The Political Economy of Public Sector Absence *

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October 4, 2022

Abstract

The paper examines how politics relates to public sector absenteeism, a chronic and intractable public service delivery problem in many developing countries. In Punjab, Pakistan, we document that political interference routinely protects doctors from bureaucratic sanction, while personal connections between doctors and politicians and a lack of political competition are associated with more doctor absence. We then examine how politics impacts the success of an at-scale policy reform to combat absenteeism. We find that the reform was more effective at increasing doctor attendance in politically competitive constituencies, both through increased monitoring and through senior health officials being able to respond more effectively to the data gathered on poor performing clnics. Our results demonstrate that politics can block the success of reform; instead of lifting poor performers up, the reform only improved places that had already been performing better. The evidence collectively points to the fundamental importance of accounting for political incentives in policy design and implementation.

* *Authors' Note*: We thank Farasat Iqbal for championing and implementing the project and Asim Fayaz and Zubair Bhatti for designing the smartphone monitoring program. Support is generously provided by the International Growth Centre (IGC) political economy program, the IGC Pakistan Country Office, and the University of California Office of the President Lab Fees Research Program Grant #235855. Callen was supported by grant #FA9550-09-1-0314 from the Air Force Office of Scientific Research. We thank Erlend Berg, Eli Berman, Leonardo Bursztyn, Ali Cheema, Melissa Dell, Ruben Enikolopov, Barbara Geddes, Naved Hamid, Gordon Hanson, Michael Kremer, Asim Ijaz Khwaja, Craig McIntosh, Ijaz Nabi, Aprajit Mahajan, Monica Martinez-Bravo, Benjamin A. Olken, Gerard Padró-i-Miquel, Karthik Muralidharan, Rohini Pande, Daniel N. Posner, Ronald Rogowski, Jacob N. Shapiro, Christopher Woodruff, Oliver Vanden Eynde, David Yanagizawa-Drott, Ekaterina Zhuravskaya and various seminar participants for insightful comments. Excellent research assistance was provided by Muhammad Zia Mehmood and Haseeb Ali. We thank Ali Cheema and Farooq Naseer for kindly sharing their data on election outcomes.

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1 Introduction

Addressing public worker absenteeism remains a critical policy challenge across much of the developing world (Banerjee et al., 2004; Kremer et al., 2005; World Health Organization, 2022). The problem is substantial and persistent: in the early 2000s, one in three educators and one in five health workers were absent from their jobs across Bangladesh, Ecuador, India, Indonesia, Peru, and Uganda (Chaudhury et al., 2006); more recently, 30% of all health workers were absent across 10 African countries (Laura et al., 2020). In our setting (Punjab, Pakistan), doctors were absent over two thirds of the time. Many governments are now targeting absenteeism, primarily through monitoring and incentivizing attendance (Banerjee and Duflo, 2006; Banerjee et al., 2008; Olken and Pande, 2012; Dhaliwal and Hanna, 2017; Finan et al., 2017; Muralidharan et al., 2019; Callen et al., 2020a) to mixed effect.

This paper studies *why* the problem is so challenging, focusing on the use of public sector jobs as patronage. We report on a randomized controlled evaluation of a province-wide reform in Punjab, a province of over 100 million in Pakistan that spans 297 electoral constituencies and so includes a rich variety of local political situations. From the outset, we designed our evaluation both to collect data and to operate at a scale that would allow us to understand how local politics affects absenteeism and the potential for reform. We join an active and growing area of research (Gulzar and Pasquale, 2017; Ornaghi, 2019; Rogger, 2014; Colonnelli et al., 2020; Brierley, 2021; Oliveros, 2021), but our focus is on the links between patronage jobs and absenteeism. Doctor absence in Punjab is exceptionally high, even relative to comparative countries, and these clinics provide essential preventative health care, antenatal services, and outpatient services for tens of millions of rural Pakistanis.

We conduct four separate analyses. First, we interview all 34 of the most senior district health officials in the province (who are only junior to the health secretary), each managing health systems that serve millions, as well as 116 of the deputies who work for them. Respondents consistently report that politicians' desire to protect doctors from accountability

is a major reason for absence. 40% of these officials report a politician having interfered in their decision to sanction an underperforming employee in the previous year. Moreover, such interference is even more common in less competitive electoral constituencies. In the least-competitive tercile of Punjab's 297 Provincial Assembly constituencies, health inspectors report an average of 6.03 instances of interference (s.e. = 2.5), while in the most competitive tercile, they report 1.41 instances (s.e. = 0.8).

Second, we use a geographic regression discontinuity to study how political competition relates to doctor attendance.[1] Importantly, in our setting, electoral constituencies cut across administrative health boundaries, limiting changes at geographic thresholds to those directly linked to politics. Moving from the most competitive third of constituencies to the least competitive third reduces doctor attendance by 20 percentage points (s.e. = 8.5pp). While this result does not tell us exactly *why* the degree of political competition matters, it does indicate that it affects doctor attendance. Moreover, doctors who are connected to their local politician are 17.7 percentage points less likely to be at work during a random audit (s.e. = 7.6 pp). Finally, doctors who are both politically connected and who serve in political strongholds (the least competitive tercile of constituencies) are 25.6 percentage points less likely to be found at the clinic (s.e. = 12.6 pp).

Third, we check whether the impact of the smartphone monitoring technology described in Callen et al. (2020a) varies with the degree of local political competition across these 297 constituencies using a province-wide randomized control trial. The reform compelled hospital inspectors to carry smartphones that geocode and time-stamp inspections on a dashboard visible to senior managers, thereby sharpening incentives for health inspectors to monitor clinics and to report data accurately. In Callen et al. (2020a), we report that the reform

[1]Doctor attendance was measured through independent, unannounced visits to health facilities during open hours. Enumerators physically verified doctor presence. Note doctors are officially required to be present and see patients at the health clinic during open hours. An unannounced visit therefore captures the official work assigned to doctors.

successfully increased health clinic inspection rates, but not average doctor attendance.[2] There is, however, suggestive evidence that increased monitoring did, in turn, increase doctor attendance in the most politically competitive tercile of constituencies by 10.2 percentage points (s.e. = 6.3pp). Moreover, in these same constituencies, doctors without connections to a politician are estimated to increase attendance by 26.6 percentage points (s.e. = 10.8pp).

Fourth, we study the impact of communicating attendance records via the dashboard on subsequent doctor behavior and whether it varies with political competition and with doctors' political connections. Specifically, we manipulate the salience of doctor absence through visualizations that select an arbitrary threshold at which facilities are 'flagged' in bright red to emphasize low levels of attendance. All health reports that meet this threshold are highlighted in a web portal (henceforth termed a 'dashboard') where data are summarized and presented to senior officials. Flagging a facility increases subsequent doctor attendance by 27 percentage points (Callen et al., 2020a). In this paper, we show that the efficacy of the senior bureaucracy is constrained by the political environment: senior bureaucrats are only able to boost doctor attendance in highly politically competitive areas and, there too, only for doctors without connections to local politicians.

All four analyses provide evidence consistent with politicians shielding doctors from accountability to the bureaucrats who manage them.

These results have antecedents in a substantial literature on interactions between politicians and bureaucrats. This literature provides several reasons a politician may seek to interfere when reforms affect public sector jobs. First, government jobs are ideal for patronage: they can be targeted to individuals, provide a credible stream of benefits, and the terms of the job—such as the wage, posting, and reporting requirements—can often be changed easily (Robinson and Verdier, 2013; Hollibaugh et al., 2014; Callen et al., 2020b; Xu, 2018). Doctors also can 'moonlight' in private clinics, where they often refer clients obtained at

[2]In Callen et al. (2020a), some specifications indicate an *average* and statistically significant increase in doctor attendance, while others are consistent with no impact.

public clinics and where doctors generally provide higher quality service (Das et al., 2016). These observations have a long history in political economy (Sorauf, 1956; Wilson, 1961; Johnston, 1979; Chubb, 1983; Golden, 2003; Calvo and Murillo, 2004; Meyer-Sahling, 2006; Chandra, 2007; Kitschelt and Wilkinson, 2007; Brusco et al., 2013; Larreguy et al., 2016, 2017; Weaver, 2021; Colonnelli et al., 2020; Akhtari et al., Forthcoming; Lehne et al., 2018; Brassiolo et al., 2020; Fafchamps and Labonne, 2017; Brollo et al., 2017).

The use of public jobs as patronage is also often a key vote-buying strategy (Gans-Morse et al., 2014; Folke et al., 2011). Interference can undermine reforms and negatively impact bureaucratic performance (Stokes, 2005; Lewis, 2007, 2011; Brusco et al., 2013; Muralidharan et al., 2017). Naturally, politicians' incentives to engage in such practices are shaped by and will carry implications for the degree of local political competition (Lindbeck and Weibull, 1987; Besley and Burgess, 2002; Careaga and Weingast, 2003; Rodden, 2006; Gordon and Huber, 2007; Kitschelt and Wilkinson, 2007; Raffler, 2022; Grossman and Michelitch, 2018; Cruz et al., 2018).These practices may be particularly problematic in South Asia (Chandra, 2007; Mohmand, 2011, 2014), where our study is carried out. Indeed, in our setting, we find using a close elections regression discontinuity that more doctors are assigned to work in areas aligned with the governing party, but that despite more assigned doctors, there is no increase in doctor attendance (Callen et al., 2020b). Recent evidence also clearly documents that public health positions can be obtained by bribing supervisors in charge of hiring (Weaver, 2021).

These results also accord with much recent work arguing that patronage jobs interfere with service delivery. We add to this by drawing a link between local politics, absenteeism *per se*, and the potential for reforms to fix the problem. We do so in the context of a large-scale randomized evaluation where data collection mainly focused on the links between patronage jobs and absenteeism. The focus on absence is important: reducing it is necessary to achieve health-focused Sustainable Development Goals, restore child vaccination programs in the wake of the Covid-19 health pandemic, and return to a trajectory of gener-

ally improving health indicators. Despite nearly 20 years of rigorous documentation of the degree of absence, it still remains intractable. Absent staff are a drain on public resources, with many development and public sector agencies spending considerable effort trying to improve the situation (Muralidharan et al., 2017). The results reported here point toward an underlying political equilibrium that persists in yielding high rates of absence, with results from all three analyses consistent with the argument that politicians seek to shield doctors from accountability for absence. We are not the first to show that patronage leads to service delivery issues, but we are able to make an empirical argument regarding the important issue of doctor absenteeism.

A substantial body of recent empirical research examines reforms aimed to make states more effective by reforming selection, incentive, and management policies.[3] Such reforms only happen in a political context, and politicians may be particularly interested in retaining de facto control of the incentives public employees face. Our central contribution is to provide a set of results linking patronage jobs to the persistence of absenteeism.

The paper proceeds as follows: Section 2 provides essential background information related to the reform. Section 3 presents our primary and secondary data. Section 4.1 presents results on political interference pre-policy reform, followed by an analysis of how political connections correlate with doctor attendance in section 4.2. Section 4.3 then presents our smartphone monitoring experiment and corresponding heterogeneous treatment effects based on political competition and connections. Section 4.4 then presents results from the dashboard experiment. Finally, Section 5 concludes the paper.

[3]See for instance: Muralidharan and Sundararaman (2011, 2013); Ashraf et al. (2014, 2015); Bertrand et al. (2020); Bloom et al. (2015); Finan et al. (2015); de Ree et al. (2016); Khan et al. (2016); Khwaja et al. (2016); Rasul and Rogger (2018).

2 Background

In the province of Punjab, Pakistan, the provision of health care services is managed by the Department of Health, based at the provincial headquarters in Lahore. There are five major types of health facilities, and we focus on the lowest tier, Basic Health Units (BHUs), which we refer to as 'clinics' hereafter. There are 2,496 such clinics in Punjab, almost all of which operate in rural and peri-urban areas. Each Basic Health Unit serves approximately one Union Council, which is the smallest administrative unit in Pakistan.

These clinics are designed to be the first stop for patients seeking medical treatment in a government facility. They provide several services including vaccinations, outpatient treatments, and neonatal and reproductive healthcare. Each clinic has a doctor, known as the Medical Officer, who is supported by a team including a Dispenser, a Lady Health Visitor, a School Health and Nutrition Supervisor, a Health/Medical Technician, a Midwife, and other ancillary staff. Officially, clinics are to be open with all staff from 8am to 2pm, Monday through Saturday.

We study Medical Officers who head these rural clinics. These doctors are general practitioners who have completed five years of medical school, and are almost always the most trained health professionals in rural areas. Doctors are either hired as permanent employees of the province by the Health Department of Punjab, or on a contractual basis at the District level by a senior bureaucrat.[4] While doctors receive a higher income with rising seniority, their portfolio of duties does not tend to increase significantly. Very few of these doctors rise through the ranks to become Deputy District Officers (described below): compared to the 2,496 Medical Officer posts in clinics, there are only about 120 such senior positions.

Under the umbrella of the Provincial Health Department, district governments are responsible for managing public clinics. The District Health Department is headed by an Executive District Officer (EDO), referred to as a 'senior health official' hereafter, who re-

[4]Appendix B details the hiring process.

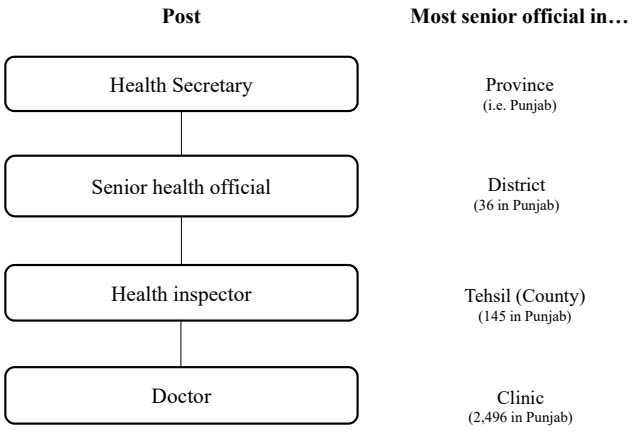

Figure 1: Health Sector Administration in Punjab

ports to the Director General of Health Services and the Secretary of the Health Department– the health leadership in Lahore. There are only 36 senior health officials in Punjab, one for each district. These officials are supported by several Deputy District Officers, typically one for each county (along with other staff excluded for brevity). Figure 1 depicts this simplified health administration hierarchy in Punjab.

The Deputy District Officers, hereon referred to as 'inspectors', occupy the lowest position in the officer cadre of the district health administration. Inspectors have the authority to punish absent clinic staff by issuing a show-cause notice, requiring staff to explain their absence to the senior health official. The senior health official can formally suspend and deny pay to any contract staff, including doctors, in severe cases of persistent absence under the Punjab Employees Efficiency, Discipline and Accountability Act 2006. They can also informally punish the absent staff by transferring them to less desirable locations. The senior health official relies entirely on these inspectors to ensure staff presence.

Inspectors have, on average, 21 clinics in their jurisdiction and are expected to visit them once per month. During these visits, inspectors record their findings on a standard form, collecting data on utilization, resource availability, and worker absence. These forms

are provided in Appendix C. Once collected, these reports are brought to a central district facility, manually entered into a spreadsheet, and aggregated into a monthly report for senior health officials.

This inspection system limits the ability of senior health officials to monitor their inspectors. Compounding this problem, senior health officials also have only two ineffective means of sanctioning an inspector: issuing a verbal reprimand or, in serious cases, sending a written request for investigation to provincial authorities. The investigation process is long, highly bureaucratic, and prone to interference by elected politicians, though it can lead to more serious consequences.

The career concerns of senior health officials and inspectors are also fundamentally different. The senior health official reports directly to senior provincial authorities who face few bureaucratic hurdles to sanctioning and holding the senior health officials directly accountable for service delivery in their district. Performance for the senior health official is commonly rewarded with appointment to a higher office, and yet, in contrast, inspectors are neither officially nor practically accountable for health service delivery. Appointees to this lower position have to serve for several years before they are considered for promotion to the next level in the district, and rarely ascend to leadership positions.

These considerations bear critically on how we should expect health officials to react to new technologies which make monitoring easier. First, senior health officials might embrace a smartphone monitoring system because it makes it easier for them to deliver services effectively, and they benefit professionally from getting their inspectors to perform better. Correspondingly, additional monitoring could lead to an increase in the rate of inspections. It also provides a logic for why senior health officials might respond to reports of absence by encouraging doctors to go to work.

3 Data

We use three sources of data: 1) interviews with the universe of senior health officials and inspectors; 2) attendance audits and interviews of doctors in a representative sample of clinics; and 3) data on election outcomes.

3.1 Interviews of Senior Health Officials and Inspectors

We interviewed all senior health officials and inspectors in Punjab. These included 34 of the 36 Senior Health Officials in Punjab,[5] as well as the 116 posted health inspectors. All staff were interviewed at their offices or the district headquarters to ensure a high response rate. The interview focused on questions about day-to-day activities of senior health officials and inspectors and included questions on political interference in the health bureaucracy.

3.2 Representative Survey of Clinics

We collected primary data on a representative sample of 850 of the 2,496 clinics in Punjab. Clinics were selected randomly using an Equal Probability of Selection (EPS) design, stratified on district and distance from the district headquarters. Our estimates of absence are thus self-weighting, and no sampling corrections are used in the analysis.[6] All districts in Punjab except Khanewal are represented in our data. Figure 2, Panel A, provides a map of the Basic Health Units in our experimental sample along with the different Provincial Assembly constituencies in Punjab.

Surveyors made three unannounced visits to these facilities: first in November 2011, then in June 2012, and finally in October 2012. During the unannounced visits, our team collected information on doctor absenteeism. Each enumerator was asked to fill an attendance sheet

[5]Senior health official Khanewal was not interviewed as Khanewal was the pilot district for our study, while senior health official Faisalabad was not available for interview.

[6]We sampled an equal proportion of clinics within each stratum to preserve an equal probability of selection.

for the staff at the clinic at the end of the interview *and* in private. Doctors are officially required to be present and see patients at the clinic. An unannounced visit therefore captures the official work assigned to doctors. This measure was vetted by our government partners.

Importantly, during our doctor interviews, we collected data on doctors' tenure in their post, the distance of their post from their hometown, and whether they know the local Member of the Provincial Assembly (MPA) personally.[7] To ensure sampling of doctors who were not present at their clinics during any of our three visits, we pursued the absent doctors until we could find them and interview them. We detail this process in Appendix Table A1.

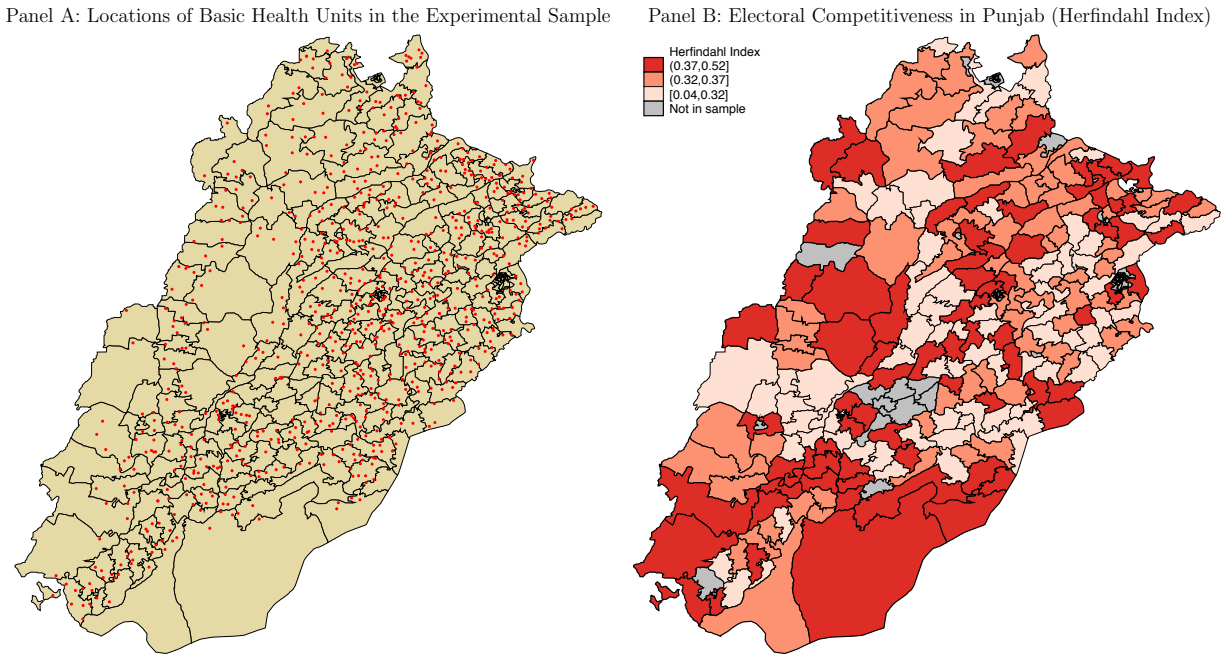

Figure 2: Experimental Sample and 2008 Political Outcomes by Constituency

Notes: Drawn borders demarcate Provincial Assembly constituencies in Punjab. The Herfindahl index in Panel B is computed as the sum of squared candidate vote shares in each provincial assembly constituency during 2008 elections.

