HEALTH SERVICE PROVISION IN GUJARAT

Assessing Facility Capacity, Costs of Care, and Patient Perspectives

ACCESS, BOTTLENECKS, COSTS, AND QUITY

IHME INSTITUTE FOR HEALTH METRICS AND EVALUATION
UNIVERSITY OF WASHINGTON

PUBLIC HEALTH FOUNDATION OF INDIA

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ABCE
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About Public Health Foundation of India

The Public Health Foundation of India (PHFI) is a public-private initiative to build institutional capacity in India for strengthening training, research, and policy development for public health in India. PHFI adopts a broad, integrative approach to public health, tailoring its endeavors to Indian conditions and bearing relevance to countries facing similar challenges and concerns. PHFI engages with various dimensions of public health that encompass promotive, preventive, and therapeutic services, many of which are often lost sight of in policy planning as well as in popular understanding.

About IHME

The Institute for Health Metrics and Evaluation (IHME) is an independent global health research center at the University of Washington that provides rigorous and comparable measurement of the world's most important health problems and evaluates the strategies used to address them. IHME makes this information freely available so that policymakers have the evidence they need to make informed decisions about how to allocate resources to best improve population health.

Collaborations

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About this report

Assessing Facility Capacity, Costs of Care, and Patient Perspectives: Gujarat provides a comprehensive assessment of health facility performance in Gujarat, including facility capacity for service delivery, efficiency of service delivery, and patient perspectives on the service they received. Findings presented in this report were produced through the ABCE project in Gujarat, which aims to collate and generate the evidence base for improving the cost-effectiveness and equity of health systems. The ABCE project is funded through the Disease Control Priorities Network (DCPN), which is a multi-year grant from the Bill & Melinda Gates Foundation to comprehensively estimate the costs and cost-effectiveness of a range of health interventions and delivery platforms.

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Acronyms

ABCE	Access, Bottlenecks, Costs, and Equity
ANC	Antenatal care
ANM	Auxiliary nurse midwife
CHC	Community health centre
CI	Confidence interval
DCPN	Disease Control Priorities Network
DEA	Data envelopment analysis
DH	District hospital
DOTS	Directly observed treatment, short-course
GJ	Gujarat
IHME	Institute for Health Metrics and Evaluation
IPHS	Indian Public Health Standards
NCD	Non-communicable diseases
OR	Odds ratio
PHC	Primary health centre
PHFI	Public Health Foundation of India
SDH	Sub-district hospital
SFA	Stochastic frontier analysis
SHC	Sub health centre
STI	Sexually transmitted infection
WHO	World Health Organization

Terms and definitions

Definitions presented for key technical terms used in the report.

Constraint
a factor that facilitates or hinders the provision of or access to health services. Constraints exist as both "supply-side," or the capacity of a health facility to provide services, and "demand-side," or patient-based factors that affect health-seeking behaviors (e.g., distance to the nearest health facility, perceived quality of care received by providers).

Data Envelopment Analysis (DEA)
an econometric analytic approach used to estimate the efficiency levels of health facilities.

Efficiency
a measure that reflects the degree to which health facilities are maximizing the use of the resources available in producing services.

Facility sampling frame
the list of health facilities from which the ABCE sample was drawn. This list was based on a 2012–2013 facility inventory published by the Gujarat state government.

Inpatient visit
a visit in which a patient has been admitted to a facility. An inpatient visit generally involves at least one night spent at the facility, but the metric of a visit does not reflect the duration of stay.

Inputs
tangible items that are needed to provide health services, including facility infrastructure and utilities, medical supplies and equipment, and personnel.

Outpatient visit
a visit at which a patient receives care at a facility without being admitted.

Outputs
volumes of services provided, patients seen, and procedures conducted, including outpatient and inpatient care, laboratory and diagnostic tests, and medications.

Platform
a channel or mechanism by which health services are delivered.

Stochastic Frontier Analysis (SFA)
an econometric analytic approach used to estimate the efficiency levels of health facilities.

Table 1 defines the types of health facilities in Gujarat; this report will refer to facilities according to these definitions.

TABLE 1 Health facility types in Gujarat[1]

Health facility types in Gujarat
District hospital (DH) These facilities are the secondary referral level for a given district. Their objective is to provide comprehensive secondary health care services to the district's population. DHs are sized according to the size of the district population, so the number of beds varies from 75 to 500.
Sub-district hospital (SDH) These facilities are sub-district/sub-divisional hospitals below the district and above the block-level hospitals (CHC). As First Referral Units, they provide emergency obstetrics care and neonatal care. These facilities serve populations of 500,000 to 600,000 people, and have a bed count varying between 31 and 100.
Community health centre (CHC) These facilities constitute the secondary level of health care and were designed to provide referral as well as specialist health care to the rural population. They act as the block-level health administrative unit and as the gate-keeper for referrals to higher-level facilities. Bed strength ranges up to 30 beds.
Primary health centre (PHC) These facilities provide rural health services. PHCs serve as referral units for primary health care from sub-centres and refer cases to CHCs and higher-order public hospitals. Depending on the needs of the region, PHCs may be upgraded to provide 24-hour emergency hospital care for a number of conditions. A typical PHC covers a population of 20,000 to 30,000 people and hosts about six beds.
Sub health centre (SHC) Along with PHCs, these facilities provide rural health care. SHCs typically provide outpatient care, which includes immunizations, and refer inpatient and deliveries to higher-level facilities.

1 Directorate General of Health Services, Ministry of Health & Family Welfare, and Government of India. *Indian Public Health Standards (IPHS) Guidelines*. New Delhi, India: Government of India, 2012.

Executive summary

With the aim of establishing universal health coverage, India's national and state governments have invested significantly in expanding and strengthening the public health care sector. This has included a particular commitment to extending its reach to rural populations and reducing disparities in access to care for marginalized groups. However, in order to realize this goal, it is necessary for the country to critically consider the full range of factors that contribute to or hinder progress toward it.

Since its inception in 2011, the Access, Bottlenecks, Costs, and Equity (ABCE) project has sought to comprehensively identify what and how components of health service provision – access to services, bottlenecks in delivery, costs of care, and equity in care received – affect health system performance in several countries. Through the ABCE project, multiple sources of data, including facility surveys and patient exit interviews, are linked together to provide a nuanced picture of how facility-based factors (supply-side) and patient perspectives (demand-side) influence optimal service delivery.

Led by the Public Health Foundation of India (PHFI) and the Institute for Health Metrics and Evaluation (IHME), the ABCE project in Gujarat is uniquely positioned to inform the evidence base for understanding the country's drivers of health care access and costs of care. Derived from a state-representative sample of 103 facilities, the findings presented in this report provide governments, international agencies, and development partners alike with actionable information that can help identify areas of success and targets for improving health service provision.

The main topical areas covered in this report move from an assessment of facility-reported capacity for care, to quantifying the services actually provided by facilities and the efficiency with which they operate; tracking facility expenditures and the costs associated with different types of service provision; and comparing patient perspectives of the care they received across different types of facility. Further, we provide an in-depth examination and comparison of facility-level outputs, efficiency, capacity, and patient experiences. It is with this information that we strive to provide the most relevant and actionable information for health system programming and resource allocation in Gujarat.

Facility capacity for service provision

While most facilities report providing key health services, significant gaps in capacity were identified between reported and functional capacity for care.

- Health facilities generally reported a high availability of a subset of key services. Services such as antenatal care, routine deliveries, general medicine, pharmacy, and lab services were nearly universally available across facilities.
- Services for non-communicable diseases (NCDs) had limited availability. While 80% of district hospitals reported providing psychiatry, lower numbers reported providing cardiology (60%). This figure fell at lower facility levels, with just 25% of sub-district hospitals providing either cardiology or psychiatry. These services were unavailable at community health centres.
- Basic medical equipment such as scales, stethoscopes, and blood pressure apparatus were widely available at all health facility levels, as was basic laboratory equipment such as glucometers. However, equipment such as blood chemistry analyzers and incubators were less widely available, particularly at community health centres. This shows limited capacity for testing, particularly at lower levels of the health system, with particular implications for diagnosing and treating NCDs.
- Gaps also emerged with regard to imaging equipment. While 80% of district hospitals had a functional ultrasound, CT scans were available in just 40% of district hospitals and 13% of sub-district hospitals.

- A service capacity gap emerged for many health facilities across several types of services. Many facilities reported providing a given service but lacked full capacity to properly deliver it, for instance lacking functional equipment or medications. For example, while nearly all sub-district hospitals, community health centres, and primary health centres reported providing routine delivery care, none were fully equipped to do so. Additionally, only 40% of district hospitals were fully equipped for this purpose. This discordance has substantial programmatic and policy implications for the health system in Gujarat, highlighting continued challenges in ensuring facilities have all the supplies they need to provide a full range of services.

Physical infrastructure of health facilities has improved, but gaps in transport and communication remain.

- Functional electricity was available at all hospitals and primary health centres, and the large majority of community health centres (94%) and sub health centres (86%), showing substantial improvement over figures from past government surveys.
- Access to piped water was generally high at hospitals (100%), though lower at health centres (72%–78%). There was nearly universal availability of flush toilets at hospitals, community health centres, and primary health centres, with the figure dropping to 72% at sub health centres. These figures reflect investments into improving physical infrastructure at health facilities, though some discrepancies remain between higher- and lower-level facilities.
- All but 22% of sub health centres reported access to a landline phone. Computers and phones were nearly universally available at all other facility types. Only 47% of primary health centres reported having access to an emergency vehicle. Given that these types of facilities often play key referral functions, these findings have serious implications for coordinating the care and transportation of patients.

Nurses were the most common medical staff at hospitals, while at lower levels paramedical staff outnumbered doctors and nurses.

- In general, hospitals reported that they staffed more nurses than doctors, and hospitals tended to employ more medical than paramedical or non-medical staff. Most primary health centres tended to have more doctors than nurses, though they employed more paramedical and non-medical staff than medical staff.
- Staff numbers were concentrated at district hospitals with an average of 168 personnel. Sub-district hospitals had the second highest number of personnel, but this was around 40% of that at district hospitals, while health centres averaged between two and 25 staff. While some of this variation is a result of service provision and population size, this also demonstrates relative shortages in human resources for health.

Facility production of health services

Both outpatient and inpatient visits have increased over time.

- Between 2011 and 2015, the number of outpatient visits increased slightly across facility types. Outpatient visits accounted for the large majority of patients seen per staff member per day across all facility types. Inpatient visits also increased for all facility types between 2011 and 2015.

Facilities showed capacity for larger patient volumes given observed resources.

- In generating estimates of facility-based efficiency, or the alignment of facility resources with the number of patients seen or services produced, we found a wide range of efficiency levels within and across facility types. The average efficiency score of district hospitals ranged from 53% to 94%, with a platform average of 79%. Sub-district hospitals were between 75% and 98% efficient. Community health centres were between 19% and 82% efficient. The range of efficiency scores was similarly wide for primary health centres, ranging from 10% to 93%, with four facilities more than 75% efficient.

- If they operated at optimal efficiency, district hospitals could provide 229,838 additional outpatient visits with the same inputs (including physical capital and personnel), while primary health centres could produce 16,439 additional outpatient visits.
- These efficiency scores indicate that there is considerable room for health facilities to expand service production given their existing resources. Future work on pinpointing specific factors that heighten or hinder facility efficiency, and how efficiency is related to the quality of service provision, should be considered.

Costs of care

Trends in average facility spending between 2011 and 2015 varied between facility types, though all platforms recorded higher spending in 2015 than 2011.

- Spending on personnel accounted for the majority of annual spending across facility types. Notably, the proportion of expenditure put toward personnel was slightly higher at community health centres than other facility types, while the proportion of expenditure on medical supplies was highest at sub-district hospitals and primary health centres.

Patient perspectives

Travel and wait times were generally shorter for patients visiting lower-level facilities than higher-level ones.

- 58% of patients who went to district hospitals traveled less than 30 minutes, compared to 80% at primary health centres – this reflects the greater distances people travel to receive specialist treatment provided at hospitals.
- Nearly all patients seeking care at primary health centres (93%) received care within 30 minutes, with 80% receiving care within 30 minutes at community health centres. Wait times were longest at district hospitals, where 32% of patients waited more than 30 minutes to receive care.

Patients gave higher ratings of health care providers than facility characteristics

- At sub-district hospitals and primary health centres, patients receiving care from doctors reported slightly higher levels of satisfaction about respectfulness and clarity than those receiving care from nurse and auxiliary nurse midwives (ANMs). Generally, satisfaction with both was high across platforms, and highest at community health centres.
- Most patients were relatively satisfied with facility cleanliness at primary health centres (86%), with decreasing satisfaction with cleanliness at higher levels. Privacy was rated lowest among patients who sought care at community health centres (80%), while ratings were similar for all other platforms (ranging from 86% to 88%).

With its multidimensional assessment of health service provision, findings from the ABCE project in Gujarat provide an in-depth examination of health facility capacity, costs of care, and how patients view their interactions with the health system. Gujarat's health provision landscape was markedly heterogeneous and will likely continue to evolve over time. This highlights the need for continuous and timely assessment of health service delivery, which is critical for identifying areas of successful implementation and quickly responding to service disparities or faltering performance. Expanded analyses would also allow for an even clearer picture of the trends and drivers of facility capacity, efficiencies, and costs of care. With regularly collected and analyzed data, capturing information from health facilities, recipients of care, policymakers, and program managers can yield the evidence base to make informed decisions for achieving optimal health system performance and the equitable provision of cost-effective interventions throughout Gujarat.

Introduction

The performance of a country's health system ultimately shapes the health outcomes experienced by its population, influencing the ease or difficulty with which individuals can seek care and facilities can address their needs. At a time when international aid is plateauing[1] and the government of India has prioritized expanding many health programs,[2,3] identifying health system efficiencies and promoting the delivery of cost-effective interventions has become increasingly important.

Assessing health system performance is crucial to optimal policymaking and resource allocation; however, due to the multidimensionality of health system functions,[4] comprehensive and detailed assessment seldom occurs. Rigorously measuring what factors are contributing to or hindering health system performance – access to services, bottlenecks in service delivery, costs of care, and equity in service provision throughout a country – provides crucial information for improving service delivery and population health outcomes.

The Access, Bottlenecks, Costs, and Equity (ABCE) project was launched globally in 2011 to address these gaps in information. In addition to India, the multi-pronged, multi-partner ABCE project has taken place in seven other countries (Bangladesh, Colombia, Ghana, Kenya, Lebanon, Uganda, and Zambia). In India, the ABCE project was undertaken in six states: Andhra Pradesh and Telangana, Gujarat, Madhya Pradesh, Odisha, and Tamil Nadu.

The ABCE project, with the goal of rigorously assessing the drivers of health service delivery across a range of settings and health systems, strives to answer these critical questions facing policymakers and health stakeholders in each country or state for public sector health care service delivery:

- What health services are provided, and where are they available?
- What are the bottlenecks in provision of these services?
- How much does it cost to produce health services?
- How efficient is provision of these health services?

Findings from each country's ABCE work will provide actionable data to inform their own policymaking processes and needs. Further, ongoing cross-country analyses will likely yield more global insights into health service delivery and costs of health care. These eight countries have been purposively selected for the overarching ABCE project as they capture the diversity of health system structures, composition of providers (public and private), and disease burden profiles. The ABCE project contributes to the global evidence base on the costs of and capacity for health service provision, aiming to develop data-driven and flexible policy tools that can be adapted to the particular demands of governments, development partners, and international agencies.

The Public Health Foundation of India (PHFI) and the Institute for Health Metrics and Evaluation (IHME) compose the core team for the ABCE project in India, and they received vital support and inputs from the state Ministry of Health and Family Welfare for data collection, analysis, and interpretation. The core team harnessed information from distinct but linkable sources of data, drawing from a state-representative sample of health facilities to create a large and fine-grained database of facility attributes, expenditure, and capacity, and patient characteristics and outcomes. By capturing the interactions between facility characteristics and patient perceptions of care, we have been able to piece together what factors drive or hinder optimal and equitable service provision in rigorous, data-driven ways.

1 Institute for Health Metrics and Evaluation (IHME). *Financing Global Health 2015: Development assistance steady on the path to new Global Goals*. Seattle, WA: IHME, 2016.
2 Planning Commission Government of India. *Eleventh Five Year Plan (2007-12)*. New Delhi, India: Government of India, 2007.
3 Planning Commission Government of India. *Twelfth Five Year Plan (2012-17)*. New Delhi, India: Government of India, 2012.
4 Murray CJL, Frenk J. A Framework for Assessing the Performance of Health Systems. *Bulletin of the World Health Organization*. 2000; 78 (6): 717-731.

We focus on the facility because health facilities are the main points through which most individuals interact with the health system or receive care. Understanding the capacities and efficiencies within and across different types of public sector health facilities unveils the differences in health system performance at the level most critical to patients – the facility level. We believe this information is immensely valuable to governments and development partners, particularly for decisions on budget allocations. By having data on what factors are related to high facility performance and improved health outcomes, policymakers and development partners can then support evidence-driven proposals and fund the replication of these strategies at facilities throughout India.

The ABCE project in India has sought to generate the evidence base for improving the cost-effectiveness and equity of health service provision. In this report, we examine facility capacity across platforms, as well as the efficiencies and costs associated with service provision for each type of facility. Based on patient exit interviews, we consider the factors that affect patient perceptions of and experiences with the state's health system. By considering a range of factors that influence health service delivery, we have constructed a nuanced understanding of what helps and hinders the receipt of health services through facilities in the state of Gujarat.

The results discussed in this report are far from exhaustive; rather, they align with identified priorities for health service provision and aim to answer questions about the costs of health care delivery in the respective state in India. This report provides an in-depth examination of health facility capacity across different platforms, specifically covering topics on human resource capacity, facility-based infrastructure and equipment, health service availability, patient volume, facility-based efficiencies, costs associated with service provision, and demand-side factors of health service delivery as captured by patient exit interviews.

Table 2 defines the cornerstone concepts of the ABCE project: Access, Bottlenecks, Costs, and Equity.

TABLE 2 Access, Bottlenecks, Costs, and Equity

Access, Bottlenecks, Costs, and Equity
Access Health services cannot benefit populations if they cannot be accessed; thus, measuring which elements are driving improved access to – or hindering contact with – health facilities is critical. Travel time to facilities, user fees, and cultural preferences are examples of factors that can affect access to health systems.
Bottlenecks Mere access to health facilities and the services they provide is not sufficient for the delivery of care to populations. People who seek health services may experience supply-side limitations, such as medicine stockouts, that prevent the receipt of proper care upon arriving at a facility.
Costs Health services costs can translate into very different financial burdens for consumers and providers of such care. Thus, the ABCE project measures these costs at several levels, quantifying what facilities spend to provide services.
Equity Various factors influence how populations interact with a health system. The nature of these interactions either facilitates or obstructs access to health services. In addition to knowing the cost of scaling up a given set of services, it is necessary to understand costs of scale-up for specific populations and across population-related factors (e.g., distance to health facilities). The ABCE project aims to pinpoint which factors affect the access to and use of health services and to quantify how these factors manifest.

