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PAY-FOR-PERFORMANCE INCENTIVES IN LOW- AND MIDDLE-INCOME COUNTRY HEALTH PROGRAMS

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ABSTRACT

This chapter surveys experience with performance pay in developing country health programs. In doing so, it focuses on four key conceptual issues: (1) What to reward, (2) Who to reward, (3) How to reward, and (4) What unintended consequences might performance incentives create. We highlight that the use of performance pay has outpaced growth in corresponding empirical evidence. Moreover, very little research on performance incentives focuses on the underlying conceptual issues that we outline. We consider these to be important constraints to the design of better performance incentives in low- and middle-income country health programs.

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1. Introduction

Poor performance of health care providers plagues the delivery of health services in many low- and middle-income countries (Banerjee, Deaton, and Duflo 2004; Das, Hammer, and Leonard 2008; Berendes et al. 2011). The underlying reasons are complex and incompletely understood, but poor performance is not simply due to inadequate training or deficiencies in provider knowledge.

Instead, a growing body of evidence documents substantial deficits in provider effort. One striking example is the high absenteeism rates (as high as 75%) among health professionals documented in a number of studies (Chaudhury and Hammer 2003; Chaudhury et al. 2006; Lewis 2006). When providers are present, a sizeable "know-do" gap (or failure to do in practice what a provider knows to do in principle) also contributes to low quality medical care (Das and Hammer 2004; Alcazar et al. 2006; Chaudhury et al. 2006; Das and Hammer 2007; Das et al. 2012). Provider effort may also not focus directly on improving health – for example, health professionals may provide unnecessary services that are not medically appropriate (intravenous glucose drips to create the illusion of therapeutic effectiveness, for example) (Phadke 1998; Kremer 2002; Blumenthal and Hsiao 2005; Bloom et al. 2006). Moreover, even when providers exert appropriate effort during a clinical encounter, they may do little to promote the health of their patients outside of the encounter (through prevention and outreach activities, for example) (Eichler and Levine 2009).

One might expect that given weaker market incentives, these problems would be more prevalent in public sector health service delivery. However, sub-optimal provider effort can be sustained in equilibrium in all sectors, including private practice, due to well-known market failures. For example, a well-established literature demonstrates that asymmetric information

limits the ability of patients and the lay-public to observe provider effort or judge medical care quality (Arrow 1963; Holmstrom and Hart 1987; McGuire 2000). As a result, patients are unable to penalize under-performing providers through their choices. These problems are compounded by market conditions and rigidities common in low- and middle-income countries, including inadequate regulatory processes (World Health Organization 2003) and a relatively large government role in financing and delivering health services (given more prevalent infectious diseases and larger positive externalities in service delivery, for example).

To better align provider incentives with patient and population welfare (or health – one argument of welfare), "pay-for-performance" schemes have become increasingly common in developing country health service delivery.[1] In principle, the idea is straightforward: drawing on the logic of performance pay in human resource management (Lazear 1995; Hall and Liebman 1998; Lazear 2000), this approach rewards providers directly for achieving pre-specified performance targets related to health. Use of performance incentives in wealthy countries began in earnest during the 1990s with programs that rewarded both process indicators and measures of clinical quality (Rosenthal et al. 2004). Examples of performance targets include immunization rates (Fairbrother et al. 1999; Fairbrother et al. 2001); disease screening (Rosenthal et al. 2005); adherence to clinical guidelines (Roski et al. 2003); and the adoption of case management processes, physician reminder systems, and disease registry systems. The UK went further with the National Health Service's Quality and Outcomes Framework, tying physician practice bonuses to a comprehensive range of quality indicators (Roland 2004; Gravelle, Sutton, and Ma

[1] A variety of terms have been used interchangeably for pay-for-performance (P4P) incentives, including performance-based incentives (PBI), performance-based pay (PBP), and performance pay (PP). Beyond aligning provider incentives with patient and population health, there are other rationales for performance pay, including reducing the regulatory resources and effort otherwise required for provider monitoring (Lewis and Gunilla 2009).

2007). Performance pay in low- and middle-income country health programs emerged in the late 1990s (Franco, Bennett, and Kanfer 2002), and its use has grown rapidly since then.

In practice, pay-for-performance contracts are complex and fraught both with difficult trade-offs and with the possibility of 'multitasking' and other unintended consequences (Holmstrom and Milgrom 1991; Petersen et al. 2006; Rosenthal and Frank 2006; Mannion and Davies 2008). This chapter outlines key conceptual issues in the design of pay-for-performance contracts and summarizes existing empirical evidence related to each. In doing so, it focuses on four key conceptual issues: (1) What to reward, (2) Who to reward, (3) How to reward, and (4) What perverse incentives might performance rewards create. We conclude by highlighting important areas for future research and by noting the overall lack of evidence on many key aspects of incentive design in the health sector.

2. What to Reward

If "you get what you pay for," then it presumably follows that one should pay for what one ultimately wants (Cutler 2005). If a health program's primary objective is good patient or population health outcomes, it would seem natural for performance incentives to reward good health or health improvement directly rather than the use of health services or other health inputs. Rewarding health outcomes rather than health input use not only creates strong incentives for providers to exert effort, but it can also create incentives for providers to innovate in developing new, context-appropriate delivery strategies. Put differently, rather than tying rewards to prescriptive algorithms for service provision (often developed by those unfamiliar with local conditions), rewarding good health outcomes encourages providers to use their local knowledge creatively in designing new delivery approaches to maximize contracted health outcomes.

