kenya, Yeh (2006) found that sex workers charge more for anal sex, and that risky sexual activity fluctuates in response to consumption expenditures and income shocks experienced within the household.

Another promising area of research in behavioral economics and decision theory offers an understanding of risk-taking behavior that may be radically and irreconcilably inconsistent with rational decision-making, such as the decision to engage in risky sex in a setting with high HIV prevalence. For example, O'Donoghue and Rabin (2000) have developed a behavioral model in which young people are assumed to make decisions by weighing costs and benefits, but they may also choose to act compulsively in certain instances. In this model, the benefits and costs incurred in the future are discounted in the same way that they would be in rational choice models, except that youth may place higher value on rewards received instantaneously. Behavioral economics refers to this as "hyperbolic time discounting" and it is a similar concept to that of "immediate gratification" used in developmental psychology.

The conceptual foundations of CCTs rest easily within either economic framework of decision-making, since cash payments can be used either to alter the cost-benefit parameters of the decision calculus of the rational individual, or it can be used to counter impulsive tendencies by rewarding, in the short term, behaviors that are likely to

bring longer-term health benefits. Applied to poverty alleviation, the goal is to compensate individuals in the short term for the "costs" associated with investments in health and education that have a longer-term payoff. Applied to risky behavior, the goal is to shift potential future costs of weight gain, smoking, and substance abuse higher to the present, so they can be more immediately perceived. Clearly, some behavioral changes may be more "costly" than others. For example, the uptake of health and educational services likely places fewer demands on the individual than, for example, the decision to *refrain* from specific behaviors, particularly those that afford pleasurable short-term benefits. This has been described as a difference between "simple" behavioral change and "complex" change, and the latter may require a larger incentive to bring about the desired change (Kane and others 2004).

The same framework is useful in regards to sexual and reproductive health. As O'Donoghue and Rabin (2000) remind us, the decision to have sex involves a trade-off between the short-term benefit of sexual pleasure and intimacy, and the long-term (probabilistic) cost of getting pregnant, acquiring an STI, or contracting AIDS. Thus, risky decisions – such as whether or not to have unprotected sex – may be the result of a realistic assessment of trade-offs and probabilities, or may result from problems associated with undervaluing the future (or, excessive discounting, in economic parlance). Of course, this is a stylized view of the decision making process that may be conditioned and constrained by the cultural, social, and economic context. In fact, many studies have highlighted how poverty, lack of economic opportunity, and powerlessness closes off options to the point that individuals (and especially, young girls) do not experience their engagement in risky sexual behavior as the outcome of a deliberate decision (Krishnan and others, 2007).

With regards to preventing HIV transmission, an added difficulty is that the "costs" of engaging in risky sexual behavior may not be perceived for many years, due to the lag between infectivity and presentation of acute and/or chronic symptoms of AIDS. Thus, one goal of the CCT intervention would be to shorten the horizon of the future by offering cash rewards at regular but more importantly *frequent* intervals. The premise is that a system of rapid feedback and positive reinforcement using cash as an incentive to shape behavior can effectively discourage risky sexual activity and therefore contribute to reduced rates of HIV transmission.

To understand what the current state of knowledge regarding the effectiveness of CCTs at shaping behavior, we review the experiences of countries with CCT programs to encourage the uptake of health and educational services among the poor, and the results of clinical trials using "contingency management" (CM) techniques to discourage unhealthy activities, such as substance abuse, smoking, and over-eating.

CCTs and Poverty Alleviation: Encouraging the Uptake of Health (and Education) Services among the Poor

The best known and most widely implemented CCT programs have had poverty alleviation as a central objective, and investments in human capital, namely, health and education, as the principle vehicle. Individuals are rewarded for increasing the frequency

or reliability of their participation in activities that they are likely to already engage in, or already perceive to be in their self-interest. Kids are likely to be enrolled in school, but may not always attend. Mothers may wish to attend well-baby clinics, but may find it hard to be consistent about the regular visits that are required.

Mexico's program, initially known as PROGRESA and, later, *Oportunidades*, was launched in 1997 following the completion of a successful pilot project undertaken in three cities in Campeche, a state in southern Mexico. The main objective was to support families living in extreme poverty through investments in human capital by improving the health and nutritional status of all members, but especially mothers and children, in addition to increasing school enrollment rates, school attendance, and educational performance. The program grew rapidly and was wildly popular. By the year 2000, the program was reaching nearly 40 percent of the total rural population, or 2.6 million rural households, with an annual budget of $2.6 billion (Sridhar and Duffield, 2006).