ABCE project design

For the ABCE project in India, we conducted primary data collection through a two-pronged approach:

1. A comprehensive facility survey administered to a representative sample of health facilities in select states in India (the ABCE Facility Survey)
2. Interviews with patients as they exited the sampled facilities

Here, we provide an overview of the ABCE survey design and primary data collection mechanisms. All ABCE survey instruments are available online at http://www.healthdata.org/dcpn/india.

ABCE Facility Survey

Through the ABCE Facility Survey, direct data collection was conducted from a state-representative sample of health service platforms and captured information on the following indicators for the five fiscal years (running from April to March of the following year) prior to the survey:

- **Inputs:** the availability of tangible items that are needed to provide health services, including infrastructure and utilities, medical supplies and equipment, pharmaceuticals, personnel, and non-medical services.
- **Finances:** expenses incurred, including spending on infrastructure and administration, medical supplies and equipment, pharmaceuticals including vaccines, and personnel. Facility funding from different sources (e.g., central and state governments) and revenue from service provision were also captured.
- **Outputs:** volume of services and procedures produced, including outpatient and inpatient care, emergency care, and laboratory and diagnostic tests.
- **Supply-side constraints and bottlenecks:** factors that affected the ease or difficulty with which patients received services they sought, including bed availability, pharmaceutical availability and stockouts, cold-chain capacity, personnel availability, and service availability.

Table 3 provides more information on the specific indicators included in the ABCE Facility Survey.

TABLE 3 Modules included in the ABCE Facility Survey in India

SURVEY MODULE	SURVEY CATEGORY	KEY INDICATORS AND VARIABLES
Module 1: Facility finances and inputs	Inputs	Input funding sources, managing authority, and maintenance information Availability and functionality of medical and non-medical equipment
	Finances	Salary/wages, benefits, and allowances Total expenses for infrastructure and utilities; medical supplies and equipment; pharmaceuticals; administration and training; non-medical services, personnel (salaries and wages, benefits, allowances) Performance and performance-based financing questions
	Revenue	User fees; total revenue and source
	Personnel characteristics	Total personnel by cadre Funding sources of personnel Health services provided and their staffing; administrative and support services and their staffing
Module 2: Facility management and direct observation	Facility management and infrastructure characteristics	Characteristics of patient rooms; electricity, water, and sanitation Facility meeting characteristics Guideline observation
	Direct observation	Latitude, longitude, and elevation of facility. Facility hours, characteristics, and location; waiting and examination room characteristics
Module 3: Lab-based consumables, equipment, and capacity	Facility capacity	Lab-based tests available
	Medical consumables and equipment	Lab-based medical consumables and supplies available
Module 4: Pharmaceuticals	Facility capacity	Drug availability and stockout information
Module 5: General medical consumables, equipment, and capacity	Medical consumables and equipment	Availability and functionality of medical furniture, equipment, and supplies Inventory of procedures for sterilization, sharp items, and infectious waste Inventory of personnel
Module 6: Facility outputs	Facility capacity	Fund and vehicle availability for referral and emergency referral
	General service provision	Inpatient care and visits; outpatient care and visits; emergency visits; home or outreach visits Laboratory and diagnostic tests
Module 7: Vaccines	Facility procedures for vaccine supply, delivery and disposal	Source from vaccine obtained Personnel administering vaccine Procedures to review adverse events Disposal of vaccines
	Vaccine availability, storage, and output	Stock availability and stockouts of vaccines and syringes Types and functionality of storage equipment for vaccines Temperature chart history; vaccine inventory and vaccine outputs; vaccine outreach and home visits Vaccine sessions planned and held

Sample design

A total of nine districts in Gujarat were selected for the ABCE survey (Figure 1). The districts were selected using three strata to maximize heterogeneity: proportion of full immunization in children aged 12-23 months as an indicator of preventive health services; proportion of safe delivery (institutional delivery or home delivery assisted by a skilled person) as an indicator of acute health services; and proportion of urban population as an indicator of overall development. The districts were grouped as *high* and *low* for urbanization based on median value, and into three equal groups as *high*, *medium,* and *low* for the safe delivery and full immunization indicators. Eight districts were selected randomly from each of the various combinations of indicators, and in addition the capital district was selected purposively.

Within each sampled district, we then sampled public sector health facilities at all levels of services based on the structure of the state health system (Figure 2). In each

FIGURE 1 Sampled districts in Gujarat

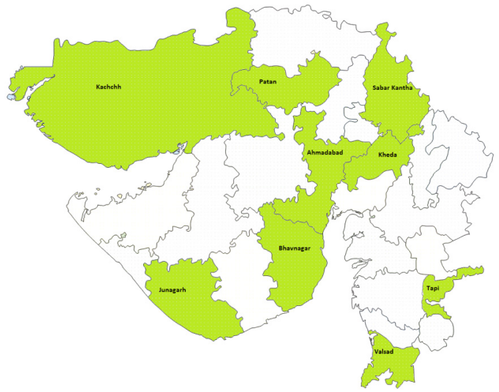
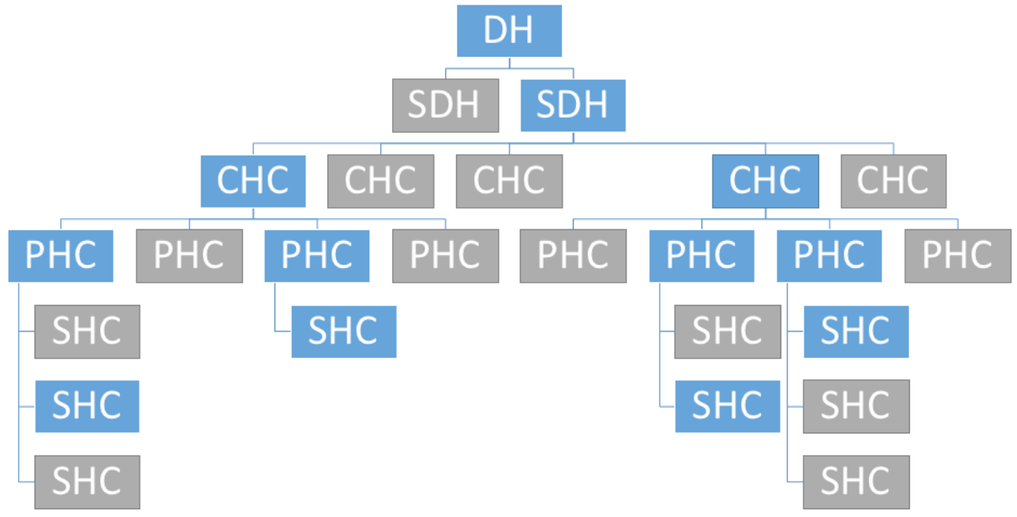


FIGURE 2 Sampling strategy for health facilities in a district in the ABCE survey in India



Selected facilities are in blue; unselected facilities from the sampling frame are in grey.
DH: District hospital; **SDH:** Sub-district hospital; **CHC:** Community health centre; **PHC:** Primary health centre; **SHC:** Sub health centre

TABLE 4 Types of questions included in the Patient Exit Interview Survey in India

SURVEY CATEGORY	TYPES OF KEY QUESTIONS AND RESPONSE OPTIONS
Direct observation of patient	Sex of patient (and of patient's attendant if surveyed)
Direct interview with patient	Demographic questions (e.g., age, level of education attained, caste) Scaled-response satisfaction scores (e.g., satisfaction with medical doctor) Open-ended questions for circumstances and reasons for facility visit, as well as visit characteristics (e.g., travel time to facility) Reporting costs associated with facility visit (user fees, medications, transportation, tests, other), with an answer of "yes" prompting follow-up questions pertaining to amount

sampled district, one district hospital (DH); all sub-district hospitals (SDH, from a total of zero to two) for each sampled DH; two community health centres (CHC, from a total of two to seven) for each sampled SDH; two primary health centres (PHC, from a total of two to 11) for each sampled CHC; and one sub centre (SHC, from a total of one to six) for each sampled PHC were randomly selected for the study.

Patient exit interview survey

A fixed number patients or attendants of patients were interviewed at each facility, based on the expected outpatient density for the platform. A target of 30 patients were interviewed at district hospitals, 20 at SDH, 15 at CHC, 10 at PHC and five at SHC. Patient selection was based on a convenience sample. The main purpose of the Patient Exit Interview Survey was to collect information on patient perceptions of the health services they received and other aspects of their facility visit (e.g., travel time to facility, costs incurred during the facility visit, and satisfaction with the health care provider). Table 4 provides more information on the specific indicators included in the exit survey. This information fed into quantifying the "demand-side" constraints to receiving care (as opposed to the facility-based, "supply-side" constraints and bottlenecks measured by the ABCE Facility Survey).

TABLE 5 Facility sample, by platform, for the ABCE project in Gujarat

FACILITY TYPE	FINAL SAMPLE
District hospital	5
Sub-district hospital	8
Community health centre	18
Primary health centre	36
Sub health centre	36
Total health facilities	103

Data collection for the ABCE survey in Gujarat

Data collection took place from August 2015 to October 2016. Prior to survey implementation, PHFI and the data collection agency hosted a two-week training workshop for 35 interviewers, where they received extensive training on the electronic data collection software (DatStat and Surveybe), the survey instruments, the Gujarat health system's organization, and interviewing techniques. Following this workshop, a one-week pilot of all survey instruments took place at health facilities. Ongoing training occurred on an as-needed basis throughout the course of data collection.

All collected data went through a thorough verification process between PHFI and IHME and the ABCE field team. Following data collection, the data were methodically cleaned and re-verified, and securely stored in databases hosted at PHFI and IHME.

A total of 103 health facilities participated in the ABCE project. Two SHCs were replaced due to data being unavailable for the years considered; the reporting chain of the sampled facility being incorrect; or the facility having been functional for less duration.

Main findings
Health facility profiles

The delivery of facility-based health services requires a complex combination of resources, ranging from personnel to physical infrastructure, that vary in their relative importance and cost to facilities. Determining what factors support the provision of services at lower costs and higher levels of efficiency at health facilities is critical information for policymakers to expand health system coverage and functions within constrained budgets.

Using the ABCE Gujarat facility sample (Table 5), we analyzed five key drivers of health service provision at facilities:

- Facility-based resources (e.g., human resources, infrastructure and equipment, and pharmaceuticals), which are often referred to as facility inputs.
- Patient volumes and services provided at facilities (e.g., outpatient visits, inpatient bed-days), which are also known as facility outputs.
- Patient-reported experiences, capturing "demand-side" factors of health service delivery.
- Facility alignment of resources and service production, which reflects efficiency.
- Facility expenditures and production costs for service delivery.

These components build upon each other to create a comprehensive understanding of health facilities in Gujarat, highlighting areas of high performance and areas for improvement.

Facility capacity and characteristics

Service availability

Across and within district hospitals, sub-district hospitals and community health centres in GJ (Table 6), several notable findings emerged for facility-based health service provision. While fundamental services such as routine deliveries, antenatal care, general medicine, pharmacy, and laboratory services were nearly universally available, fewer facilities reported available services for non-communicable diseases such as cardiology and psychiatry, particularly at the sub-district and community levels. Geriatric services were also notably lacking. District hospitals reported a wide range of services such as surgical services, dentistry, orthopedics, and emergency obstetrics. Sub-district hospitals generally offered fewer services than district hospitals but still reported high coverage of services such as minor surgery, STI and HIV services, and accident and emergency services. Community health services had particularly low coverage of anesthesiology, blood banks, orthopedics, and ear, nose, and throat services, but all reported providing DOTS.

Human resources for health

A facility's staff size and composition directly affect the types of services it provides. In general, a greater availability of health workers is related to higher service utilization and better health outcomes.[1] India has a severe shortage of qualified health workers, and the workforce is concentrated in urban areas.[2] The public health system has a shortage of both medical and paramedical personnel. The number of primary and community health centres without adequate staff is substantially higher if high health-worker absenteeism is taken into consideration.[3] The Indian Government is aware of the additional requirements and shortages in the availability of health workers for the future. The National Rural Health Mission, for instance, recommends a vastly strengthened infrastructure, with substantial increases in personnel at every tier of the public health system.[4]

1 Rao KD, Bhatnagar A, Berman P. So many, yet few: *Human resources for health in India*. Human Resources for Health. 2012; 10(19).
2 Rao M, Rao KD, Kumar AK, Chatterjee M, Sundararaman T. Human resources for health in India. *The Lancet*. 2011; 377(9765): 587-98.
3 Hammer J, Aiyar Y, Samji S. Understanding government failure in public health services. *Economic and Political Weekly*. 2007; 42: 4049–58.
4 National Rural Health Mission. Ministry of Health and Family Welfare, Government of India. *Mission Document (2005-2012)*. New Delhi, India: Government of India, 2005.

TABLE 6 Availability of services in health facilities, by platform

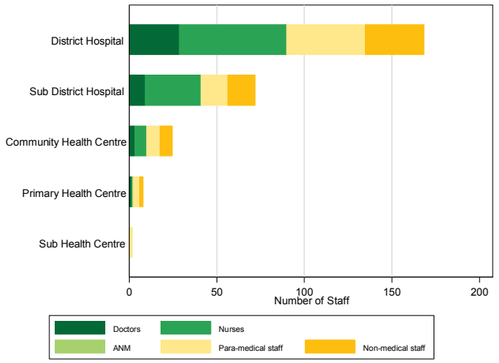
	DISTRICT HOSPITAL (DH)	SUB-DISTRICT HOSPITAL (SDH)	COMMUNITY HEALTH CENTRE (CHC)
Total obstetrics and gynecology services	100%	100%	100%
Routine deliveries	100%	100%	100%
Emergency obstetrics	100%	100%	61%
Antenatal care	100%	100%	100%
Major surgical services	100%	88%	33%
Minor surgical services	100%	100%	94%
Cardiology	60%	25%	0%
Non-communicable disease services	60%	38%	44%
Geriatric services	40%	38%	39%
Psychiatric	80%	25%	0%
Accident, trauma, and emergency	100%	100%	89%
Ophthalmology	100%	75%	56%
Pediatric	100%	88%	78%
General anesthesiology	80%	75%	17%
Blood bank	40%	13%	6%
Ear, nose, and throat services	100%	63%	11%
Dentistry	100%	63%	6%
DOTS treatment	60%	88%	100%
STI HIV	80%	100%	67%
Immunization	100%	88%	100%
Internal/general med	100%	100%	94%
Mortuary	100%	88%	61%
Burns	100%	50%	33%
Orthopedic	100%	75%	17%
Pharmacy	100%	100%	100%
Chemotherapy	0%	0%	NA
Dermatology	100%	63%	NA
Alternative medicine	0%	13%	0%
Diagnostic medical	100%	88%	72%
Laboratory services	100%	100%	100%
Outreach services	0%	0%	11%

NA: Not applicable to this platform according to standards.

LOWEST AVAILABILITY — HIGHEST AVAILABILITY

Note: All values represent the percentage of facilities, by platform, that reported offering a given service at least one day during a typical week.

FIGURE 3 Composition of facility personnel, by platform



Based on the ABCE sample, we found substantial heterogeneity across facility types in GJ by considering the total number of staff in the context of bed strength (i.e., number of beds in the facility) and patient load (Figure 3). Overall, the most common medical staff at district hospitals were nurses (61) followed by paramedical staff (45), non-medical staff (33), and doctors (29), while at lower levels, paramedical staff outnumbered doctors and nurses. This is a reflection of the differential service offerings between higher- and lower-level facilities. Additionally, higher-level facilities tended to have a greater number of health personnel overall; while a degree of this variation is due to differences in service provision and population size, some of this indicates relative shortages in human resources for health.

The greatest number of doctors, nurses, paramedical staff, and non-medical staff are concentrated at the district hospitals (average of 168 total staff). Sub-district hospitals reported the second highest number of personnel; however, the total personnel at these facilities was just over 40% of what was reported by district hospitals (average of 72 total staff). Community health centres maintained a smaller body of health workers, an average total of 25, with most of the medical staff being nurses or paramedical (14). Primary health centres reported, on average, eight staff in total, half of which were paramedical staff (four). Finally, sub health centres reported two paramedical staff performing immunizations, simple outpatient care, and community outreach.

FIGURE 4 Ratio of nurses and ANMs to doctors, by platform

Vertical bars represent the platform average ratio.

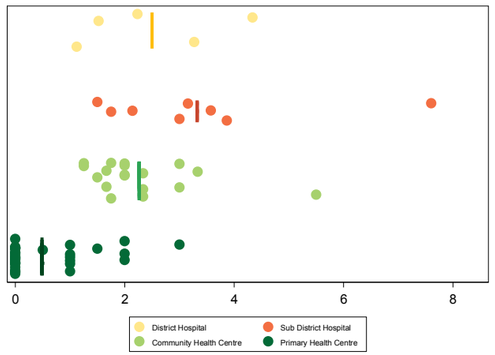
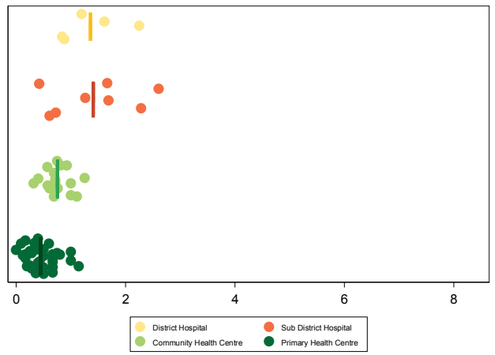


FIGURE 5 Ratio of nurses and doctors to paramedical and non-medical staff, by platform

Vertical bars represent the platform average ratio.



Nurses and ANMs to doctors ratio

The ratio of number of nurses and ANMs to number of doctors is presented in Figure 4. A ratio greater than 1 indicates that nurses and ANMs outnumber doctors; for instance, a ratio of 2 indicates that there are two nurses and/or ANMs staffed for every one doctor. Alternatively, a ratio lower than 1 indicates that doctors outnumber nurses and ANMs; for instance, a ratio of 0.5 indicates there is one nurse or ANM staffed for every two doctors. Facilities with a ratio of zero have no nurses or ANMs, but do have doctors.

District hospitals reported an average ratio of 2.5, indicating that they staff more nurses and ANMs than doctors. However, the ratio reported by various district hospitals ranged from a low of 1.1 to a high of 4.3. On average, sub-district hospitals reported more nurses and ANMs than doctors, but again showed wide variation, with ratios as low as 1.5 (suggesting more doctors than nurses and ANMs) and as high as 7.6. There was also substantial heterogeneity among community health centres, with ratios ranging from 1.3 to 5.5. Finally, primary health centres reported a narrower range of ratios, from 0.0 to 3.0. The average ratio of nurses and ANMs to doctors was similar for sub-district hospitals (3.3), district hospitals (2.5), and community health centres (2.3), but the average ratio for primary health centres (0.5) suggests that these facilities tend to have more doctors than nurses and ANMs.