In practice, however, very few pay-for-performance schemes have rewarded good health. At the time of writing this review, we are aware of only two: performance incentives for primary school principals in rural China to reduce student anemia (Miller et al. 2012) and incentives for Indian day care workers in urban slums to improve anthropometric indicators of malnutrition among enrolled children (Singh 2011).[2] In the Chinese study, researchers measured student hemoglobin concentrations at the beginning of an academic year, issued incentive contracts rewarding anemia reduction to principals shortly afterwards, and measured student hemoglobin concentrations again at the end of the school year. School principals responded creatively, persuading parents to change their children's diets at home as well as providing micronutrient supplementation at school, and anemia prevalence fell by roughly 25%. In the Indian study, researchers measured child anthropometrics at day care facilities, issued incentive contracts rewarding providers for each child with an improved malnutrition score, and repeated anthropometric measurement three months later. In response, day care workers visited mothers' homes and promoted the use of nutritious recipe booklets; malnutrition indicators declined by about 6%.

The fact that so few pay-for-performance programs reward health outcomes may reflect important limitations to doing so that arise in practice. Instead, performance incentives generally reward the use of pre-specified health inputs. In the following sections, we discuss shortcomings and trade-offs inherent in incentive contracts that reward health outcomes.

Share of Variation in Contracted Outcome under Provider Control

One drawback to rewarding good health is that even when exerting optimal effort, a relatively small amount of variation in health outcomes may be under the control of providers.

[2] Leonard (2003) studies traditional healers who voluntarily offer payment contracts to patients contingent on health outcomes in Cameroon, Tanzania, and Ethiopia is a related example.

For illustration, consider the case of neonatal survival. Maternal health behaviors during pregnancy are key determinants of birth weight, and low birth weight is a leading risk factor for neonatal death (McCormick 1985). Although rewarding maternity care providers for neonatal survival could in theory motivate them to engage expectant mothers from an early stage of their pregnancy, providers may be unlikely to succeed or may believe a priori that they will be unable to change maternal health behaviors. Patients or community members may also respond to changes in provider behavior caused by performance incentives; in some cases, these responses may undermine provider actions. For example if educators or health providers take direct action to improve nutrition because of performance incentives, parents may respond by reducing children's dietary quality at home. In both cases, if providers do not believe that their effort will ultimately be rewarded, they may simply not respond to the performance incentive.

A clear (and common) alternative is to reward the use of health services and inputs, particularly those that are relatively sensitive to provider effort.[3] Providers generally have greater influence on service use than health outcomes, and even more so on quality of clinical care. In several rigorous studies of pay-for-performance incentives in Rwanda, providers were rewarded for prenatal care visits, immunizations among children and pregnant women, institutional deliveries, HIV testing, and a wide range of service quality indicators. Incentive payments were offered for each service provided and were weighted using overall quality scores. This set of incentives motivated providers both to increase delivery of contracted services and to raise overall quality of care. Researchers found that the program increased institutional delivery rates by 23% and preventive service use among children under age 4 by 25-50%, and it also

[3] Beyond trade-offs in rewarding health input use vs. health outputs, optimal contract design more generally requires information about the cost of provider effort, the productivity of provider effort, and the utility functions of both providers and the contracting 'principal' (Laffont and Tirole 1993; Salanie 2005).

reduced the "know-do" gap by 20% (Basinga et al. 2011; Gertler and Vermeersch 2012) . Although not directly contracted, infant weight-for-age and child (2-4 year old) height-for-age rose by roughly 0.5 and .25 standard deviations, respectively. The incentives also led to a 15% increase in the rate of HIV testing and counseling among couples, and an 18% increase in the probability that both partners in HIV discordant households had been tested for HIV at least once (de Walque et al. 2013).

Interactions with Provider Skill/Human Capital Base

A second limitation to rewarding good health outcomes is that providers may not possess adequate ability to innovate if they lack the necessary skills and human capital. These skills can be both technical and inter-personal. Loevinsohn and Harding (2005) suggest that providers may be unsuccessful in responding to performance incentives when success requires changing patient behavior (which requires skills beyond clinical ability). In the Rwandan program, providers were unsuccessful in increasing contraception use and in persuading patients to complete the contracted sequence of four prenatal care visits in part because of local patient preferences (superstitions about acknowledging pregnancies at an early stage) (Basinga et al. 2011; Gertler and Vermeersch 2012). To address this shortcoming, one program in the Democratic Republic of Congo paired performance incentives with consulting services for community outreach and business planning. Health facility managers were encouraged to submit quarterly business plans detailing their strategies to achieve incentivized targets, and consultants provided them with custom-tailored advice (Soeters et al. 2011; Bishai 2012).