Following in Mexico's footsteps, Nicaragua and Colombia launched their own poverty alleviation programs, closely modeling the PROGRESA program, in the year 2000. Nicaragua's program proposed to supplement household income for up to three years to increase food consumption, and to improve the health and nutritional status of children; in addition to reducing school drop out rates in primary education (grades 1-4). By 2005, the program was reaching nearly 22,500 households in 6 percent of the rural areas. A major difference with PROGRESA, besides significant differences in scale, was that Nicaragua contracted with private providers to provide the health and educational services to participants instead of relying, as Mexico did, on traditional public service providers, through the Health and Education Ministries. With a similar focus on poor families with small children, Colombia's program offered a nutritional subsidy to families with children under 7 years of age, and an educational subsidy to families with school aged children from 7-17 years (Sridhar and Duffield, 2006).

By contrast, Honduras elected to modify a welfare program known as PFAF which was launched in 1990 to mitigate the effects of structural adjustments. PFAF II was launched in 1999 with the goal of increasing investments in the poorest communities in much the same manner as its Latin American neighbors, through improvements in health and education. Cash transfers were given three times per year to families with pregnant women and/or children under three years of age. Transfers were conditional on five antenatal care visits during pregnancy, peri-natal checkups within ten days of delivery, and monthly health checks for young children. Brazil and Jamaica have since launched similar types of programs (Rawlings and Rubio, 2005; Lagarde, Haines, and Palmer, 2007)

The conditionality of the cash payments offered by these programs was largely similar in that payments were tied to families' use of health and educational services. The goal was therefore to make long term investments in human capital, in addition to short term cash transfers. In other words, the cash was intended to function as an incentive on credit-constrained (poor) families to invest in their children's future, recognizing the powerful limitations that short-term financial constraints placed on poor families. The way in which the size of the cash payments was calculated reflected this orientation. In Mexico, where the total size of the cash transfer represented nearly a third of household expenditures, families were compensated for direct costs of accessing

services (e.g. in the case of education, school fees and supplies) and the opportunity costs associated with participation. In Honduras, the size of the cash transfer was calculated to compensate mothers for the time they invested in making a trip to the health care center and waiting to receive care (Rawlings and Rubio, 2005).

Overall, the results of these programs have been extremely promising. The evaluations of such programs, some more rigorously designed than others, have all shown positive impacts on health and education. Mexico's program has been evaluated most thoroughly. Studies have found increases of 25-60% in health care visits among children under 3 years, higher rates of nutritional monitoring, and higher immunization rates. In addition, caloric intake increased by 7 percent, driven by higher expenditures on fruits, vegetables, and meats. Actual health impacts have also been observed, with 12 percent lower incidence of illness among children from 0-5 years old, and a height increase of one centimeter among children aged 6-36 months (with the greatest effects in the poorest households with educated fathers) (Lagarde, Haines, and Palmer, 2007).

Similar effects were seen in Nicaragua, where total household expenditures increased by 18%, and annual food consumption increased by $41 per person, on average. In Colombia, also, total food consumption increased by 19 percent in rural areas and 9 percent in urban areas. By contrast, the Honduras program showed no impact on height for age, and no evidence of nutritional impact, and stunting remained high (Lagarde, Haines, and Palmer, 2007).

However, differences in programmatic impact raise inevitable questions about differences in the impact of the conditionality in terms of its size or target behavior. In Mexico, Colombia, and Nicaragua, the size of the cash transfer was roughly similar, representing between 20 and 30 percent of household expenditures. By contrast, in Honduras, the size of the transfer was much smaller: only 4-10 percent of household annual expenditures, and one-fifth of Mexico's transfer (Lagarde, Haines, and Palmer, 2007; Sridhar and Duffield, 2006). Unfortunately, very little can be surmised about the relationship between the magnitude of the transfer and the behavioral effect it induces due to the lack of experimentation with this issue.