Nurses, ANMs, and doctors to paramedical and non-medical staff

The ratio of number of nurses, ANMs, and/or doctors to number of paramedical and/or non-medical staff in 2015 is presented in Figure 5. A ratio greater than 1 indicates that nurses, ANMs, and doctors outnumber paramedical and non-medical personnel; for instance, a ratio of 2 indicates that there are two nurses and/or ANMs and/or doctors staffed for every one paramedical/non-medical staff. Alternatively, a ratio lower than 1 indicates that paramedical and/or non-medical personnel outnumber nurses and/or ANMs and/or doctors.

The average ratio for both district hospitals and sub-district hospitals was 1.4, though the range of ratios for district hospitals (0.8 to 2.3) was narrower than for sub-district hospitals (0.4 to 2.6). Community health centres were homogenous, reporting an average ratio of 0.8, with facilities reporting ratios that ranged from 0.3 to 1.3. The ratio for primary health centres ranged from 0.0 to 1.1, with an average of 0.4 doctors, ANMs, and nurses to paramedical and non-medical staff.

Beds to doctors ratio

The ratio of number of beds to number of doctors in 2015 is presented in Figure 6. A ratio greater than 1 indicates that beds outnumber doctors; for instance, a ratio of 2 indicates that there are two beds for every one doctor staffed. Alternatively, a ratio lower than 1 indicates that doctors outnumber beds.

FIGURE 6 Ratio of beds to doctors, by platform

Vertical bars represent the platform average ratio.

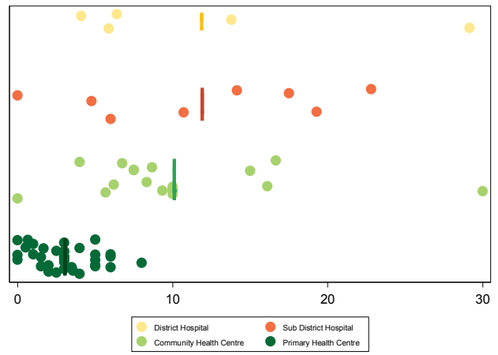
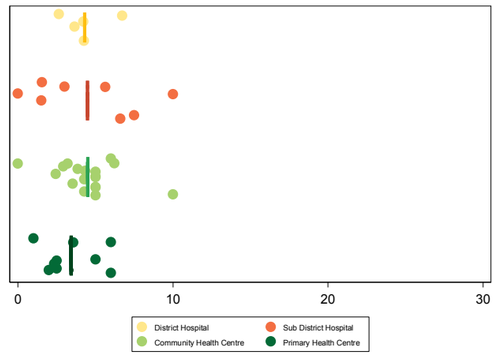


FIGURE 7 Ratio of beds to nurses, by platform

Vertical bars represent the platform average ratio.



The average ratio of beds to doctors was similar in district hospitals (11.9), sub-district hospitals (11.9), and community health centres (10.1). These platforms also had a wide range of ratios. District hospitals ranged from 4.0 to 29.2, while sub-district hospitals had ratios from 0.0 to 22.8, and community health centres had a range from 0.0 to 30.0. The average ratio among primary health centres was much lower, at 3.0, with a narrower range from 0.0 to 8.0.

Beds to nurses ratio

The ratio of number of beds to number of nurses in 2015 is presented in Figure 7. A ratio greater than 1 indicates that beds outnumber nurses; for instance, a ratio of 2 indicates that there are two beds for every one nurse staffed. Alternatively, a ratio lower than 1 indicates that nurses outnumber beds.

Similar to the ratio of beds to doctors, the average ratio of beds to nurses was similar for district hospitals (4.3), sub-district hosptials (4.5) and community health centres (4.5). For primary health centres, this ratio was only slightly lower at 3.4. Though there are only nine primary health centres with nurses and beds, the range was varied, from 1.0 to 6.0.

In isolation, facility staffing numbers are less meaningful without considering a facility's overall patient volume and production of specific services. For instance, if a facility mostly offers services that do not require a doctor's administration, failing to achieve the doctor staffing target may be less important than having too few nurses. Further, some facilities may have much smaller patient volumes than others, and thus "achieving" staffing targets could leave them with an excess of personnel given patient loads. While an overstaffed facility has a different set of challenges than an understaffed one, each reflects a poor alignment of facility resources and patient needs. To better understand bottlenecks in service delivery and areas to improve costs, it is important to assess a facility's capacity (inputs) in the context of its patient volume and services (outputs). We further explore these findings in the "Efficiency and costs" section. As part of the ABCE project in India, we compare levels of facility-based staffing with the production of different types of health services. In this report, we primarily focus on the delivery of health services by skilled medical personnel, which include doctors, nurses, and other paramedical staff. It is possible that non-medical staff also contribute to service provision, especially at lower levels of care, but the ABCE project in India is not currently positioned to analyze these scenarios.

TABLE 7 Availability of physical capital, by platform

	DISTRICT HOSPITAL (DH)	SUB-DISTRICT HOSPITAL (SDH)	COMMUNITY HEALTH CENTRE (CHC)	PRIMARY HEALTH CENTRE (PHC)	SUB HEALTH CENTRE (SHC)
Functional electricity	100%	100%	94%	100%	86%
Piped water	100%	100%	78%	72%	78%
Flush toilet	100%	100%	94%	92%	72%
Hand disinfectant	100%	100%	100%	94%	86%
Any four-wheel vehicle	80%	75%	39%	61%	NA
Emergency four-wheel vehicle	80%	88%	83%	47%	NA
Landline phone	100%	100%	100%	100%	78%
Computer	100%	100%	100%	97%	NA

NA: Not applicable to this platform according to standards.

LOWEST AVAILABILITY — HIGHEST AVAILABILITY

Note: Values represent the percentage of facilities, by platform, that had a given type of physical capital

Infrastructure and equipment

Health service provision depends on the availability of adequate facility infrastructure, equipment, and supplies (physical capital). In this report, we focus on four essential components of physical capital: power supply, water and sanitation, transportation and communication, and medical equipment, with the latter composed of laboratory, imaging, and other medical equipment. Table 7 illustrates the range of physical capital, excluding medical equipment, available across platforms.

Power supply

All hospitals and primary health centres reported access to a functional electrical supply, while just 6% of community health centres and 14% of sub health centres lacked functional electricity (Table 7). One facility reported solely relying on a generator for power. Inadequate access to consistent electric power has substantial implications for health service provision, particularly for the effective storage of medications, vaccines, and blood samples. However, these results demonstrate an improvement in the availability of electricity at the lowest platform levels compared to 2007–2008, when 50% of sub health centres had a regular electric supply.[5]

Water and sanitation

All hospitals reported the availability of improved water sources (functional piped water) and improved sanitation with a functional sewer infrastructure with flush toilets (Table 7). Similarly, nearly all community health centres and primary health centres had access to flush toilets, though for both, access to piped water was substantially lower. Notably, more sub centres than primary health centres had piped water. Hand disinfectant was broadly available as a supplementary sanitation method at all platform levels. Among all facilities, 19% reported a severe shortage of water at some point during the year. These findings show a mixture of both notable gains and ongoing needs for facility-based water sources and sanitation practices among both hospitals and primary care facilities.

Transportation and computers

Facility-based transportation and modes of communication varied across platforms (Table 7). In general, the availability of a vehicle decreased down the levels of the health platform. Access to emergency vehicles was relatively high across platforms, though again, this was lower at lower levels of the health platform. Alongside trans-

5 International Institute for Population Sciences (IIPS). *District Level Household and Facility Survey (DLHS-3), 2007-08: India, Gujarat*. Mumbai, India: IIPS, 2010.

TABLE 8 Availability of functional equipment, by platform

	DISTRICT HOSPITAL	SUB-DISTRICT HOSPITAL	COMMUNITY HEALTH CENTRE	PRIMARY HEALTH CENTRE	SUB-HEALTH CENTRE
Medical equipment					
Wheelchair	100%	100%	83%	36%	0%
Adult scale	100%	100%	89%	100%	97%
Child scale	100%	100%	100%	92%	100%
Blood pressure apparatus	100%	100%	100%	97%	100%
Stethoscope	100%	100%	100%	97%	100%
Light source	100%	100%	94%	97%	92%
Lab equipment					
Glucometer	100%	100%	100%	100%	83%
Test strips for glucometer	100%	100%	100%	97%	83%
Hematologic counter	80%	63%	56%	42%	NA
Blood chemistry analyzer	100%	88%	50%	19%	NA
Incubator	80%	75%	33%	22%	NA
Centrifuge	100%	100%	94%	72%	NA
Microscope	100%	100%	94%	94%	NA
Slides	100%	100%	100%	100%	97%
Slide covers	100%	100%	100%	92%	89%
Imaging equipment					
X-ray	100%	88%	78%	NA	NA
ECG	80%	63%	22%	NA	NA
Ultrasound	80%	63%	11%	NA	NA
CT scan	40%	13%	NA	NA	NA

NA: Not applicable to this platform according to standards.

LOWEST AVAILABILITY — HIGHEST AVAILABILITY

Note: Availability of a particular piece of equipment was determined based on facility ownership on the day of visit. Data on the number of items present in a facility were not collected. All values represent the percentage of facilities, by platform, that had a given piece of equipment.

portation, communication is also a necessary facet of the efficient delivery of health services. The availability of modes of communication was generally high across facility levels: all hospitals, community health centres and primary health centres reported having a phone (landline or cellular), and computers were widely available across platforms.

Equipment

For three main types of facility equipment – medical, lab, and imaging – clear differences emerge across levels of health service provision, with Table 8 summarizing the availability of functional equipment by platform.

We used WHO's Service Availability and Readiness Assessment (SARA) survey as our guideline for what types of equipment should be available in hospitals and primary care facilities.[6] Table 8 illustrates the distribution of SARA scores across platforms. In general, hospitals had greater availability of medical equipment, and deficits in essential equipment availability were found in the lower levels of care. Lacking scales and blood pressure cuffs can severely limit the collection of important patient clinical data, but all facility levels reported a high level of availability of these key pieces of equipment.

Microscopes and corresponding components were largely prevalent among all relevant facilities. Additional testing capacity was relatively high too: for example, nearly all facilities had glucometers and test strips, though availability was slightly lower at sub health centres. This indicates good capacity for addressing non-communi-

6 World Health Organization (WHO). *Service Availability and Readiness Assessment (SARA) Survey: Core Questionnaire*. Geneva, Switzerland: WHO, 2013.

TABLE 9 Availability of tests and functional equipment to perform routine antenatal care, by platform

	DISTRICT HOSPITAL	SUB-DISTRICT HOSPITAL	COMMUNITY HEALTH CENTRE	PRIMARY HEALTH CENTRE	SUB HEALTH CENTRE
Testing availability					
Urinalysis	100%	100%	100%	81%	69%
Hemoglobin	100%	100%	100%	92%	83%
Glucometer and test strips	100%	100%	100%	97%	83%
Blood typing	100%	75%	83%	75%	NA
Functional equipment					
Blood pressure apparatus	100%	100%	100%	97%	100%
Adult scale	100%	100%	89%	100%	97%
Ultrasound	80%	63%	NA	NA	NA
Service summary					
Facilities reporting ANC services	100%	100%	100%	97%	81%
Facilities fully equipped for ANC provision based on above tests and equipment availability	80%	38%	72%	66%	71%

NA: Not applicable to this platform according to standards.

LOWEST AVAILABILITY — HIGHEST AVAILABILITY

Note: Availability of a given ANC item was determined by its availability at a facility on the day of visit. All values represent the percentage of facilities, by platform, that had the given ANC item. The service summary section compares the total percentage of facilities reporting that they provided ANC services with the total percentage of facilities that carried all of the functional equipment to provide ANC services.

TABLE 10 Availability of blood tests and functional equipment to perform routine delivery care, by platform

	DISTRICT HOSPITAL	SUB-DISTRICT HOSPITAL	COMMUNITY HEALTH CENTRE	PRIMARY HEALTH CENTRE
Testing availability				
Hemoglobin	100%	100%	100%	92%
Glucometer and test strips	100%	100%	100%	97%
Cross-match blood	60%	75%	17%	NA
Medical equipment				
Blood pressure apparatus	100%	100%	100%	97%
IV catheters	100%	88%	94%	89%
Gowns	100%	100%	94%	69%
Measuring tape	100%	100%	94%	94%
Masks	100%	100%	100%	92%
Sterilization equipment	100%	100%	67%	72%
Adult bag valve mask	100%	88%	50%	47%
Ultrasound	80%	63%	NA	NA
Delivery equipment				
Infant scale	80%	75%	78%	61%
Scissors or blade	100%	100%	83%	83%
Needle holder	100%	100%	100%	97%
Speculum	100%	100%	100%	83%
Delivery forceps	100%	88%	61%	67%
Dilation and curettage kit	100%	75%	61%	39%
Neonatal bag valve mask	100%	88%	94%	72%
Vacuum extractor	60%	63%	44%	33%
Incubator	100%	100%	78%	47%
Service summary				
Facilities reporting delivery services	100%	100%	100%	78%
Facilities fully equipped for delivery services based on above tests and equipment availability	40%	0%	0%	0%

NA: Not applicable to this platform according to standards.

LOWEST AVAILABILITY — HIGHEST AVAILABILITY

Note: Availability of a given delivery item was determined by its availability at a facility on the day of visit. All values represent the percentage of facilities, by platform, that had the given delivery item. The service summary section compares the total percentage of facilities reporting that they provided routine delivery services with the total percentage of facilities that carried all of the recommended pharmaceuticals and functional equipment to provide routine delivery services.

TABLE 11 Availability of blood tests and functional equipment to perform major or minor surgery, by platform

	DISTRICT HOSPITAL (DH)	SUB-DISTRICT HOSPITAL (SDH)	COMMUNITY HEALTH CENTRE (CHC)	PRIMARY HEALTH CENTRE (PHC)
Testing availability				
Hemoglobin	100%	100%	100%	92%
Cross-match blood	60%	75%	17%	NA
Medical equipment				
Blood pressure apparatus	100%	100%	100%	97%
IV catheters	100%	88%	94%	89%
Sterilization equipment	100%	100%	67%	72%
Gowns	100%	100%	94%	69%
Masks	100%	100%	100%	92%
Adult bag valve mask	100%	88%	50%	47%
Surgical equipment				
Thermometer	100%	88%	78%	83%
General anesthesia equipment	100%	88%	28%	8%
Scalpel	100%	75%	100%	75%
Suction apparatus	100%	88%	78%	58%
Retractor	100%	100%	72%	53%
Nasogastric tube	80%	88%	56%	33%
Blood storage unit/refrigerator	80%	50%	22%	3%
Intubation equipment	100%	75%	33%	NA
Service summary				
Facilities reporting major or minor surgery services	100%	100%	94%	89%
Facilities fully equipped for major or minor surgery services based on above tests and equipment availability	40%	38%	6%	0%

NA: Not applicable to this platform according to standards.

LOWEST AVAILABILITY — HIGHEST AVAILABILITY

Note: Availability of a given surgery item was determined by its availability at a facility on the day of visit. All values represent the percentage of facilities, by platform, that had the given surgery item. The service summary section compares the total percentage of facilities reporting that they provided general surgery services with the total percentage of facilities that carried all of the recommended functional equipment to provide general surgery services.

cable diseases (NCDs) such as diabetes, for which this equipment is necessary. Other essential equipment, including hematologic counters, blood chemistry analyzers, and incubators, was notably missing from many community health centres and primary health centres, and their availability was limited even at the hospital level.

District hospitals generally had good availability of imaging equipment, with the notable exception of CT scanners, which were available in only 40% of facilities. Sub-district hospitals showed somewhat patchier availability of imaging equipment, with less than two-thirds reporting the availability of ECGs and ultrasounds and only 13% having CT scanners. Community health centres also had low availability of ECGs and ultrasounds, though 78% had access to X-ray equipment.

Overall, these findings demonstrate gradual improvements in equipping health facilities with basic medical equipment in GJ, as well as the continued challenge of ensuring that these facilities carry the supplies they need to provide a full range of services. Measuring the availability of individual pieces of equipment sheds light on specific deficits, but assessing a health facility's full stock of necessary or recommended equipment provides a more precise understanding of a facility's service capacity.

Focus on service provision

For the production of any given health service, a health facility requires a complex combination of the basic infrastructure, equipment, and pharmaceuticals, with personnel who are adequately trained to administer necessary clinical assessments, tests, and medications. Thus, it is important to consider this intersection of facility resources to best understand facility capacity for care. In this report, we further examined facility capacity for a subset of specific services – antenatal care, delivery, general surgery, and laboratory testing. For these analyses of service provision, we only included facilities that reported providing the specific service, excluding facilities that were potentially supposed to provide a given service but did not report providing it in the ABCE Facility Sur-

TABLE 12 Availability of laboratory tests, by platform

	DISTRICT HOSPITAL (DH)	SUB-DISTRICT HOSPITAL (SDH)	COMMUNITY HEALTH CENTRE (CHC)	PRIMARY HEALTH CENTRE (PHC)
Blood typing	100%	75%	83%	75%
Cross-match blood	60%	75%	17%	NA
Complete blood count	100%	88%	61%	28%
Hemoglobin	100%	100%	100%	92%
HIV	100%	100%	94%	83%
Liver function	100%	75%	17%	NA
Malaria	100%	100%	100%	92%
Renal function	100%	75%	22%	NA
Serum electrolytes	40%	0%	0%	NA
Spinal fluid test	80%	38%	0%	NA
Syphilis	100%	100%	89%	NA
Tuberculosis skin	40%	25%	22%	3%
Tuberculosis sputum	80%	100%	89%	39%
Urinalysis	100%	100%	100%	81%

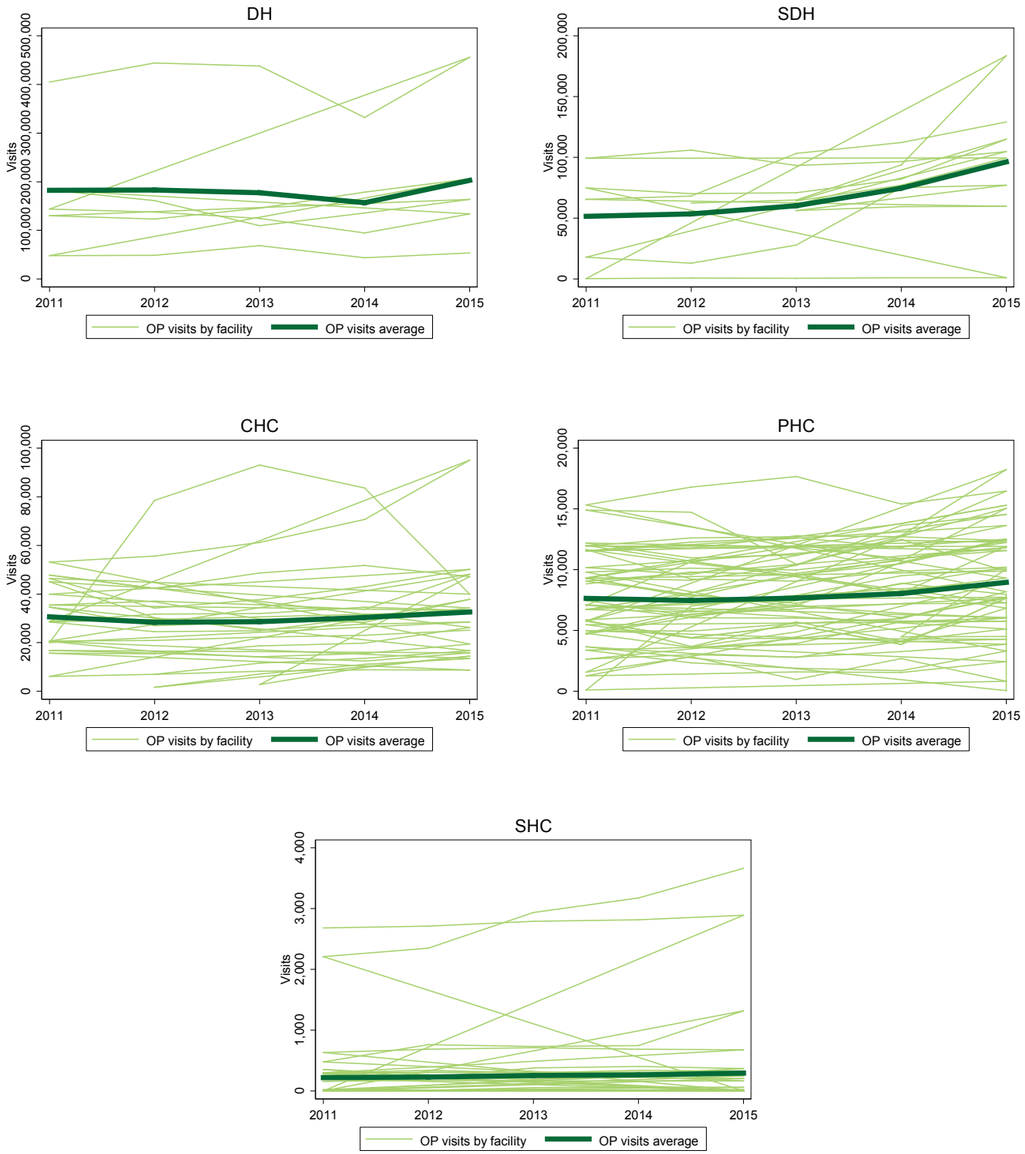
NA: Not applicable to this platform according to standards.