Measurement of Contracted Outcomes

A third obstacle to rewarding good health is that health outcomes can be more difficult and expensive to measure than health service or input use, particularly when physiological health

indicators must be measured directly. For example, all else equal, the expense of measuring hemoglobin concentrations would potentially be an important barrier to scaling up the China performance pay program described above (Miller et al. 2012).[4] Alternatively, incentives tied to service and input use have successfully relied on combinations of self-reporting and random audits to measure contracted outcomes on a larger scale (see Regalia and Castro 2009 and Gertler and Vermeersch 2012, for example). Examples of contracted health inputs measured this way include well-baby visits (Basinga et al. 2011) and adherence to clinical protocols during medical visits (Soeters et al. 2011). Finally, measurement of contracted outcomes (either health input use or health outcomes) among patients in clinical settings may pose fewer measurement challenges than in community-wide settings (Section 5 considers trade-offs between rewards for outcomes among patients vs. population members).

3. Who to Reward

Another important issue in designing performance incentives is deciding who to reward. Which agents at what organizational level will be most efficient and effective in improving on contracted outcomes? In this section we describe conceptual issues in contracting at the macro (or organizational) and micro (individual) level.

Macro-level Incentives: Organizations and Local Government

At the macro-level, central governments in low- and middle-income countries often contract with private organizations or transfer resources to local government to deliver health services – and performance incentives are increasingly being included in these schemes.[5]

[4] A cost-effectiveness analysis of this program has not yet been conducted.
[5] Although beyond the scope of this chapter, a growing number of international donors also use pay-for-performance incentives under the umbrella of "results based financing" – for example, the Global Alliance for Vaccines and

Because performance pay shifts risk to incentivized agents, the more risk averse the agent, the greater the expected compensation must be (all else equal). One advantage of organizational-level incentives is that collectively, organizational agents may effectively be less risk averse than individual employees. This is because idiosyncratic risk that effort will not result in good performance – and thus not be rewarded – is pooled across individuals within organizations. As a result, overall program costs may be lower when contracting at the organizational level (all else equal). However, contracted organizations must then solve their own internal principal-agent problems, and they may pass the costs of doing so on to the principals contracting with them.

There are many circumstances under which central governments "contract-out" health service delivery to private organizations (typically NGOs). One is settings in which public sector facilities are largely absent – for example, regions of post-conflict Afghanistan (Palmer et al. 2006; Sondorp et al. 2009) and Haiti (Eichler et al. 2009). Under these conditions, governments and international organizations have contracted with NGOs to open facilities, recruit and train providers, and manage all aspects of service delivery. In the context of Afghanistan and Haiti, achieving performance targets was rewarded with operating budget transfers of up to 10% of the base contract amounts (paid by the World Bank and USAID, respectively). In Afghanistan, studies found that these contracting strategies were associated with improvements in service availability (measured as the ratio of facilities to population, which increased by about 30%, and the share of facilities providing antenatal care, which rose by 45% to 75%) and institutional delivery rates (which roughly doubled) (Eichler and Levine 2009). In Haiti, research suggested that performance pay was associated with 13-24 percentage point

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Immunization (GAVI) provides recipient countries with an initial unconditional payment followed by additional financial rewards based on quality of vaccination data and improvements in immunization coverage. The Millennium Challenge Corporation also uses a performance-based model for determining ongoing eligibility for aid among recipient countries (MCC 2012).

increases in full childhood immunization coverage and 17-27 percentage point increases in institutional delivery rates (Eichler and Levine 2009).

Contracting-out also occurs when public sector facilities exist but perform poorly. For example, in 1999, the Cambodian government began contracting with NGOs to manage health service delivery in five randomly-selected districts (8 districts were chosen for contracting, but not all districts had suitable quality proposals from NGOs). Contracts rewarded eight explicit performance indicators (immunization rates, vitamin A supplementation, antenatal care use, medical supervision of deliveries, institutional delivery rates, contraceptive use, and use of public vs. private sector health facilities). Researchers found that after five years, performance-based contracting led to a 32 percentage point increase in antenatal care use, a 16 percentage point increase in completion of recommended childhood immunizations, and a 17 percentage point increase in vitamin A supplementation. Cambodia's contracting strategy also improved general facility operations (24 hour service availability, staff attendance, managerial supervision, and equipment availability) (Bloom et al. 2006).

Macro-level performance incentives have also become increasingly common in the public sector. In the 1980s, central governments in many low- and middle-income countries began transferring funds for service provision to local governments, decentralizing authority over policy design and management (Manor 1999). One of the rationales for decentralization is that local governments have superior information about local preferences and are therefore better able to satisfy them (Rondinelli 1980; Conyers 1983; Mills et al. 1990; Maccini 2006). However, even if local governments have superior information about local preferences, they do not necessarily have strong incentives to satisfy them. Decentralization can therefore include performance-based incentives. For example, a recent initiative in Indonesia gave block grants to

village leaders to provide maternal and child health services and to run schools. In a randomly selected subset of villages, the size of subsequent block grants was tied to performance according to 12 performance measures (8 maternal and child health indicators and both enrollment and attendance in primary and secondary schools). With performance incentives, midwives in treatment villages worked longer hours, increasing the availability of health services – and prenatal care visits rose by 37 percentage points. Local administrators in incentivized districts also used central government funds more efficiently, negotiating savings in education (without any apparent decline in school attendance) and re-allocating the savings to the health sector (Olken, Onishi, and Wong 2012).