[7]Connections to politicians are less likely for other staff posted at the clinic. For the empirical analysis, we generate a time invariant indicator variable that equals 0 unless doctors report they know the local politician in all the waves where this question is answered, in which case, it is coded as 1.

3.3 Election Data

We study elections for seats in the Punjab Provincial Assembly, a legislative body comprising 371 members, including general and reserved seats. Punjab, a province of over 100 million citizens, follows a party-based single-member district electoral system. We make use of election data for the 2008 Punjab Provincial Assembly elections. These data provide vote totals by constituency for all candidates running in the election. In cases of by-elections, we consider data from the election that most immediately preceded our program. Appendix D describes the protocol for identifying the constituency corresponding to each clinic. There are 371 seats in the Punjab Provincial Assembly. Of these, 66 are reserved for women and eight for non-muslims, leaving 297 elected seats. We draw a representative sample of 850 clinics from the universe of 2,496 facilities in Punjab. As a result, we have data from 240 constituencies that ends up in our analysis.

Figure 2, Panel B, shows the degree of political competition, as measured by the Party Herfindahl Index, across Punjab. Higher values of the index correspond to lower political competition. Appendix E explores the appropriateness of the Herfindahl index as a measure of political competition, and the robustness of our results to alternative measures. In Punjab, despite being a First Past the Post electoral system, more than two parties often get significant shares of the vote. As such, the Herfindahl index, and several other related measures of political competition, are conceptually useful in Punjab. Focusing on the provincial legislature is appropriate because a lot of services, including public health, were devolved to the provincial level under the Eighteenth Amendment to the Constitution of Pakistan which was approved on April 8, 2010.

4 Results

4.1 Political Interference in Bureaucratic Management

Political interference in the bureaucracy in Pakistan can work in at least two ways. First, politicians can help officials obtain postings in their region of choice, which is often their home county. Speculatively, we show in Appendix Table A2 that doctors who know politicians are more likely to be posted closer to their hometowns. Second, once posted, doctors and clinic staff are also known to appeal to politicians for protection against suspension, transfer, and other sanctions for underperformance.

Often, staff members at the clinics belong to politically powerful clans and families. These staff can provide at least two types of favors to politicians. First, they can activate their networks to mobilize votes (Wade, 1985). Although we do not measure this mobilization directly, various experts interviewed for this project independently confirmed that this is a relevant channel in our context. Indeed, there is evidence that doctors campaign directly for the candidates while serving in their official capacity.[8] Second, clinic staff are commonly recruited to assist the election commission with drawing up voter lists and overseeing polling on election day. They can therefore significantly aid or hinder a politician's election campaign by biasing voter lists or by turning a blind eye to vote-rigging. Consistent with this, we find a strong positive relationship between the share of doctors in a constituency who report knowing their politician in 2011 and whether the incumbent wins re-election in 2013. This is true even when we control for the degree of competition during the 2008 election. Appendix Table A3 reports these results.

Politicians may also want to provide sinecures to doctors without expectation of any direct reciprocal benefits. In background interviews, three former senior bureaucrats with experience in Punjab's health sector described how candidates needed to publicly demon-

[8]Appendix Figures A1 and A2 provide tweets by an election monitoring organization, the Free and Fair Elections Network (FAFEN), of doctors campaigning in their official capacity on behalf of politicians.

strate influence over the local state machinery to garner voters' confidence. The local police, courts, and bureaucracy are viewed as being susceptible to elite figures' influence. Politicians' ability to influence state machinery, including affecting the posting and promotion of government officials, affects voters' perception of the candidate. In Punjab, citizens are aware that politicians face limited executive constraints. Consequently, even if doctors do not directly reciprocate, directing a posting to a doctor provides politicians with an important means of indicating their power and competence.

Table 1: Political Interference in the Health Bureaucracy

Variable	Mean	SD	N
Panel A: Senior Health Officials and Inspectors			
Ever influenced by Any Powerful Actor	0.4	0.492	150
Ever Influenced by Provincial Assembly Member	0.322	0.469	149
Instances of Interference by Provincial Assembly Member	2.786	6.158	140
Panel B: Senior Health Officials Only			
Ever influenced by Any Powerful Actor	0.441	0.504	34
Ever Influenced by Provincial Assembly Member	0.441	0.504	34
Instances of Interference by Provincial Assembly Member	4.000	7.141	29
Panel C: Health Inspectors Only			
Ever influenced by Any Powerful Actor	0.388	0.489	116
Ever Influenced by Provincial Assembly Member	0.287	0.454	115
Instances of Interference by Provincial Assembly Member	2.468	5.87	111

Notes: This table reports the frequency of interference by politicians in decisions of senior health bureaucrats. Data come from a survey of the universe of senior health bureaucrats and inspectors in Punjab. For each panel, the first variable is an indicator variable for whether the bureaucrat was influenced by any powerful actor to either (a) not take action against doctors or other staff who were performing unsatisfactorily in their jurisdiction (county) or (b) assign doctors to their preferred posting in the previous two years. The second variable measures the same, but restricts attention to influence by provincial assembly politicians, the focus of our study. The third variable is a count of the number of times that bureaucrats report that Members of the Provincial Assembly pressured them to either (a) not take action against doctors or other staff that were performing unsatisfactorily in their jurisdiction or (b) assign doctors to their preferred posting in the previous two years. Of the 150 Senior Officials and Inspectors in our sample, 149 provided responses to this question. We drop nine reports which indicate more than 100 instances of interference (95th percentile). Table A7 presents the data without this restriction.

Table 1 reports summary statistics on self-reported incidents of pressure experienced by

inspectors and senior health officials. We asked the respondents to report the number of instances where a person of influence pressured either their colleague or themselves into a) not taking action against doctors or other staff that were performing unsatisfactorily in their county or district, or b) assigning doctors or other staff to their preferred posting (see Appendix Section F for English translations of these questions). Forty percent of officials report experiencing this type of interference and 32 percent of all respondents report pressure coming from elected Members of Provincial Assemblies, politicians whose behavior we focus on in this paper.

More speculatively, in Appendix G we find that political interference occurs more often in less politically competitive constituencies. Broadly, this suggests that politicians who have carved out strongholds are more likely to try to influence health officials. There are a number of reasons such a correlation might exist, but it suggests the possibility that politicians might exert control over bureaucrats as part of a political strategy.

4.2 Connections, Political Competition, and Doctor Attendance Under the Status Quo

Next, we examine whether political competition and doctors' political connections correlate with doctor attendance. For this analysis, we restrict ourselves to control districts to avoid reporting correlations induced by the experiment.

Appendix Table A4 summarizes the data. We can see that doctor attendance in our control districts is low. While unannounced enumerator visits took place during normal operating hours, we were able to locate doctors in only 22.5 percent of our visits. All clinics are supposed to have doctors posted. However, because of a combination of shortage of doctors, a lack of interest in rural postings, and perhaps misreporting to disguise absence, we find that only 53.1 percent of clinics officially have doctors posted. Even accounting for this low rate, doctors are present at only 42.1 percent of actual postings. Of the set of

doctors we observe, 25.3 percent report knowing the MPA personally (Lehne et al., 2018).[9]

We now test whether the degree of political competition in a constituency affects doctor attendance. We do so using an OLS with fixed effects as well as a geographic regression discontinuity approach. Our approach relies on the following specification:

$$\begin{aligned} Present_{ckw} = \quad & \beta_1 MedPol\ Comp_c + \beta_2 LowPol\ Comp_c + \beta_3 Knows\ MP_{ck} + \\ & \beta_3 Knows\ MP_{ck} \times MedPol\ Comp_c + \beta_4 Knows\ MP_{ck} \times LowPol\ Comp_c + \\ & \beta_5 \mathbf{X}_{ckw} + f(X_k, Y_k) + \gamma_w + \varepsilon_{ckw} \end{aligned}$$

$$\forall\ k \quad s.t. \quad X_k, Y_k \in (-h, h)$$

where $Present_{ckw}$ is an indicator variable that equals 1 if an assigned doctor at clinic k in constituency c is present during an unannounced inspection in survey wave w. $Knows\ MP_{ck}$ is a dummy variable that equals 1 if a doctor reports knowing their provincial assembly member personally, $Pol\ Comp_c$ variables are constituency-level Herfindahl Index terciles proxying for low, medium, or high (omitted) political competition, and $\mathbf{X}_{ckw}$ is a vector of additional covariates, including distance to the county headquarters, as well as one of county, or constituency, fixed effects, to exploit local variation in doctor attendance. All models also include survey wave fixed effects, denoted by γ_w.

For a geographic regression discontinuity model, we also use $f(X_k, Y_k)$, a flexible function in two dimensions, latitudes (X) and longitudes (Y) for every clinic k. We follow Dell (2010) in including a smooth function in longitudes X and latitudes Y.[10] Adding these geographic controls in a flexible way helps the regression absorb spatial trends that might bias estimates. We further assign the closest constituency boundary to each clinic in our data so that we compare clinics that provide the closest approximation to random assignment. For each clinic in the data, h refers to the distance to the nearest constituency boundary in kilometers.

[9]Appendix Table A5 tests whether doctors strategically misreport their connections to politicians by examining whether the smartphone monitoring program created any changes in how doctors respond to this question. We find that doctors did not change their responses, allaying concerns that these connections are misreported.

[10]Here, we set $f(X_k, Y_k) = x + y + x^2 + y^2 + xy + x^3 + y^3 + x^2y + xy^2$.

Finally, to improve precision, clinics are weighted in the regression based on a Triangular Kernel, where weights increase as the distance to the constituency boundary decreases.

We report results in Table 2. Column (1) shows the correlation between political competition and doctor attendance. Relative to places with high political competition, constituencies where political competition was low are 9.3 percent points less likely to have a doctor present during an unannounced visit, a difference of almost 50 percent. Column (2) shows that this effect is robust to the addition of a flexible function in latitudes and longitudes. Column (3) reports the geographic RD results. We restrict attention to a bandwidth of 5 kilometers, and weigh observations closer to this boundary higher with a triangular kernel. The effect of political competition is robust and larger. This result holds in Column (4) when we include additional controls for the number of registered voters and whether the PML-N (ruling party) provincial candidate won or was the runner up in the last election (2008).[11]

We also report OLS correlations between doctor connections with the local Member of the Provincial Assembly and doctor attendance. Columns (5) and (6) show that doctor attendance is 17.7 and 16.7 percentage points lower respectively for doctors that are connected to their local MPA.

Finally, we also interact political competition and doctor connections in columns (7) and (8). Consistent with the evidence above, doctors who are personally connected to politicians and serve in areas where political competition is low are precisely the ones who are least likely to be present at work during an unannounced visit by our enumerators.

Based on the recommendations in Cattaneo et al. (2019), we subject the spatial RD estimates in Table 2 Columns (3) and (4) to a number of robustness checks. Cattaneo et al. (2019) specifically recommend five so-called validation and falsification tests: (i) examining balance around the cutoff in terms of observable characteristics not affected by 'treatment'

[11]Note there is no difference between high and medium political competition in any of these models nor in those in columns (5) and (6). We find similar results when using a linear measure of political competition, or if we split our sample above/below median political competition or by quartiles instead of terciles. See Appendix Table A6 for this analysis for column (3).

Table 2: Political Connections, Competition, and Doctor Attendance

Dependent Variable:	Doctor Present (=1)							
Model:	OLS (1)	OLS (2)	GEO (3)	GEO (4)	OLS (5)	OLS (6)	OLS (7)	OLS (8)
Med Political Competition	0.002	-0.014	-0.089	-0.112			-0.120*	-0.140*
	(0.044)	(0.045)	(0.102)	(0.105)			(0.072)	(0.078)
Low Political Competition	-0.093**	-0.105**	-0.181**	-0.200**			-0.077	-0.113
	(0.047)	(0.048)	(0.085)	(0.085)			(0.068)	(0.069)
Doctor Knows Local MPA Personally (=1)					-0.177**	-0.163*	-0.116	-0.125
					(0.076)	(0.083)	(0.110)	(0.108)
Doctor Knows × Med Political Competition							-0.002	-0.001
							(0.134)	(0.134)
Doctor Knows × Low Political Competition							-0.256**	-0.246*
							(0.126)	(0.126)
Distance to District Center (in minutes)		-0.002***	-0.001	-0.002		-0.001		-0.000
		(0.001)	(0.001)	(0.001)		(0.002)		(0.001)
Mean, High Competition	0.204	0.204	0.205	0.205			0.444	0.444
Mean, Doctor Knows=0					0.463	0.463	0.460	0.460
High Comp & Mean, Doctor Knows=0							0.456	0.456
# Constituencies	121	121	115	115	93	93	91	91
# Observations	1173	1173	924	924	613	613	608	608
R-Squared	0.158	0.167	0.331	0.335	0.221	0.235	0.167	0.177
County Fixed Effects	Yes	Yes	-	-	-	-	Yes	Yes
Constituency Fixed Effects	-	-	-	-	Yes	Yes	-	-
Spatial Controls	-	Yes	Yes	Yes	-	Yes	-	Yes
Election controls	-	-	-	Yes	-	-	-	-
Boundary Fixed Effects	-	-	Yes	Yes	-	-	-	-
Triangular Kernel	-	-	Yes	Yes	-	-	-	-
Bandwidth	All data	All data	5 Km	5km	All data	All data	All data	All data

Notes: This table reports on the relationship between doctor attendance and interactions between the political connections of doctors and the degree of political competition. The dependent variable is a dummy equal to 1 if a doctor is present during an unannounced facility inspection performed by our survey team. The political competition index is a Herfindahl index computed as the sum of squared candidate vote shares in each provincial assembly constituency during 2008 elections. It varies between 0.040 and 0.52 and we split it into its terciles to indicate High (omitted), Medium, or Low competition. All specification samples are restricted to basic health unit facilities in control districts. All models include survey wave fixed effects. Indicated estimates include a triangular kernel and a geographic control function in longitudes (x) and latitudes (y) of the form $x + y + x^2 + y^2 + xy + x^3 + y^3 + x^2y + xy^2$. Election controls include counts of the number of registered voters, election turnout, and the number of candidates in each provincial constituency in 2008 and a dummy for whether the PML-N (the ruling party) provincial candidate won in 2008. Standard errors clustered at the constituency level reported in parentheses. *Levels of significance*:*$p < 0.1$, **$p < 0.05$, ***$p < 0.01$.

(in this case high political competition can be considered treatment, low as control), (ii) examining whether the number of observations below the cutoff is surprisingly different from the number of observations above it, (iii) examining treatment effects at artificial or placebo cutoff values, (iv) examining sensitivity to observations near the cutoff, and (v) examining sensitivity to bandwidth choice. We present Appendix Figures for all recommended tests except (iii). We do not attempt to construct placebo cutoffs.[12]

First, Appendix Figure A3 presents balance at the cutoff for nine time-invariant or pre-

[12]If we redrew constituency boundaries arbitrarily, we would then need to assign the degree of political competition in each placebo constituency arbitrarily as well.

treatment covariates. For each covariate we present balance at bandwidths of two through ten kilometers and for linear through quadratical spatial control functions. For five of nine variables we are balanced in almost all cases. For three variables we find imbalances at low bandwidths (slope, registered voters 2008, and turnout 2008). For one variable we find imbalances at high bandwidths (ruggedness). We are not surprised to find imbalances in some election variables as these variables are correlated with political competition. This is why in Table 2 Column 4 we add these additional election variables as controls. If we additionally include slope and ruggedness as controls in this regression, the coefficient on low political competition becomes -.180 (p-value 0.036).[13]

Second, in Appendix Figure A4 we examine the number of observations in high vs low political competition at a range of bandwidths. We cannot reject that the observations are split 50/50 using a Bernoulli test at any bandwidth.

Third, in Appendix Figure A5 we examine whether throwing out BHUs within 0.1 to 0.5 kilometers of a constituency boundary affects our results. While we find it hard to believe there was manipulation in BHU placement by political competition, Cattaneo et al. (2019) also motivate this test saying "Even when manipulation of the score is not suspected, this strategy is also useful to assess the sensitivity of the results to the unavoidable extrapolation involved in local polynomial estimation, as the few observations closest to the cutoff are likely to be the most influential when fitting the local polynomials." We do not find evidence of such a sensitivity.

Lastly, in Appendix Figure A6 we show that our primary results from Table 2 Columns (3) and (4) are robust to changes in bandwidths and functional form. We do not run our model with a bandwidth below two kilometers as our sample becomes too small relative to the number of constituencies. Note that Cattaneo et al. (2019) recommend optimal bandwidth selection and bias correction formulas for standard regression discontinuity designs. However,

[13]In Appendix Figure A3, we standardized all variables for comparability. The two non-election variables (slope and ruggedness) have relatively small imbalances (within +/- 0.2 standard deviations). Neither of these vary much in our sample, so these amount to small geographic differences.

these formulas are not appropriate for our geographic RD design (Dell, 2010). As such, we opt to show that our main results do not depend on our choice of bandwidth.

These robustness checks support the idea that our spatial RD estimates to plausibly isolate causal variation, especially when we consider the specification in Column (4) with election controls.[14] In order for an omitted variable to bias our estimate, it would need to be correlated with both political competition and doctor absence and it would need to vary exactly at the constituency boundary. Administrative boundaries in Punjab are not aligned with constituency boundaries so bureaucratic variation is accounted for by spatial controls. Election controls further account for many potential omitted variables related to the party in power and general electoral engagement, such as differences in patronage, and thus public service delivery outcomes, by ruling party that are documented in Callen et al. (2020b) and that would also vary at the constituency boundary.

The results on political competition and political connectedness in the first three columns of Table 2 are broadly consistent with two separate arguments. First, it may be that in highly competitive constituencies, politicians face stronger incentives to make sure health services are effectively delivered. Second, it may be that politicians who can capture constituencies are more likely to interfere in the bureaucracy on the doctors' behalf. Doctors in protected jobs may be expected to work less. These are not mutually exclusive theories, and our estimates suggest both may have some relevance in this context. Critically, however, the survey evidence indicating frequent interference by politicians, coupled with the evidence that doctors connected to politicians work less in Columns (4) and (5), as well as the evidence in Columns (6) and (7) that connected doctors in low competition areas are particularly susceptible to absenteeism, provides reason to believe that second channel might most accurately

[14]Though not a check of internal validity like these others, a final check we conduct on our spatial RD estimate is whether our result is sensitive to the choice to split political competition into terciles. While this seems natural for our interpretation, it is ad-hoc. In Appendix Table A6, we repeat our primary result from Table 2 Column (3) with three different models: a linear political competition variable (the party Herfindahl index), a model splitting competition above/below the median, and a model splitting political competition into quartiles. The results are consistent across all models.

characterizes this environment.

These results carry implications for the effectiveness of our experiment. Politically connected doctors could be less sensitive to monitoring. While monitoring innovations increase the probability of shirking doctors being detected, they may matter less for doctors and bureaucrats who seek protection from local politicians. We will turn to this now.