In fact, the importance of the conditionality to observed gains in health and educational status among program participants has been the subject of intense debate. Some have argued that the conditionality component is inappropriate for the African context (Shubert and Slater, 2006). Even in the Latin American context, it has been recognized that it is difficult to attribute health impact to the conditionality, per se, as the programmatic intervention has many component parts, and is not limited to the conditionality (Gertler 2004; Lagarde, Haines, and Palmer, 2007). Nevertheless, evidence of the impact of the conditionality has been made apparent in unexpected ways. For example, in Honduras, cash payments may have created a perverse incentive to increase family size (Palmer and others, 2004). Also in Brazil, fertility appeared to increase due to the fact that cash payments were made only to pregnant women (Lagarde, Haines, and Palmer, 2007). These examples provide evidence of perverse incentives at work, and while unintentional, they serve to provide some indication of the degree of responsiveness of individuals to the design of the programmatic incentives.

In the absence of a well-developed body of literature on the subject, debates regarding whether contingencies are essential for impact, or appropriate in settings with limited infrastructure (Shubert and Slater, 2006; Kakwani, 2005), remain unresolved. In

several African countries, including Zambia and South Africa, the conditionality component of the cash transfers was not included in the design of the cash transfer programs for poor households. Zambia launched a Social Cash Transfer Scheme in 2003 targeting households headed by the elderly and caring for children who had been orphaned by the death of their parent(s), often as the result of AIDS; South Africa, by contrast, initiated a Child Support Grant (CSG) in 1998 to contribute to the cost of child-rearing in very poor households (Sridhar and Duffied, 2006). Other countries, including Tanzania and Mozambique, have considered similar types of programs, and the desirability of linking conditionalities to the payment is under review. Unfortunately, none of the African experiences have yet been rigorously evaluated, so it is not possible to draw firm conclusions about their effectiveness.

In sum, the evidence from an impressive collection of evaluations of CCTs as part of a broader poverty alleviation strategy demonstrates that such programs are feasible and effective. Such programs have demonstrated positive impacts on uptake rates of health (and education) services, and, in some cases, marked improvements in health outcomes. However, it is important to note that the evidence on how and whether the conditionality works remains weak. For STI/HIV prevention, this is the most critical piece of information that is needed to assess whether similar types of programs can be effective at reducing risky sexual behavior.

CCTs and Risky Behaviors: Applications to Substance Abuse, Smoking, and Obesity

To better understand the potential impact of CCTs at changing complex behaviors, it is helpful to examine the "contingency management" literature which spans several areas of risky behaviors, including substance abuse, smoking, and over-eating. Contingency management (CM) is a therapeutic approach that has been studied by clinical psychologists to encourage the practice of healthful behaviors, and to discourage unhealthy behavioral practices, especially those that may be linked to addiction or other destructive behaviors that are deeply engrained and/ or habit-forming. CM interventions provide "reinforcers" (e.g. incentives or rewards) contingent on an individual's abstinence from a target drug or behavior. The reinforcement device, often cash payments, vouchers, or prizes, is contingent upon an objective measure of a predetermined therapeutic target. An "objective" measure means a biochemical measure such as urine toxicology testing or the measurement of breath alcohol or carbon monoxide levels instead of self-reported compliance, which is not verifiable.

The essential principles of CM, as outlined by Petry and others (2000), are to reinforce the treatment goals by 1) closely monitoring the target behavior; 2) providing tangible, positive reinforcement of the target behavior; and 3) removing the positive reinforcement when the target behavior does not occur. CM techniques have been developed and tested in the context of clinical trials and settings, and have rarely, if ever, been implemented on a large scale in the manner of CCT programs. However, studies of the behavioral and health impacts of CM are valuable for their focus on different aspects of the conditionality that is expected to bring about the required behavioral changes.

As with CCTs, CM interventions have been tied to participation and the uptake of services in several domains, although risk behaviors are the important determinant for participant selection, rather than income constraints. CM has been shown to increase uptake rates of counseling sessions for drug abuse; attendance at weight loss sessions; and attendance in smoking cessation clinics.[1] Of particular interest, however, is the use of CM to elicit a complex behavioral change – usually, to discourage an unhealthy behavior by positively reinforcing the cessation of that activity (e.g. drug or alcohol abuse, smoking, or over-eating). The conceptual basis of CM and CCTs is thus largely similar, although advocates of CM impose no a priori assumptions about the effectiveness of the use of cash as the incentive or reinforcement device, and have experimented with a variety of reward mechanisms, including vouchers and prizes.[2] In addition, many CM studies are designed to explore effect differences due to variations in the value of the conditionality (known as the "dose-response" curve), the frequency of monitoring and payments, and the length of time that the elicited behavior change is sustained after the program has ended.