Under all of these circumstances, organizational autonomy may be critical for the success of incentive programs. The Cambodian program experimented explicitly with the degree of independence given to contracting NGOs, using both more restrictive "contracting-in" and more autonomous "contracting-out" arrangements. Management and facility indicators improved more in contracting-out districts, and there is suggestion that health indicators did as well (Bloom et al. 2006). Other cases illustrate the breadth of responses to performance incentives enabled by autonomy. For example, hospitals in Sao Paulo, Brazil with municipal health delivery contracts that rewarded hospital efficiency, patient volume, and service quality developed creative organizational strategies tailored to their own hospital settings (Jack 2003). Hospital spending fell and efficiency indicators rose without measurable declines in service quality. La Forgia and Couttolenc (2008) and La Forgia and Harding (2009) estimate that to produce comparable changes in patient discharges absent performance incentives, hospitals would need to increase spending by about 60%.

An important limitation of macro-level incentives is that they may not translate into private rewards for organizational leaders. Although performance incentives could in principle be structured this way, to date they have generally been designed as operating budget transfers

and eligibility for future contracts (we discuss rewards paid as budget transfers vs. private income in more detail in Section 4 on "How to Reward"). A related drawback is the possibility that organizational policies and regulations limit organizational or local government ability to solve their own internal principle-agent problems (if managers are not permitted to use budget transfers for employee bonuses, for example). In Cambodia, contracting NGOs increased the use of many (presumably productive) health inputs, but actual health outcomes (the infant mortality rate and diarrhea incidence among children under five) did not improve (Bloom et al. 2006). NGOs managing hospitals in Afghanistan (Sondorp et al. 2009) and Costa Rica (under similar programs) (Garcia-Prado and Chawla 2006) made improvements in facility management and service provision, but there were no measurable gains in health input use (immunizations, for example).

Micro-level Incentives

At the micro-level, organizations often use performance incentives to solve principal-agent problems with individual employees. These incentives can target upper-level managers and/or rank-and-file providers that they supervise.

An important virtue of rewarding managers for good performance is that they possess greater flexibility for innovation in service delivery. In contrast, lower-level health workers often must follow detailed, highly prescriptive protocols from which they are not allowed to deviate. For example, a recent study shows that Chinese primary school principals (who manage schools) offered performance rewards for reducing student anemia (Miller et al. (2012) see Section 2) not only supplemented school meals with vitamins, but they also took the initiative to discuss nutrition with parents, persuading them to increase their children's consumption of iron-rich foods at home. As a result, anemia prevalence among participating children fell by roughly

25% (Miller et al. 2012). In Nicaragua, health facility managers were given performance incentives for offering and providing both prenatal care and well-child services to a large share (90%) of local CCT program beneficiaries. In response, managers took the initiative to partner with community organizers (*promotoras*), school teachers, and the local media to conduct community outreach campaigns encouraging mothers to bring their children for check-ups. These managerial efforts were reportedly successful: nearly all providers were judged to have achieved the performance targets, preventive care use increased by 16 percentage points, and vaccination rates rose by 30 percentage points (Regalia and Castro 2009).

In practice, many pay-for-performance schemes to date have rewarded individual providers rather than their managers for good performance. Although rank-and-file health workers may have less flexibility to innovate in service delivery, their effort may ultimately matter most for organizational performance. Additionally, because they have the most direct contact with target populations, individual providers may also have better knowledge about local conditions. For example, day care workers in the Indian program rewarding reductions in malnutrition (Singh 2011) made more frequent home visits in addition to providing more nutritious meals at day care facilities. Through these home visits, they encouraged mothers to use nutritious recipe booklets, and malnutrition among children at their day care centers declined by 4.2% over a 3 month period (Singh 2011). In Rwanda, individual public sector providers responded to incentives for higher prenatal care and institutional delivery rates by partnering with midwives to identify and refer pregnant women for services. The associated increase in institutional deliveries was 10-25 percentage points (Rusa et al. 2009; Basinga et al. 2011; Gertler and Vermeersch 2012).

In addition to lacking flexibility to innovate in service delivery, there can be other limitations to incentivizing individual health workers as well. A potentially important one is that rewarding health workers for their own individual performance may create disincentives for teamwork or cooperation. Alternatively, rewarding providers for group performance (see Peabody et al. 2011, for example) creates incentives for free-riding because individual health workers do not bear the full cost of shirking – and may be rewarded for good performance among co-workers.

4. How to Reward

Using performance incentives to increase provider effort necessarily requires assumptions about what motivates providers. It is reasonable to assume the providers care about both financial compensation (Ellis and McGuire 1986; Ellis and McGuire 1993) and patient welfare (Delfgaauw 2007) to varying degrees. But human motives are complex, and other factors undoubtedly play a role too – professional recognition and the esteem of colleagues, pride in one's work, opportunities for professional advancement (career concerns), working conditions, and amenities where one lives, for example. From the standpoint of policy or program design, many of these other factors cannot be translated into performance rewards as easily as financial incentives. However, these other motives can interact with financial incentives in important ways.

In this section, we discuss general conceptual issues in the structure of performance incentive contracts.

Balancing Fixed vs. Variable Compensation

As discussed in the literature outside of health (on executive compensation, for example), performance pay should optimally balance fixed (unconditional) and variable (performance-based) pay. On one hand, performance bonuses must be sufficiently large to influence provider behavior. Aligning executive effort with firm interests may require that a large share of total compensation be tied to firm performance through performance pay (Hall and Liebman 1998). Several studies suggest that in health care, performance incentives may be ineffective if they are too small (Grady et al. 1997; Hillman et al. 1998; Petersen et al. 2006; Rosenthal and Frank 2006).