4.3 The Monitoring the Monitors Program

We partnered with the government to design and evaluate the "Monitoring the Monitors" program. The policy objectives of this program were to collect actionable data and improve inspector compliance with monitoring duties. Under this program the government replaced the existing paper-based monitoring system with an Android-based smartphone application, which collected the same data as the paper forms and transmitted them instantly to a central online dashboard.

The dashboard provided summary statistics, charts, and graphs in a format designed in collaboration with senior health officials. Inspections were also geotagged, timestamped, and required photos of the inspector and all facility staff marked present to check for reliability. The geotagging and time-stamping features were designed to increase monitoring of inspectors while the facility staff photos were intended to increase monitoring of doctors.

Our experimental sample comprises all health facilities in 35 of the 36 districts in Punjab. We remove Khanewal from the experimental sample as that district served as the location for our pilot. We randomly implemented the smartphone program in 18 of the 35 districts in our experimental sample. See Callen et al. (2020a) for more information on Monitoring the Monitors and on the experimental design.

4.3.1 Heterogeneity in the Success of Monitoring the Monitors by Political Competition

The links between doctor attendance, relationships to politicians, and the degree of local political competition, reported in Sections 4.1 and 4.2 above, suggest potential heterogeneity in the impact of the smartphone monitoring program. We use the large degree of variation in competitiveness across the 240 constituencies in our sample to check for impact heterogeneity.

Table 3 reports these results. Column (1) indicates no average impact on doctor attendance. However, consistent with the results in Section 4.2, results in column (2) suggest that the program increased doctor attendance in the most competitive tercile of constituencies (with a $p = 0.06$ using Fisher's exact test). By contrast, while not statistically significant, the point estimates suggest that, if anything, the program decreased attendance for doctors in constituencies with low degrees of political competition. One way monitoring might reduce doctor attendance, measured during our independent inspections (which are not coordinated with the smartphone inspections), is by allowing inspectors and doctors to collude on both being present during the smartphone inspection. If, prior to the introduction of the smartphone monitoring system, inspectors and doctors did not communicate regarding inspection schedules, but started doing so because of the program, this might explain the point estimate.[15]

Column (3) checks for differences in impact by whether doctors are connected to their local politician. In the above analysis, we found that connected doctors are less likely to work. This suggests both that there is greater room for improvement for these doctors, but also that they may be less likely to react to, and perhaps more likely to try to undermine, the monitoring system. The estimates indicate this may be the case. The point estimates, while not statistically significant, suggest a modest positive impact on attendance for unconnected doctors and a negative impact for connected doctors. We explore this further in Column

[15]See Callen et al. (2017) for a more thorough discussion of collusion in this context.

(4) which reports the double interaction of the policy reform with doctor connections and political competition. Though we are cutting the data into small bins, we note that it is unconnected doctors serving in the most political competitive areas who are most likely improve their attendance in response to the reform.

Table 3: Hetereogeneous Treatment Effects on Doctors by Political Competition and Doctor Connections

Dependent Var.	Doctor Present (=1)			
	(1)	(2)	(3)	(4)
Monitoring	-0.010			
	(0.043)			
	[0.645]			
Monitoring x High Political Competition		0.102		
		(0.063)		
		[0.057]		
Monitoring x Med Political Competition		-0.059		
		(0.067)		
		[0.873]		
Monitoring x Low Political Competition		-0.066		
		(0.060)		
		[0.900]		
Monitoring x Doctor Does Not Know Politician			0.010	
			(0.074)	
			[0.495]	
Monitoring x Doctor Knows Politician			-0.104	
			(0.150)	
			[0.699]	
Monitoring x High Comp X Not Know				0.266**
				(0.108)
				[0.017]
Monitoring x High Comp X Knows				0.099
				(0.421)
				[0.441]
Monitoring x Med Comp X Not Know				-0.102
				(0.111)
				[0.853]
Monitoring x Med Comp X Knows				-0.111
				(0.141)
				[0.776]
Monitoring x Low Comp X Not Know				-0.094
				(0.107)
				[0.876]
Monitoring x Low Comp X Knows				-0.180
				(0.135)
				[0.864]
Constant	0.326***	0.324***	0.503***	0.498***
	(0.014)	(0.014)	(0.023)	(0.022)
Mean, Controls	0.227			
High Comp Mean, Controls		0.202		0.202
Med Comp Mean, Controls		0.234		0.234
Low Comp Mean, Control		0.240		0.240
Does Not Know Mean, Control			0.462	0.462
Knows Mean, Control			0.225	0.225
Mon. x (High vs Med Comp) (p-value)		0.079		
Mon x (High vs Low Comp) (p-value)		0.027		
Mon. x (Does Not Know vs Knows) (p-value)			0.502	
Mon. x High x (Not Know vs Knows) (p-value)				0.715
Mon. x Med x (Not Know vs Knows) (p-value)				0.962
Mon. x Low x (Not Know vs Knows) (p-value)				0.642
# Districts	35	35	34	34
# Clinics	852	842	538	533
# Observations	2422	2398	1544	1532
R-Squared	0.006	0.010	0.017	0.029

Notes: This table reports on the effects of the 'Monitoring the Monitors' program on the attendance of doctors. Columns (2) and (3) look at heterogeneous impacts by the degree of political competition in the constituency where the reform is implemented and columns (4) and (5) look at heterogeneity by whether the doctor reports being connected to their local politician. These estimates correspond to specification (2) in the paper, replacing the dependent variable with an indicator equal to one if a doctor is found to be present during an independent inspection. All regressions include clinic and survey wave fixed effects. Standard errors clustered at the district level reported in parentheses. Fisher Exact Test p-values reported in brackets. This test places the 'true' treatment assignment p-values in the distribution of p-values obtained from a 1000 random draws of treatment assignment.

4.4 Highlighting Absence to Senior Bureaucrats

The 'Monitoring the Monitors' program was designed to increase the flow of information from doctors and inspectors to senior officials. The program therefore provides information that is essential for senior bureaucrats to improve the performance of doctors and inspectors. Increasing the flow of such information is viewed as holding promise for service delivery in developing countries (Finan et al., 2015). In this case, we can check whether senior bureaucrats' ability to correct attendance problems is related to the degree of political competition and doctor connections in the constituency in which a clinic is located. In this sense, we can evaluate how political interference in decision-making of senior health officials may carry consequences for service delivery.

Data collected via the smartphones are aggregated and presented to senior health officials on an online dashboard. In addition to these officials, this dashboard is visible to the Health Secretary and the Director General of Health for Punjab.

To test whether actions by senior health officials affect absence, we directly manipulated data on the dashboard to make certain inspection reports salient. Specifically, we highlighted in red inspection reports on the dashboard that reported three or more staff (of 7 generally) as absent during an unannounced visit to the clinic. The exact formula for this arbitrary threshold was not known to anyone but the research team.

We examine whether this manipulation affected subsequent doctor absence in our primary data with the following specification:

$$Present\ Survey_{jt} = \alpha + \beta_1 Flagged_{jt-1} + \sum_{i=1}^{3} \delta_t + \eta_{jt} \tag{1}$$

$Present\ Survey_{jt}$ is equal to 1 if the doctor j was absent during an unannounced visit by our enumerator in wave t, $Flagged_{it-1}$ is a dummy variable that equals 1 if the facility was flagged in red on the dashboard in a window of time prior to the primary survey wave t. For our primary analysis, we define this window as 11 to 25 days before an unannounced visit by

our field enumerators. Senior health officials only looked at the web dashboard every week or two, so we would not expect an immediate response from flagging. However, if the window is made too long, virtually every facility will become flagged and we will lose variation.[16]

To minimize possible different trends in absence between facilities that were flagged and not flagged, and thus to isolate the effect of the flagging itself, we restrict our sample to only facility reports in which either two or three staff were absent.[17] Causal identification requires that facilities just below the cutoff (those with two staff absent during a health inspector's visit) and facilities just above the cutoff (those with three staff absent) share potential outcomes in the absence of the flagging. In Callen et al. (2020a), we show our "flagging" result (not the heterogeneity results in this paper, but simply the average effect) is isolated to the exact threshold we set for flagging (going from 2 to 3 staff absent) and that we do not see any effect at placebo thresholds of 1 to 2 staff absent, 4 to 5, etc. Also in that paper, we perform five validity checks of this identification strategy. These include: (i) checking alternative thresholds; (ii) checking whether absence flagged on the dashboard predicts attendance in surveys performed prior to the appearance on the dashboard; (iii) controlling for the entire history of flagging on the dashboard; (iv) checking whether

Columns (1) and (2) reproduces unconditional flagging results from Callen et al. (2020a). Column (3) examines directly whether the impact of flagging underperformance depends on the degree of political competition in the constituency from which the report originates. It may be that senior health officials can work to correct doctor attendance at a clinic when that facility is in a competitive constituency as political interference there is likely to be low. The results suggest that doctor attendance is indeed higher as a result of flagging in high competition areas. Flagging a clinic on the dashboard in a highly competitive con-

[16]We report robustness in all of our flagging results to the choice of the time window, in Appendix Figure A7.

[17]This also means we cannot generalize the results here to understand how dashboard flagging would have affected clinics that always have fewer than two or three or more staff absent. In this sense this section reports Local Average Treatment Effects, localized to those right around the cutoff.

Table 4: Effect of Flagging Underperformance on the Dashboard

	Doctor Present in Unannounced Visit (=1)				
	(1)	(2)	(3)	(4)	(5)
Flagged	0.079	0.177**			
	(0.054)	(0.082)			
Flagged x High Competition			0.359***		
			(0.118)		
Flagged x Med Competition			0.004		
			(0.165)		
Flagged x Low Competition			-0.087		
			(0.134)		
Flagged x Doctor Does Not Know Politician				0.201*	
				(0.109)	
Flagged x Doctor Knows Politician				-0.250	
				(0.249)	
Flagged x High Comp x Does not Know					0.454***
					(0.130)
Flagged x High Comp x Knows					-0.565*
					(0.288)
Flagged x Med Low Comp x Does not Know					-0.129
					(0.188)
Flagged x Med Low Comp x Knows					-0.063
					(0.169)
DV control mean	0.281	0.236	0.236	0.354	0.354
Flagged x High Comp = Flagged x Med Comp (p-value)			0.090		
Flagged x High Comp = Flagged x Low Comp (p-value)			0.014		
Flagged x Doctor Does Not Know = Flagged x Doctor Knows (p-value)				0.072	
Flagged x Doctor Does Not Know vs (High vs Med Low Comp) (p-value)					0.016
Flagged x Doctor Knows vs (High vs Med Low Comp) (p-value)					0.136
# Clinics	268	112	112	80	80
# Reports	376	130	130	91	91
R-Squared	0.156	0.298	0.352	0.347	0.418
District Fixed Effects	Yes	Yes	Yes	Yes	Yes
Sample	Full	Discontinuity	Discontinuity	Discontinuity	Discontinuity

Notes: This table reports on the effect on subsequent doctor attendance of flagging on an online dashboard the fact that a clinic had three or more staff absent to a senior policymaker. Clinics were flagged in red on an online dashboard if three or more of the seven staff were absent in one or more health inspections of the clinic 11 to 25 days prior to an unannounced visit by our survey enumerators. The Discontinuity sample limits to facility reports in which either two or three staff were absent (the threshold to trigger the underreporting red flag). Column 5 combines Medium and High competition because of sparsity of data by doctor connections in the medium competition bin. In addition, the sample in all columns is limited to Monitoring the Monitor treatment districts due to the necessity of the web dashboard for flagging clinics. All regressions include survey wave fixed effects. Standard errors clustered at the clinic level reported in parentheses. $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

stituency increases subsequent doctor attendance by 35.9 percentage points. By contrast, flagging a clinic in an uncompetitive constituency reduces attendance, though the estimate is not statistically significant. The difference in estimated impacts is, however, statistically significant at the 5 percent level. Speculatively, district health officials have reported facing pressure and obstacles from influential persons to sanction underperforming health staff. In our survey, 44 percent of the senior health officials and 39 percent of the inspectors reported having faced such pressure. If senior health officials face more political obstacles to sanctioning absent doctors with stronger patrons, this would explain why the effect of highlighting a facility as underperforming could be localized to competitive districts.

Column (4) tests whether flagging also has differential impacts depending on whether doctors know their local politician. Mirroring the broader pattern of results, doctors who do not know their politician are more likely to be at work following an instance of their facility being flagged on the dashboard, while connected doctors are less likely. The difference between these two estimated effects is significant at the 10 percent level.

Finally, though we are cutting the sample a lot, Column (5) shows the effect of flagging by competition and doctor connections. We find that the senior bureaucracy is most able to improve doctor attendance in high competition areas and for doctors who do not report knowing the politician personally. We see no equivalent increase for doctors that know the politician even in high competition areas.

We probe the robustness of our result in columns (3) and (4) of Table 4 in Appendix Figure A7. We do this by running the same regression 1300 times varying the window for which we define a clinic as flagged prior to a primary unannounced visit to a clinic along two dimensions—we vary the length of the window being used along the x-axis and the delay from when a clinic is highlighted in red to when the window begins along the y-axis (so for example, a length of 30 and delay of 15 corresponds to considering a clinic as flagged if it was highlighted in red anytime 15 to 45 days prior to an unannounced visit). Panel A reports p-values for the hypothesis test in column (3) that Flagged x High Comp. = Flagged x Low

Comp. Panel B reports the p-value for the hypothesis test in column (4) that Flagged x Doctor Does Not Know = Flagged x Doctor Knows. We observe a robust and significant treatment effect of flagging a clinic across a wide range of windows. We see our political competition result is extremely robust. Our differential effects by whether doctors know their local political are less robust, which is in-line with previous results.

4.5 Alternative Explanations

Subsections 4.1 to 4.4 present four results linking politics to absenteeism. Each of them is subject to several concerns and alternative explanations, which we discuss here.

Our first result is that bureaucrats report that politicians routinely interfere when they try to sanction absent employees. The result is descriptive and the data are self-reported. As such, the result is subject to standard concerns. We cannot make precise statements about the share of absence that is caused by political interference. Nor can we rule out that bureaucrats are overstating the degree of the problem. Some assurance that these responses are genuine is given by the fact that inspectors who are one standard deviation above the mean in their conscientiousness, using a standard Big Five Personality measure (conditional on district fixed effects), are 11.4 percentage points (s.e. = 4.89 pp) more likely to report political interference by a provincial assembly member (35% of the unconditional mean in Table 1), indicating that those who are likely to work harder to improve matters encounter more interference.

Next, our geographic regression discontinuity indicates that doctor attendance is higher in more competitive constituencies, and corresponding regressions show this is especially so for politically-connected doctors. One advantage of our setting is that administrative units mostly do not line up with political constituencies. As such, the treatment effect the RD attempts to recover is the impact of moving from a low to a high competition constituency, leaving room for wide interpretation. Our design and data do not directly document *why* political competition improves attendance. In addition, any result that uses doctors' connec-

tions to politicians as an explanatory variable could be biased; political connections likely correlate with other doctor attributes.

Turning to the smartphone monitoring technology, we see that, directionally (though not significantly) increased monitoring leads to better attendance in competitive constituencies. And, again, this is principally for politically-connected doctors (which is significant). Both political competition and doctor connections could plausibly be affected by confounds.

Last, we find that when the dashboard flags attendance as problematic in specific facility, then senior managers take action and succeed in increasing attendance. These efforts succeed in competitive constituencies and for doctors who do not have connections to politicians, which, again, are not randomly assigned.

Importantly, the pattern of results is consistent across the three non-descriptive exercises in this paper. Absence is lower, and more responsive to reform, for doctors in competitive constituencies and when they are not politically connected. Any alternative explanation for these results would need to account for the consistent relevance of political competition and political connections as meaningful dimensions of heterogeneity.

5 Discussion and Conclusion

Absenteeism among civil servants is a highly persistent problem in developing countries. Appropriately, current research focuses on the technical aspects of this issue, seeing its roots in an information asymmetry between principals and the agents being monitored. If absence is a result of agency problems between senior bureaucrats and local level civil servants, then improving monitoring should be an effective policy response. Correspondingly, a substantial body of recent empirical research explores the potential for monitoring to improve public service delivery. These studies provide mixed results, drawing attention to the critical nature of understanding whether the political environment can sustain such reforms.

Our results highlight the importance of political economy considerations in determining

whether monitoring initiatives will be effective. We find evidence that the effect of monitoring follows a predictable pattern; it has impacts both in competitive constituencies and for employees with limited political connections.

This exercise provides insight for why public doctors are often absent and for why reforms aimed at solving the problem meet with mixed success. First, politicians routinely interfere with bureaucrats who would like to increase attendance. Second, doctors work less (in public facilities) where politics is not competitive, and especially when they share connections with politicians. This is consistent with a view that low levels of competition mark constituencies in a patronage equilibrium where doctor postings provide political currency. Third, we find that the increase in inspections driven by the new technology only raised doctor attendance for doctors in competitive constituencies who were not politically connected. Again, this points toward a system where doctors do not feel a need to respond to more regular visits by an inspector. Fourth, senior bureaucrats can reduce absence when monitoring information is presented to them in an actionable format. However, their ability to make a difference is similarly limited to areas of high political competition and to doctors unconnected with politicians. Once again, this suggests that politically-connected doctors, working in uncompetitive constituencies do not respond when bureaucrat managers learn about their absence.

Our data cannot fully capture how this works, but these findings suggest the following are important elements in a model characterizing the political reasons that absence is both high and resistant to reform. First, at least some senior bureaucrats want to address the problem, and will effectively use new technologies to do so. Second, politicians regularly interfere with bureaucrats' attempts to increase attendance. Third, doctors with connections to politicians understand that they are protected and so attend work less and are less responsive to increases in monitoring. And last, the problem of absence, and of politicians constraining bureaucratic efforts to reduce it, will concentrate in constituencies marked by low levels of political competition.

While this description leaves gaps, it points toward a broader set of interventions to combat absenteeism. First, professionalizing the civil service, and eliminating politicians' involvement in decisions related to bureaucratic hiring, firing, promotion, and posting, would remove the opportunity to use these positions as patronage. Such policy reform, however, is hard to implement in practice, and an alternate set of solutions may prove more promising: reform should leverage political incentives in policy design. For instance, increasing voter awareness of public worker absence might amplify the political costs from voters not motivated by patronage. This could be done through public facing information portals, such as making the smartphone inspection dashboard available publicly – which politicians objected to in the context of this experiment – rather than just to senior health officials.

More broadly, the tremendous investments that researchers, philanthropists, and aid organizations are making to enable and promote evidence-based policy naturally raises questions. Are data and evidence alone enough to sustainably improve policy? How do political considerations affect the potential for data to improve service delivery? When will policymakers act on data? Our view is that questions such as these provide fertile and important ground for a discussion between applied researchers, who have been focusing on identifying what works in international development, and political economists who study interactions between politicians, bureaucrats, and citizens. We hope that our results provide suggestive answers to these questions. In particular, our findings that reforms fail to succeed and data has limited impact when attempting to change the status quo in political settings where power is highly concentrated speak to these questions.

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APPENDIX: FOR ONLINE PUBLICATION ONLY

A Additional Tables and Figures

Table A1: Breakdown of Doctor Surveys

	Wave 1	Wave 2	Wave 3	Wave 4	Total
Doctors Assigned in Sample	535	509	488		
Total Interviews	266	252	226	141	885
Number of New Doctors Interviewed	266	128	61	82	537
Balance	259	115	33		

Notes: Doctors were frequently absent during our unannounced visits. Consequently, we had to make a concerted effort to find all of the doctors assigned in our sample. We tracked down 537 doctors after the completion of our three unannounced field visits and an additional announced visit that was specifically carried out to interview doctors that were absent in the previous waves. This table describes the breakdown of our sample.