The use of CM has been most intensively studied in relation to its efficacy in treating substance abuse. A landmark study by Higgins and others (1994) demonstrated that incentives delivered contingent on submitting cocaine-free urine specimens significantly improved treatment outcomes in ambulatory cocaine-dependent patients. Over 50 percent in the treatment condition achieved at least two months of cocaine abstinence versus only 15 percent of the controls. Silverman et. al. (1996) showed that 47 percent of cocaine abusing methadone patients assigned to the CM group achieved more than 7 weeks of continuous abstinence, compared to only 6 percent of patients in the control group who achieved more than 2 weeks of abstinence. Similar results have been found for treating opioid dependency.[3] While CM has also been shown efficacious in treating alcohol abuse, the studies are fewer in number due to the difficulties associated with objectively verifying abstinence. Breath, urine, and blood tests can detect alcohol use only up to four to eight hours, which means that effective monitoring would have to take place two or three times a day (Stizer and Petry, 2006).

The use of financial incentives to discourage smoking has also been extensively studied. Donatelle et al (2000) used social support and financial incentives to induce high risk pregnant smokers to quit during their pregnancies. They provided in the amount of $50 per month for each month of abstinence (up to a maximum 10 month period, which included two months of postpartum). Lab-verified abstinence was required, and the biochemically-confirmed quit rates within the treatment group were higher both at 8 months and 2 months postpartum. Stizer (1983) experimented with different levels of cash payment, providing a payment of $1, $5, or $10 per day for 10 days to the three treatment groups (the control group received no cash). The study found that CO levels decreased in an orderly fashion as pay increased. However, another study by Windsor (1988) which provided cash payments of $25 at 6 weeks and 6 months as a reward for abstinence found no different in cessation rates between the control and

[1] See, for example, Higgins and others (1994); Petry (2000); and Emont (1992).
[2] The findings of studies reviewed for this study suggested that cash is typically preferred by research subjects, and in some studies it has been shown to have a greater behavioral effect than the equivalent non-cash reward (Kamb and others, 1998; Deren, 1994), although the findings are hardly conclusive.
[3] See, for example, Petry (2000).

treatment groups. Other studies experimenting with prizes, vouchers, and in-kind gifts of free nicotine patches showed mixed results, but even positive results disappeared after 6 months.

The use of financial incentives to treat obesity has also gained in popularity, but the evidence regarding efficacy is decidedly more mixed.[4] A recent systematic review of randomized controlled trials of treatments for obesity (Paul-Ebhohimhen and Avenell, 2007) showed no significant effect of the use of financial incentives on weight loss or maintenance at 12 months and 18 months. However, further sub-analysis indicated that large transfers (greater than 1.2% of personal disposable income) had greater impact, as did rewards for behavioral change rather than weight loss, per se, and rewards based on group performance rather than individual results.

The CM literature, overall, offers useful insights into aspects of the conditionality that appear to elicit the desired behavior change. This is an important area of inquiry that has not been sufficiently explored within CCT programs. However, unlike CCT programs, studies of CM have remained largely experimental and have not been brought to scale (Petry 2000; Kane and others 2004). Furthermore, the small sample sizes of study groups – most typically involving groups of 20 to 100, and rarely more than 500 – have made it difficult to detect effects that are statistically significant, much less estimate effect sizes accurately. Also, factorial designs with several treatment arms are common which – in combination with already small sample sizes – leads to even more constraints on power (Kane and others 2004).

CCTs and Sexual and Reproductive Health

While there is growing interest in exploring potential applications of CCTs to sexual and reproductive health, there is understandably concern expressed in some quarters about the ethics of doing so. Individual choices with respect to sexual and reproductive behaviors, more so than perhaps any other area of health, are considered an intensely private affair, and there has traditionally been a great deal of resistance to public interference in women's and their partners' right to choose when, whether, and under what circumstances to bear children (Mauldon, 2003).

Nonetheless, CCTs have been used to support sexual and reproductive health policy goals in some countries, and have typically focused either on increasing rates of contraceptive use in communities where birth rates are high (Bangladesh, India) or discouraging teen pregnancies, especially among poor and disadvantaged girls (United States) (Mauldon 2003). More recently, CCTs were used to encourage the uptake of Voluntary Counseling and Testing (VCT) services testing for HIV in a small, randomized control study in Malawi (Thornton, 2006). Interestingly, only the latter example – encouraging the uptake of VCT services – resembles the traditional CCT programs in that the focus is on a simple, and in this case, "one-off" change in behavior. Otherwise the collective experience of applying CCTs to sexual and reproduction health more closely parallels the contingency management approach to behavior change.