LOWEST AVAILABILITY — HIGHEST AVAILABILITY

Note: Availability of a given test was determined by its availability at a facility on the day of visit. All values represent the percentage of facilities, by platform, that had the given test.

FIGURE 8 Number of outpatient visits, by platform

Note: Each line represents outpatient visits for an individual facility, with the bold line depicting the average for the platform. Scales are different for each platform.



vey. Thus, our findings reflect more of a service capacity "ceiling" across platforms, as we are not reporting on the facilities that likely should provide a given service but have indicated otherwise on the ABCE Facility Survey.

Antenatal care services

In GJ, according to the National Family Health Survey-4, 71% of women had at least four antenatal care (ANC) visits during their last pregnancy.[7] This figure neither reflects what services were actually provided nor the quality of care received. Through the ABCE Facility Survey, we estimated the proportion of facilities that stocked the range of tests and medical equipment to conduct a routine ANC visit. It is important to note that this list was not exhaustive but represented a number of relevant supplies necessary for the provision of ANC.

The availability of tests and functional equipment for ANC is presented in Table 9. While all hospitals and community health centres in this survey reported providing ANC services, few were adequately supplied for care. The discrepancy was most striking with sub-district hospitals , where only 38% of facilities were fully equipped to provide ANC. One-fifth of district hospitals were not fully equipped, due to the lack of ultrasound equipment. Primary and sub health centres were fairly well equipped, particularly with regard to functional equipment. In fact, primary and sub health centres were generally better equipped than some larger facilities to provide the

7 International Institute for Population Sciences (IIPS). *National Family Health Survey (NFHS-4), 2015-2016: Gujarat Factsheet*. Mumbai, India: IIPS, 2016.

FIGURE 9 Number of inpatient visits (excluding deliveries), by platform

Note: Each line represents inpatient visits for an individual facility, with the bold line depicting the average for the platform. Scales are different for each platform.

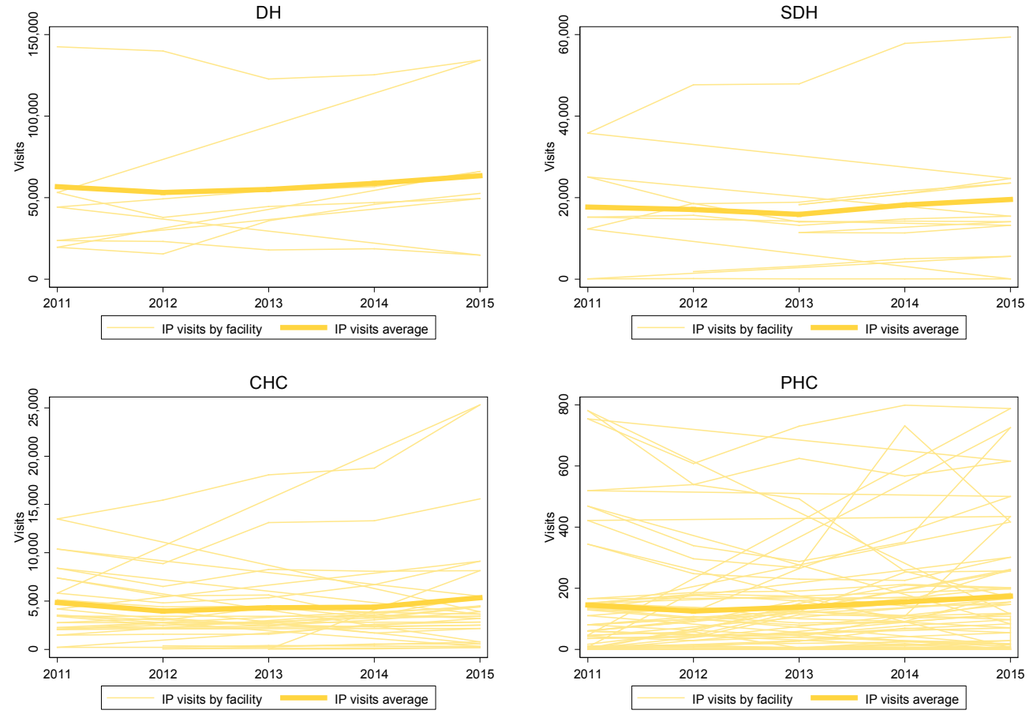
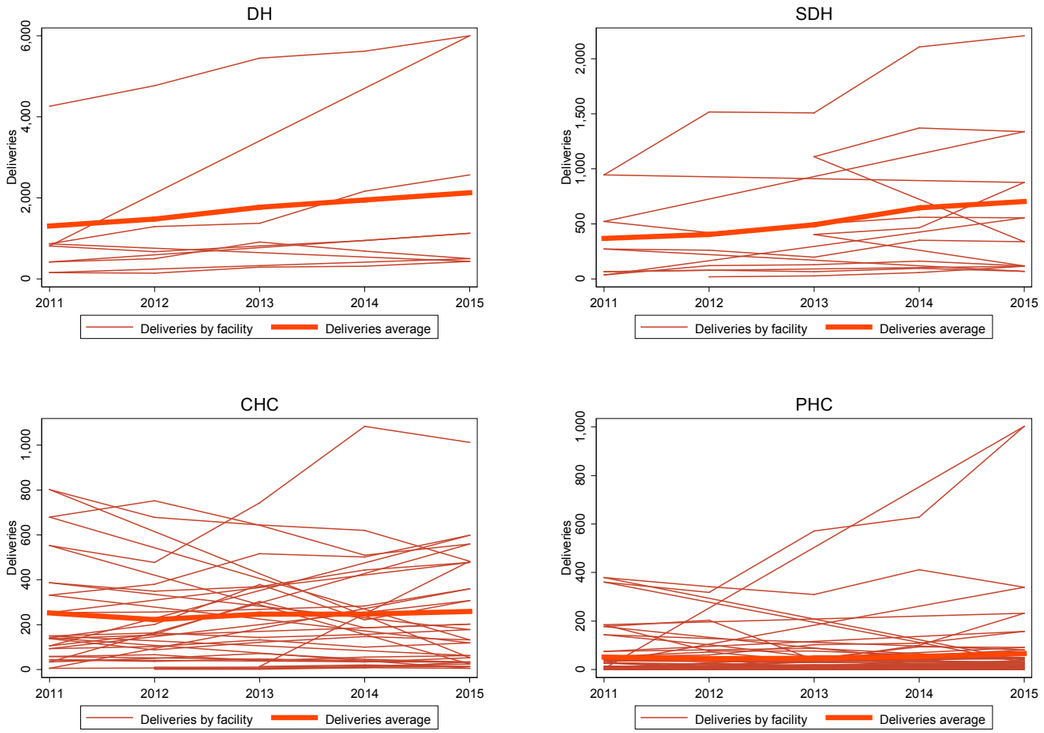


FIGURE 10 Number of deliveries, by platform

Note: Each line represents deliveries visits for an individual facility, with the bold line depicting the average for the platform. Scales are different for each platform.



relevant level of ANC. These findings do not suggest that such platforms are entirely unable to provide adequate ANC services; it simply means that they did not have the recommended diagnostics and medical equipment for ANC.

Delivery care services

Eighty-nine percent of deliveries in GJ occur in a health facility, and 33% in a public facility.[8] Availability of essential equipment is necessary for providing high-quality delivery care; these results are presented in Table 10. Availability was generally highest in district hospitals, declining at lower levels with notable gaps among community and primary health centres, particularly with regard to delivery-specific equipment. While nearly all facility levels offered routine delivery services, no sub-district hospitals, community health centres, or primary health centres had all essential tests and equipment available, and only 40% of district hospitals were fully equipped. Vacuum extractors were notably lacking across all platforms, despite these being essential items for service provision. Cross-match blood tests and ultrasounds also showed generally low availability.

This finding is cause for concern, as not having access to adequate delivery equipment can affect both mater-

8 International Institute for Population Sciences (IIPS). *National Family Health Survey (NFHS-4), 2015-2016: Gujarat Factsheet*. Mumbai, India: IIPS, 2016.

FIGURE 11 Number of immunization doses administered, by platform

Note: Each line represents immunization doses for an individual facility, with the bold line depicting the average for the platform. Scales are different for each platform.

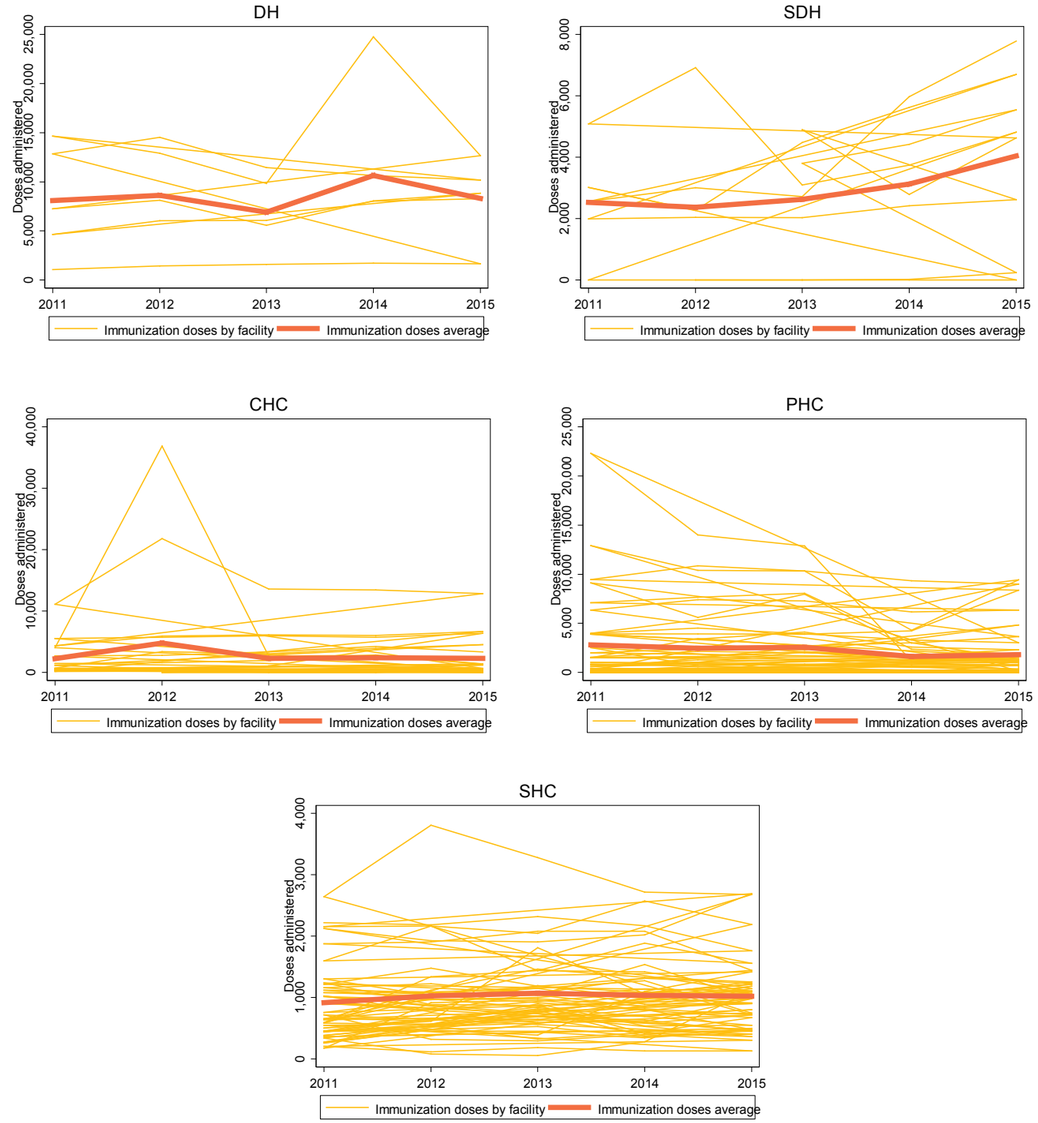
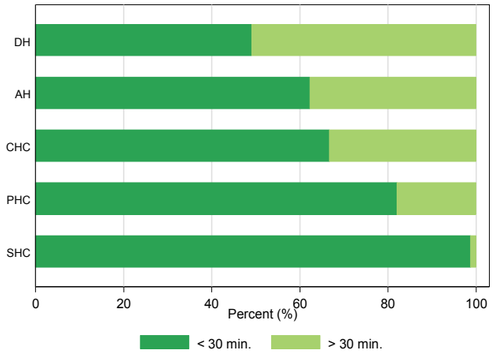


TABLE 13 Characteristics of patients interviewed after receiving care at facilities

	DH	SDH	CHC	PHC	TOTAL
Total patient sample	514	337	272	112	1,235
Percent female	35%	47%	47%	42%	41%
Patient's age group (years)					
<16	5%	8%	14%	10%	8%
16-29	20%	25%	21%	29%	22%
30–39	19%	16%	19%	20%	18%
40–49	19%	18%	22%	13%	19%
>50	38%	32%	24%	29%	32%
Scheduled caste/scheduled tribe	39%	40%	30%	15%	35%
Other backwards caste	34%	34%	41%	47%	37%
Education attainment					
None	27%	25%	29%	38%	28%
Classes 1 to 5	20%	23%	21%	29%	22%
Classes 6 to 9	23%	24%	21%	19%	23%
Class 10 or higher	30%	28%	29%	14%	28%

FIGURE 12 Patient travel times to facilities, by platform



DH: District hospital; **SDH:** Sub-district hospital;
CHC: Community health centre; **PHC:** Primary health centre

nal and neonatal outcomes at all levels of care.[9,10] We found a substantial gap between the proportion of facilities, across platforms, that reported providing routine delivery services and those that were fully equipped for their provision.

General surgery services

Availability of essential tests and equipment for general surgery services is presented in Table 11. The percentage of facilities fully equipped to provide this care was low across platforms, due primarily to a lack of cross-match blood tests and blood storage units across all platforms. Essential medical equipment was mostly available across platforms, though lower-level facilities notably lacked sterilization equipment and adult bag valve masks. Availability of surgical equipment was relatively high at district hospitals, though gaps were evident at the sub-district level with a quarter of facilities lacking

9 Nyamtema AS, Urassa DP, van Roosmalen J. Maternal health interventions in resource limited countries: a systematic review of packages, impacts and factors for change. *BMC Pregnancy and Childbirth*. 2011; 11(30).
10 Wall SN, Lee ACC, Carlo W, Goldenberg R, Niermeyer S, Darmstadt GL, et al. Reducing intrapartum-related neonatal deaths in low- and middle-income countries – what works? *Seminars in Perinatology*. 2010; 34: 395–407.

scalpels and intubation equipment, and half having no capacity for blood storage. There were clear gaps in medical and surgical equipment in community health centres and primary health centres, indicating a lack of capacity to provide general surgical services at these levels. It is also crucial to consider the human resources available to perform surgical procedures, as assembling an adequate surgical team is likely to affect patient outcomes. Given the nature of documentation of human resources in the records, such data could not be captured, but future work on assessing surgical capacity at health facilities should collect this information.

Laboratory testing

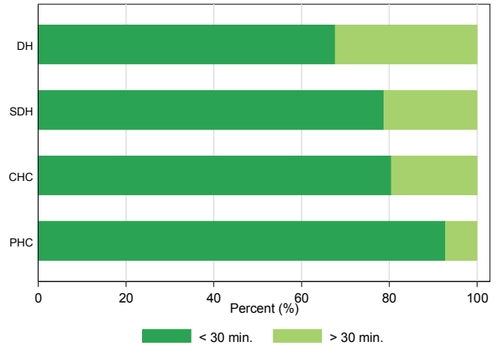
The availability of laboratory tests is presented in Table 12. Availability was generally high in district hospitals and decreased at lower facility levels, with particularly large gaps among primary health centres. Serum electrolyte tests, useful as part of a metabolic panel and to measure symptoms of heart disease and high blood pressure, were available in only 40% of district hospitals and were completely unavailable in sub-district hospitals and community health centres. Spinal fluid tests were available at 80% of district hospitals. There was generally low availability of cross-match blood tests. There were also some gaps in the capacity to test for infectious diseases at primary health centres: while 92% were able to test for malaria and 83% for HIV, only 3% and 39%, respectively, had tuberculosis skin or sputum tests available.

Facility outputs

Measuring a facility's patient volume and the number of services delivered, which are known as outputs, is critical to understanding how facility resources align with patient demand for care. The number of outpatient visits by fiscal year, by platform, is presented in Figure 8. In general, the average number of outpatient visits increased slightly over five fiscal years. Patient volume was highest in district hospitals (average of 157,097–202,512 visits per year). Sub-district hospitals reported an average of 51,571–96,216 visits per year, which was nearly triple the number reported by community health centres (average of 28,349–32,611 visits per year). Primary health centres reported 30 times more outpatient visits (average of 7,476–8,949 visits per year) than sub-health centres (average of 218–294 visits per year).