On the other hand, increasing variable pay as a share of total compensation increases the financial risk borne by providers (Ellis and McGuire 1990). Because providers are generally risk-averse (to varying degrees), they must be compensated for bearing additional risk inherent in pay-for-performance contracts. Negotiations over a health service delivery contract in Haiti between a NGO (Management Sciences for Health) and USAID illustrates this point (Eichler and Levine 2009). When re-negotiating its contract, Management Sciences for Health was only willing to accept the additional risk imposed by performance pay if USAID would increase the total amount that could be earned to exceed contractual payments under the alternative unconditional contract (under the performance pay contract, fixed payments were set to 95% of the unconditional contract amount, and an additional 10% was made conditional on good performance (Eichler et al. 2009)).

The Functional Form of Provider Rewards

A second issue in the structure of performance pay contracts is the functional form mapping incentive payments onto performance indicators. Absent knowing what the contract theory literature suggests is needed for optimal incentive contract design, a simple approach is to

offer rewards that are linear in contracted outcomes. Examples include constant incremental rewards per child reduction in malnutrition (Singh 2011), per child reduction in anemia (Miller et al. 2012), or per infant delivery supervised by a skilled birth attendant (Basinga et al. 2011).

Other programs have adopted a step-function approach, offering bonuses for surpassing one or more bright-line performance thresholds. Depending on its specific form, this approach can have theoretical grounding[6] and may also be appropriate when thresholds have clinical significance (vaccination rates at levels that confer herd immunity, for example (Anderson 1992). However, a drawback to the step-function approach can be greater risk that provider effort will not be rewarded. Specifically, it creates strong incentives in the neighborhood of a threshold, but it may also be a poor motivator for health workers far below (or above) a threshold.[7]

Salary vs. Operating Budget Rewards

Structuring performance rewards as private income or operational budget revenue also requires assumptions about what motivates providers. In one extreme, if providers were purely motivated by private financial considerations, offering rewards as private income would presumably induce them to exert greater effort. In the other extreme, if providers were purely philanthropic, incentive payments made as operational revenue could be more effective. Given that preferences are mixed in reality (and also include other things such as professional esteem,

[6] Contract theory suggests that optimal incentive contracts are likely to be non-linear in contracted outcomes (Laffont and Tirole 1993; Salanie 2005), and step-functions could provide a reasonable approximation of these non-linearities. However, the information required for optimal contract design (including the cost of provider effort, the health productivity of provider effort, and the utility functions of both providers and the contracting principal) is unlikely to be available in practice.

[7] Alternatively, Toonen and co-authors argue that setting bright-line aspirational goals could change institutional culture to be more results- or goal-oriented (Toonen et al. 2009). Although there is little evidence among studies of performance pay, bright-line performance incentive targets may also help to focus attention on contracted outcomes when provider attention is scarce (DellaVigna 2007; Shah, Mullainathan, and Shafir 2012).

pride in one's work, career aspirations, etc.), predictions about the relative effectiveness of different types of financial incentives are ambiguous and may be context-specific. One study suggests that NGO employees providing health services in Afghanistan responded positively to performance incentives even though bonuses accrued to facilities and did not result in personal financial gain. In principle, combinations of the two are possible, although we are unaware of schemes that mixed the two. In practice, macro-level rewards are often paid as operational revenue, while micro-level rewards are typically offered as private income.

Non-Financial Incentives

While pay-for-performance contracts strengthen extrinsic incentives, intrinsic motivation is commonly thought to be an important determinant of provider effort as well (Bokhour et al. 2006).[8] Although not focused specifically on health care provider behavior, research on intrinsic motivation in psychology suggests that more altruistic individuals work harder to achieve organizational goals (Franco, Bennett, and Kanfer 2002). In the health sector, altruistic individuals are more likely to work for health delivery organizations with explicit charity mandates (Serra, Serneels, and Barr 2011), suggesting that intrinsic motivation may be heterogeneous across types of health facilities. Health care providers with greater intrinsic motivation may also be more responsive to professional recognition among community members or peers (Franco, Bennett, and Kanfer 2002; Benabou and Tirole 2003). In such cases, non-financial rewards and other psychological tools[9] may be close substitutes for (or may even be more effective than) financial incentives.

[8] Intrinsic motivation refers to rewards that are internal and related to deriving enjoyment or satisfaction from the very act of completing a task. By contrast, extrinsic motivation refers to incentives or pressures that originate from the outside (the offer of financial rewards, for example).

[9] For a discussion of behavior modification strategies that do not rely on extrinsic incentives (including the use of framing, priming, and cognitive dissonance), see Kamenica (2012). We discuss the possibility that financial rewards undermine intrinsic motivation in Section 5.