[4] See, for example, Follick (1984); Jeffrey (1978); and Jeffrey (1984).

Increasingly, researchers have experimented with the use of CCT and/or CM in preventing HIV and other sexually transmitted infections (STI), with mixed results. Kamb and others (1998) examined the differential impact of small monetary incentives versus other types of incentives (e.g. grocery coupons) on enrolment and participation in an HIV/STD prevention counseling intervention. 55 percent of enrollees offered cash completed the program, compared to only 37% of those offered other incentives. However, regardless of the type of incentive provided, enrollees experienced similar STD rates at follow-up. Petry (2001) experimented with a group based CM intervention offered at increasing frequency at an HIV drop-in center which provided a reward for attending group sessions and completing steps related to treatment goals. Attendance increased significantly in response to the frequency of reward, and the percentage of treatment activities completed rose from 25% at baseline to 65% during intervals of more frequent rewards.

It has also been suggested that CM could be effective at improving adherence to anti-retroviral (ARV) therapy (Haug and Sornesen, 2006). In fact, a U.S.-based study of 56 HIV-positive patients with histories of illicit substance abuse and had shown suboptimal adherence during a baseline assessment found that a brief CM-based intervention was associated with significantly higher adherence and lower viral loads, compared to supportive counseling only. However, by the end of the 16-week follow up phase, differences in adherence and viral load between the two groups was no longer significantly different.

Finally, Thornton (2006) conducted a cluster randomized control trial of individuals who were tested for HIV in a VCT clinic in rural Malawi. Individuals were randomly assigned voucher payments ranging in value between $0 and $3 to be paid when test results became available. The experiment found that participants were very responsive to even small amounts of cash. The cash payment increased the number of individuals returning to collect their test results by a mean of 27 percent, after controlling for distance. In addition, each extra dollar paid resulted in a 9 percent increase in the number of individuals returning to collect test results.

Arguably, each of the above examples used cash incentives to encourage a relatively simple behavioral change – participation in educational sessions, completion of target goals for treatment, adherence to medications, and showing up to retrieve test results. However, the ultimate goal of HIV prevention is to discourage risky sexual practices in order to stop the spread of the AIDS virus. For this, it makes sense to more closely align the incentive with the target behavior. In other words, for maximum effect, the cash incentive should reward safe sexual practices, and discourage risky ones.

Of course, sexual activity, risky or otherwise, is not an observable behavior, so a proxy is required. A cash transfer that is conditional on remaining HIV negative is, perhaps surprisingly, not ideal. It would be ethically questionable to impose this conditionality, as it would represent a “double-whammy” for individuals to be denied the cash payment in conjunction with having been just diagnosed with HIV. In addition, as HIV is a rare event and has a long incubation period, such a contingency is likely to be too far distant from the behavior needing to be reinforced (e.g. safe sexual behavior). Thus, a more reasonable proxy would be the condition of remaining free of sexually-transmitted infections that are prevalent within the population, have been incontrovertibly linked to risky sexual activity, and can be easily treated and cured. Examples of curable

STIs that are prevalent in many African countries include Chlamydia, gonorrhea, and trichomonas.

In sum, a CCT-based STI/HIV prevention intervention that targets risky sexual behavior is likely to more closely resemble CM interventions that have been used in clinical settings to discourage risky behaviors such as substance abuse, smoking, and over-eating than the traditional CCT programs that promote simple behavioral change, such as increasing enrollment and attendance rates in educational or counseling sessions, or the uptake of other health or educational services. However, the very nature of the intervention – transforming a typically private activity into a matter of public concern and scrutiny – is likely to generate extensive ethical debates about the public's right to interfere, in a similar manner as discussions regarding contraceptive use in poor populations. Thus, ideally, any discussion of using CCTs in STI/HIV prevention efforts should be firmly embedded in the sexual and reproductive health policy discourse in individual countries. In some countries of Sub-Saharan Africa, where the AIDS epidemic has become generalized and affected the very social, cultural, and economic fabric of the population, it will be necessary to balance privacy concerns against an assessment of the high public costs and consequences of risky "individual" choices (Philipson and Posner, 1995). Of course, prior to engaging in such a discussion, it may be useful to determine whether a CCT-based STI/HIV prevention intervention can be shown to be effective at reducing rates of disease transmission. For this, we will need to examine challenges to the design, implementation, and evaluation of such a program.