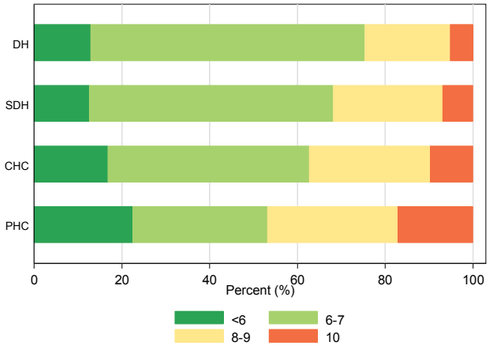
Inpatient visits generally entail more service demands than outpatient visits, including ongoing occupancy of facility resources such as beds. The reported number of inpatient visits (other than deliveries) by year is presented

FIGURE 13 Patient wait times at facilities, by platform



DH: District hospital; **SDH:** Sub-district hospital;
CHC: Community health centre; **PHC:** Primary health centre

FIGURE 14 Patient scores of facilities, by platform



DH: District hospital; **SDH:** Sub-district hospital;
CHC: Community health centre; **PHC:** Primary health centre

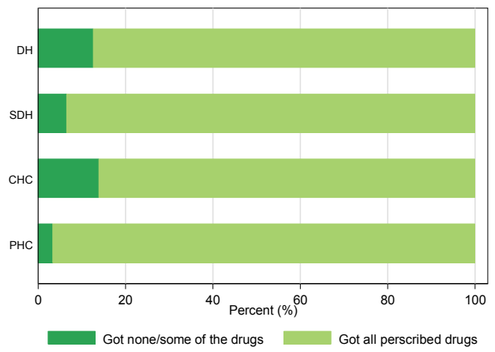
Note: Facility ratings were reported along a scale of 0 to 10, with 0 as the worst facility possible and 10 as the best facility possible.

TABLE 14 Proportion of patients satisfied with facility visit indicators, by platform

		DISTRICT HOSPITAL	SUB-DISTRICT HOSPITAL	COMMUNITY HEALTH CENTRE	PRIMARY HEALTH CENTRE
Staff interactions					
Nurse/ANM	Medical provider respectfulness	97%	95%	97%	94%
	Clarity of provider explanations	96%	95%	97%	94%
Doctor	Medical provider respectfulness	97%	97%	97%	95%
	Clarity of provider explanations	95%	96%	97%	96%
Facility characteristics					
Cleanliness		69%	72%	77%	86%
Privacy		86%	88%	80%	87%

LOWEST AVAILABILITY — HIGHEST AVAILABILITY

FIGURE 15 Availability of prescribed drugs at facility, by platform



DH: District hospital; **SDH:** Sub-district hospital;
CHC: Community health centre; **PHC:** Primary health centre

in Figure 9. Over time, the average number of inpatient visits has increased slightly for all platforms. District hospitals provided care for an average of 53,148–63,468 inpatient visits per fiscal year. Sub-district hospitals provided care for an average of 15,880–19,529 visits per year, while community health centres provided fewer visits (an average of 3,965–5,348 inpatient visits per year). Primary health centres reported substantially fewer inpatient visits than other platforms (on average 125–174 visits per year).

The reported number of deliveries, by platform and over time, is presented in Figure 10. District hospitals reported an average between 1,306 and 2,126 deliveries in each year of observation, while sub-district hospitals reported far fewer, with an average of 369–702 deliveries per year. While many hospitals experienced an increase in the number of deliveries over time, several hospitals reported decreasing numbers over the five years of observation. Community health centres reported an annual average number of deliveries between 222 and 259. Few deliveries were reported in primary health centres (an average of 45–66 deliveries per year). The ratio of deliveries to inpatient visits is higher among the lower platforms, particularly primary health centres.

Immunization

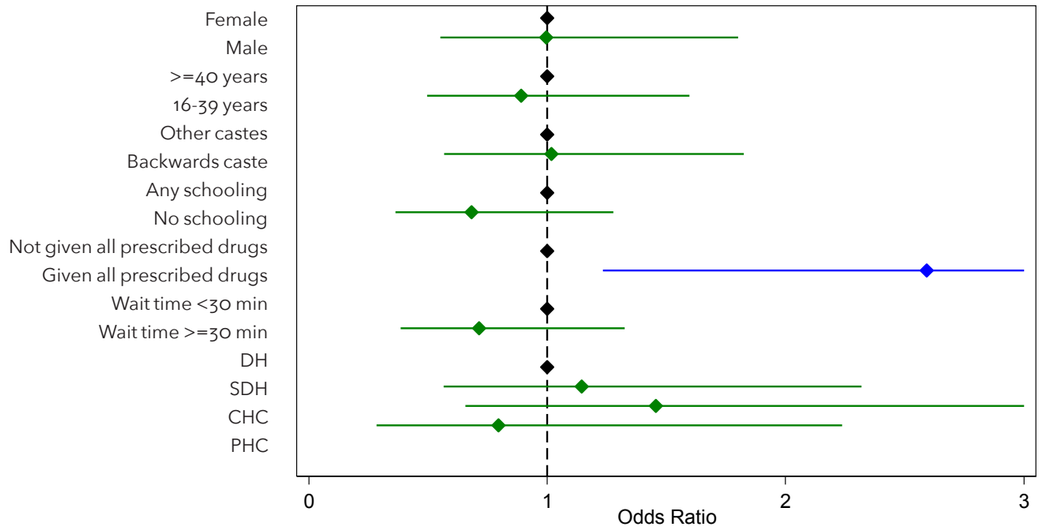
The number of immunization doses administered over time, by platform, is presented in Figure 11. The highest volume of immunization doses administered was seen in district hospitals, with an average between 6,905 and 10,664 doses per fiscal year. Sub-district hospitals reported an average between 2,373 and 4,042 doses administered in each year of observation. Community health centres reported providing an average number of doses between 2,256 and 2,411 most years, though with a spike of 4,810 doses in 2012. Primary health centres reported an average of 1,620 to 2,819 doses administered per year, while sub health centres reported an average of 918–1,068.

Patient perspectives

A facility's availability of and capacity to deliver services is only half of the health care provision equation; the other half depends upon patients seeking those health services. Many factors can affect patients' decisions to seek care, ranging from associated visit costs to how patients view the care they receive. These "demand-side" constraints can be more quantifiable (e.g., distance from facility) or intangible (e.g., perceived respectfulness of the health care provider), but each can have the same impact on whether patients seek care at particular facilities or have contact with the health system at all.

Using data collected from the Patient Exit Interview Surveys, we examined the characteristics of patients who presented at health facilities and their perspectives on the care they received. Table 13 provides an overview of the interviewed patients (n=1,235) or their attendants

FIGURE 16 Determinants of satisfaction with doctors



Dotted vertical line represents an odds ratio of 1. Black points represent the reference groups, which all carry an odds ratio of 1. Compared to the referent category, significant odds ratios and 95% confidence intervals are represented with blue points and horizontal lines, respectively. Odds ratios that are not significant are represented by green points, and their 95% confidence intervals with a green horizontal line. Any confidence intervals with an upper bound above 3 were truncated for ease of interpretation.

DH: District hospital; **SDH:** Sub-district hospital; **CHC:** Community health centre; **PHC:** Primary health centre

at public facilities. Most patients were male (59%) and the majority of patients identified as part of a scheduled caste/scheduled tribe (35%) or other backwards caste (37%). Seventy-two percent of patients had some education, and all facilities saw patients with a range of educational attainment. Thirty percent of patients were under the age of 30.

Travel and wait times

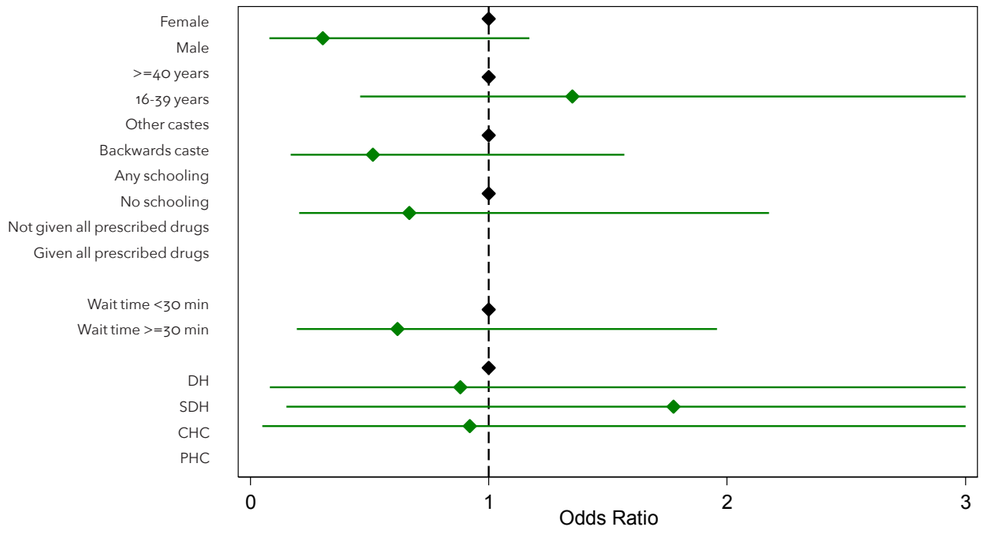
The amount of time patients spend traveling to facilities and then waiting for services can substantially affect their care-seeking behaviors. Among the patients who were interviewed, we found that travel time to a facility for care (Figure 12) differed by platform, with shorter travel time for patients seeking care at lower-level facilities than higher-level. It is important to note that patients only reported on the time spent traveling to facilities, not the time needed for round-trip visits. Most patients had travel times of less than 30 minutes to a facility for care (Figure 12). Fifty-eight percent of patients who went to district hospitals traveled less than 30 minutes, 33% traveled between 30 minutes and one hour, and 9% traveled more than one hour. At primary health centres these proportions were 80%, 17%, and 3%, respectively. These findings are not unexpected, as primary health centres are the closest health facilities for many patients, particularly those in rural areas, while people will travel longer distances to receive the specialist care provided at hospitals.

In terms of wait time, the large majority of patients waited less than 30 minutes to receive care at all platforms (Figure 13), and nearly all patients seeking care at primary health centres received care within 30 minutes. Wait times were longer at district hospitals (32% of patients waited more than 30 minutes to receive care) and sub-district hospitals (21%). Approximately 5% of all patients waited more than one hour to receive care.

Patient satisfaction ratings

We report primarily on factors associated with patient satisfaction with provider care and perceived quality of

FIGURE 17 Determinants of satisfaction with nurses



Dotted vertical line represents an odds ratio of 1. Black points represent the reference groups, which all carry an odds ratio of 1. Compared to the referent category, significant odds ratios and 95% confidence intervals are represented with blue points and horizontal lines, respectively. Odds ratios that are not significant are represented by green points, and their 95% confidence intervals with a green horizontal line. Any confidence intervals with an upper bound above 3 were truncated for ease of interpretation.

DH: District hospital; **SDH:** Sub-district hospital; **CHC:** Community health centre; **PHC:** Primary health centre

TABLE 15 Input-output model specifications

	CATEGORY	VARIABLES
Model 1	Inputs	Expenditure on personnel Expenditure on pharmaceuticals All other expenditure
	Outputs	Outpatient visits Inpatients visits (excluding deliveries) Deliveries Immunization visits
Model 2	Inputs	Number of beds Number of doctors Number of nurses plus ANMs Number of para-medical staff Number of non-medical staff
	Outputs	Outpatient visits Inpatients visits (excluding deliveries) Deliveries Immunization visits

services by patients on medicine availability and hospital infrastructure, as these have been previously identified to be of significance in the patient's perception of quality of health services in India.[11]

Ratings of patient satisfaction, which were based on a rating from 1 to 10, with 10 being the highest score, are presented in Figure 14. Overall, patients were satisfied with the care they received and, in general, ratings were higher for higher-level platforms. Few patients (8%) gave a rating of 10, and the majority rated the facility they attended a 6 or 7 (54% of all patients). Among patients seeking care at sub-district hospitals, only 13% rated the facility below a 6; among patients seeking care at primary health centres, this proportion is 23%. The most variation in patient scores was at the primary health centre level.

Table 14 provides a more in-depth examination of patient ratings of facility characteristics and visit experiences. Most patients were satisfied with facility cleanliness at primary health centres (86%), with decreasing satisfaction with cleanliness at higher levels. Privacy was rated lowest among patients who sought care at community health centres (80%), while ratings were similar for all other platforms (ranging from 86% to 88%).

Three parameters were assessed to document satisfaction with health providers – being respectfully treated by the provider, clarity of explanation provided by the provider – using a five-point Likert scale, with the highest ratings of good and very good responses combined as satisfied, and rest as not satisfied. Using the three parameters of satisfaction, a composite satisfaction variable was created separately for doctors and nurses – if a patient reported good/very good with all three parameters, it was categorized as satisfied. At sub-district hospitals and primary health centres, patients receiving care from doctors reported slightly higher levels of satisfaction about respectfulness and clarity than those receiving care from nurses and ANMs. Generally, satisfaction was highest at community health centres.

Access to to affordable drugs has been interpreted to be part of the right to health. Among 899 patients who were prescribed drugs and attempted to obtain those drugs during the visit, 800 received all prescribed drugs (Figure 15). This ranged from 86% of patients at community health centres to 97% of patients at primary health centres.

Many complex factors affect patient satisfaction with the medical care they receive. Given this, a multivariate logistic regression was conducted in order to determine which patient and facility characteristics were associated with patient satisfaction with both medical doctors (Figure 16) and nurses/ANMs (Figure 17). For each characteristic – for example, the age or sex of the patient – the odds ratio (OR) is presented. The OR represents the odds that a patient is satisfied given a particular characteristic, compared to the odds of the patient being satisfied in the absence of that characteristic. An OR and 95% confidence interval (CI) greater than 1.0 indicates that there are greater odds of being satisfied with care as compared to the reference group. An OR and 95% CI below 1.0 indicates that there are lower odds of being satisfied with care than the reference group.

For example, while the OR for male patients being satisfied with care from a doctor is 0.99 (95% CI: 0.55–1.80) as compared to female patients, it is not statistically different from an OR of 1.0 (Figure 16). This means that, considering all other characteristics, male patients are not more or less satisfied with care from doctors than female

11 Rao KD, Peters DH, Bandeen-Roche K. Towards patient-centered health services in India–a scale to measure patient perceptions of quality. *International Journal for Quality in Health Care.* 2006; 18(6):414-421.

TABLE 16 Average and range of inputs and outputs, by platform. INR denotes Indian Rupees.

		DISTRICT HOSPITAL	SUB-DISTRICT HOSPITAL	COMMUNITY HEALTH CENTRE	PRIMARY HEALTH CENTRE
Inputs	Personnel expenditure (INR)	71,765,792	26,236,950	9,376,922	1,969,061
	Pharmaceutical expenditure (INR)	5,822,359	2,051,987	386,757	321,899
	Other expenditure (INR)	10,844,130	3,225,598	800,033	110,080
	Number of beds	261	89	29	4
	Number of doctors	28	10	3	1
	Number of nurses	66	17	6	0
	Number of ANMs	0	0	0	0
	Number of paramedical staff	48	15	7	4
	Number of non-medical staff	38	10	7	2
Outputs	Outpatient visits	186,322	90,687	27,106	8,047
	Inpatient visits (excluding deliveries)	58,253	24,028	4,820	142
	Deliveries	2,089	893	201	40
	Immunization doses	8,749	3,839	2,246	2,325

patients. In Figures 16-17, ORs that are statistically significant are signified by blue points, with blue horizontal bars representing their confidence interval. ORs that are not statistically significant are represented with green points and green confidence bars.

Compared to patients who received none or some of the drugs on the day of the survey, there was higher satisfaction with doctors for patients who were prescribed and received all drugs (Figure 16, OR: 2.59, 95% confidence interval [CI]: 1.23–5.45). Controlling for all other factors, the platform that the patient attended was not associated with satisfaction.

Considering all patient and facility characteristics, no factors significantly increased the odds of a patient being satisfied with their care from nurses or ANMs (Figure 17).

Efficiency and Costs

The costs of health service provision and the efficiency with which care is delivered by health facilities go hand in hand. An efficient health facility uses resources well, producing a high volume of patient visits and services without straining its resources. Conversely, an inefficient health facility is one where the use of resources is not maximized, leaving usable beds empty or medical staff seeing very few patients per day. We present technical efficiency analysis for district hospitals, sub-district hospitals, community health centres, and primary health centres.

Analytical approach

An ensemble model approach was used to quantify technical efficiency in health facilities, combining results from two approaches – the restricted versions of Data

TABLE 17 Average annual cost in INR, by platform, last fiscal year. INR denotes Indian Rupees.

DISTRICT	DISTRICT HOSPITAL	SUB-DISTRICT HOSPITAL	COMMUNITY HEALTH CENTRE	PRIMARY HEALTH CENTRE
District 1			1,954,117	4,010,274
District 2			3,945,378	3,149,586
District 3	188,401,072		9,396,875	2,360,504
District 4		20,875,948	2,105,338	1,375,577
District 5	78,190,760	51,003,264	689,567	2,745,199
District 6	50,468,736		1,942,424	1,659,271
District 7			10,733,075	2,777,315
District 8	36,668,560		32,583,444	1,715,856
District 9		29,047,544	10,772,848	2,023,544

Empty cells were either dropped from analysis due to data availability, or there were no facilities to sample of that platform.