Qualitative and anecdotal evidence from field studies support the hypothesis that health care providers are intrinsically motivated. Health workers employed by NGOs in post-conflict Afghanistan reportedly felt a great sense of pride and accomplishment after meeting contracted performance targets (Palmer et al. 2006). A program (not formally evaluated) in Myanmar offered new scales for measuring patient weight to providers who met Tuberculosis (TB) case identification and registration goals. In townships with these (essentially) non-financial incentives, identification of TB cases rose by 30 percentage points relative to informal comparison townships (Maung, Kluge, and Aye 2006). Anecdotal reports suggest that Zambian health workers participating in an incentive program (rewarding malaria treatment, infant and maternal care, and childhood immunizations) responded more favorably to trophies than to cash incentives (USAID 2006). Finally, case studies suggest that health providers rewarded for good performance with t-shirts (Speizer, Trambashe, and Tegang 2001), badges and certificates (Amare 2011), and recognition photographs (Bhattacharyya et al. 2001) may have been successful.

One rigorous quantitative study concurs with this qualitative and anecdotal evidence. In studying Zambian hair stylists with financial and non-financial incentives to sell condoms to salon clients, Ashraf, Bandiera, and Jack (2012) find that public recognition out-performs monetary incentives. These results are heterogeneous across stylists and are largely due to strong behavioral responses among stylists believed to be more committed to the cause of HIV prevention.

5. Perverse Incentives and Unintended Consequences

The use of incentives to improve health program performance is fraught with the possibility of unintended and potentially perverse consequences. In this section, we discuss some of these concerns and describe the empirical literature related to each.[10]

Non-Contracted Outcomes

One type of unintended behavioral response to performance incentives has been studied in the theoretical literature on "multitasking." When agents are responsible for multiple tasks or multidimensional tasks (some of which are unobservable or non-contractible), rewarding performance on a subset of contractible tasks or outcomes can lead to a reduction in effort devoted to non-contracted outcomes (Holmstrom and Milgrom 1991). The degree to which this occurs may depend in part on the extent to which non-contracted outcomes share inputs with contracted outcomes (Mullen, Frank, and Rosenthal 2010; Sherry, Bauhoff, and Mohanan 2013).

Empirically, some studies of performance incentives have found evidence of such behavioral distortions. A Kenyan school meal program rewarding improved pupil malnutrition rates found that subsidized meal preparation crowded out teaching time by 15% (Vermeersch and Kremer 2005). Similarly, providing incentives to Chinese primary school principals for reductions in student anemia may also have displaced teaching effort, leading to lower test scores in some cases (Sylvia et al. 2012). Findings across empirical studies of performance incentives are heterogeneous, however. Several rigorous studies also report no clear evidence of distortionary or detrimental reallocation of effort or other resources in response to performance

[10] This section discusses costly behavioral distortions that performance incentives may induce. We do not include misrepresentation of contracted outcomes (lying about them, for example) in our discussion because fraud/deception do not generally represent costly behavioral distortions (although fraudulent reporting that leads to undeserved incentive payments has a true resource cost).

incentives (Bloom et al. 2006; Mullen, Frank and Rosenthal 2010; Olken, Onishi, and Wong 2012, for example).[11]

Beyond the standard multitasking framework, performance incentives may lead to other closely related behavioral distortions. For example, although not studied empirically (to the best of our knowledge), performance incentives could lead to reallocation across multiple substitute activities related to the same disease or health outcome – or even the purposeful neglect of one to earn higher rewards for another (rewarding the successful treatment of a disease would undermine incentives to prevent it). Given growing emphasis on "impact evaluation,"[12] another related example would be distortionary reallocation of effort and resources towards an evaluation's primary outcomes (and away from outcomes not emphasized by the evaluation). Because demonstrating "impact" can lead to new or continued funding, the evaluation process itself may therefore create important behavioral distortions (depending on the beliefs of the evaluated organization).

Heterogeneity in the Return to Effort across Contracted Outcomes

Among contracted outcomes, providers may also allocate effort to those that yield the largest (net) marginal return (Mullen, Frank, and Rosenthal 2010; Gertler and Vermeersch 2012; Sherry, Bauhoff, and Mohanan 2013). In Rwanda, researchers found that rewards for good performance were most effective in improving outcomes that appear to have the highest marginal return or require the least effort. For example, performance incentives were more effective in increasing institutional delivery rates among pregnant women already in contact with community health workers (a relatively easy task because new patient relationships did not have to be

[11] Olken, Onishi and Wong (2012) find technical efficiency gains in education and re-allocation of resulting savings from education to health spending. However, measured education outcomes did not decline.
[12] For example, see the Systematic Reviews series published by the International Initiative for Impact Evaluation (3IE) available at http://www.3ieimpact.org/en/publications/

created) than they were in initiating the use of early prenatal care (which the authors suggest to be a relatively difficult task because doing so requires early identification of pregnant women not yet in contact with the health care system). Moreover, the incremental payment for institutional deliveries was relatively high (US $4.59), while the incremental payment for completion of quarterly prenatal care visits was relatively low (US $0.09) (Gertler and Vermeersch 2012). Ultimately, institutional delivery rates rose by more than 20 percentage points, but there were no increases in the share of women completing all quarterly prenatal care visits.

Patient/Sub-Population Selection

In addition to altering how providers choose among tasks, performance incentives may also influence how providers allocate effort among patients or community members. Although not the focus of our review, incentives for patient selection are a ubiquitous concern with the use of high-powered incentives that emphasize cost containment (capitated contracts under managed care in wealthy countries, for example) (Frank, Glazer, and McGuire 2000). With performance incentives for good patient outcomes, selection against the sickest or most remote patients ('cherry picking') may occur if producing contracted outcomes among them is relatively difficult or costly (Shen 2003; Oxman and Fretheim 2008).