CCTs, Risky Behavior, and STI/HIV Prevention: Challenges to Design, Implementation and Evaluation

If CCTs are to be used for STI/HIV prevention to curb risky behaviors, their programmatic characteristics are likely to more closely resemble the clinical management of alcohol and drug abuse, smoking, and/or weight loss rather than the collection of CCT programs that have been designed to increase the uptake of services. This will likely be true in regards to the overall design, implementation, and strategies for evaluation.

Design Considerations

A major design consideration is the size of the incentive. CCT programs focused on uptake have typically relied on formulas to compensate participants on the opportunity costs, or time requirements, of complying with programmatic requirements such as attending antenatal care visits or taking the child to the clinic for his or her regular check ups. However, in the case of CCT programs designed to encourage safer sexual practices and discourage risky ones, the purpose of the incentive is not primarily to compensate the individual for the opportunity costs of participating in the program, but rather to change the decision calculus of the individual regarding his or her sexual behavior. The goal would be to increase the immediate costs associated with risky behavior by increasing the possibility of future reward (cash). Several studies of CM interventions have found a positive relationship between the magnitude of the reward and the impact on the target behavior (and laboratory-confirmed health impact) (Sindelar and others, 2007; Stitzer and

Bigelow, 1983, 1984), at least during the treatment period; the effect appears to weaken during follow up (Higgins and others, 2007). However, the magnitude of incentive required for shaping sexual behavior is unknown. Preliminary assessments can be obtained through focus group discussions, survey data, and discrete choice experiments, but these are no substitute for direct measures of impact achieved by randomly assigning different sized payments to individuals participants, as was done in the Malawi study (Thornton, 2006).

A separate but related consideration is the frequency and immediacy in which the cash incentive is paid out. Given the unplanned and spontaneous nature of many sexual encounters, the incentive needs to be offered frequently enough to keep it ever-present in the minds of the target group, and as immediately as possible to reinforce the link between the payment and the target behavior. It seems reasonable to assume, and the CM literature has confirmed (Stizer and Petry, 2006), that larger cash payments given frequently have greater impact than smaller payments given less frequently, but it is nevertheless unclear how these two dimensions of magnitude and frequency interact.

Of additional interest is whether the cash incentive should be paid directly to individuals, to a couple, or some other social grouping. CCT programs for poverty alleviation have tended to target households and communities, but the incentive is actually paid to the mothers of young children, rather than the fathers or the legal head-of-household. This design feature has been a nod to a series of findings that women are more likely to use the money on food for the family rather than on alcohol or other purchases (Rawlings and Rubio, 2005, Schady and Rosero, 2007). However, some studies of CM interventions have found that the effect size of incentive was greatest if the payment was made to a pre-designated group rather than the individual (Jeffrey 1983). This may be due to the social support provided by the group, or peer pressure, or some combination, and the question is whether such a mechanism can or should be applied to the sexual relationship.

Relatedly, there is the question of whether the cash incentive should be given alone or in conjunction with a psycho-social or counseling component. A study of California teens on welfare found that teens who received counseling in addition to cash were slightly more likely to complete high school than those receiving either cash or counseling alone (UCDATA). Several studies of CM interventions offered singly and in conjunction with counseling also found that the combination appeared to have greater impact (Krishnan-Sarin and others 2006). However, the effects were small, and the question of whether the additional programmatic costs involved in adding a counseling component were justified was not resolved.

Implementation

CCT programs for poverty alleviation have already been brought to scale in several different settings, and therefore have broken the credibility barrier by proving that it can be done. Of course, this has not eliminated concerns about whether CCT programs will be equally effective in other settings, particularly those where initial infrastructural investments in schools and health clinics are very low, as in many countries in Sub-Saharan Africa (Lagarde, Haines, and Palmer, 2007). However, some important initial groundwork has been laid, such as assessments of the type of infrastructural support that is needed to administer these programs, and associated costs. Nonetheless, the cost-

effectiveness of CCT programs when compared to traditional supply side investments in health and education has not been sufficiently explored (Lagarde, Haines, and Palmer, 2008).