FIGURE 18 Average total and type of expenditure, by platform, 2011–2015

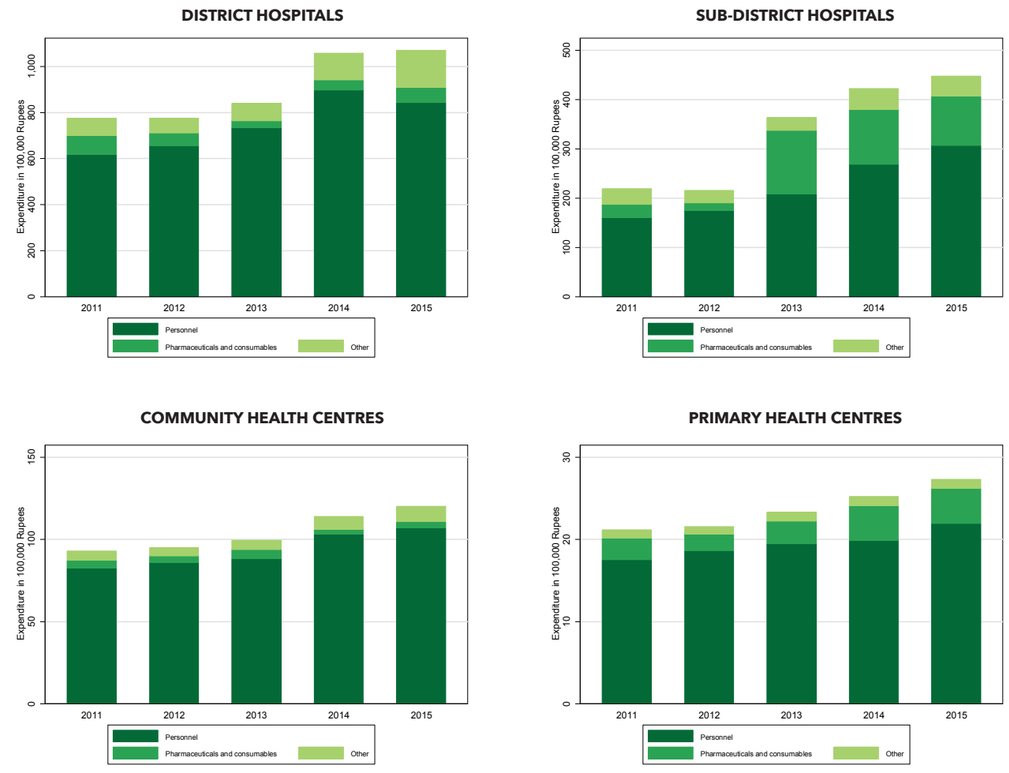
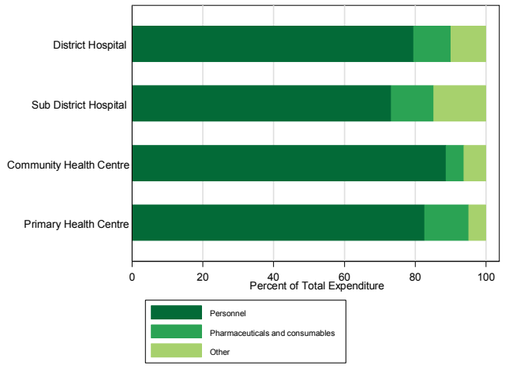


FIGURE 19 Average percentage of expenditure type, by platform, 2015



Envelopment Analysis (rDEA) and Stochastic Distance Function (rSDF).[12] Based on this analysis, an efficiency score was estimated for each facility, capturing a facility's use of its resources. Relating the outputs to inputs, the rDEA and rSDF approaches compute efficiency scores ranging from 0% to 100%, with a score of 100% indicating that a facility achieved the highest level of production relative to all facilities in that platform.

This approach assesses the relationship between inputs and outputs to estimate an efficiency score for each facility. Recognizing that each type of input requires a different amount of facility resources (e.g., on average, an inpatient visit uses more resources and more complex types of equipment and services than an outpatient visit), we applied weight restrictions to rescale each facility's mixture of inputs and outputs. The incorporation of additional weight restrictions is widely used in order to improve the discrimination of the models. Weight restrictions are most commonly based upon the judgment about the importance of individual inputs and outputs, or reflect cost or price considerations. The resulting ensemble efficiency scores were averaged over five years and between the two input models.

12 Di Giorgio L, Flaxman AD, Moses MW, Fullman N, Hanlon M, Conner RO, et al. Efficiency of Health Care Production in Low-Resource Settings: A Monte-Carlo Simulation to Compare the Performance of Data Envelopment Analysis, Stochastic Distance Functions, and an Ensemble Model. *PLOS ONE*. 2016; 11(2): e0150570.

For these models, service provision was categorized into outpatient visits, inpatient visits, deliveries, and immunization visits. Two input-output specifications were used, with the inputs being different in the two models. The inputs and outputs are listed in Table 15. The detailed data utilized for this analysis are documented in the annex. The average and range of inputs and outputs for the variables is presented in Table 16.

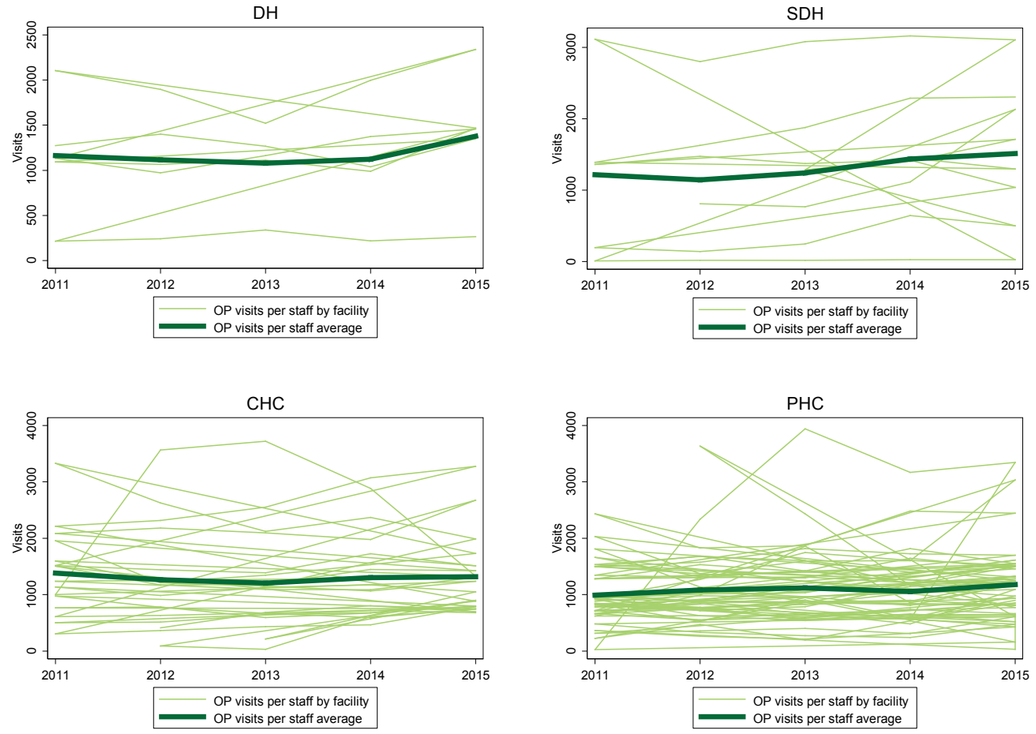
Costs of care

Total expenditure, by district and platform, is presented in Table 17. In terms of annual total expenditures, trends in average facility spending varied by platform between 2011 and 2015 (Figure 18). All platforms recorded slightly higher levels of average expenditures in 2015 than in 2011, which appeared to be largely driven by increased spending on medical supplies. Figure 19 shows the average composition of expenditure types across platforms for 2015. Notably, community health centres spent a slightly greater proportion of their total expenditures on personnel than other platforms.

It is important to note that data availability on the input and output indicators varied across the facilities and platforms, with more non-availability for PHCs. Facilities with five years of missing data for any input or output variable were dropped from analysis. In addition, the data were smoothed where necessary based on the trends seen in inputs or outputs for that facility.

To further illustrate the production of outputs per inputs – in this case, staff – a simple ratio of outpatient visits (Figure 20), inpatient visits (Figure 21), deliveries (Figure 22), and immunization doses (Figure 23) per staff are presented. District hospitals produced an average of 1,172 outpatient visits per staff, though the ratio ranged greatly between facilities. The average ratio was 1,326 visits per staff for sub-district hospitals, 1,293 for community health centres, and 1,087 for primary health centres. This gradient was similar for inpatient visits, with district hospitals providing 335 inpatient visits per staff, sub-district hospitals providing 346, community health centres providing 183, and primary health centres providing 19. The range of inpatient visits per staff was low for primary health centres, where inpatient visits are rare. Overall, as expected, outpatient visits accounted for the overwhelmingly large majority of the patients seen per staff per day across the platforms.

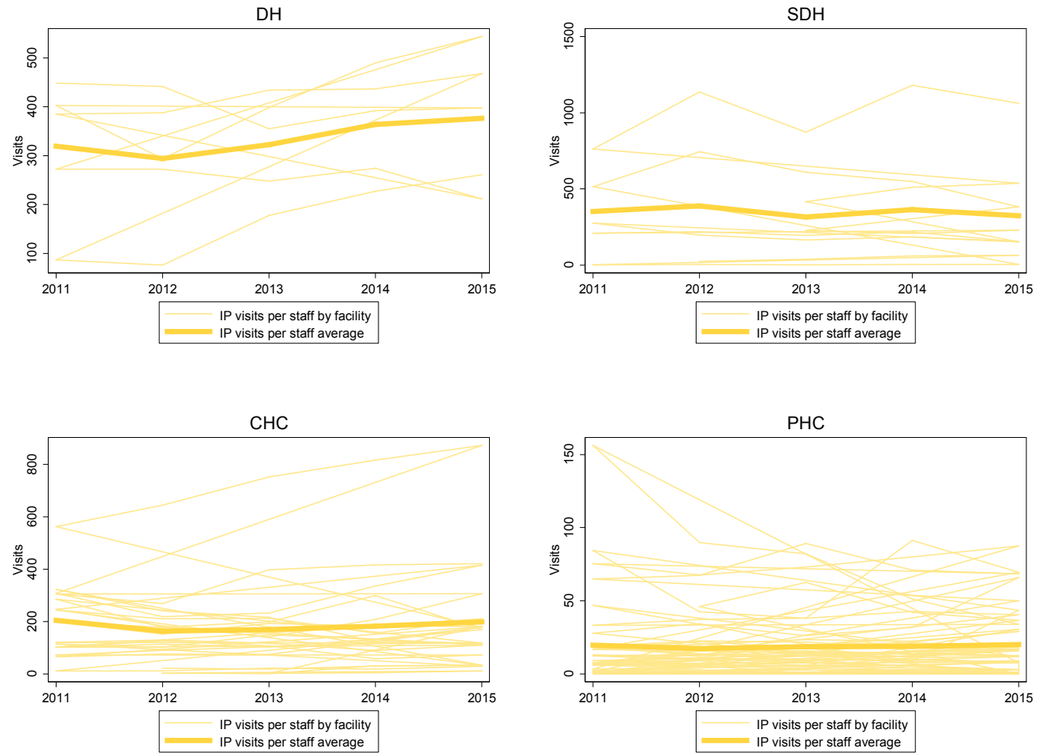
FIGURE 20 Outpatient load per staff, by platform



DH: District hospital; **SDH:** Sub-district hospital; **CHC:** Community health centre; **PHC:** Primary health centre

Note: each line represents an individual facility, with the bolded line depicting the average for the platform. Scales are different for each platform type.

FIGURE 21 Inpatient load per staff, by platform



DH: District hospital; **SDH:** Sub-district hospital; **CHC:** Community health centre; **PHC:** Primary health centre

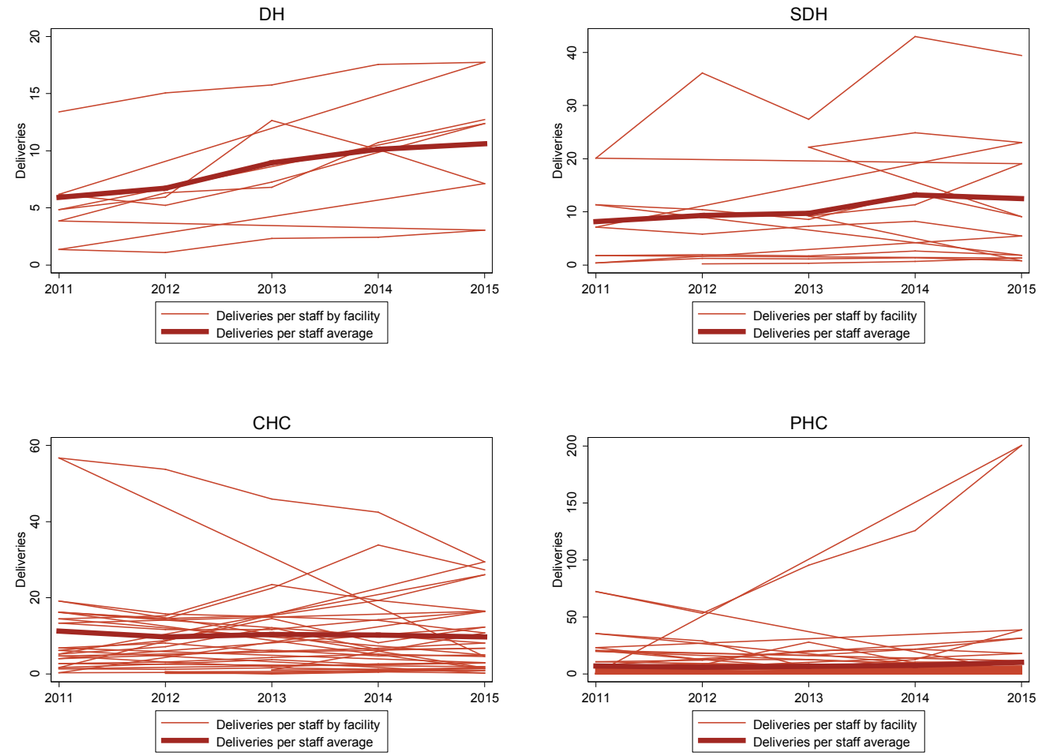
Note: each line represents an individual facility, with the bolded line depicting the average for the platform. Scales are different for each platform type.

Fewer deliveries were performed per staff than other services, with an average of eight deliveries per staff in district hospitals, 11 per staff in sub-district hospitals, 10 per staff in community health centres, and seven per staff in primary health centres. For immunizations, 81 doses were administered per staff in district hospitals, 65 per staff in sub-district hospitals, 127 per staff in community health centres, and 353 per staff in primary health centres. There was quite a bit of variation of these ratios within a platform and over time, however.

Efficiency results

Using the five fiscal years of data to estimate the efficiency scores for all facilities, two main findings emerged. First, efficiency scores were varied across health facility types, with 85% being the highest mean and 44% the lowest. Second, the range between the facilities with highest and lowest efficiency scores was quite large within platforms, suggesting that a substantial performance gap may exist between the average facility and facilities with the highest efficiency scores. Figure 24 depicts this range of facility efficiency scores across platforms for GJ.

FIGURE 22 Deliveries per staff, by platform



DH: District hospital; **SDH:** Sub-district hospital; **CHC:** Community health centre; **PHC:** Primary health centre

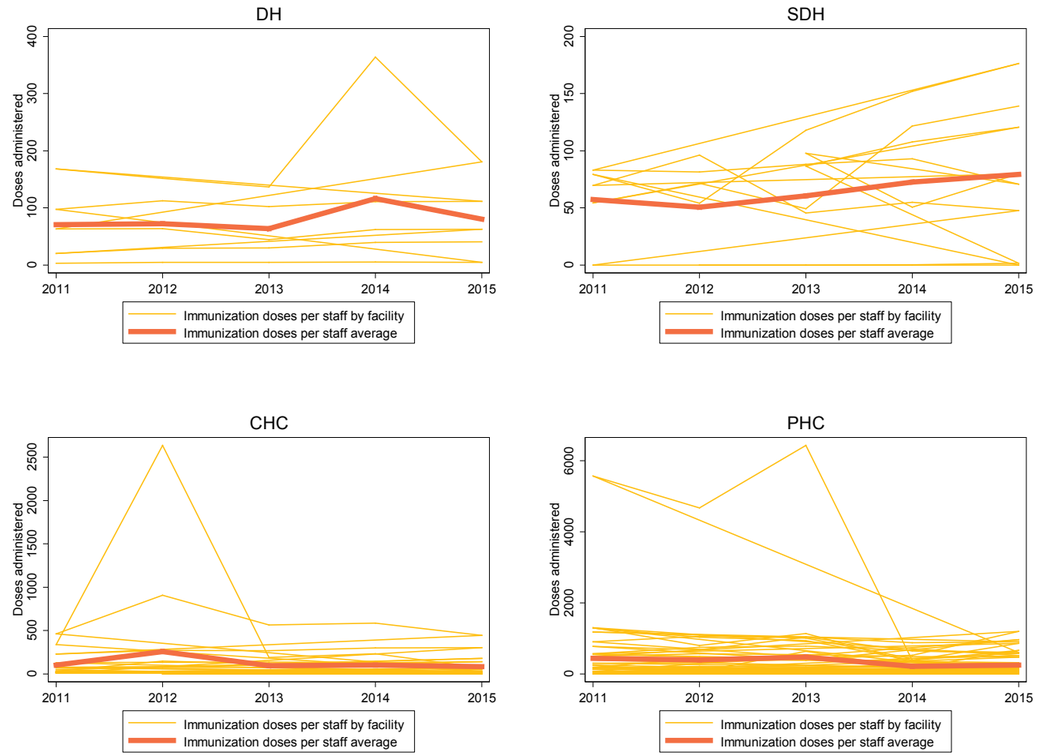
Note: each line represents an individual facility, with the bolded line depicting the average for the platform. Scales are different for each platform type.

The five-year average efficiency of district hospitals ranged from 53% to 94%, with a platform average of 79%. Sub-district hospitals were between 75% and 98% efficient. Community health centres were between 19% and 82% efficient. The range of efficiency scores was similarly wide for primary health centres, from 10% to 93%, with four facilities more than 75% efficient.

Efficiency by district is presented in Table 18. There is variation in facility efficiency both between and within districts. Some of the least-efficient primary health centres were in the same district as the least-efficient sub-district hospitals (for example, District 4). District 8, for example, had the least efficient district hospital but the second most efficient community health centre. While one primary health centre in District 4 was 76% efficient, another was only 16% efficient.

Given observed levels of facility-based resources (beds and personnel), it would appear that many facilities had the capacity to handle much larger patient volumes than they reported. Figure 25 displays this gap in potential efficiency performance across platforms, depicting the possible gains in total service provision that could be

FIGURE 23 Immunizations per staff per day, by platform



DH: District hospital; **SDH:** Sub-district hospital; **CHC:** Community health centre; **PHC:** Primary health centre

Note: each line represents an individual facility, with the bolded line depicting the average for the platform. Scales are different for each platform type.

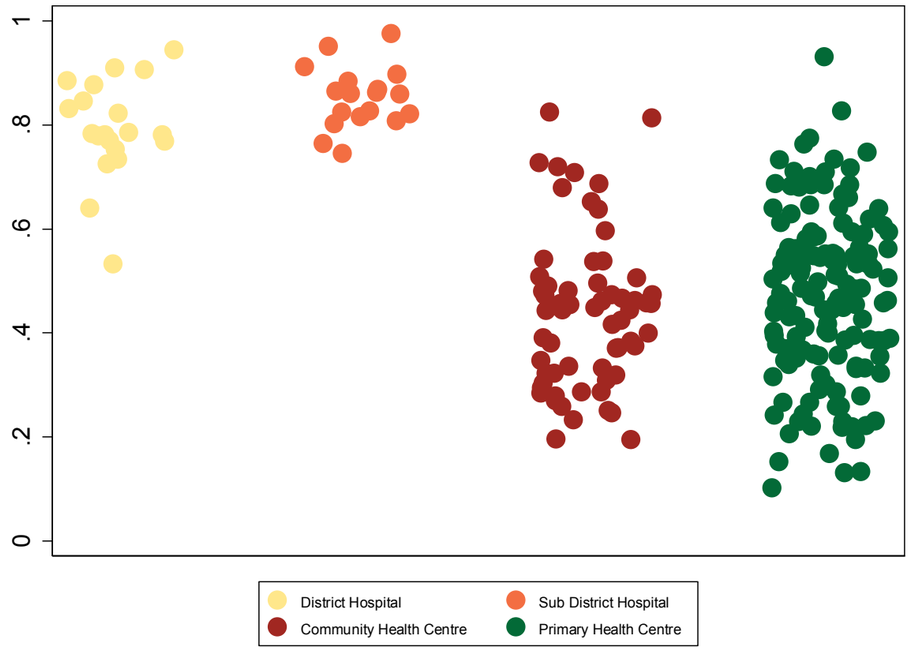
achieved if every facility in the ABCE sample operated at optimal efficiency.