Performance could alternatively be linked to population rather than patient outcomes, but providers could then be discouraged from providing services to individuals outside of the pre-defined population. Similarly, they may simply focus on the easiest to treat sub-populations within their defined service area. Some pay-for-performance schemes have tried to limit perverse incentives like these by offering larger rewards for services provided in more difficult or remote areas (Meessen, Soucat, and Sekabaraga 2011). Although such design features may

reduce incentives for selection, eliminating them is a nearly impossible task (as the literature on risk adjustment suggests (van de Ven and Ellis 2000)).

Erosion of Intrinsic Motivation

Finally, pay-for-performance incentives may have unintended consequences for the intrinsic motivation of individual providers and for the institutional culture of health care organizations. Benabou and Tirole (2005) develop a model in which effort in the presence of rewards is a function of intrinsic motivation (operationalized as altruism, but which could also include pride in one's work, etc.), extrinsic motivation (material self-interest), and 'reputational' motivation (related to social- or self-image). In the model, monetary rewards undermine 'reputational' motivation and can therefore crowd-out effort by changing the perceived meaning of one's actions (an 'image-spoiling' effect). Both laboratory and field evidence lend some empirical support to this prediction. In one experiment asking students to perform an altruistic task (collecting charitable donations), Gneezy and Rustichini (2000) show that the net effect of small monetary incentives on pro-social effort is negative – students put more effort into the task when they were not compensated than they did when offered a small incentive. A set of experiments conducted by Hayman and Ariely (2004) also suggest that financial rewards may frame a task as a 'money-market' rather than a 'social-market' task, potentially leading to reduced effort.

In low- and middle-income countries, there is similar concern that the use of financial incentives may lead to demoralization (due to perceptions of 'bureaucratization') (Oxman and Fretheim 2008), reductions in intrinsic motivation (McDonald et al. 2007; Ashraf, Bandiera, and Jack 2012), and less trust between patients and providers (Ellingsen and Johannesson 2008). Over time, the quality of individuals entering the public health workforce could also decline if

the use of financial incentives selects against intrinsically motivated health care workers (Witter et al. 2012).

Even if extrinsic incentives appear to work in the short-run, the errosion of intrinsic motivation can still be a longer-run concern. Psychology experiments reviewed by Deci, Koestner, and Ryan (1999) and Kamenika (2012) suggest that individuals offered monetary incentives to perform an otherwise intrinisically rewarding task put substantially less effort into the task (compared to control groups) when the incentives were removed. Social psychologists attribute this to the effect of extrinsic rewards on individuals' perception of themselves, on the value of the rewarded task (Gneezy, Meier, and Rey-Biel 2011), and on social perceptions of the task (Gneezy and Rustichini 2000).[13] Although not yet studied in low- and middle-income country health programs, one study of performance pay in the U.S. (at Kaiser Permanente hospitals) supports these findings (Lester, Schmittdiel, and Selby 2010).

6. Conclusion

This chapter summarizes important conceptual issues in the design of pay-for-performance incentive schemes. These include choice of contracted outcomes, the organizational level at which to offer incentives, the structure of incentive contracts, and what the unintended consequences of performance pay might be. In doing so, we have also surveyed existing peer-reviewed evidence related (in varying degrees) to each. We highlight that despite the growing body of research on performance incentives, very little of it has studied the

[13] Murayama and coauthors (2010) study a neural basis for this effect, measuring neurobiological changes when extrinsic rewards are introduced for otherwise intrinsically rewarding tasks. Although subjects offered financial rewards outperformed control subjects, researchers showed that the magnitude of the neural response to extrinsic rewards was negatively correlated with subsequent voluntary participation in the same activity after the rewards were withdrawn.

underlying conceptual issues that we outline;[14] we consider these to be important areas for future research. We also note that evaluation has not kept pace with growth in the use of performance pay: Table 1 lists programs that have not been studied (or studied rigorously) to the best of our knowledge. Strategically selected empirical research on these unstudied programs may provide a low-cost way of strengthening the body of evidence on foundational issues inherent in the design of performance incentives. In concluding, we also raise additional issues for further research not discussed in the body of our review.

The first is that there is substantial heterogeneity in responses to performance pay both across and within programs. We therefore caution against direct comparison of pay-for-performance schemes across different organizational, social, and institutional environments. However, we also note that understanding the underlying sources of this heterogeneity may provide insight into the circumstances under which performance pay is more or less effective (or socially desirable) too. For example, lack of autonomy among providers or health care organizations may be a critical obstacle to the effective use of performance pay in the public sector (because it restricts the range of behavioral responses that are possible) (Jack 2003).

Performance incentives may also interact with pre-existing incentives and social norms in important ways. In one study, the impact of performance pay varied across incentivized agents by a factor of three or more (and the underlying source of heterogeneity was not strongly correlated with demographic and socio-economic characteristics) (Miller et al. 2012). Another found that provider responses to performance pay varied significantly by baseline provider quality indicators (Sherry, Bauhoff, and Mohanan 2013). More generally, adequate bureaucratic capacity to enforce contracts, collect data, and verify performance is presumably necessary for

[14] See Christianson, Leatherman and Sutherland (2008), Mullen, Frank and Rosenthal (2010), and Eijkenaar (2012) on related work in high-income countries.

pay-for-performance schemes to succeed (Banerjee, Duflo and Glennerster 2008). Analysis of heterogeneous responses to performance incentives is an important area for future research.