In any case, these cost analyses would provide little insight into the costs of implementing a CCT-based program for HIV prevention where the major expenditures would include the cash payment (for which the appropriate magnitude has not been determined), as well as laboratory costs associated with the monitoring of biological outcomes. Petry (2000) has indicated that having an on-site laboratory is essential element of providing immediate and reliable feedback, which dramatically increases the capacity constraints for implementing such an intervention in rural areas of Sub-Saharan Africa. Improvements in rapid diagnostic testing may eventually address this concern.

However, cost concerns must be balanced against the benefits of an effective behavioral intervention, and – again – too little is yet known to draw any conclusions at this stage. Certainly the epidemiological context is highly relevant to this discussion, as the costs can be more easily justified in settings where the rate of disease transmission is very high. Also, the size effect of the CCT on infection rates is relevant.

De Janvry and Sadoulet (2006) have raised concerns about inefficiencies in the design of CCT programs, pointing out that large-scale CCT programs fail to distinguish between those families who would have attended pre-natal clinics and sent their children to school regardless of the incentive and those who require the incentive to induce the desired behavior. They conclude that CCT programs can be made more efficient if they do a better job of targeting the group that needs the incentive to be induced to alter their behaviors.

In other words, the less targeted the program, the less efficient it will be. This poses a challenge for the targeting of a CCT program to address risky sexual behavior. Should it target a geographical area, where HIV transmission rates are high; or, should it target a specific demographic group, such as young people between the ages of 15 and 30, where infection rates are highest; or occupational groups, such as sex workers or truck drivers? Cost-effectiveness and cost-benefit studies of CCTs in different target groups will be needed to inform these types of implementation decisions.

Monitoring and Evaluation

Monitoring and evaluation of CCT programs to address risky sexual behavior also raises some very special challenges. Although the ultimate aim is to address HIV transmission in the target population, the immediate objective is to reduce risky sexual behavior. A proxy measure is therefore needed, since the immediate outcome of interest in not directly observable. In HIV prevention, prevalence rates, incidence rates, and self-reported behaviors relating to sexual practice (e.g. condom use, number and concurrency of sexual partners) are commonly used for this purpose; by they are not perfect measures by any means. For example, biological markers such as HIV incidence are highly dependent on the prevalence and transmission patterns of the virus circulating within the population. Since HIV infection is a rare event compared to other types of STIs, the sample sizes needed to detect difference in study arms can be prohibitive. Also, self-reported data, especially as concerns sexual behavior, are notoriously unreliable and subject to strong reporting biases. Thus, it has become common practice in studying the impact of HIV prevention programs to track the incidence of STIs that are known to be

circulating within the population of interest and that have been incontrovertibly linked to unprotected sex and risky sexual practices.

These same challenges are relevant to the continuous monitoring of participants needed to trigger the cash payment, assuming compliance to the programmatic requirements can be verified. It is important to avoid false positives – thereby punishing individuals who have not been engaging in risky sexual behavior – but it is equally important to avoid false negatives – or, rewarding individuals who continue to engage in risky sexual behaviors but who have not been found out.

"Gaming" can also be a problem, and strategies must be found to minimize this. If individuals are asked to provide biological specimens, it is important to ensure that they have not substituted a friend or family member's urine or blood specimen for analysis. If individuals are expected to be free of STIs at the time of testing, it is important to ensure that self-treatment for potential infections (for example, with over the counter antibiotics) is not readily available.

In short, the types of monitoring and evaluation challenges that must be overcome in a CCT-based STI/HIV prevention intervention are significant. However, many of these challenges have been addressed in clinical settings evaluating the efficacy and effectiveness of CM interventions designed to discourage unhealthy or risky behaviors. In addition, the large-scale CCT programs designed to encourage uptake of health and educational services in poor populations have put systems in place, often automated, of tracking participant identities, ensuring compliance to the conditionality, and making cash payments. Together, these lessons learned can be used to inform efforts to design, implement, and monitor and evaluate a CCT-based STI/HIV prevention intervention.

Discussion and Conclusions

Cash incentives have been shown to be effective at shaping behavior in a variety of health domains, from improving the uptake of health and educational services among the poor, to discouraging unhealthy or risky behaviors, such as substance abuse, smoking, and over-eating. These successes inevitably raise the question of whether they can also be applied in areas of sexual and reproductive health and, in particular, to HIV prevention. A review of countries' experiences with CCT programs for poverty alleviation and CM provides useful insights into how to design, implement and evaluate a CCT-based STI/HIV prevention intervention. If found to be effective, the extensive literature on CCT programs in Latin America and similar programs in Africa, can be used to inform efforts to bring the program to scale.

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