We found that all types of facilities could expand their outputs substantially given their observed resources. Based on our analyses, the highest level of care, district hospitals, had the greatest potential for increasing service provision without expanding current resources. Overall, based on our estimation of efficiency, a large portion of GJ health facilities could increase the volume of patients seen and services provided with the resources available to them.

If all facilities were perfectly efficient, many more patient services could be provided with the same inputs (Figure 25). On average, district hospitals could provide 229,838 additional outpatient visits with the same inputs, while primary health centres could see an average of 16,439 additional outpatient visits. Sub-district hospitals could administer an average of 4,471 additional immunization doses with the same inputs if all facilities were efficient.

At the same time, many reports and policy documents emphasize that pronounced deficiencies in human re-

FIGURE 24 Range of efficiency scores across platforms



District hospital	Sub-district hospital	Community health centre	Primary health centre
Mean: 79.3	Mean: 85.2	Mean: 43.9	Mean: 47.4
Median: 78.2	Median: 86.0	Median: 44.4	Median: 48.4
IQR: 76.1-86.2	IQR: 81.6-88.4	IQR: 32.2-49.6	IQR: 36.0 -57.8

Note: One data point per five-year facility average.

sources for health exist across India in the public sector health system, such that "significant [human resources for health] will be required to meet the demand" for health services.[13] Our results suggest otherwise, as most facilities in the ABCE sample had the potential to bolster service production given their reported staffing of skilled personnel and physical capital.

13 Rao M, Rao KD, Kumar AK, Chatterjee M, Sundararaman T. Human resources for health in India. *The Lancet*. 2011; 377(9765): 587-98.

These findings provide a data-driven understanding of facility capacity and how health facilities have used their resources in GJ; at the same time, they are not without limitations. Efficiency scores quantify the relationship between what a facility has and what it produces, but these measures do not fully explain where inefficiencies originate, why a given facility scores higher than another, or what levels of efficiency are truly ideal. It is conceivable that always operating at full capacity could actually have negative effects on service provision, such as longer wait times, high rates of staff burnout and turnover, and com-

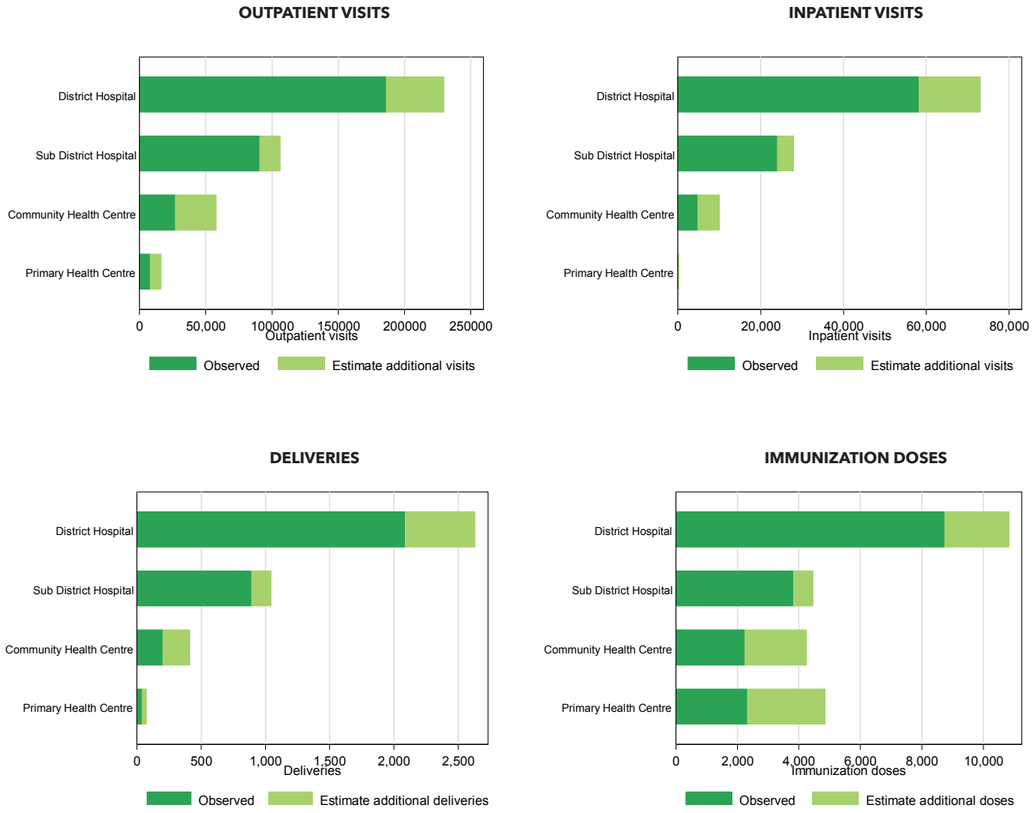
TABLE 18 District-wise efficiency scores (%), by platform

DISTRICT/ PLATFORM	DISTRICT HOSPITAL	SUB DISTRICT HOSPITAL		COMMUNITY HEALTH CENTRE		PRIMARY HEALTH CENTRE			
	1	1	2	1	2	1	2	3	4
1				28.6		54.8	42.7	46.5	68.3
2				43.0	75.1	47.9	30.8	34.2	
3	81.6			49.5		55.8	59.2	61.4	46.7
4		88.1	84.4	24.4		76.0	37.6	16.4	65.8
5	80.5	82.1		42.3		51.4	65.4	45.6	
6	86.1			28.1		31.3	45.2	35.1	22.7
7				31.9	33.7	52.7	39.5		
8	68.9			65.9	48.2	56.5	44.8	22.4	38.1
9		86.0		47.8	42.7	70.2	64.7	47.0	

Grey cells were dropped from analysis due to data availability; white cells were not available to sample of that platform.

promised quality of care. These factors, as well as less tangible characteristics such as facility management, are all important drivers of health service provision, and future work should also assess these factors alongside measures of efficiency.

FIGURE 25 Observed and estimated additional visits that could be produced given observed facility resources



Conclusions and policy implications

To achieve its mission to "expand the reach of health care and establish universal health coverage,"[1] India has strived over the past 10 years to expand and strengthen the public sector of health care, with a focus on reaching rural areas. The country recognizes disparities and has sought to enact policies and implement programs to expand access to essential and special services for marginalized groups. Our findings show that these goals are ambitious but attainable, if the country focuses on rigorously measuring health facility performance and costs of services across and within levels of care, and if it can align the different dimensions of health service provision to support optimal health system performance.

Facility capacity for service provision

Optimal health service delivery, one of the key building blocks of the health system,2 is linked to facility capacity to provide individuals with the services they need and want. With the appropriate balance of skilled staff and supplies needed to offer both essential and special health services, a health system has the necessary foundation to deliver quality, equitable health services.

The availability of a subset of services, including routine delivery, antenatal care, general medicine, pharmacy, and laboratory services, was generally high across facility types in Gujarat, reflecting the expansion of these services throughout the state. However, clear differences remain between facility types. Sub-district hospitals notably lack certain services: for example, only 63% offer ear, nose, and throat services or dentistry. Community health centres also showed limited capacity for certain essential services, including emergency obstetrics and STI/HIV services. Moreover, substantial gaps were identified between facilities reporting availability of services and having the full capacity to actually deliver them. While almost all facilities, across platforms, indicated that they provided routine delivery care, only 40% of district hospitals and no lower-level facilities had the full stock of medical supplies and equipment to optimally provide these services. These gaps were also clearly evident for ANC and general surgery in all facility types. In general, district hospitals were well-equipped with medical, laboratory, and imaging equipment, with the notable exceptions of CT scanners. The availability of equipment declined through the levels of the system, particularly with regard to laboratory equipment and imaging equipment. Closing these gaps and making sure that all facilities are fully equipped to optimally provide essential services warrants further policy consideration.

Chronic diseases (e.g., cardiovascular diseases, mental health disorders, diabetes, and cancer) and injuries are the leading causes of death and disability in India, and are projected to increase in their contribution to the burden of disease during the next 25 years.[3,4,5] Much of the care for chronic diseases and injuries is provided in the private sector and can be very expensive. These study findings also document notably lacking NCD-related services from all levels of care, including cardiology, psychiatry, and chemotherapy. While 80% of district hospitals provided psychiatric services, this dropped to just 25% of sub-district hospitals. Cardiology services were available at even lower rates, with just 60% of district hospitals providing them and, similarly, just a quarter of sub-district hospitals. Chemotherapy was completely unavailable at district hospitals, where it is considered an essential service. Such gaps in the health system will exacerbate disparities by not dealing appropriately with NCDs while continuing to endeavor to eliminate major infectious diseases like tuberculosis, HIV, and malaria or to reduce neonatal and infant mortality. Furthermore, there also is a paucity of essential equipment for NCD services. While there was relatively high availability of more basic items such as glucometers for testing blood sugar, there was a notable lack of equipment such as ECGs in sub-district hospitals and community health centres. These findings support the need for immediate action to scale up interventions for chronic diseases through improved public health and primary health-care systems that are essential for the implementation of cost-effective interventions.

India has a severe shortage of human resources for health. It has a shortage of qualified health workers, and the workforce is concentrated in urban areas. In the context of a shortage of qualified health personnel at all levels of the health system, but especially rural areas,[6,7,8] results reveal disparate staffing patterns between facilities. Hospitals employ a large number of staff. At the lower, community levels, paramedical staff including nurses and ANMs provide the majority of care to patients (based on reported staffing). These staffing patterns are not unexpected, as this is the hierarchy of care. However, nurses do not have much authority or say within the health system, and the resources to train them are still inadequate. A call has been made to the government to urgently address the issues of human resources through a comprehensive national policy to achieve universal health care in India. However, it should be noted that despite the shortfall in human resources, the study findings suggest suboptimal efficiency in production of services with the given level of human resources.

Infrastructure

Adequate operational infrastructure is essential for the functioning of a facility, which in turn affects the efficiency of service provision. In Gujarat, all hospitals and primary health centres, and almost all community and sub health centres, had access to functioning electricity, and only one facility reported being solely dependent on a generator. This means a higher quality of service provision, as it allows for reliable storage of medications, vaccines, and laboratory samples. Access to piped water was more variable in these types of facilities; it was widely available in hospitals but less so in community, primary, and sub health centres. Access to flushed toilets was widely available at every facility type except sub-health centres. That so many facilities did report access to essential resources like water, sanitation, and electricity likely reflects India's commitment[9,10] to upgrade all facilities so they meet Indian Public Health Standards. However, there remain some discrepancies between the higher- and lower-level facility types, which suggests that there should be a sustained focus on making sure that these resources reach every level of the health system.

Communication is also an important facet of health service delivery, and in general facilities in Gujarat had good access to phones, which makes for more efficient referrals and coordination. Computer availability was also high.

Facility production of health services

Overall, the number of outpatient visits by year and platform saw slight increases over the five years of observation for most platforms. The highest volumes of visits were held by district hospitals, followed by sub-district hospitals. Inpatient services also saw an increase in total number of visits over the five years, with the largest volume of visits in district hospitals. The volume of deliveries increased over time among district and sub-district hospitals, but remained stable in community health centres and primary health centres, on average.

Facility expenditure is dominated by personnel costs – accounting for, on average, at least 80% of total costs. The ratio is highest in community health centres, in which 89% of the expenditure is on personnel. Pharmaceuti-

1 Planning Commission Government of India. *Twelfth Five Year Plan (2012-17)*. New Delhi, India: Government of India, 2012.
2 World Health Organization (WHO). *Everybody's Business: Strengthening health systems to improve health outcomes: WHO's Framework for Action*. Geneva, Switzerland: WHO, 2007.
3 GBD 2015 Mortality and Causes of Death Collaborators. Global, regional, and national life expectancy, all-cause mortality, and cause-specific mortality for 249 causes of death, 1980–2015: a systematic analysis for the Global Burden of Disease Study 2015. *The Lancet*. 2016; 388:1459–1544.
4 Patel V, Chatterji S, Chisholm D, Ebrahim S, Gopalakrishna, G, Mathers C et al. Chronic diseases and injuries in India. *The Lancet*. 2011; 377: 413-28.
5 GBD 2015 DALYs and HALE Collaborators. Global, regional, and national disability-adjusted life-years (DALYs) for 315 diseases and injuries and healthy life expectancy (HALE), 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015. *The Lancet*. 2016 Oct 7; 388:1603–1658.
6 Planning Commission Government of India. *Twelfth Five Year Plan (2012-17)*. New Delhi, India: Government of India, 2012.
7 Hazarika I. Health Workforce in India: Assessment of Availability, Production and Distribution. *WHO South East Asia Journal of Public Health*. 2013; 2(2): 106-112.
8 Rao M, Rao KD, Kumar AK, Chatterjee M, Sundararaman T. Human resources for health in India. *The Lancet*. 2011; 377(9765): 587-98.
9 Planning Commission Government of India. *Eleventh Five Year Plan (2007-12)*. New Delhi, India: Government of India, 2007.
10 Planning Commission Government of India. *Twelfth Five Year Plan (2012-17)*. New Delhi, India: Government of India, 2012.

cal expenditure makes up 13% of the total for primary health centres, but only 4% of the total for community health centres and 7% of the total for district and sub-district hospitals.

Efficiency scores reflect the relationship between facility-based resources and the facility's total patient volume each year. Average efficiency scores by platform ranged from 44% to 85%, indicating patient volume could substantially increase with the observed levels of resources and expenditure. Within each platform, there is great variation in the efficiency of health facilities between and within districts. With this information, we estimated that facilities could substantially increase the number of patients seen and services provided, based on their observed levels of medical personnel and resources in 2015. As India seeks to strengthen public sector care to reduce the heavy burden of out-of-pocket expenditures,[11,12] stakeholders may seek to increase efficiency by providing more services while maintaining personnel, capacity (beds), and expenditure.

Further use of these results requires considering efficiency in the context of several other factors, including quality of care provided, demand for care, and expediency with which patients are seen.

The policy implications of these efficiency results are both numerous and diverse, and they should be viewed with a few caveats. A given facility's efficiency score captures the relationship between observed patient volume and facility-based resources, but it does not reflect the expediency with which patients are seen, the optimal provision of services, demand for the care received, and equity in provision of services to serve those who are disadvantaged.[13] These are all critical components of health service delivery, and they should be thoroughly considered alongside measures of efficiency. On the other hand, quantifying facility-based levels of efficiency provides a data-driven, rather than strictly anecdotal, understanding of how much GJ health facilities could potentially expand service provision without necessarily increasing personnel or bed capacity in parallel.

Costs of care

Average facility expenditure per year differed substantially across platforms. We were unable to estimate the costs of care by type of services (such as outpatients, inpatients, deliveries, immunization, etc.) or by type of disease/condition (such as TB, diabetes, etc.) as such data are not readily available at the facilities. Estimating such costs of care and identifying differences in patient costs across types of platform is critical for isolating areas to improve cost-effectiveness and expand less costly services, especially for hard-to-reach populations.

Nevertheless, these results on expenditures offer insights into each state's health financing landscape, a key component of health system performance, in terms of cost to facilities and service production. While these costs do not reflect the quality of care received or the specific services provided for each visit, they can enable a compelling comparison of overall health care expenses across states within India. Future studies should aim to capture information on the quality of services provided, as it is a critical indicator of the likely impact of care on patient outcomes.

Patient perspectives

Patient satisfaction is an important indicator of patient perception of the quality of services provided by the health care sector.[14,15] Evaluation of services by patients is important for purposes of monitoring, increasing accountability, recognizing good performance, and adapting patient-centric services, and for utilization of services and compliance with treatment. This report examined patient perspectives at public facilities; a major strength of this study is that patient satisfaction was assessed across the various levels of public sector health care in both the states. The type of platform accounted for significant variance in the multilevel model in the state.

The public health system in India is designed as a referral hierarchical system to provide a continuum of health care, and as a consequence of this, failure at one level can impact the chain of care at another level.[16] Although various government initiatives have led to improved basic service delivery at primary care health facilities over the last few years, still a large number of patients directly visit higher-level facilities leading to overcrowding of those facilities,[17] which impacts quality of care as it stretches facility resources in terms of both infrastructure and staff. In addition, a persistent shortage of medical staff in public facilities can aggravate the crowded condition at these facilities.[18]

Findings indicate that patients were generally satisfied with the care they received, and ratings and satisfaction were slightly higher at lower levels of care. However, many were not satisfied with the cleanliness or privacy provisions at the facility they visited. Holding other factors constant, patients who received all prescribed medications were more satisfied with their care from doctors than those who did not receive all medications.

Most patients experienced short travel and wait times. Most patients traveled less than 30 minutes to receive care, with patients at lower-level facilities reporting the shortest travel times. District hospitals had the highest proportion of patients who had to wait more than 30 minutes to receive care; the lowest proportion of patients waiting more than 30 minutes was at primary health centres. However, only 5% of all patients waited more than one hour to receive care.

Finally, nearly 15% of patients at community health centres reported being unable to acquire all prescribed drugs. Ensuring that all patients may obtain prescribed medications at the time of their visit should be a priority, as it facilitates adherence and continuity of care.

With the developmental priorities for the government of India clearly highlighting the need to increase user participation in health care service delivery for better accountability,[19] understanding how patients perceive the quality of the existing public health services encompassing various dimensions of care such as time to receive medical attention, staff behavior, and so on, could contribute to developing strategies to improve performance and utilization of the public health system.[20]

Health information system

This study was dependent on the data availability at the facilities for the various inputs and outputs. Because of the vast extent of data that were collected for five financial years across the facilities, there are several lessons regarding the common bottlenecks within the health information system, both at the facility level and at the state level. In general, there is weak staff capacity for data capture, management, and use (interpretation or planning) at all levels. No system of regular review of data at the facility level that could guide planning or improvement of service provision was observed.

It is not possible to assess the outputs by disease/condition other than those for deliveries, as data are not captured or collated by disease groups at the facilities. At the higher-level facilities, collation of patients seen at the facilities was not readily available, and it was not possible to assess the level of duplication of patients across departments. Furthermore, documentation of patients as a new patient or a follow-up patient was neither standardized nor practiced across most health facilities. Therefore, data interpretation is possible only in terms of number of visits and not in terms of number of patients.

Data were either incomplete or inaccurate at some facilities for expenditure, patient-related outputs, and staff numbers. In general, the expenditure documentation had the most bottlenecks, with these data available across various sources for a given facility. For example, it is not possible to document the expenditures at a given facility without procuring relevant data from the facility, a higher level of facility (block level), district health society, and at times from the state. The most limited capacity was for capturing the expenditure on drugs, medical consumables, and supplies.