Second, pay-for-performance schemes may have important equity implications (Yujing Shen 2003; Mannion and Davies 2008; Bierman and Clark 2007). Given that the net return to provider effort will undoubtedly vary across activities and sub-populations, performance pay may lead providers to focus on individuals with varying socio-economic or health characteristics. Pay-for-performance contracts offered to village governments in Indonesia attempted to address this concern by allocating equal performance pay budgets across geographic regions with varying socio-economic characteristics (to prevent some regions from benefitting disproportionately from the performance scheme) (Olken, Onishi, and Wong 2012). Competition among villages for performance rewards therefore occurred within, but not across, regions.

Finally, there has been surprisingly little rigorous empirical evaluation of the full welfare consequences of performance pay. The necessary building blocks for a cost-benefit analysis include a full understanding of the behavioral responses to performance pay and their magnitudes (including unintended ones) and a method for valuing each in common (typically monetary) units. Such evaluations are critical for understanding the ultimate social desirability of pay-for-performance schemes.

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Table 1: Partial list of pay-for-performance programs that have not been formally evaluated

Country	Year	Who to Reward	What to Reward	How to Reward	
Latin America					
Argentina		Provincial governments	Volume of poor women and children enrolled in health insurance; performance on 10 health indicators	60% of per-enrollee funding is fixed, 40% linked to performance on 10 targets.	14
Belize	2001	Public andprivate facilities		30% of total capitated service payments are paid monthly with deductions for failure to meet efficiency, quality and administrative process indicators.	21
Costa Rica	1994	Public hospitals	Clinical performance (low delvery complications, low reinfection rates)	Budgetary bonuses	8
Honduas		Private hospitals	Health input quality indicators	Payment for each indicator given according to the extent to which the indicator is met (70% performance on a target translates to 70% funding for that indicator)	14
Europe/Asia					
Armenia	2008	Primary care providers	Unclear	Unclear	15
Bangladesh	2010	Primary care facilities	Infant and maternal care use, postpartum contraception	Unclear if institutional bonuses or provider-level bonuses	11
Indonesia	2007	Village governing bodies	12 Health and education indicators	20% of annual block grants determined by village performance on each of 12 contracted indicators	9
Nepal	2005	Health workers in public health facilities	Attended deliveries (home or institutional)	$4.70 for each delivery attended	12
Africa					
Benin	2012	Public and private non-profit health facilities	Maternal and infant health, malaria service use	Salary bonuses	4
Burundi	2006	Public health centers and hospitals	24 specific services	Payment for each contracted service provided; payments weighted (up to 25% additional) for quality; payments up to 80% higher in poor and remote areas	3
Cameroon					
Central African Republic	2012	Private providers	Maternal and child health services, technical and capacity building indicators	Quarterly payments to facilities directly, used partly for worker bonuses and general operating budget	20
Egypt	2006	Public and private service providers in District Provider Organizations	Family planning, immunization,	Salary supplements to public and private service providers (up to 275% of base salary)	5
Ethiopia	2009	Commuity health workers	Peer and community based health education and outreach	non-financial incentives and recognition	1
Ghana	early-mid 2000s	NGO sector health workers	Varies across NGO provider	Varies across NGO provider	6

Liberia	2008	NGO health systems managers	6 administrative and managerial indicators and 12 targeted services	Operating budget bonuses	[4]
Malawi	2012	Primary care facilities	Quality as measured by a standards-based management and recognition tool		[2]
Mali	2012	Primary care providers	Essential obstetric and newborn care service use	Unclear	[17]
Mozambique	2011	Community health workers	Institutional deliveries, vaccination completion rates, combination of input and output based indicators	Unclear	[18]
Senegal	2012	Public sector hospitals, health management teams, and health centers	Increased care use and quality indicators	Unclear	[16]
Somaliland	2009	Nurses and traditional birth attendants	Institutional Deliveries	Nurses received bonuses for each attended delivery; Traditional midwives received an incentive for each referral	[10]
South Sudan	2009	NGO health systems managers	Vaccination rates, Vitamin A supplimentation, insecticide treated bednet use, underweight children, staffing, sufficient drug supply, clinical vignette performance	Below 80% of targets yields 95% contract payment; 80-99% leads to 100% payment; 100% of targets leads to 106% of contract payents	[10]
Tanzania	2011	Public health centers, non-profit hospitals and dispensaries	Unspecified indicators contracted (set of indicators specified for each type of facility)	Operating budget bonuses	[4]
Uganda	2004	Private non-profit health facilities	Increased patient volume, prenatal care visits, attended deliveries, immunization rates, contraception use, malaria treatment	Operating budget bonuses	[7]
Zambia	2004	Public providers	Malaria and sexually transmitted infection incidence; prenatal care, attended deliveries, postnatal care, patient satisfaction, immunization rates	Salary bonuses or non-financial awards (trophies)	[13]
Zimbabwe	2011	Provincial and district health executives, district hospitals and rural health centers	Infant and maternal health indicators	Service payments for each service provided; payments weighted by score on quality indicator tool; payments up-weighted for delivery of services in remote areas	[19]

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