Table A2: Connections and Perks

Dependent Variable:	Distance to Doctor's Hometown (minutes)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Doctor Knows MP Personally (=1)	-100.019***	-94.780**	-94.692**	-79.759**	-245.656***	-518.787**	-635.428**
	(23.374)	(38.983)	(39.039)	(39.567)	(69.086)	(239.558)	(281.251)
Doctor's Years of Service			0.085	0.024			1.791
			(0.264)	(0.201)			(1.306)
Catchment Population (1,000)			0.011	0.291			-7.334
			(4.742)	(3.732)			(18.684)
Distance to District Center (km)			0.875	1.873**			-0.497
			(0.802)	(0.893)			(4.113)
Constant	157.045***	164.940***	122.576	55.548	413.700***	494.535***	549.422
	(37.438)	(42.528)	(133.626)	(96.883)	(97.633)	(138.318)	(388.894)
District Fixed Effects	No	Yes	Yes	No	No	Yes	Yes
County Fixed Effects	No	No	No	Yes	No	No	No
Sample	Full	Full	Full	Full	>50 mins	>50 mins	>50 mins
# Observations	269	220	212	259	85	60	57
R-Squared	0.020	0.179	0.189	0.348	0.050	0.348	0.401

Notes: This table provides evidence that doctors who know their MP personally are less likely to be posted farther from their hometown. Sample: Full - control district clinics; >50 minutes - control clinics where doctor is further than 50 minutes from their hometown. All regressions include county and survey wave fixed effects. Standard errors clustered at the clinic level are reported in parentheses. *Levels of significance:* $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table A3: Predicting Reelection of Incumbent

Dependent Variable:	Incumbent Elected in 2013 (Dummy)					
	(1)	(2)	(3)	(4)	(5)	(6)
Doctor Knows MPA	0.537**					0.619**
	(0.235)					(0.240)
Doctor Present		0.053				0.122
		(0.184)				(0.236)
Doctor Tenure			-0.000			-0.001
			(0.001)			(0.001)
Doctor Tenure at Clinic				-0.000		0.000
				(0.001)		(0.001)
Distance to Doctor Hometown					0.000	0.000
					(0.000)	(0.000)
Distance to HQ	0.002	-0.001	0.000	0.001	0.001	0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)
Political Competition Index	1.461	1.779**	1.730*	1.711*	1.735*	1.555
	(0.929)	(0.844)	(0.988)	(0.954)	(0.969)	(1.006)
Constant	-0.284	-0.234	-0.227	-0.247	-0.275	-0.338
	(0.332)	(0.325)	(0.360)	(0.359)	(0.363)	(0.364)
# Observations	83	94	81	83	83	81
R-Squared	0.107	0.066	0.061	0.061	0.063	0.120

Notes: This table reports reelection probabilities for 2008 winners in the 2013 election. The outcome is an indicator variable that takes the value of 1 if a 2008 winner wins again in 2013 and 0 otherwise. The regressors are averages of doctor and clinic characteristics from our primary data across the constituency. Each observation is weighted by the number of clinics in our sample in the constituency. Heteroskedasticity robust standard errors reported in parentheses. *Levels of significance:* $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table A4: Summary Statistics

Variable	Obs	Mean	Std. Dev.
Doctor Present (=1)	1199	.227	.419
Doctor Assigned (=1)	1199	.532	.499
Doctor Knows Local Politician (=1)	216	.301	.46
Doctor Distance to Hometown (min)	216	139.398	308.265
Doctor Tenure (months)	212	98.915	92.285
Distance to District Headquarters (Km)	420	49.521	29.334
Clinic Catchment Population (1000s)	420	22.162	6.913
Herfindahl Index	419	.348	.083
Victory Margin Share	421	.12	.099

Notes: Sample is limited to control district clinics, survey waves 1 - 3. Doctor Present (=1) and Doctor Assigned (=1) are clinic-wave level observations and so there at most three observations per clinic for these variables. The next four variables are at the doctor level. See Appendix Table A1 for an explanation of data collection for this subsample. The last two variables, Herfindahl index and Victory Margin Share, are at the clinic level.

Table A5: Strategic Misreporting of Connections

	Knows Politician Personally		
	Doctor	Doctor	Inspector
	(1)	(2)	(3)
	(1)	(2)	(3)
Smartphone Monitoring	-0.025	0.006	-0.184
	(0.044)	(0.082)	(0.133)
Constant	0.079**	0.154**	0.569***
	(0.034)	(0.060)	(0.102)
Wave	2	3	-
# Districts	30	25	35
# Clinics	188	114	103

Notes: This table reports whether the 'Monitoring the Monitors' treatment induced strategic misreporting of connections by doctors and health inspectors. Standard Errors clustered at the district level reported in parentheses. Results are robust to clustering at the constituency level in columns (1) and (2). *Levels of significance:* $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table A6: Spatial RD Robustness to How Political Competition is Split

Dependent Variable:	Doctor Present (=1)			
Model: GEO	GEO	GEO	GEO	
	(1)	(2)	(3)	(4)
2nd Tercile Political Competition	-0.089			
	(0.102)			
3rd Tercile Political Competition	-0.181**			
	(0.085)			
Party Herfindahl Index (Linear)		-0.826**		
		(0.397)		
Above Median Political Competition			-0.117*	
			(0.062)	
2nd Quartile Political Competition				-0.128
				(0.140)
3rd Quartile Political Competition				-0.157
				(0.102)
4th Quartile Political Competition				-0.256**
				(0.102)
Distance to District Center (in minutes)	-0.001	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)
Mean, High Competition	0.205	0.205	0.205	0.205
# Constituencies	115	115	117	115
# Observations	924	924	932	924
R-Squared	0.331	0.330	0.341	0.333
County Fixed Effects	-	-	-	-
Constituency Fixed Effects	-	-	-	-
Spatial Controls	Yes	Yes	Yes	Yes
Election controls	-	-	-	-
Boundary Fixed Effects	Yes	Yes	Yes	Yes
Triangular Kernel	Yes	Yes	Yes	Yes
Bandwidth	5 Km	5km	5km	5km

Notes: This table reports on the relationship between doctor attendance and political competition with political competition split up various ways. The dependent variable is a dummy equal to 1 if a doctor is present during an unannounced facility inspection performed by our survey team. The political competition index is a Herfindahl index computed as the sum of squared candidate vote shares in each provincial assembly constituency during 2008 elections. It varies between 0.040 and 0.52 and we split it differently by model. All specification samples are restricted to basic health unit facilities in control districts. All models include survey wave fixed effects. Indicated estimates include a triangular kernel and a geographic control function in longitudes (x) and latitudes (y) of the form $x + y + x^2 + y^2 + xy + x^3 + y^3 + x^2y + xy^2$. *Levels of significance*:*$p < 0.1$, **$p < 0.05$, ***$p < 0.01$.

Table A7: Political Interference in the Health Bureaucracy (Not Trimmed)

Variable	Mean	SD	N
Panel A: Senior Health Officials and Inspectors			
Ever influenced by Any Powerful Actor	0.4	0.492	150
Ever Influenced by Provincial Assembly Member	0.322	0.469	149
Instances of Interference by Provincial Assembly Member	13.49	48.368	149
Panel B: Senior Health Officials Only			
Ever influenced by Any Powerful Actor	0.441	0.504	34
Ever Influenced by Provincial Assembly Member	0.441	0.504	34
Instances of Interference by Provincial Assembly Member	34	84.779	34
Panel C: Health Inspectors Only			
Ever influenced by Any Powerful Actor	0.388	0.489	116
Ever Influenced by Provincial Assembly Member	0.287	0.454	115
Instances of Interference by Provincial Assembly Member	7.426	28.179	115

Notes: This table reports the frequency of interference by politicians in decisions of senior health bureaucrats. Data come from a survey of the universe of senior health bureaucrats and monitors in Punjab. For each panel, the first dependent variable is an indicator variable for whether the bureaucrat was influenced by any powerful actor to either (a) not take action against doctors or other staff that were performing unsatisfactorily in their jurisdiction (county) or (b) assign doctors to their preferred posting in the previous two years. The second variable measures the same, but restricts attention to influence by provincial assembly politicians, the focus of our study. The third variable is a count of the number of times bureaucrats report that Members of the Provincial Assembly pressured them. Panel A reports results for all bureaucrats in the sample, while Panel B disaggregates them by Senior Health Officials and Health Inspectors. Panel C reports the results only for Inspectors.

Figure A1: Doctors as Political Workers in 2013 Elections

Figure A2: Selected Tweets from Free and Fair Elections Network before 2013 Elections

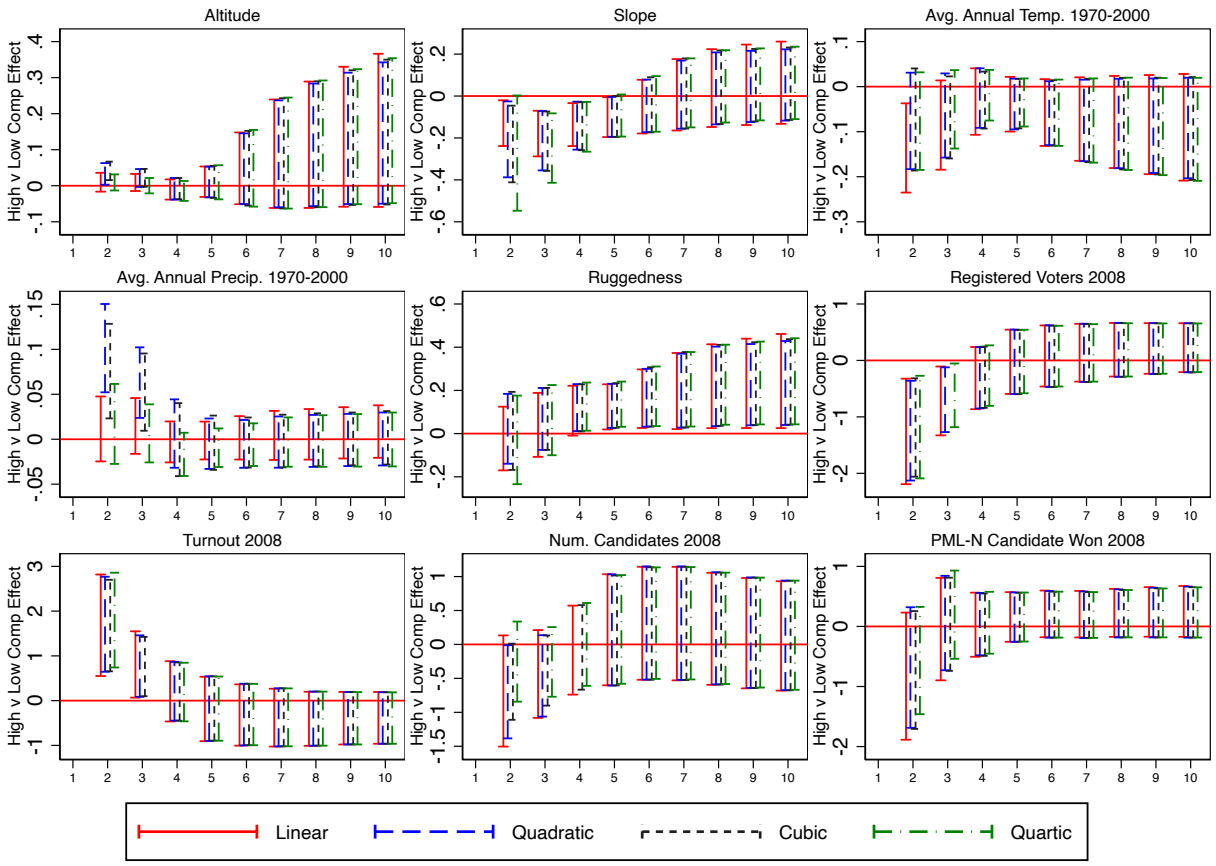


Figure A3: Geographic RD Balance

Notes: This figure shows balance of pre-covariates for the geographic discontinuity analysis. The political competition index is a Herfindahl index computed as the sum of squared candidate vote shares in each provincial assembly constituency. It varies between 0.040 and 0.52. High v Low Comp Effect is the difference between constituencies in the highest political competition tercile and the lowest. All specification samples are restricted to basic health unit facilities in control districts with a doctor assigned and include survey wave fixed effects. All specifications include closest constituency boundary fixed effects, a control for distance to HQ, and spatial controls. The spatial controls are of the following forms: Linear: $x + y$, Quadratic: $x + y + x^2 + y^2 + xy$, Cubic: $x + y + x^2 + y^2 + xy + x^3 + y^3 + x^2y + xy^2$, and Quartic: $x + y + x^2 + y^2 + xy + x^3 + y^3 + x^2y + xy^2 + x^4 + y4 + x^3y + x^2y^2 + xy^3$. All models weigh observations using a triangular kernel. The cubic control specification is a replication of Dell (2010) and Michalopoulos and Papaioannou (2016)'s main specification. The vertical bars represent 95 percent confidence intervals with standard errors clustered at the constituency level.

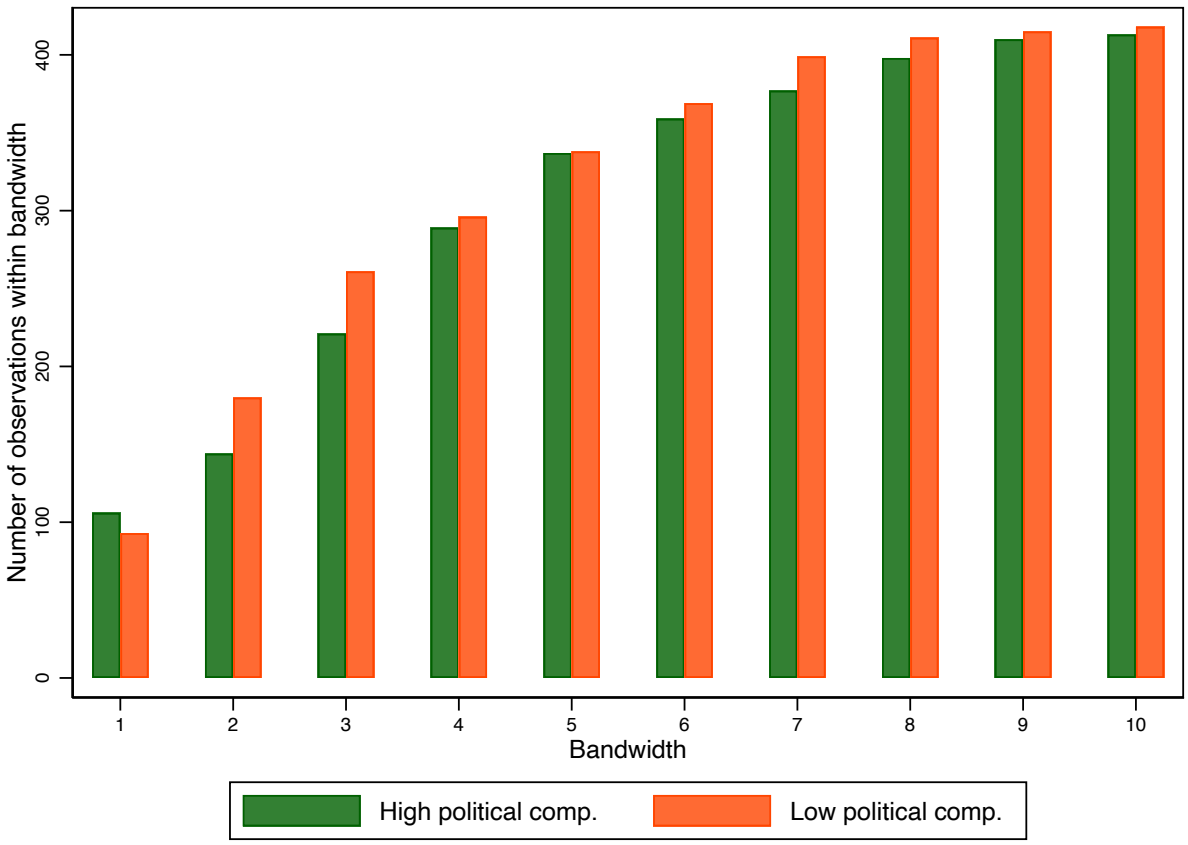


Figure A4: Geographic RD Check for Bunching around Cutoff

Notes: This figure shows the number of observations (constituency-survey wave) by political competition by bandwidth. The political competition index is a Herfindahl index computed as the sum of squared candidate vote shares in each provincial assembly constituency. It varies between 0.040 and 0.52. Constituencies are then placed into terciles by political competition. Note the only way the number of observations could be manipulated (bunch) around constituency boundaries would be if the Health Department purposefully built more BHUs closer to constituency boundaries in more or less competitive constituencies.

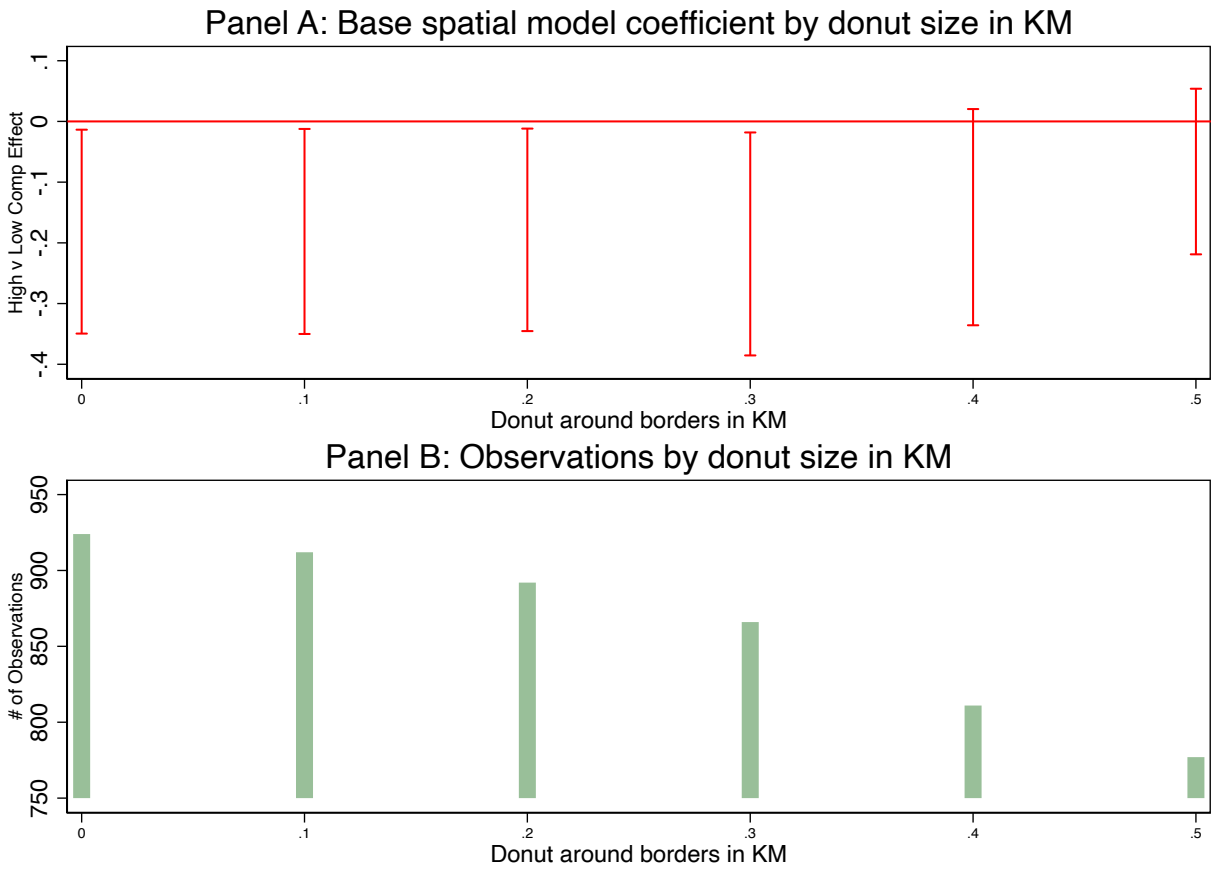


Figure A5: Geographic RD Robustness to Donut around Constituency Boundaries

Notes: This figure shows the robustness of our primary geographic RD result from Table 2 Column 3 to throwing out observations close to constituency boundaries (called a 'donut hole'). The political competition index is a Herfindahl index computed as the sum of squared candidate vote shares in each provincial assembly constituency. It varies between 0.040 and 0.52. High v Low Comp Effect is the difference between constituencies in the highest political competition tercile and the lowest. All specification samples are restricted to basic health unit facilities in control districts with a doctor assigned and include survey wave fixed effects. All specifications include closest constituency boundary fixed effects, a control for distance to HQ, and cubic spatial controls: $x + y + x^2 + y^2 + xy + x^3 + y^3 + x^2y + xy^2$. All models weigh observations using a triangular kernel. The cubic control specification is a replication of Dell (2010) and Michalopoulos and Papaioannou (2016)'s main specification. The vertical bars represent 95 percent confidence intervals with standard errors clustered at the constituency level.

