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The devil is in the details: The successes and limitations of bureaucratic reform in India

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ABSTRACT

Using a biometric technology to monitor the attendance of public health workers in India resulted in a 15 percent increase in staff presence, particularly for lower-level staff. The monitoring program led to a reduction in low-birth weight babies, highlighting the importance of improving provider presence. But, despite the government initiating this reform, there was ultimately a low demand by the government to use the higher quality attendance data available in real time to enforce their existing human resource policies (e.g. leave or salary deductions) due to logistical challenges and a not unrealistic fear of generating staff discord or increase in staff attrition, especially among doctors, who showed the least improvement in attendance. While we observed some gains from this type of monitoring program, technological solutions by themselves will not improve attendance of government staff without a willingness to use the data generated to enforce existing penalties.

1. Introduction

Our models to analyze bureaucratic behavior often derive from the principal-agent-citizen framework. The principal—the government—designs a program around a specific goal, and the agents—the various bureaucrats—implement it (for a discussion of the literature, see Banerjee et al. (2013)). The challenge lies in bureaucrats naturally having different incentives than the government in terms of how they would administer the program, combined with the government's inability to perfectly monitor the bureaucrats' behavior. It, thus, follows that technological improvements in monitoring to increase the probability of getting caught engaging in a wrong behavior—along with increasing penalties for doing so, either financial penalties or other forms of stigma that may affect one's career trajectory—could, in theory, better align the bureaucrat's incentives to the government's. However, just monitoring along one dimension of work may not necessarily improve the program outcomes if the bureaucrat needs to undertake a series of different tasks—and not just the monitored one—to improve outcomes. It may even exacerbate problems if the monitoring harms the bureaucrat's intrinsic motivation to undertake the complementary, unmonitored tasks (Holstrom and Milgrom, 1991; Benabou and Tirole, 2006).

We focus on a particular form of malfeasance: the absenteeism of public health care workers. Bureaucratic absenteeism is a common problem around the world and one that has defied many efforts to tackle (e.g. Chaudhury et al., 2006). Even in the fairly well-off Indian state that we study (Karnataka), staff are often missing: for example, doctors in the public-sector primary health centers (PHCs) were present only 36 percent of the time in our baseline survey, but rarely took a "formal" leave day. If health care workers are absent, citizens may go without essential primary care and, especially, women may choose not to seek antenatal visits or have a delivery by a trained physician. In the long run, this can dissuade citizens from even approaching public health care facilities for accessing care.[1]

Due to the high absentee rate, in 2010, the National Rural Health Mission (NRHM) of Karnataka—the lead department for the delivery of health services in the state—designed a program to enforce their attendance policy, which existed on the books for decades, but was rarely adhered to in practice. Specifically, they developed a system that utilized a biometric monitoring device to digitally capture the thumb print of each staff member at the start and end of the work-day. The data were then to be uploaded daily —via a cell phone—to a central office that was tasked with providing detailed attendance information to supervisors in the head office and field and to the PHCs, and ensuring that the staff's "leave days" were properly deducted on the days that they were absent.

This pilot program provided a unique opportunity to study

[1] For instance, India launched a conditional cash transfer (CCT) program, *Janani Suraksha Yojana* (JSY), to promote institutional births.

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an organically-developed, government program that aimed to use the latest technology available to increase the monitoring of and incentives to both mid-level (doctors) and lower-level bureaucrats (e.g. nurses, laboratory technicians, etc) working in Primary Health Centers (PHCs) which as the name suggests are meant to be the primary providers of rural health care. The government piloted the system in about 140 PHCs in five diverse districts across the state, thus allowing us to randomize which 140 out of the 322 total PHCs in these districts received the intervention. We collected detailed data in order to understand how the system affected the bureaucrats' work behaviors and to test whether the system would ultimately affect citizen health. Note that even as a pilot, the introduction of this system was a sizable policy change: over 300 government employees and about two and a half million citizens (in the catchment areas of the treatment PHCs) had the potential to be impacted by the project.

Previous studies from the non-profit setting showed that these kinds of programs can be successful (Duflo et al., 2012). The non-profit setting provides a clean empirical test of the principal-agent model, as non-profit programs are usually conducted on a relatively small scale requiring few intermediate agents. In addition, in a non-profit setting it is relatively easy to alter the employee contracts to provide financial incentives.[2] However, a monitoring and incentive system may work very differently in government settings given the much larger scale that leads to decentralization of different tasks, the varying incentives of different government staff, and immense complexity of human resources processes including rigid civil service rules for incentives and discipline and multiple supervisory authorities. And yet, such monitoring and incentive systems are much more important in government settings precisely for these reasons and because governments in many developing countries like India continue to be the biggest providers of health care and education where absenteeism is highly prevalent. Consequently, more recent work has focused on introducing these kinds of systems into government (see, for example, Banerjee et al. (2008) and Callen et al. (2016)), but with varying levels of success.