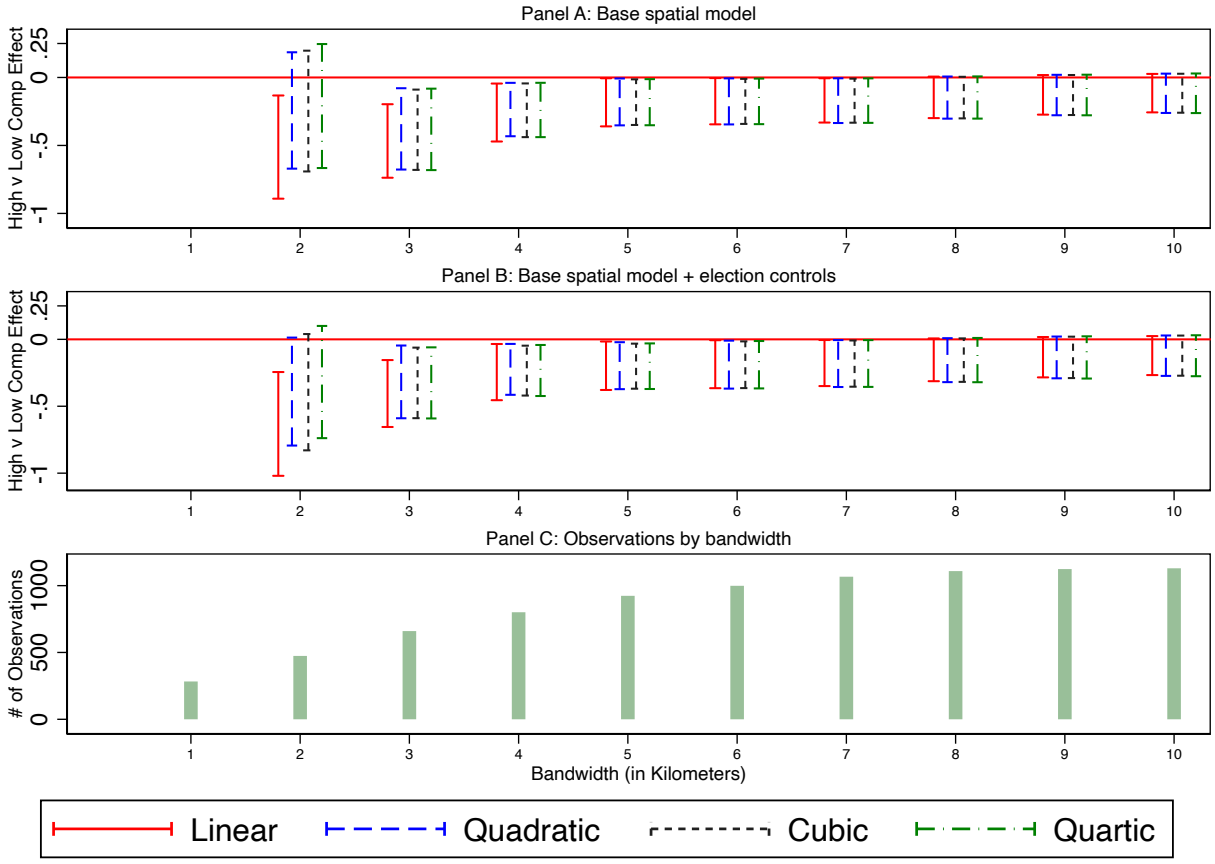
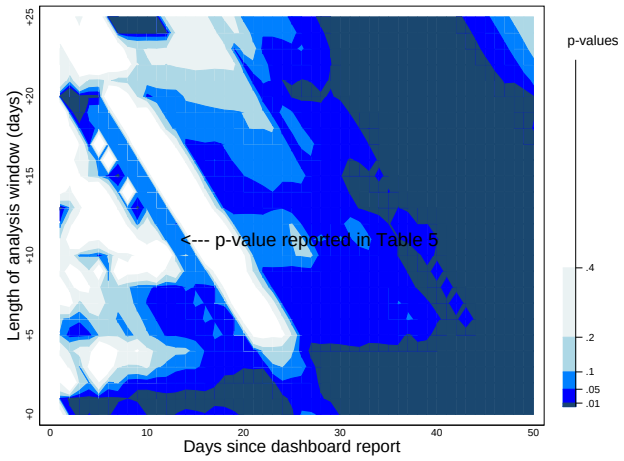


Figure A6: Robustess across Functional Forms

Notes: This figure reports robustness of Table 2 Columns 3 & 4. The dependent variable is a dummy equal to 1 if a doctor is present during an unannounced facility inspection performed by our survey team. The political competition index is a Herfindahl index computed as the sum of squared candidate vote shares in each provincial assembly constituency. It varies between 0.040 and 0.52. High v Low Comp Effect is the difference between constituencies in the highest political competition tercile and the lowest. All specification samples are restricted to basic health unit facilities in control districts with a doctor assigned and include survey wave fixed effects. The base model includes closest constituency boundary fixed effects, a control for distance to HQ, and spatial controls. The spatial controls are of the following forms: Linear: $x + y$, Quadratic: $x + y + x^2 + y^2 + xy$, Cubic: $x + y + x^2 + y^2 + xy + x^3 + y^3 + x^2y + xy^2$, and Quartic: $x + y + x^2 + y^2 + xy + x^3 + y^3 + x^2y + xy^2 + x^4 + y4 + x^3y + x^2y^2 + xy^3$. All models weigh observations using a triangular kernel. The cubic control specification is a replication of Dell (2010) and Michalopoulos and Papaioannou (2016)'s main specification. Election controls include counts of the number of registered voters, election turnout, and the number of candidates in each provincial constituency in 2008 and a dummy for whether the PML-N (the ruling party) provincial candidate won in 2008. The vertical bars represent 95 percent confidence intervals with standard errors clustered at the constituency level.

Panel A: The Effect of Flagging by Doctor Connections



Panel B: The Effect of Flagging by Political Competition

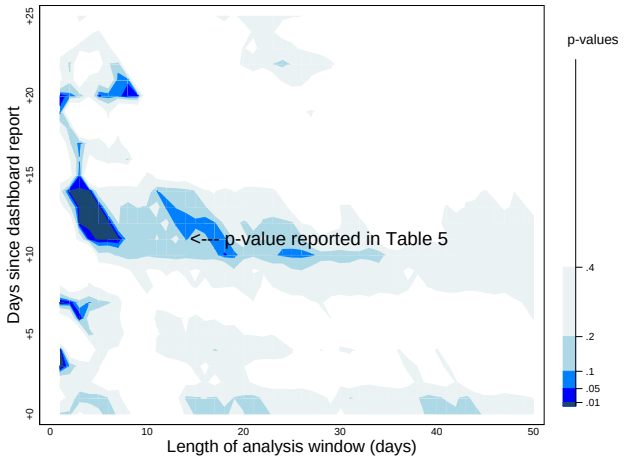


Figure A7: Heterogeneous Effects on Absence after Flagging

Notes: Panel A reports p-values from 1300 hypothesis tests analogous to that conducted in Table 4 column (3) that Flagged x High Comp = Flagged x Low Compl., varying the window for which we define a clinic as flagged prior to a primary unannounced visit to a clinic along two dimensions—we vary the length of the window being used along the x-axis and the delay from when a clinic is highlighted in red to when the window begins along the y-axis (so for example, a length of 30 and delay of 15 corresponds to considering a clinic as flagged if it was highlighted in red anytime 15 to 45 days prior to an unannounced visit). For each window, we report using a colored pixel the p-value of the hypothesis test of a null effect of flagging on subsequent doctor attendance. Panel B conducts the same exercise for the hypothesis test in Table 4 column (4) that Flagged x Doctor Does Not Know = Flagged x Doctor Knows.

B Hiring Process for Doctors

There are two different hiring processes for the Medical Officers. The first is through Punjab Provincial Service Commission (PPSC). Through this route a Medical Officer becomes part of the bureaucracy either temporarily or permanently, depending on the nature of positions that are being filled. PPSC is a statuary body tasked with hiring of human resources for several arms of the provincial government. The commission floats an advertisement with details of the hiring process. Individuals who have passed the doctor certifications (M.B.B.S.), and are registered with Pakistan Medical and Dental Council, are eligible to apply to these positions. The top candidates are called in for a test and further shortlisted candidates are interviewed by a selection committee. The committee consists of senior officials from PPSC, the Health Department, and the Director General Health Services office, and a senior medical expert. Merit lists generated based on performance in the interview are then communicated to the Health Department by PPSC. The department then decides on the postings based on these lists.

The second process for hiring Medical Officers is devolved at the District Level. The EDO health office advertises vacant positions locally, and shortlisted applicants are interviewed by the EDO himself. The candidates might also be given a test designed by the EDO on the same day. Recommendations of the EDO are conveyed to the Establishment Division of the Health Department, which then issues offer letters to the successful applicants. However, these doctors are only hired on a contractual basis. In order to become permanent employees, long-term contractual doctors have to clear a promotion exam at PPSC. EDOs also have the power to hire and appoint temporary MOs during times of high demand of services, such as in the case of an outbreak of the dengue virus, or flood-prone epidemics. Some of these MOs can be considered preferentially for filling vacancies once the demand normalizes. However, temporary MOs also have to clear a test at PPSC in order to become permanent employees.

C Paper Inspection Form

INSPECTION FORM OF BASIC HEALTH UNIT
HEALTH DEPARTMENT (GOVERNMENT OF THE PUNJAB)
A - BASIC HEALTH UNIT INFORMATION

HMIS Code: ☐☐☐☐☐☐☐ Name of BHU: _____

Managed by: i) PRSP ☐ ii) Dist. Govt. ☐ (please tick only one option)

Mauza: _____ UC Name: _____ UC No. _____

NA No. _____ PP. No. _____ District: _____ Tehsil: _____

Name of incharge of the facility: _____ Designation: _____

Mobile No.: _____ BHU's Phone (with code): _____

Name of DDOH: _____ Reference No. _____

Date & Time of arrival for inspection: ____/____/____ Time: Hours _____ Minutes _____ am / pm

B - CLEANLINESS AND GENERAL OUTLOOK OF THE FACILITY
(tick relevant column)

Sr. No	Location	Good	Average	Poor
1	Boundary Wall			
2	Lawns			
3	Waiting Area			
4	Building			
5	Labour Room			
6	Wards			
7	Toilets			

C - DISPLAYS
(tick relevant column)

ITEMS		Yes	No
Signboards/Direction Board displayed			
Display in the MO/ Incharge office:	1) Organogram		
	2) Map of Union council showing all localities		
	3) Statistics of the Union Council and the BHU		
	4) Tour Programme of 'outreach team'		

D - AVAILBILITY OF UTILITIES
(tick relevant column)

Sr. No	Name of Utility	Not Available	Available	
			Functional	Non Functional
1	Electricity			
2	Telephone			
3	Water supply System			
4	Sui Gas			
5	Sewerage System			
6	Other			

E - DISPOSAL OF HOSPITAL WASTE
(tick relevant column)

Sr. No	Mode		Yes	No
1	Hospital Waste Segregated as per guidelines			
2	Hospital Waste Lying Open			
3	Burnt by:	(a) Incinerator		
		(b) Other means		
4	Buried			
5	Carried away by municipality			
6	Any other (Please state)			

F - PURCHI FEES (give amount)

Fee Deposited during the current financial year till the last calendar month: ***(Rs.)*** _____

Purchi fee being charged @ ***Rs.*** _____ *per patient.*

G - PATIENTS TREATED IN LAST CALENDAR MONTH (give numbers)

Sr. No	*Cases*	*Numbers*	Sr. No.	*Cases*	*Numbers*
1	OPD Cases		7	Children vaccinated outside BHU	
2	Percentage of pervious day OPD Cases registered with NIC No.		8	TB Patients under Treatment	
3	Deliveries at BHU		9	Hepatitis "B" Vaccination Done	
4	No. of PCD slides prepared		10	Antenatal Cases Checked	
5	No. of referrals to other hospitals		11	Family Planning Visits	
6	Children vaccinated at BHU		12	No. of referrals by LHW	

H- SCHOOL HEALTH PROGRAM

S. No.	Indicator	Numbers
1	Total Number of Students referred by SH&NS during previous month	
2	Total Numbers of student treated at BHU referred by SH&NS	
3.	Total Numbers of School visited during previous month	
4.	Tour program approved and displayed in DHQ	Yes / No

I - DOCTORS (give numbers)

Sanctioned Posts	Filled Posts	Present

This doctor is posted in this BHU but is not present during the visit

Details regarding absence of doctors. (Do not write anything if a doctor is present.)

Sr. No	Designation	Name of Doctors	Type of Absence on the monitoring day. (tick only one box)					Days of absence during last three calendar months	
			UA	SL	OD	St. L	LC	UA	Other Types
1	MO WMO								

Unauthorized absence (UA), Sanctioned leave (SL), On official duty outside the BHY (OD), Short leave (St.L), Late Comer (LC).

J- PARAMEDICS (OTHER THAN DOCTORS)

PARAMEDICS INCLUDES:	Medical Assistant, Medical Technician, Health Technician, Dispenser, Other

Sr. No	Staff Category	Sanctioned	Filled Posts	Present
1	Paramedical Staff			

Details regarding absence of Paramedics. (Do not write anything if staff is present.)

Sr. No	Designation	Name of Paramedic	Type of Absence on the monitoring day. (tick only one box)					Days of absence during last three calendar months	
			UA	SL	OD	St. L	LC	UA	Other Types
1									
2									
3									

K - PREVENTIVE / OUTREACH STAFF

PREVENTIVE / OUTREACH STAFF INCLUDES.	LHV, RHI, Midwife, Dai, Vaccinator CDC Supervisor, Sanitary Inspector Sanitary Worker, School Health & Nutrition Supervisor

Sanctioned Posts	Filled Posts	Present

Details regarding absence of Preventive / outreach staff. (Do not write anything if staff is present.)

Sr. No	Designation	Name of Staff	Type of Absence on the monitoring day. (tick only one box)					Days of absence during last three calendar months	
			UA	SL	OD	St. L	LC	UA	Other Types
1									
2									
3									

L - ADMIN / SUPPORT STAFF

ADMIN / SUPPORT STAFF INCLUDES:	Computer Operator, Naib Qasid, Chowkidar, Mali, Sweeper

Sanctioned Posts	Filled Posts	Present

Details regarding absence of Admin/Support staff. (Do not write anything if staff is present.)

Sr. No	Designation	Name of Staff	Type of Absence on the monitoring day. (tick only one box)					Days of absence during last three calendar months	
			UA	SL	OD	St. L	LC	UA	Other Types
1									
2									
3									

M- VACANT POSTS (please write full name of posts)

Sr. No	Name of Post	Number of Vacant Post	Sr. No.	Name of Post	Number of Vacant Posts

U - MONTHLY PERFORMANCE

Sr. No		Monthly Target	Performance
1	No of children given full immunization coverage		
2	Daily OPD attendance		
3	Delivery coverage at facility		

V– GENERAL REMARKS

Time of Departure from the facility: Hours _____ Minutes _____ am / pm

Certified that this basic Health Unit was inspected today by the undersigned and the information stated above is as per facts and record.

Signature of DDOH/MEA **Signatures & Stamp of MO/Incharge** **Signatures of DMO/EDOH**

D Matching Clinics to Political Constituencies

We followed a two-pronged strategy to place the clinics in their relevant electoral constituencies:

First, we gathered the GPS coordinates of each clinic in our sample during field surveys. These coordinates were compared with those provided to us by the Health Department and then verified in cases of disagreement. This enables us to place clinics on a geo-referenced map of constituencies.

The Election Commission of Pakistan has publicly released maps of all provincial and national constituencies as PDFs on their website[18]. As these maps lack vector information that is required for direct use with GPS coordinates, we manually converted the PDFs to shape files so that we can place each clinic in the correct constituency polygon. The quality of this approach however, is affected by the reliability of these base maps prepared by the Election Commission of Pakistan.

A second approach helps ensure that the placement of clinics does not hinge solely on the quality of these maps. During the second round of our surveys, we asked all respondents in a clinic to identify the constituency where the clinic is located. In cases where respondents did not know the constituency number, we asked them to name the elected representative from the area. To corroborate this further, we asked the most senior official present at the clinic to identify the political constituency in consultation with colleagues during the third round of the surveys.

We manually compared the names of elected politicians provided by the clinic staff with official lists available on the website of Punjab Assembly. We assigned a constituency number if the name matched with information on the website. At the end of this exercise we had constituency information from multiple respondents. We proceeded by taking the mode of these responses to assign clinics to political constituencies. In cases with disagreements, we

[18]http://ecp.gov.pk/Delimitation/ConstituencyMap/PA.aspx

manually compared the data with official lists of district-wise constituencies and corrected cases with obvious typos. For instance, a district with a constituency number 191 had a reported constituency number of 91, which we corrected.

Through this procedure, we were able to match all but a few clinics to constituencies. We used geo-spatial information and Election Commission of Pakistan's maps to break the tie between the remaining few clinics.

E Alternate Measures of Political Competition

The primary measure of political competition used in the paper is the Party Herfindahl index, which is calculated for each constituency c as follows:

$$H_c = \sum_i s_i^2$$

where s_i is the vote share of party i

Many measures of political competition rely on an isomorphic transformation of the Herfindahl index. For instance, the Effective Number of Parties index is just an inverse of the Herfindahl index:

$$Effective\ \#\ of\ Parties_c = \frac{1}{\sum_i s_i^2}$$

Another popular measure of political competition, the victory margin share, only considers the top two parties in a constituency. This measure calculates the margin by which the winning party won the election. The benefit of this approach is that it focuses on the most important players in the constituency. However, this comes at the cost of losing important information on close thirds for instance. This measure is calculated as follows:

$$Victory\ Margin_c = \frac{s_k - s_j}{s_k}$$

where s_k is the vote share of the winning party, while s_j is the vote share of the runner-up.

While this measure is often recommended in two-party settings such as the United States (Cox et al., 2020), we do not consider this measure to be appropriate for our setting given there are many relevant third parties and in some cases fourth parties for constituency elections in Pakistan. To show this, in Figure A8, we plot the distribution of vote shares for the winner, runnerup, second runnerup, and third runnerup across all the constituencies in our sample. We can see that many second second runnerups have more than 20 percent of

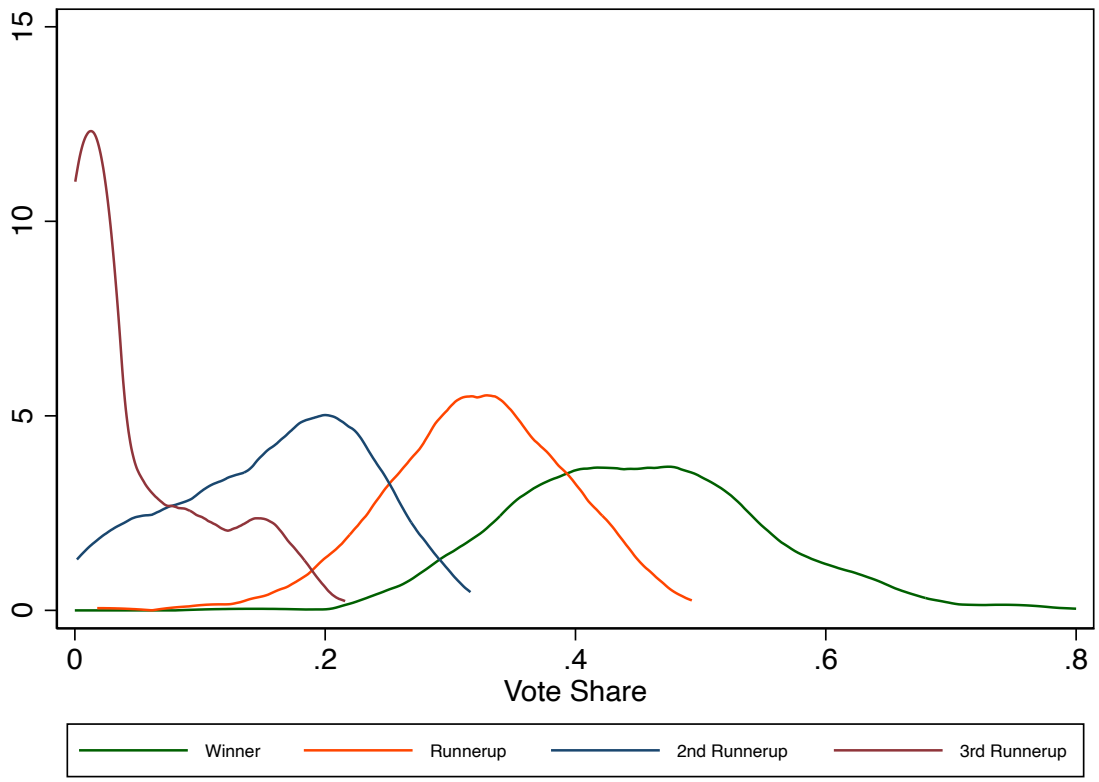


Figure A8: Vote shares by candidate placement

Notes: This figure presents distribution of vote shares by candidate placement for Pakistan's 2008 parliamentary elections.

the vote share.

We instead show the robustness of our results to another more recent measure of political competition—electoral availability (Wagner and Krause, 2021), which is measured as follows:

$$Availability_j = \sum_{i=2}^{N} 1 - (\sqrt{PTV_{max,j}} - \sqrt{PTV_{i,j}})$$

where j denotes voters, PTV_i stands for the propensity to vote for party i (i.e. the vote share for that party) and PTV_{max} refers to the party the person has the highest inclination to vote for (i.e. the vote share of the winning party).

This measure accounts for vote shares in multiparty systems like the one we study. Wagner and Krause (2021) write: "This measure does not only focus on voters' availability to

another party than the one they vote for. Instead, it is sensitive to the overall number of parties a citizen considers voting for. Consequently, votes in multiparty systems are, on average, more available than in two-party systems (cf. Wagner 2017, 516)."

Tables A8, A9, and A10 reproduce our primary three results tables using this measure of political competition. Results are largely consistent with our preferred Herfindahl index results.

Table A8: Political Connections, Competition, and Doctor Attendance - Political Availability

Dependent Variable:	Doctor Present (=1)							
Model:	OLS (1)	OLS (2)	GEO (3)	GEO (4)	OLS (5)	OLS (6)	OLS (7)	OLS (8)
Medium Availability	0.057	0.059	0.106	0.086			-0.091	-0.068
	(0.038)	(0.037)	(0.072)	(0.075)			(0.058)	(0.059)
Low Availability	-0.076*	-0.079**	-0.130*	-0.179**			-0.141*	-0.160**
	(0.039)	(0.039)	(0.078)	(0.087)			(0.073)	(0.068)
Doctor Knows Local MPA Personally (=1)					-0.177**	-0.163*	-0.171**	-0.162**
					(0.076)	(0.083)	(0.074)	(0.078)
Doctor Knows × Medium Availability							-0.068	-0.129
							(0.141)	(0.144)
Doctor Knows × Low Availability							-0.048	-0.046
							(0.118)	(0.126)
Distance to District Center (in minutes)		-0.002***	-0.001	-0.001		-0.001		-0.000
		(0.001)	(0.001)	(0.001)		(0.002)		(0.001)
Mean, High Availability	0.213	0.213	0.196	0.196			0.402	0.402
Mean, Doctor Knows=0					0.463	0.463	0.460	0.460
High Comp & Mean, Doctor Knows=0							0.424	0.424
# Constituencies	121	121	115	115	93	93	91	91
# Observations	1173	1173	924	924	613	613	608	608
R-Squared	0.164	0.172	0.338	0.342	0.221	0.235	0.163	0.174
County Fixed Effects	Yes	Yes	-	-	-	-	Yes	Yes
Constituency Fixed Effects	-	-	-	-	Yes	Yes	-	-
Spatial Controls	-	Yes	Yes	Yes	-	Yes	-	Yes
Election controls	-	-	-	Yes	-	-	-	-
Boundary Fixed Effects	-	-	Yes	Yes	-	-	-	-
Triangular Kernel	-	-	Yes	Yes	-	-	-	-
Bandwidth	All data	All data	5 Km	5km	All data	All data	All data	All data

Notes: This table reports on the relationship between doctor attendance and interactions between the political connections of doctors and the degree of political competition. The dependent variable is a dummy equal to 1 if a doctor is present during an unannounced facility inspection performed by our survey team. The political competition index is a political availability during 2008 elections. We split it into its terciles to indicate High (omitted), Medium, or Low competition. All specification samples are restricted to basic health unit facilities in control districts. All models include survey wave fixed effects. Indicated estimates include a triangular kernel and a geographic control function in longitudes (x) and latitudes (y) of the form $x + y + x^2 + y^2 + xy + x^3 + y^3 + x^2y + xy^2$. Election controls include counts of the number of registered voters, election turnout, and the number of candidates in each provincial constituency in 2008 and a dummy for whether the PML-N (the ruling party) provincial candidate won in 2008. Standard errors clustered at the constituency level reported in parentheses. *Levels of significance*:*$p < 0.1$, **$p < 0.05$, ***$p < 0.01$.

Table A9: Hetereogeneous Treatment Effects on Doctors by Political Competition and Doctor Connections - Political Availability

Dependent Var.	Doctor Present (=1)			
	(1)	(2)	(3)	(4)
Monitoring	-0.010			
	(0.043)			
	[0.645]			
Monitoring x High Availability		0.086		
		(0.065)		
		[0.089]		
Monitoring x Med Availability		-0.039		
		(0.065)		
		[0.830]		
Monitoring x Low Availability		-0.070		
		(0.053)		
		[0.905]		
Monitoring x Doctor Does Not Know Politician			0.010	
			(0.074)	
			[0.495]	
Monitoring x Doctor Knows Politician			-0.104	
			(0.150)	
			[0.699]	
Monitoring x High Avail X Not Know				0.206*
				(0.106)
				[0.037]
Monitoring x High Avail X Knows				-0.177
				(0.240)
				[0.706]
Monitoring x Med Avail X Not Know				-0.072
				(0.106)
				[0.805]
Monitoring x Med Avail X Knows				0.027
				(0.258)
				[0.485]
Monitoring x Low Avail X Not Know				-0.079
				(0.100)
				[0.843]
Monitoring x Low Avail X Knows				-0.201
				(0.169)
				[0.842]
Constant	0.326***	0.325***	0.503***	0.499***
	(0.014)	(0.014)	(0.023)	(0.022)
Mean, Controls	0.227			
Low Avail Mean, Controls		0.209		0.209
Med Avail Mean, Controls		0.283		0.283
High Avail Mean, Controls		0.189		0.189
Does Not Know Mean, Controls			0.462	0.462
Knows Mean, Controls			0.225	0.225
Mon. x (Low vs Med Avail) (p-value)		0.041		
Mon x (Low vs High Avail) (p-value)		0.683		
Mon. x (Does Not Know vs Knows) (p-value)			0.502	
Mon. x Low x (Not Know vs Knows) (p-value)				0.141
Mon. x Med x (Not Know vs Knows) (p-value)				0.734
Mon. x High x (Not Know vs Knows) (p-value)				0.565
# Districts	35	35	34	34
# Clinics	852	844	538	534
# Observations	2422	2404	1544	1535
R-Squared	0.006	0.008	0.017	0.023

Notes: This table reports on the effects of the 'Monitoring the Monitors' program on the attendance of doctors. Columns (2) and (3) look at heterogeneous impacts by the degree of political competition in terms of political availability in the constituency where the reform is implemented and columns (4) and (5) look at heterogeneity by whether the doctor reports being connected to their local politician. These estimates correspond to specification (2) in the paper, replacing the dependent variable with an indicator equal to one if a doctor is found to be present during an independent inspection. All regressions include clinic and survey wave fixed effects. Standard errors clustered at the district level reported in parentheses. Fisher Exact Test p-values reported in brackets. This test places the 'true' treatment assignment p-values in the distribution of p-values obtained from a 1000 random draws of treatment assignment.

Table A10: Effect of Flagging Underperformance on the Dashboard - Political Availability

	Doctor Present in Unannounced Visit (=1)				
	(1)	(2)	(3)	(4)	(5)
Flagged	0.079	0.177**			
	(0.054)	(0.082)			
Flagged x High Availability			0.320***		
			(0.121)		
Flagged x Med Availability			0.181		
			(0.140)		
Flagged x Low Availability			-0.209		
			(0.155)		
Flagged x Doctor Does Not Know Politician				0.201*	
				(0.109)	
Flagged x Doctor Knows Politician				-0.250	
				(0.249)	
Flagged x High Avail x Does not Know					0.391***
					(0.128)
Flagged x High Avail x Knows					-0.109
					(0.127)
Flagged x Med Low Avail x Does not Know					-0.025
					(0.192)
Flagged x Med Low Avail x Knows					-0.352
					(0.278)
DV control mean	0.281	0.236	0.236	0.354	0.354
Flagged x Low Avail = Flagged x Med Avail (p-value)			0.054		
Flagged x Low Avail = Flagged x High Avail (p-value)			0.010		
Flagged x Doctor Does Not Know = Flagged x Doctor Knows (p-value)				0.072	
Flagged x Doctor Does Not Know vs (High vs Med Low Comp) (p-value)					0.078
Flagged x Doctor Knows vs (High vs Med Low Comp) (p-value)					0.367
# Clinics	268	112	112	80	80
# Reports	376	130	130	91	91
R-Squared	0.156	0.298	0.349	0.347	0.386
District Fixed Effects	Yes	Yes	Yes	Yes	Yes
Sample	Full	Discontinuity	Discontinuity	Discontinuity	Discontinuity

Notes: This table reports on the effect on subsequent doctor attendance of flagging on an online dashboard the fact that a clinic had three or more staff absent to a senior policymaker. Clinics were flagged in red on an online dashboard if three or more of the seven staff were absent in one or more health inspections of the clinic 11 to 25 days prior to an unannounced visit by our survey enumerators. The Discontinuity sample limits to facility reports in which either two or three staff were absent (the threshold to trigger the underreporting red flag). Column 5 combines Medium and High competition because of sparsity of data by doctor connections in the medium competition bin. In addition, the sample in all columns is limited to Monitoring the Monitor treatment districts due to the necessity of the web dashboard for flagging clinics. All regressions include survey wave fixed effects. Standard errors clustered at the clinic level reported in parentheses. $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

F Measurement of Interference

We measure political interference through the following questions. These questions are translated to English from Urdu. For any political interference, we create a categorical variable that takes a value of 1 if the officials respond yes to question 1 and zero otherwise. Similarly, for interference specifically by politician from the provincial assembly we create a categorical variable that takes the value of 1 if the respondents select "Member Provincial Assembly" from the options given under question 2 and zero if this option is not selected.

1. Have you ever faced pressure from influential persons not to punish underperforming doctors or staff in their Tehsil/District, or to provide them favors such as more favorable postings etc.?

2. If yes, please tick which of the following were involved? (Pick multiple options if relevant)

    - Member National Assembly
    - Member Provincial Assembly
    - Unelected politicians
    - Senior bureaucrats
    - Police
    - Powerful private individuals (such as feudal lords)
    - Others
    - Don't want to answer

3. How many such cases you have faced in the last two years?

G Interference and Political Competition

This section investigates whether the incidence of political interference is related to political competition. To do so, we aggregate our data to the level of a county, which corresponds to the jurisdiction of an inspector.[19] Figure A9 depicts the relation between the Herfindahl index and the number of instances of political interference in a leverage plot. The slope of the line in the leverage plot corresponds to $\hat{\beta}_1$ estimated from the regression:

$$Interference_c = \beta_0 + \beta_1 \overline{Herfindahl}_c + \gamma' \mathbf{X}_c + \varepsilon_c, \tag{2}$$

where $Interference_c$ is the number of times the inspector in charge of county c reports being interfered with, $\overline{Herfindahl}_c$ is the average Herfindahl index across constituencies in the county, and $\mathbf{X}_c$ is a vector of inspector characteristics including their tenure, whether they know their local MPA, and the amount of time they report monitoring facilities.[20] We note that the degree of the correlation is reduced and statistical significance is lost if we remove constituencies that span county boundaries. However, given that a politician may have incentive to influence any bureaucrat in a shared jurisdiction, there is an argument for keeping these constituencies in the data.

[19] We perform this analysis for inspectors, as there are only 33 senior health officials in our data and their jurisdiction spans several constituencies. Inspectors, by contrast, have administrative jurisdiction in only one or two constituencies.

[20] This regression is weighted by the number of constituencies in a county. Constituencies are intended to have roughly equal populations, so these estimates are comparable to population weighted estimates. A full set of corresponding regressions are presented in Table A11.

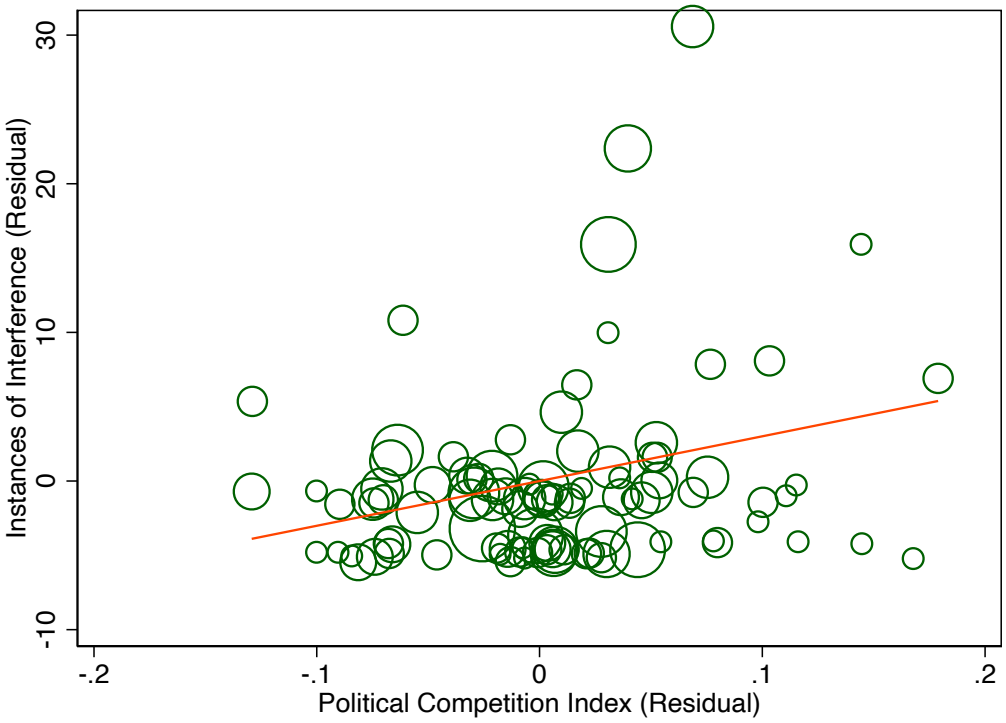


Figure A9: Interference and Political Competition

Notes: This figure shows the correlation between interference by politicians in health inspectors decisions and the mean level political competition in the jurisdictions of inspectors. The unit of observation is a county-constituency. The dependent variable is a count of the number of times that inspectors report Members of the Provincial Assembly pressuring them to either (a) not take action against doctors or other staff that were performing unsatisfactorily in their jurisdiction (county) or (b) assign doctors to their preferred posting in the previous two years. Of the 123 inspectors covering our experimental sample, we have responses from 103. We drop four reports which indicate more than 100 instances of interference (99th percentile). The political competition index is a Herfindahl index computed as the sum of squared candidate vote shares in each constituency. The axis residuals from a regression of the variable on whether the inspector knows the local MPA personally, the tenure of the inspector, as well as the time the inspector spends on monitoring clinics. Regression results for this figure are presented in Table A11.

Table A11: Interference in Inspector Decisions and Political Competition

Dependent Variable:	Instances of Political Interference						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Political Competition Index	48.533	27.025*	28.771**	31.700**	8.569	8.145	9.331
	(29.486)	(14.354)	(14.115)	(15.882)	(8.334)	(8.373)	(9.982)
Inspector knows Local MPA Personally (=1)			-4.030***	-3.821**		-3.219**	-3.130*
			(1.466)	(1.526)		(1.456)	(1.648)
Inspector Tenure				0.171			0.081
				(0.133)			(0.144)
Time Spent Monitoring Clinics (mins)				-0.005			-0.006
				(0.010)			(0.009)
Constant	-9.872	-6.535	-5.418	-9.470	-0.552	1.063	-0.308
	(9.248)	(4.339)	(3.924)	(6.319)	(2.849)	(3.042)	(5.372)
# Observations	103	100	100	86	75	75	64
R-squared	0.012	0.046	0.133	0.154	0.007	0.075	0.086
Outcome	-	<100	<100	<100	<100	<100	<100
Sample	Full				Non-overlapping constituencies		

Notes: This table reports the frequency of interference by politicians in health inspectors decisions by the level political competition. The unit of observation is a county-constituency. The dependent variable is a count of the number of times that inspectors report Members of the Provincial Assembly pressuring them to either (a) not take action against doctors or other staff that were performing unsatisfactorily in their jurisdiction (county) or (b) assign doctors to their preferred posting in the previous two years. Of the 123 inspectors covering our experimental sample, we have responses from 103. In columns (2)-(7), we drop four reports which indicate more than 100 instances of interference (99th percentile). These three observations are more than four standard deviations from the mean. The remaining 100 inspectors are responsible for facilities spanning 211 provincial assembly constituencies. 79 of the constituencies belong to multiple inspectors' jurisdictions. Columns (1) through (3) report OLS regressions of the instances of interference on indicator variables for the degree of political competition in the full sample of 211 constituencies. Jurisdictions spanning multiple constituencies are repeated with the level of political competition in each constituency providing an observation. Columns (4) through (6) drop constituencies spanning multiple jurisdictions. The political competition index is a Herfindahl index computed as the sum of squared candidate vote shares in each constituency in 2008. Low competition is a dummy variable equal to 1 for constituencies in the top tercile of this index and medium competition is a dummy variable for constituencies in the middle tercile. Standard errors clustered at the jurisdiction (county) level reported in parentheses. *Levels of significance:* $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

H Training Manual For Smartphone Application Use

MANUAL
FOR
HEALTH FACILITY INFORMATION AGGREGATION SYSTEM

DIRECTORATE GENERAL HEALTH SERVICES
SUPPORTED BY
PUNJAB HEALTH SECTOR REFORMS PROGRAM

CONTENTS

1. INTRODUCTION

The Health Department of Government of the Punjab is committed to adopting state-of-the-art technology to strengthen governance and improve service delivery for all citizens.

For this purpose, the Punjab Health Sector Reforms Program (PHSRP), with technical assistance from International Growth Centre (IGC) Team, is supporting DGHS and district health managers in strengthening the internal monitoring system of the Health Department. This is being done by introducing a mobile phone based information management system that is being rolled out across different districts of the province.

This initiative will improve the internal information transmission within the Health Department and will ensure that timely, authentic and actionable information is sent quickly from individual facilities to district and provincial health managers on such crucially important issues as absenteeism, medicine stock outs, availability and functionality of equipment etc.