Given our project set-up, we are thus able to contribute to this existing literature in three main ways.[3] First, we test an organically developed and comprehensive program at a very large scale, with a partner who fully intended to scale it up across the entire state if found to be effective. Banerjee et al. (2008), for example, had an incentive scheme introduced just for the experiment, and it was only enforced for sub-center nurses on one-day a week (since the nurses' primary duties were in the field). In our paper, we study a program developed by the government to use much more sophisticated technology to monitor their staff at primary health centers—who are required to be in the office on all days—and use the data to better enforce the existing government rules. Thus, with the detailed data that we have collected, we can not only test whether the monitoring has an effect on absenteeism, but we can better understand the challenges that arise when trying to implement these theoretical models within government settings and the reasons for its success or failure.

Second, we study the effect on different types of workers, from doctors to nurses to pharmacists, who may face different types of incentives and penalties within the government and may have differences in their outside opportunities. Importantly, across these very different workers, we also explore issues relating to their job satisfaction, retention, preferences to be in treated PHCs, and even corruption levels. Finally, while the previous research studied the effect of such systems on bureaucratic behavior, we additionally study the impact of the system on patient outcomes—health, payments and satisfaction.

Overall, health care workers increased their presence by 14.7 percent as a result of the introduction of the monitoring technology, despite some of the implementation challenges that we detail below. Disaggregating by time of day, we observe large increases in attendance in the morning, suggesting that the program effect may have been driven by reducing tardiness, which thus increased the total time spent in the PHC conditional on a staff member showing up at all. Importantly, there was substantial heterogeneity, however, within the PHCs: there were no observable treatment effects for doctors who are in charge of the PHCs, but instead the overall treatment effect appears driven by an 18 percent increase in the presence of the lower-level staff—the nurses, lab technicians and pharmacists. These results are consistent with the qualitative evidence that we collected suggesting that, for doctors, public sector jobs, especially those in rural areas, are increasingly becoming less attractive than private sector jobs as evidenced by a number of vacant doctor positions in PHCs. Therefore, the government—which is worried about doctor recruitment and retention—is more likely to let the rules slide for them, even when they have very good information on their absence. On the other hand, public sector jobs for nurses continue to be better in terms of pay, benefits and work-life balance than private sector ones and thus it is more feasible to impose more stringent regulations on them. Note that overall treatment effect was fairly constant for the first 10 months of follow-up, but then somewhat declined in the final months as the pilot program wound down.[4]

An increase in staff presence may not necessarily affect citizen health. The production function for health may require several concurrent tasks, and so just increasing attendance may not have a large enough effect. It may even exacerbate problems if the incentives harm the intrinsic motivation of the staff to participate in these other tasks. Moreover, only nurses and pharmacists were present more in the treatment PHCs—it is possible that any gains to health would come only from doctor attendance. Finally, at the extreme, it is possible that health care worker quality is so low (for example, see Das and Hammer (2005), Das et al. (2008) and Das and Hammer (2007)) that any increase in attendance would not have a noticeable effect on patient health. Thus, it is an empirical question as to whether we would observe gains to health from increased monitoring and staff presence. We find that health outcomes improved: there was a 4.6 percentage point decrease in the probability of being born below 2500 g. The level of antenatal visits was already high and did not alter as a result of the treatment, so the birth weight outcome was not due to an increase in visits. However, it is possible that the longer time spent by nurses and other staff at the PHC led to longer, more helpful visits; for

[2] For example, in Duflo et al. (2012) about 60 one-teacher schools were in the treatment. In fact, once the program was scaled up to the control group as well, the NGO had to decentralize the running of the program to different regional staff to administer rather than having one central office.

[3] This paper also builds upon the literature that explores the introduction of technological solutions to various aspects of government—with varying levels of success—including the introduction of electronic voting machines (Fujiwara, 2015), computerized land registration systems (Deininger and Goyal, 2012), electronic identification cards for the beneficiaries of social assistance programs (Muralidharan et al., 2014), and smart-phones to "monitor" officials who "monitor" lower-level bureaucrats (Callen et al., 2016). This paper contributes not only by exploring the impact of these programs, but also by exploring how the government's conflicting goals may impact whether technology will have sustained impacts.

[4] There were several possible reasons that the project began to wind down. First, the head of the NRHM who introduced the program changed and there was rapid turnover of successors for whom this was no longer a priority project. Second, the research team also became less involved in the day-to-day monitoring of the system.