Android-based smartphones have been provided to those district supervisory officers, such as Executive District Health Officers (EDOs), District Health Officers (DOs), and Deputy District Health Officers (DDOs), who have been tasked with the collection of performance related data from Basic Health Units (BHUs), Rural Health Centers (RHCs) and Tehsil and District Headquarters (THQs and DHQs).

The report submitted by these officers through the phone will be recorded on a website and automatically analyzed for use by managers at various levels. It is expected that this information will become a powerful tool for management both for district and central level officials. This is expected to bring about marked improvement in health service delivery management, particularly at primary and secondary levels of healthcare, leading to better health outcomes for the poor and disadvantaged in the province.

At Directorate General Health Services, Director, District Health Information System (DHIS), supported by the PHSRP and IGC team, is the focal person for implementation of the program at the provincial level. Overall responsibility for the program at the district level lies with EDOs, and Statistical Officers (SOs) are the designated focal persons for managing the system at the district level.

This manual contains basic information about the program and the phone, as well

as details of how to submit data and deal with some problems that may arise.

2. ABOUT THE PHONE

The HTC Explorer runs on Android 2.3.5 with HTC's latest custom interface - Sense 3.0, and is equipped with a 3.2 inch capacitive touch screen.

The phone has 4 capacitive touch buttons on the front- HOME, MENU, BACK and SEARCH.

With a 600 MHz processor based on the latest mobile technology, 512 MB of RAM and a 2 GB SD card, the phone is well equipped to deal with advanced tasks associated with smart-phones today.

The phone can be used for browsing the internet using either GPRS or WIFI. It is also equipped with a GPS device and a 3 MP camera which can capture high-resolution images and videos.

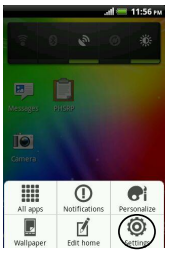
For detailed instructions regarding how to undertake different tasks on the phone and a comprehensive guide to unlocking the full potential of the device, please visit the following website:

http://www.htc.com/uk/help/htc-explorer/#overview

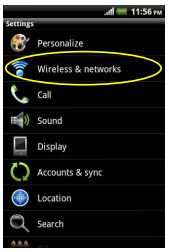
If you encounter any further problems while using the phone, please contact the helpline given at the end of this document.

3. ABOUT THE APPLICATION

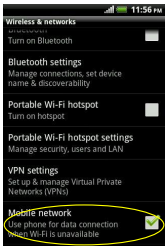
The Android application is very intuitive and simple to use. Before running the application, you must ensure that you are connected to the internet and the GPS is switched on. To confirm that you are connected to the internet, tap the 'Internet' icon on the home screen to launch the phone browser and try opening any webpage (e.g. yahoo.com); if the webpage opens up, it means you are connected to the internet. In this case, tap the phone's 'HOME' capacitive touch button to return to the home screen. To confirm if GPRS (internet) is enabled or not, tap the phone's 'MENU' capacitive touch button while on the home screen and select 'Settings' tab that pops on the bottom right of the screen, as shown below:



Choose 'Wireless & networks' from the list of settings that appear on the screen.



Then scroll down the page to check whether the option of 'Mobile network' is selected or not.



If it is selected, as shown, then the GPRS is switched on. If not, switch it on by checking this option. Confirm again by returning to the home screen by tapping "HOME" and opening any webpage using the phone's browser. If it still does not open, report the issue on the helpline given at the bottom of this document. If the website opens, go back to the home screen.

To check if the GPS is on or off, check the power control widget on the main screen (the dark grey bar at the top with five large symbols); if the GPS symbol is highlighted, as shown below, the GPS is on. If not, tap the GPS symbol to toggle it on, before starting the application.

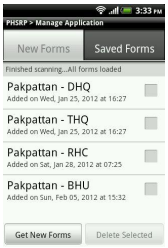
Once it is confirmed that the phone is connected to the internet and the GPS is switched on, tap the PHSRP icon on the home screen to start the application.

The application main screen has three buttons- 'Start New Form', 'Send Finished Forms' and 'Manage Application'- as shown below:

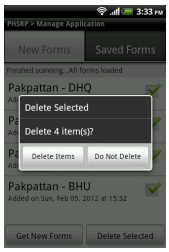
In order to start making entries, the application needs to first download the relevant forms. There are four forms for each district; one for each type of facility- BHU, RHC, THQ and DHQ. For the case of the phones handed out, the relevant forms have already been downloaded. However, in case there are any revisions made, all concerned officials will be notified that the forms will have to be updated. **Do not** delete the forms unless you are formally notified to do so.

3.1. How to update forms if notified

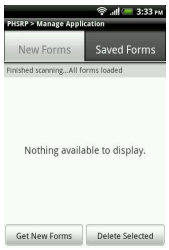
To update the forms on the application **if you are notified to do so**, tap the 'Manage Application' button. Considering Pakpattan as an example, the following screen will be displayed:



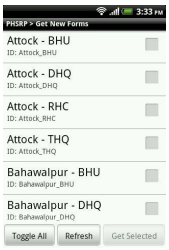
Select all the forms, or just the ones that you need to update as notified, by tapping on the checkboxes on the right, and tap the 'Delete Selected' button at the bottom right. A confirmation will be displayed as follows:



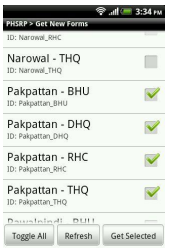
Tap 'Delete Items' to confirm and the selected forms will be deleted. If all the forms are deleted, the following screen will be displayed:



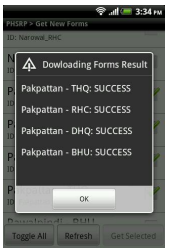
Now, tap 'Get New Forms', to retrieve the updated forms. The application will use the internet to list the updated forms of all districts for download as follows:



If you encounter an error at this point, it means you are not connected to the internet. Ensure that you are connected to the internet by following the instructions given previously and try again. If you encounter an error again, report the issue immediately on the helpline given at the end of this document. If there is no error and the above screen is displayed, scroll vertically to find the forms of your district and select them all by tapping the checkboxes on their right as shown:

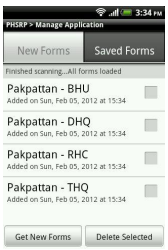


Then, tap 'Get Selected' to download the updated forms of your district. Once the forms are successfully downloaded, the following screen will be displayed:



If there is some sort of error at this point, try downloading the forms again. If you are still unsuccessful, report the issue on the helpline to get an immediate solution.

If all forms are successfully downloaded and the above screen is displayed, tap 'OK' and the following screen will be displayed:



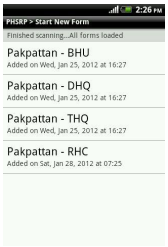
Tap the phone's 'BACK' capacitive touch button at the bottom of the screen to get to the main screen of the application again. You are all set to continue to making and submitting entries now.

3.2. How to fill a form

At this point, it is important to note that completing a form and submitting a form are two different tasks that are performed separately. Filling a form does not require an internet connection, so you can enter data from your inspection visits and save the completed forms regardless of whether the internet is working or not. However, submitting the forms requires an internet connection.

To start filling a form, tap the 'Start New Form' button from the main screen of the application.

The following screen will be displayed, prompting you to choose the type of facility:



Before moving on, it is important to note that if you want to close or discard the entry at any point before saving and exiting, tap the BACK capacitive button on the phone and choose 'discard entry'. If you tap BACK by mistake, simply tap 'Cancel' on the dialogue box that pops up.

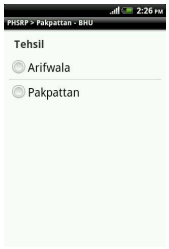
Furthermore, if you accidentally tap the phone's 'HOME' capacitive touch button and end up at the home screen while filling in the form, simply tap the PHSRP application icon again to load the application again and it will return you to the screen you were previously at in the form with all previous entries made on the form intact.

3.2.1. How to fill a BHU form

To fill a BHU form, choose the BHU form from the list shown above and the following screen will be displayed, instructing how to navigate through the form:

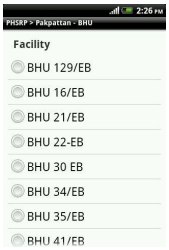
It is important to note here that you will be able to scroll back and forth within the form to check or change your entries before you complete the form, by scrolling laterally in one direction or the other, but whenever you scroll to a screen that requires numerical input from the keypad that pops up (as explained later), all numerical entries will be cleared and you will have to re-enter them.

Scroll laterally, as instructed, to start filling in the form. The next screen will allow you to choose the Tehsil in which the BHU is located, as shown below:

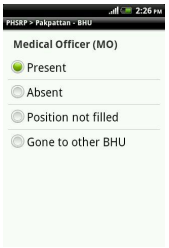


It is important to note at this time that some screens require at least one entry by the user, and you will not be able to move forward in the form unless it is made. To demonstrate, if you attempt to move forward in the form by scrolling laterally when it prompts you to enter the Tehsil in which the facility is located, the following message will appear on the screen:

You will have to select one of the options and then scroll laterally to move to the next screen. The next screen will require you to choose the BHU you are visiting from a list of all the BHUs present in that Tehsil. For demonstration, we select the Tehsil of Arifwala and scroll to the next screen. The following list is displayed:



Scroll vertically to find and choose the specific facility you are visiting, and scroll laterally to move to the next screen:



This screen relates to the availability status of the Medical Officer at the facility. An important thing to note here is that for all non-PRSP districts, the last option will not be shown on this screen as it does not apply to them. As Pakpattan is a PRSP district, the 'Gone to other BHU' option is available on the form.

Another important thing to note here is that all officers are required to make these entries from the perspective of a citizen visiting the facility- so even if the MO is on official leave or out on some official business at the time of the inspection visit, he/she would be marked absent. However, officers would also be required to take a note regarding the reason for absence of the MO in their diaries for such exceptional cases.

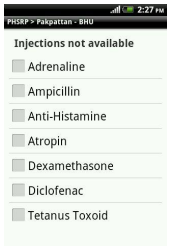
For demonstration, we choose Present and scroll laterally to the next screen:

This screen requires you to check all the people not present at the BHU. As mentioned for the case of the MO, the officer will mark people absent based on the perspective of a visiting citizen- if someone is out on official business or on official leave or even if the position is not filled etc., the position holder will be marked as absent, and a note will be made in the officer's diary about the reason for absence for these exceptional cases.

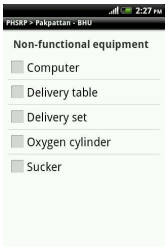
If all the staff is present, you can scroll laterally to move to the next screen without marking any checkbox on this screen. The next screen requires you to mark tablets not available at the facility, as shown:

Scroll vertically and mark all the tablets that are out of stock at the BHU. If all tablets are present, scroll laterally to the next screen without marking any checkbox.

Repeat the same procedure for 'Injections', 'Syrups' and 'Other Medicines' in the subsequent screens as shown:

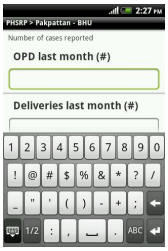


The next screen will require you to mark all equipment that is not functional. Unavailable equipment will also be marked as non-functional:



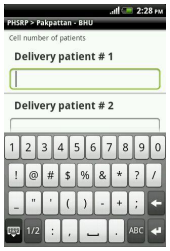
Leave the screen unmarked if all equipment is available and functional, and scroll laterally to the next screen.

The next screen will require you to tap in numerical values for the number of OPD cases last month, number of deliveries last month and number of Antenatal cases last month. A keypad will pop up at the bottom automatically so that you can enter the numbers. Tap on the entry bar of the next field to enter its number after you are done with the first one, and then move on to the third one after you are done with the second one. All **three** fields must be filled in order to move to the next screen. To get to the third field, you will have to scroll vertically lower down the page. While scrolling, ensure that you are avoiding the keypad, as scrolling over the keypad will not work.



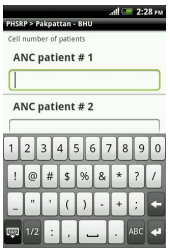
Once all three entries are filled, scroll laterally to move to the next screen. Once again, ensure that you avoid the keypad as scrolling laterally over the keypad will not work.

The next screen will require you to enter the **mobile numbers** of any **two** randomly selected delivery patients from the BHU records from **last month**. The entry fields are designed to detect invalid numbers, and the application will not let you move to the next screen unless you enter two **valid** mobile numbers.

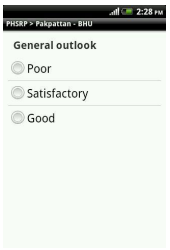


Once the two mobile numbers are entered, scroll laterally to move to the next screen.

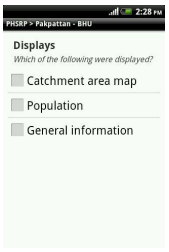
The next screen will require you to enter **mobile numbers** of any **two** randomly selected ANC patients from **last month**. The entry fields on this page are also designed to detect invalid numbers, and the application will not let you move to the next screen unless you enter two **valid** mobile numbers.



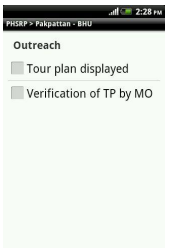
Once the numbers are entered, scroll laterally to move to the next screen:



Choose the most appropriate option and scroll laterally to move to the next screen.

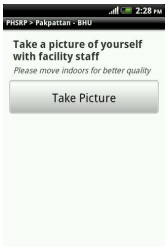


This screen will require you to mark which information was displayed in the BHU. Leave the screen unmarked and scroll laterally to the next screen if none of these were displayed at the facility.

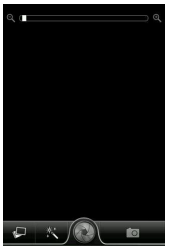


Mark the options appropriately and scroll laterally to move to the next screen.

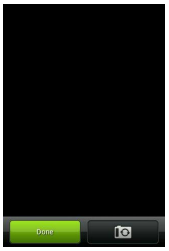
The next screen will require you to take a clear picture of yourself with the essential staff present at the BHU, as shown below:



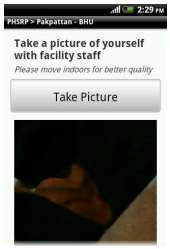
Tap the 'Take Picture' button to load the camera. For better picture quality, it is advisable to take the picture indoors and have someone take it for you. To take the picture, have that person tap the silver button in the centre-bottom of the screen, as shown below:



When the picture is taken, you will be given the option of retaking it if you are not satisfied with it. Tap the camera icon on the right to load the camera again and take a better picture, as shown below:

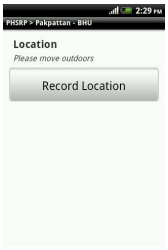


Once you are satisfied with the picture, tap the 'Done' button on the left, and you will be taken to the following screen:



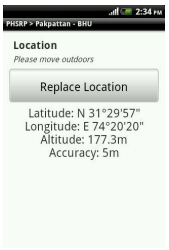
Scroll laterally to move forward. If, instead, you want to view the picture in full screen again, tap the picture preview box at the bottom, and you will be able to view it in full screen:

Tap the phone's 'BACK' capacitive touch button at the bottom to return to the previous screen. Once there, scroll laterally again to move to the next screen:

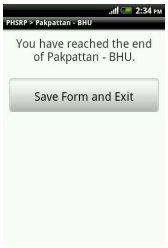


Tap 'Record Location' and the phone will record its location using GPS, network information and GPRS. It is advisable to move outdoors to record location as GPS signals are stronger outdoors. While you wait for the location to be recorded, you might see the accuracy radius values decreasing gradually:

When accuracy radius falls to 5 m, the following screen will be displayed:



GPS satellites are not always in range hence it might take some time for the phone to narrow down its location. If, even after waiting for five to ten minutes, the phone is unable to record its location, ensure that the GPS is toggled on and try again. If, still, the phone is unable to record its location, contact the helpline immediately for quick resolution. Once the location is recorded, the above screen will be displayed. To move forward, scroll laterally again to get to the following screen:

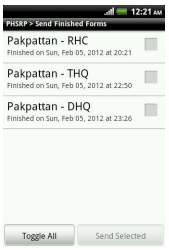


Tap 'Save Form and Exit' to complete the entry. A message will be displayed notifying you that the form was saved successfully and you will be taken back to the main screen of the application.

3.3. How to submit completed forms

Once you have completed the form (after pressing the 'Save Form and Exit' button), it needs to be submitted. After completing the form, tap the 'Send Finished Forms' button on the application main screen:

This will take you to a screen where all your completed and un-submitted forms are listed. Select the one you would like to submit or select all if you want to submit all, and tap the 'Send Selected' button on the bottom right of the screen.



If the submission was successful, a message will appear saying so, and the respective completed forms will vanish from this list. If all were selected and successfully sent, all will disappear. Tap the phone's 'BACK' capacitive button to return to the application's main screen.

If there is any error in submission, it can be because of the internet not working. In that case, confirm if the internet is working and try submitting the form/s again. If you are still unsuccessful, report your issue on the helpline given at the end of this document.

Tap the phone's 'HOME' capacitive touch button to exit the application and return to the home screen of the phone once you have successfully submitted the forms.

Helpline: 0308 4091080

I Training Manuals For Dashboard Use

MANUAL
FOR
HEALTH FACILITY INFORMATION MANAGEMENT SYSTEM
(ONLINE DASHBOARD)

Directorate General Health Services
Supported By

Punjab Health Sector Reforms Program (PHSRP)
International Growth Centre (IGC)
Lahore University of Management Sciences (LUMS)

CONTENTS

1. Introduction

The Health Department of Government of the Punjab is committed to adopting state-of-the-art technology to strengthen governance and improve service delivery for all citizens.

For this purpose, the Punjab Health Sector Reforms Program (PHSRP), with technical assistance from International Growth Centre (IGC) Team, is supporting DGHS and district health managers in strengthening the internal monitoring system of the Health Department. This is being done by introducing a mobile phone based, online information management system.

This initiative will improve the internal information transmission within the Health Department and will ensure that timely, authentic and actionable information is sent quickly from individual facilities to district and provincial health managers on such crucially important issues as absenteeism, medicine stock outs, availability and functionality of equipment etc.

Android-based smartphones have been provided to those district supervisory officers, such as Executive District Health Officers (EDOs), District Health Officers (DOs), and Deputy District Health Officers (DDOs), who have been tasked with the collection of performance related data from Basic Health Units (BHUs), Rural Health Centers (RHCs) and Tehsil and District Headquarters (THQs and DHQs).

The report submitted by these officers through the phone will be recorded on a website, known as the 'Dashboard', and automatically analyzed for use by managers at various levels. It is expected that this information will become a powerful tool for management both for district and central level officials. This is expected to bring about marked improvement in health service delivery management, particularly at primary and secondary levels of healthcare, leading to better health outcomes for the poor and disadvantaged in the province.

At Directorate General Health Services, Director, District Health Information System (DHIS), supported by the PHSRP and IGC team, is the focal person for implementation of the program at the provincial level. Overall responsibility for the program at the district level lies with EDOs, and Statistical Officers (SOs) are the designated focal persons for managing the system at the district level.

This manual explains what information is available on the online dashboard and how it is displayed, to help managers at different levels to utilize this powerful tool to its full potential in order to improve health care in the province.

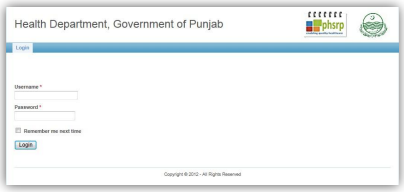
2. The Dashboard

The online dashboard can be accessed any time over the internet through the following link:

punjabmodel.gov.pk/phsrp/dashboard

When you open the link, the following page will be displayed, prompting you to enter your username and password, and giving you the option of saving these credentials for automatic login the next time you open the link, as shown in Figure 1.

Figure 1



To access the dashboard, you have to enter the unique username and password already communicated to you and click on 'Login'. Once successfully logged in, you can also change your password for the dashboard by accessing the Change Password section in the blue bar. When you are done using the dashboard, you can click on 'Logout' to end the session.

Figure 2

As shown in Figure 2, the blue bar near the top of the page contains all the major sections of the dashboard, allowing you to effortlessly navigate from one part of the online tool to another.

One major feature of this tool is the 'Print' button/icon which is located to the right, just below the blue bar. Clicking this allows you to take a snapshot of whatever is currently being displayed on the dashboard and print it out.

It is important to note that there are two levels of access for the dashboard- the district level and the provincial level. All DCOs, EDOs, DOs and DDOs have access to the district level but not the provincial level, ergo when they log in, they are shown the district level by default. The relevant higher up senior officers, however, have access to the district level as well as the provincial level, so when they log in, their default view is the provincial level, but they can also choose to access the district level by choosing from a drop down list of districts near the top of the webpage.

2.1. The District Level

2.1.1. Compliance Status

The first page that is displayed when you log in the dashboard is the Compliance Status section. Officers can use this section to track their compliance performance for the current month as well the months before. They can also gauge their current standing compared to fellow health officers in the district with respect to compliance.

The most prominent characteristics of this page are the 2 bar charts and the table below them.

The first bar chart represents the percentage compliance of all the health officers in the district for the **last calendar month**, disaggregated by facility type. This is calculated as follows:

Percentage compliance= (total visits performed last month / visits assigned last month) x 100

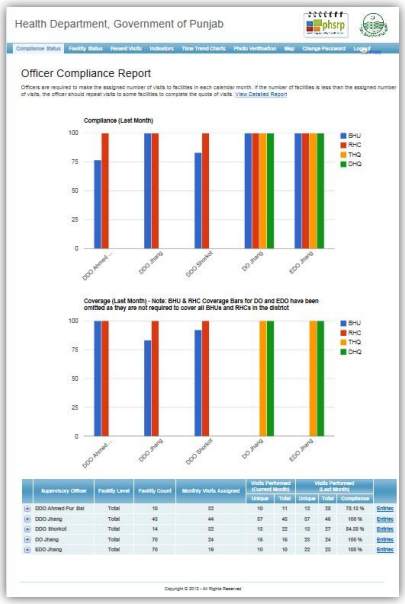
The bars are color coded by facility type, as explained by the legend displayed on the page. Compliance is 100% if the officer performed 100% of the visits assigned to him or more.

The second bar chart represents the percentage coverage of all health officers in the district for the **last calendar month**, disaggregated by facility type. This is calculated as follows:

Percentage coverage= (1 – (no. of assigned facilities not visited by **any** officer last month/ facility count)) x 100

Once again, the bars are color coded by facility type, as explained by the legend displayed on the page, as shown in Figure 3.

Figure 3

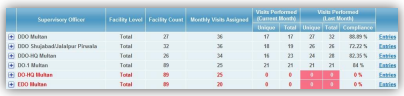


The distinction between what the two charts convey is important and is easily explainable using an example. Suppose there are 10 facilities in an officer's jurisdiction and he is assigned a total of 10 visits. If he visits every single facility once, his compliance as well as his coverage will be 100%. If he visits only 1 facility 10 times during the month, his compliance will still be 100% but his coverage will be 10%. Similarly, suppose if the assigned visits are 20 and the facility count is still 10; if he visits each facility once (leading to a total of 10 visits), his compliance will be 50% but his coverage will be 100%. Officers should strive for 100% compliance as well as the maximum possible coverage (which can be less than 100% only in cases where facility count exceeds the number of assigned visits).

The table below the charts gives detailed information regarding compliance figures. The '+' icon before every officer's designation in the 'Supervisory Officer' column can be clicked to expand the table to show information disaggregated by facility type. The information displayed in the table includes the facility count, monthly assigned visits, unique and total visits performed during the current month, unique and total visits performed last month, and the percentage compliance for last month, for every officer in the district, disaggregated by facility type as well as in total.

For cases in which compliance in the last calendar month is low, the table is highlighted red, as shown in Figure 4.

Figure 4



The last column provides hyper links, allowing you to jump directly to the relevant entries in the 'Recent Visits' section. The Recent Visits section will be explained in detail later on.

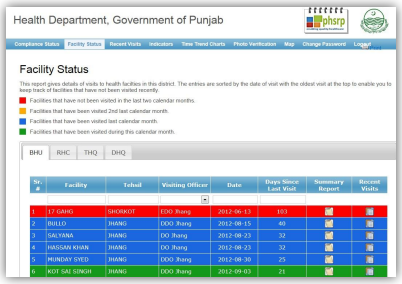
If you are interested to see compliance figures for months before the last calendar month, you can click on the 'View Detailed Report' hyperlinked text located near the top of the page.

Note: Should you find that a visit to a particular facility is not being displayed on the dashboard despite being successfully submitted from the Android smart phone allotted to you, please convey it immediately at the helpline given at the end of this document.

2.1.2. Facility Status

The Facility Status section gives you a list of all the facilities in the district, arranged by the **date of last visit** with the oldest visited at the top. It is designed to enable you to keep track of facilities that are being neglected. The facilities are color coded, according to the legend displayed on the page, as shown in Figure 5.

Figure 5



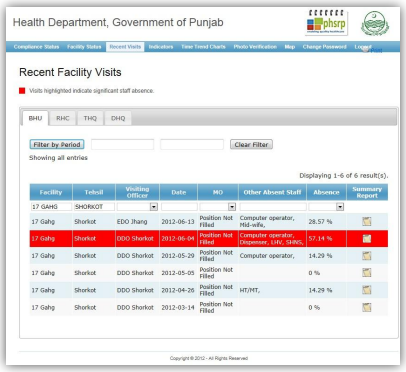
The page has different tabs for the different facility types. Each tab displays a table which displays the facility name, the Tehsil/Town it is located in, the designation of the officer who last visited the facility, the date of the last visit and the number of days since the last visit. The corresponding columns also have filters in-built that allow you to view selective information if you choose to.

The table also contains a column for Summary Report. Clicking the icon in this column for any row will take you to a page displaying details regarding the last visit to the facility as well as the second last visit, in addition to Tehsil variable averages (from 30 days from the last visit). Figure 6 shows a cropped screenshot of the page.

Figure 6

Clicking on the icon in the Recent Visits column for any facility, instead, will take you to the Recent Visits section showing you a list of all entries made for that facility, as shown in Figure 7.

Figure 7

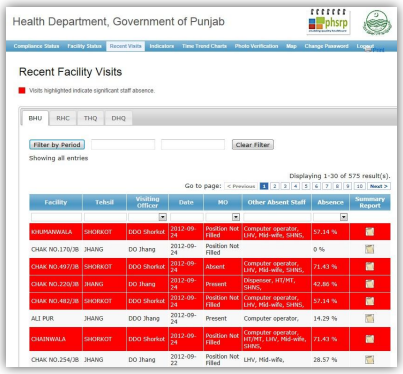


Officers should ensure that all the facilities listed in the Facility Status section are green- some can be blue for cases in which the facility count is more than the assigned visits. Orange or red rows represent neglected facilities and they should be visited as soon as possible.

2.1.3. Recent Visits

The Recent Visits section lists all entries as they come in, with the latest submitted on top. There are different tabs for different facility types. Each facility type tab contains a date filter, which allows you to view entries submitted during a particular time period, and a table consisting of entries, as shown:

Figure 8



To view entries submitted between certain dates, choose the start and end dates from the drop down calendars displayed by clicking on the two white text boxes immediately below the facility type tabs respectively, and click the 'Filter by Period' button.

Some of the entries in the table might be highlighted red, as shown in the above screenshot. These represent facilities where significant staff absence was reported. The table also allows you to display only the highlighted entries or the non-highlighted entries separately, in addition to displaying them all together. The drop down filter for the column labeled 'Absence' can be used to toggle between the selections.

The table also contains information that includes the facility name, the Tehsil/Town it is located in, the visiting officer, the date of visit, the availability status of the MO and the availability status of other staff. It also provides filters for all these categories for selective searches.

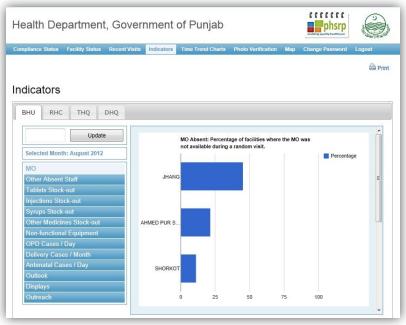
The Summary Report icon at the end of every entry in the table can lead you to a page displaying details regarding the last visit to the facility as well as the second last visit, in addition to Tehsil/Town variable averages (from 30 days from the last visit) as already depicted in Figure 6.

As already mentioned, should you find that a visit to a particular facility is not being displayed on the dashboard despite being successfully submitted from the Android smart phone allotted to you, please convey it immediately at the helpline given at the end of this document.

2.1.4. Indicators

The Indicators section displays charts comparing performance of the different Tehsils/Towns based on the various indicators reported during facility visits. Once again, there are different tabs for different facility types, and different indicators, in some cases, for different tabs. The following screenshot should give you an idea of what the page looks like:

Figure 9



It is important to note that while there are multiple BHUs, RHCs and THQs in each district, the number of DHQs is one or zero. Hence, instead of a comparison across Tehsils/Towns as for the case of BHUs, RHCs and THQs, the DHQ section compares DHQs **across districts**. Furthermore, all indicator charts that display data expressed in percentages in the DHQ section have an additional **red** bar which reflects percentage compliance in every district. The compliance bars are intended to be a gauge of how many visits' data is used to derive the charts- ergo, the higher the compliance, the more reflective is the value of the variable of the actual situation in the corresponding district.

For all tabs, there is a text box allowing you to choose which month you want to see the data for. The page displays charts for the last calendar month by default. If you want to access charts for some previous month, you need to click on the white text box, select the month and year from the drop down

menu, click 'Done', and then click the 'Update' button located to the immediate right.

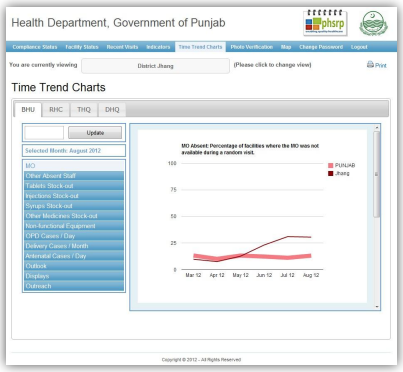
Most indicators in the list have multiple charts that are displayed when you click on any one of them. All charts have descriptive labels that clearly indicate what they represent. Tables 1 through 4 in the appendix show how the charts are arranged for each facility type.

These charts can prove to be a very powerful tool for Tehsil-wise comparison based on the different performance related indicators. However, if taken in isolation, interpretations derived from them may be misleading. For example, if Tehsil 'A' shows 0% MO absence while Tehsil 'B' shows 20% MO absence, it doesn't necessarily imply that Tehsil 'A' is better in MO attendance than Tehsil 'B'. It is possible that only a single visit was performed in Tehsil 'A' in the entire month- during which the MO was present- while, out of the 10 visits performed in Tehsil 'B', the MO was absent in only 2. Ergo, the information displayed in the charts should always be interpreted while considering compliance figures.

2.1.5. Time Trend Charts

The Time Trend Charts section contains line graphs representing the change over time in all the indicators of the different facility types present in the Indicators section as shown in Tables 1, 2, 3 and 4 in the appendix. The general layout of this section is very similar to that of the Indicators section, with the same indicator tabs and option to select a different month for all facility types. However, there is one key difference; the charts contain two lines- a thin one representing the district average and a thick one representing the provincial average- allowing you to compare the average **district** performance on each indicator to the **provincial** average, over time, instead of comparing across Tehsils/Towns of the same district. Figure 10 shows how the webpage might look.

Figure 10



You can also compare the performance of any **Tehsil/Town** compared to the **district** average over time. This can be done by clicking the drop down button near the top of the page and selecting the Tehsil/Town you want to compare with the district average. In the charts that will be displayed as a result, the thick line would represent the district's average and the thin line would represent the Tehsil/Town average.

These charts can prove to be very useful in observing and comparing trends in different indicators over time, at the provincial, district, as well as the Tehsil/Town level.

2.1.6. Photo Verification

To verify staff presence, the smart-phone Performa requires officers to take pictures of the essential staff present at the facility they are visiting. The Photo Verification section displays all these, sorted by the most recent visit, by officer designation. Figure 11 shows the layout of the page.

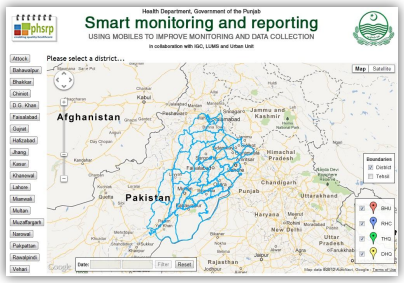
Figure 11

You can view the full size version of any picture by clicking on it. Health officers responsible for supervision of BHUs, RHCs, THQs and DHQs are advised that the pictures submitted should not be blurry or unclear in any way for the convenience and effectiveness of photo verification.

2.1.7. Map

When you click on the tab for the Map section, a separate window (or tab, depending on your browser) will open, displaying a map of Pakistan and its surrounding areas as shown in Figure 12.

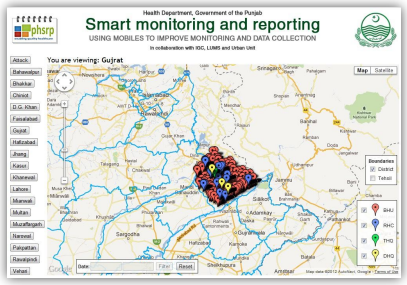
Figure 12



For completing an entry for a facility visit, the smart-phone Performa requires the supervisory officer to record the location of the facility using the phone's GPS. All successfully submitted entries show up on this map when you zoom down to individual district.

In order to view entries for any district, you need to click on the relevant district tab from the list on the left. Once you zoom in, all the relevant entries will show up as place-marks color-coded with respect to the facility type, as shown in Figure 13.

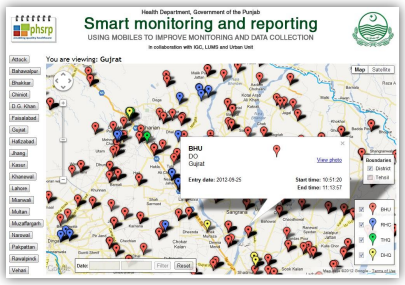
Figure 13



You can zoom further in or out using the zooming tool in the upper left corner of the map. The map also allows you to show or hide District and Tehsil boundaries, and even switch between Map and Satellite view. Furthermore, the date filter allows you to see only those entries submitted during a certain time period.

Clicking on any place-mark reveals a few details regarding the entry that include the supervisory officer's designation, the date the entry was made, the start and end time of the visit and a link to the picture taken for the entry, as shown in Figure 14.

Figure 14



The map allows for spatial review of the coverage and compliance in the District or Tehsil/Town, which can prove to be very useful for circumstances in which information regarding the location and spread of the facilities is crucial.

2.2. The Provincial Level

As already mentioned, when you log in to the dashboard with an account that has provincial level access as well as district level access, your default view of the dashboard is the provincial level view. However you can access the district level view for any district by choosing it from the drop down list that appears when you click the 'Punjab' button, which is right below the blue bar near the top of the page.

The Recent Visits and Photo Verification sections in the provincial level view are blank as the usefulness of a combined list of entries or verification pictures coming in from all districts is very limited.

Apart from that, the Map section for both the levels is exactly the same.

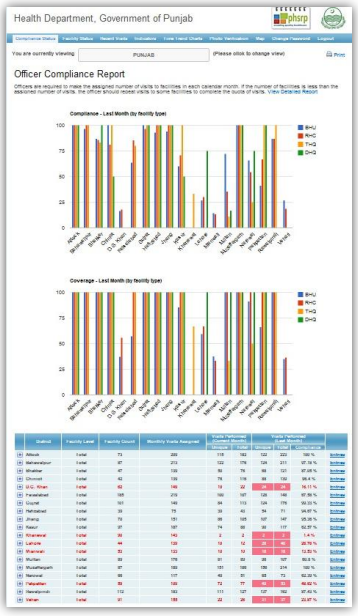
2.2.1. Compliance Status

Once again, the first page displayed after a successful login is the Compliance Status section. This is just like the Compliance Status section in the district level view except that instead of a comparison across Tehsils/Towns in a district, you have a comparison of compliance **across districts**.

The bars in the two charts are color-coded in the same way as in the district level view, and the table below the charts gives detailed information regarding compliance figures for districts, rather than supervisory officer. Again, the '+' icon can be clicked to expand the table to show information disaggregated by facility type. The information displayed in the table includes the facility count, monthly assigned visits, unique and total visits performed during the current month, unique and total visits performed last month, and the percentage compliance for last month, for every district, disaggregated by facility type as well as in total.

Figure 15 shows how the page might look like.

Figure 15



Districts with low compliance in the last calendar month will be highlighted in red. The last column provides hyperlinks, allowing you to jump directly to the relevant entries in the 'Recent Visits' section, as in the district level view.

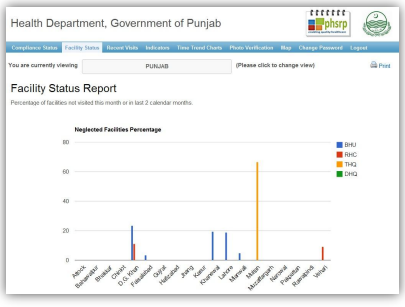
Moreover, if you are interested to see compliance figures for months before the last calendar month, you can click on the 'View Detailed Report' hyperlinked text located near the top of the page, in same way.

This section is very useful for senior officials to track the compliance and coverage status of all districts and compare them if need be.

2.2.2. Facility Status

The Facility Status section in the provincial level view is radically different from that in the district level view, as apparent from Figure 16.

Figure 16



The page displays a single bar chart representing the percentage of facilities that are being neglected in each district. The bars are color-coded based on the facility type.

The criterion for a facility to be considered neglected is that it is not visited by any supervisory officer in the current month as well as the last two calendar months. Senior officials can easily identify which district has the highest percentage and take appropriate measures to rectify the situation.

2.2.3. Indicators

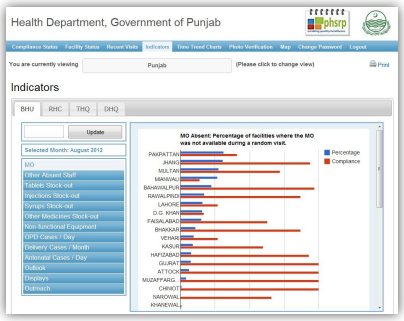
The Indicators section in the province level view is very similar to that in the district level view in terms of layout and structure. The variables are exactly the same as those in the district level view, as detailed in Tables 1, 2, 3 and 4 in the appendix.

One major difference between the two views, however, is that instead of a comparison across **Tehsils /Towns** in a district, the provincial level charts compare performance across **districts** for all the indicators.

Also, indicator charts in the province level view contain extra red bars representing compliance for the BHUs, RHCs and THQs as well as the DHQs, whereas this is only true for DHQs in the district level view of the Indicators section. As previously explained, the compliance bars serve as a gauge of how many visits' data is used to derive the charts- meaning that the higher the compliance, the more the value of the variable is reflective of the actual situation in the corresponding district

Figure 17 depicts a screenshot of the section.

Figure 17

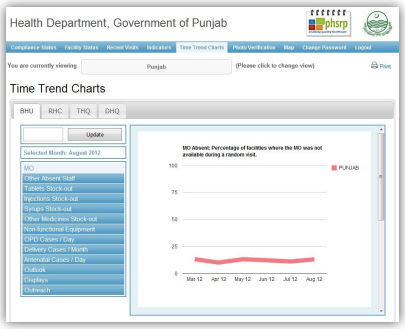


This section can prove very useful to track performance of and across districts in terms of various indicators.

2.2.4. Time Trend Charts

The Time Trend Charts section in the province level view is exactly the same as that in the district level view, except that there isn't an extra line for any district on any of the charts; just a thick line representing the trend of provincial averages for the same indicators over time, as depicted in Figure 18.

Figure 18



As already mentioned, you can move to the district level view if you want a comparison of the provincial average with a district's average, or even to the Tehsil/Town level view if you want a comparison of the district average with a Tehsil/Town's average, over time.