11 Ibid.
12 Kumar AKS, Chen LC, Choudhury M, Ganju S, Mahajan V, Sinha A et al. Financing health care for all: challenges and opportunities. *The Lancet*. 2011; 377: 668-79.
13 UNICEF. *Narrowing the gaps: The power of investing in the poorest children*. New York, NY: UNICEF, 2017.
14 Mpinga EK, Chastonay P. Satisfaction of patients: a right to health indicator? *Health Policy*. 2011; 100(2-3):144-150.
15 Baltussen RM, Yé Y, Haddad S, Sauerborn RS. Perceived quality of care of primary health care services in Burkina Faso. *Health Policy Plan*. 2002; 17: 42-48.
16 National Health Mission, Ministry of Health and Family Welfare, Government of India. *Framework for Implementation National Health Mission (2012-2017)*. New Delhi, India: Government of India, 2012.
17 Bajpai V. The Challenges Confronting Public Hospitals in India, Their Origins, and Possible Solutions. *Advances in Public Health 2014*; 2014: 27.
18 Rao M, Rao KD, Kumar AK, Chatterjee M, Sundararaman T. Human resources for health in India. *The Lancet*. 2011; 377(9765): 587-98.
19 Planning Commission, Government of India. *Faster, sustainable and more inclusive growth: An approach to the Twelfth Five Year Plan*. New Delhi, India: Government of India, 2012.
20 World Health Organization (WHO). *Global Health Observatory Data Repository*. Geneva, Switzerland: WHO, 2016.

Summary

The ABCE project was designed to provide policymakers and funders with new insights into health systems and to drive improvements. We hope these findings will not only prove useful to policymaking in the two states, but will also inform broader efforts to mitigate factors that impede the equitable access to or delivery of health services in India. It is with this type of information that the individual building blocks of health system performance, and their critical interaction with each other, can be strengthened. More efforts like the ABCE project in India are needed to continue many of the position trends highlighted in this report and overcome the identified gaps. Analyses that take into account a broader set of the state's facilities, including private facilities, may offer an even clearer picture of levels and trends in capacity, efficiency, and cost. Continued monitoring of the strength and efficiency of service provision is critical for optimal health system performance and the equitable provision of cost-effective interventions throughout the states and in India.

Annex:
Facility-specific data utilized for the efficiency analysis

Please note that data may be missing for some years across the facilities based on availability of data.

FACILITY INFORMATION					STAFF				
District	Facility	Year	Platform	Beds	Doctors	Nurses	ANMs	Para-medical	Non-medical
1	1	2012	Sub-district hospital	62	6	42	0	18	11
1	1	2013	Sub-district hospital	62	12	43	0	18	12
1	1	2014	Sub-district hospital	62	13	41	0	18	12
1	1	2015	Sub-district hospital	62	13	41	0	19	13
1	1	2012	Community Health Centre	30	3	0	0	6	8
1	1	2013	Community Health Centre	30	3	0	0	6	8
1	1	2014	Community Health Centre	30	3	0	0	6	8
1	1	2015	Community Health Centre	30	3	7	0	6	8
1	1	2011	Primary Health Centre	2	3	0	0	6	1
1	1	2012	Primary Health Centre	2	3	0	0	6	1
1	1	2013	Primary Health Centre	2	3	0	0	6	1
1	1	2014	Primary Health Centre	2	3	0	0	6	1
1	1	2015	Primary Health Centre	2	3	0	0	6	1
1	2	2011	Primary Health Centre	2	1	0	0	1	3
1	2	2012	Primary Health Centre	2	1	0	0	1	3
1	2	2013	Primary Health Centre	2	1	0	0	1	3
1	2	2014	Primary Health Centre	2	1	0	0	1	3
1	2	2015	Primary Health Centre	2	1	0	0	1	3
1	2	2011	Community Health Centre	27	3	6	1	7	6
1	2	2012	Community Health Centre	27	3	6	1	7	6
1	2	2013	Community Health Centre	27	4	6	1	9	6
1	2	2014	Community Health Centre	27	4	7	1	9	6
1	2	2015	Community Health Centre	27	4	7	1	8	5
1	3	2011	Primary Health Centre	2	2	2	0	5	1
1	3	2012	Primary Health Centre	2	2	2	0	5	1
1	3	2013	Primary Health Centre	2	2	2	0	5	1
1	3	2014	Primary Health Centre	2	2	2	0	5	1
1	3	2015	Primary Health Centre	2	2	2	0	5	1
1	4	2011	Primary Health Centre	2	2	0	1	4	1

OUTPUTS				EXPENDITURE		
Outpatient	Inpatient	Immunization doses	Births	Personnel Exp	Pharma & consumables exp	Other expenditure
62,465	1,881	0	19	12,026,949	0	1,506,669
65,070	3,199	0	29	25,492,658	89,126,816	2,148,742
93,822	4,982	0	59	50,069,008	79,508,224	5,474,931
183,552	5,585	0	115	53,123,232	72,129,528	9,223,312
7,035	383	0	2	1,498,533	329,501	99,530
11,625	322	0	2	1,633,154	319,874	586,961
13,630	523	0	9	1,523,539	170,458	257,300
16,741	804	0	5	815,034	251,106	331,477
8,826	17	1,573	40	1,638,106	335,672	50,000
9,806	58	2,157	50	2,176,251	287,674	50,000
9,570	5	2,003	42	2,172,267	131,148	50,000
10,491	13	1,765	40	2,063,802	755,980	50,000
12,438	29	1,636	48	3,015,372	527,885	50,000
4,783	11	1,519	54	1,291,207	171,740	124,219
3,599	14	1,610	60	1,381,240	112,030	159,026
3,945	4	2,120	102	1,530,821	315,534	168,104
5,737	27	1,747	109	1,544,992	692,951	269,135
6,043	15	1,586	157	1,568,318	690,026	172,473
34,630	7,412	705	142	7,575,608	362,763	312,990
27,034	5,546	3,395	201	7,541,152	411,386	409,636
28,387	5,637	3,027	379	6,856,269	223,675	391,625
29,368	3,327	3,942	222	10,097,771	347,874	1,316,261
32,720	4,511	4,526	308	10,648,721	253,823	888,571
7,065	130	587	75	5,244,323	152,360	53,890
10,661	124	1,296	81	6,127,615	292,586	88,456
9,653	265	1,201	88	5,348,997	264,200	108,205
8,081	383	1,203	65	3,797,950	319,414	45,065
11,920	501	1,236	43	5,746,783	484,594	83,694
11,949	520	1,505	53	4,828,812	283,039	79,890

FACILITY INFORMATION					STAFF				
District	Facility	Year	Platform	Beds	Doctors	Nurses	ANMs	Para-medical	Non-medical
1	4	2012	Primary Health Centre	2	2	0	1	4	1
1	4	2013	Primary Health Centre	2	2	0	0	4	1
1	4	2014	Primary Health Centre	2	2	0	1	4	1
1	4	2015	Primary Health Centre	2	2	1	1	4	1
2	1	2011	Sub-district hospital	0	6	12	0	13	7
2	1	2012	Sub-district hospital	0	6	12	0	15	9
2	1	2013	Sub-district hospital	0	5	12	0	12	9
2	1	2014	Sub-district hospital	0	5	12	0	13	7
2	1	2015	Sub-district hospital	0	4	12	0	14	8
2	1	2011	Community Health Centre	19	3	7	0	7	6
2	1	2012	Community Health Centre	19	2	7	0	6	6
2	1	2013	Community Health Centre	19	3	6	0	6	6
2	1	2014	Community Health Centre	19	3	7	0	5	6
2	1	2015	Community Health Centre	17	3	7	0	7	7
2	1	2011	Primary Health Centre	6	2	0	1	2	5
2	1	2012	Primary Health Centre	6	2	0	1	3	3
2	1	2013	Primary Health Centre	6	2	0	1	2	5
2	1	2014	Primary Health Centre	6	2	0	1	2	5
2	1	2015	Primary Health Centre	6	2	0	1	1	5
2	2	2011	Primary Health Centre	5	3	1	1	5	4
2	2	2012	Primary Health Centre	5	2	1	1	6	4
2	2	2013	Primary Health Centre	5	3	2	1	6	4
2	2	2014	Primary Health Centre	5	2	1	1	5	5
2	2	2015	Primary Health Centre	5	3	2	1	6	4
2	2	2011	Community Health Centre	16	1	7	0	7	8
2	2	2012	Community Health Centre	16	2	7	0	7	9
2	2	2013	Community Health Centre	16	2	7	0	6	7
2	2	2014	Community Health Centre	16	5	7	0	6	8
2	2	2015	Community Health Centre	16	4	5	0	6	8
2	3	2011	Primary Health Centre	3	1	0	0	4	3
2	3	2012	Primary Health Centre	3	1	0	0	4	3
2	3	2013	Primary Health Centre	3	1	0	0	4	3
2	3	2014	Primary Health Centre	3	1	0	0	4	3
2	3	2015	Primary Health Centre	3	1	0	0	3	3
2	4	2011	Primary Health Centre	6	1	0	0	3	3
2	4	2012	Primary Health Centre	6	1	0	0	3	3
2	4	2013	Primary Health Centre	6	1	0	0	2	3
2	4	2014	Primary Health Centre	6	2	0	0	2	3
2	4	2015	Primary Health Centre	6	2	0	0	3	2

OUTPUTS				EXPENDITURE		
Outpatient	Inpatient	Immunization doses	Births	Personnel Exp	Pharma & consumables exp	Other expenditure
12,609	539	3,447	73	5,599,905	246,096	32,413
12,721	625	2,723	34	5,241,959	331,555	56,770
13,789	567	3,032	49	5,075,919	505,818	53,237
15,309	616	1,386	63	5,743,848	336,259	85,852
349	104	3,012	67	9,228,704	2,147,838	908,652
759	175	2,272	81	10,285,933	1,355,412	1,001,812
611	96	4,483	66	10,066,865	1,153,887	500,479
991	114	5,626	97	10,171,542	1,032,309	711,727
973	112	6,701	69	11,489,620	2,020,603	1,208,270
28,511	1,493	1,158	93	5,444,847	38,888	227,297
24,546	1,596	570	103	5,419,440	904,750	554,569
24,955	1,577	321	132	6,126,103	379,133	620,410
30,363	2,628	514	100	6,889,937	257,406	605,546
34,231	2,829	558	119	7,726,397	407,190	681,854
9,335	754	0	0	3,248,221	49,784	222,783
9,131	608	0	0	3,197,427	364,771	213,658
10,363	730	0	0	2,555,414	407,070	225,022
13,634	799	0	0	4,264,395	337,316	284,158
14,547	788	0	0	4,934,139	331,017	365,968
9,298	47	0	0	3,806,310	12,628	37,956
7,732	58	0	0	3,658,692	302,743	91,380
9,699	150	0	0	4,626,732	165,711	62,512
10,777	210	0	0	5,555,508	98,005	48,246
15,053	198	0	0	3,568,511	68,405	72,665
44,997	2,776	664	332	324,706	493,066	300,124
30,270	3,257	762	381	306,196	337,858	38,119
25,320	2,561	1,034	517	262,522	32,776	51,659
27,684	2,344	1,004	502	312,870	42,469	178,441
28,536	2,532	558	599	433,855	39,325	16,028
5,767	151	0	0	2,127,600	209,267	74,369
4,404	181	0	0	2,904,214	175,932	110,787
5,425	174	0	0	3,362,637	114,440	97,343
3,854	142	0	0	3,041,093	264,117	120,347
7,667	147	3	1	1,169,098	346,953	125,217
5,868	3	196	29	1,499,165	204,721	123,902
3,686	10	170	13	1,797,897	104,948	99,526
5,689	7	176	16	2,447,750	0	115,796
4,124	16	189	23	3,008,046	0	139,985
6,842	19	187	23	2,232,297	69,264	155,926

FACILITY INFORMATION					STAFF				
District	Facility	Year	Platform	Beds	Doctors	Nurses	ANMs	Para-medical	Non-medical
3	1	2011	District Hospital	510	39	111	2	103	63
3	1	2012	District Hospital	510	36	109	2	104	66
3	1	2013	District Hospital	510	42	115	1	105	83
3	1	2014	District Hospital	510	40	106	1	101	72
3	1	2015	District Hospital	510	37	120	1	107	73
3	1	2011	Community Health Centre	24	3	6	0	6	5
3	1	2012	Community Health Centre	35	3	6	0	7	6
3	1	2013	Community Health Centre	27	4	6	0	8	7
3	1	2014	Community Health Centre	23	5	6	0	10	8
3	1	2015	Community Health Centre	25	4	7	0	11	8
3	1	2011	Primary Health Centre	6	2	0	0	4	2
3	1	2012	Primary Health Centre	6	2	0	0	4	1
3	1	2013	Primary Health Centre	6	2	0	0	4	3
3	1	2014	Primary Health Centre	5	2	0	0	4	1
3	1	2015	Primary Health Centre	5	2	0	0	3	3
3	2	2011	Primary Health Centre	6	2	0	0	3	4
3	2	2012	Primary Health Centre	6	2	0	0	2	4
3	2	2013	Primary Health Centre	6	2	0	0	3	4
3	2	2014	Primary Health Centre	6	2	0	0	3	4
3	2	2015	Primary Health Centre	6	2	0	0	3	4
3	2	2011	Community Health Centre	0	4	7	0	9	9
3	2	2012	Community Health Centre	0	4	7	0	9	8
3	2	2013	Community Health Centre	0	4	7	0	9	8
3	2	2014	Community Health Centre	30	4	7	0	9	8
3	2	2015	Community Health Centre	0	4	7	0	10	8
3	3	2011	Primary Health Centre	0	2	0	0	5	2
3	3	2012	Primary Health Centre	0	2	0	0	5	2
3	3	2013	Primary Health Centre	0	2	0	0	5	2
3	3	2014	Primary Health Centre	0	2	0	0	5	2
3	3	2015	Primary Health Centre	0	2	0	0	5	2
3	4	2011	Primary Health Centre	5	1	0	0	4	0
3	4	2012	Primary Health Centre	5	2	0	2	3	0
3	4	2013	Primary Health Centre	5	1	0	1	5	1
3	4	2014	Primary Health Centre	5	1	0	2	6	3
3	4	2015	Primary Health Centre	5	2	0	2	5	1
4	1	2011	Sub-district hospital	70	3	5	0	9	7
4	1	2012	Sub-district hospital	70	5	6	0	8	6
4	1	2013	Sub-district hospital	70	5	6	0	8	4
4	1	2014	Sub-district hospital	70	4	6	0	9	7

OUTPUTS				EXPENDITURE		
Outpatient	Inpatient	Immunization doses	Births	Personnel Exp	Pharma & consumables exp	Other expenditure
405,067	142,638	1,075	4,261	130,500,000	21,063,562	20,130,011
443,907	139,890	1,450	4,774	139,100,000	13,849,410	12,602,631
438,131	122,842	1,607	5,450	156,900,000	899,927	13,493,343
332,299	125,451	1,728	5,623	179,800,000	8,132,435	15,922,407
456,178	134,393	1,661	6,003	192,600,000	7,879,842	29,131,777
20,071	2,036	1,430	105	7,179,428	799,534	210,907
78,432	2,790	1,624	158	8,350,061	573,802	196,175
93,074	2,695	1,938	304	9,365,082	905,408	286,427
83,623	1,702	2,865	186	10,429,010	309,612	389,382
39,968	2,172	1,426	202	10,720,755	685,955	670,764
11,990	60	0	36	1,323,906	361,386	95,577
11,780	46	0	41	1,475,038	239,239	195,139
12,780	49	0	49	1,840,704	381,490	162,367
12,705	78	0	33	1,937,930	314,202	193,988
12,379	98	0	31	1,626,833	414,032	169,414
11,556	151	49	36	1,909,220	385,100	153,624
12,276	177	78	39	1,631,320	283,998	163,926
12,648	159	90	45	1,873,322	402,405	237,073
11,820	102	190	94	2,063,906	516,956	198,264
13,644	155	18	91	2,517,659	606,946	186,746
46,406	2,106	540	138	6,466,951	805,066	174,601
34,177	2,521	393	88	6,621,835	410,088	223,606
37,716	2,904	0	122	7,489,871	626,523	325,590
42,991	3,256	18	147	9,891,869	450,936	1,351,657
50,155	3,436	657	133	11,037,114	511,808	596,861
11,536	81	24	6	2,212,213	399,948	171,779
11,732	100	14	7	2,308,783	201,044	121,854
11,814	80	34	17	2,143,595	362,152	109,477
10,924	90	22	12	2,458,373	439,738	142,389
11,826	71	20	9	3,132,048	461,438	203,544
9,067	36	0	1	628,053	455,370	270,657
7,957	40	0	2	812,412	253,285	124,821
7,024	114	0	3	958,228	465,652	98,879
10,615	109	0	2	1,002,208	639,938	119,146
12,511	435	0	0	1,889,010	597,296	165,048
74,818	12,346	1,993	272	11,298,514	1,226,351	1,893,547
70,116	18,605	2,037	261	15,776,116	1,242,266	1,817,024
70,886	14,013	2,029	197	15,758,071	1,773,746	1,612,183
82,242	14,266	2,417	351	19,343,608	644,869	1,984,174

FACILITY INFORMATION					STAFF				
District	Facility	Year	Platform	Beds	Doctors	Nurses	ANMs	Para-medical	Non-medical
4	1	2015	Sub-district hospital	70	4	7	0	10	16
4	1	2011	Community Health Centre	30	2	4	0	3	3
4	1	2012	Community Health Centre	30	3	7	0	1	3
4	1	2013	Community Health Centre	30	1	7	0	4	2
4	1	2014	Community Health Centre	30	3	7	0	2	0
4	1	2015	Community Health Centre	30	3	7	0	4	5
4	1	2011	Primary Health Centre	6	1	0	1	2	1
4	1	2012	Primary Health Centre	6	1	0	1	2	3
4	1	2013	Primary Health Centre	6	1	2	1	2	1
4	1	2014	Primary Health Centre	6	1	1	1	3	2
4	1	2015	Primary Health Centre	6	1	1	1	2	1
4	2	2011	Primary Health Centre	6	1	0	1	3	3
4	2	2012	Primary Health Centre	6	1	0	1	1	3
4	2	2013	Primary Health Centre	6	1	0	1	1	3
4	2	2014	Primary Health Centre	6	1	0	1	2	3
4	2	2015	Primary Health Centre	6	1	1	1	3	3
4	2	2011	Community Health Centre	30	4	7	0	7	2
4	2	2012	Community Health Centre	30	4	7	0	6	2
4	2	2013	Community Health Centre	30	4	7	0	6	2
4	2	2014	Community Health Centre	30	3	8	0	6	2
4	2	2015	Community Health Centre	30	1	3	0	5	2
4	3	2011	Primary Health Centre	2	1	0	0	2	1
4	3	2012	Primary Health Centre	2	1	0	0	3	0
4	3	2013	Primary Health Centre	2	1	0	0	2	1
4	3	2014	Primary Health Centre	2	1	0	0	2	2
4	3	2015	Primary Health Centre	2	0	0	0	3	1
4	4	2012	Primary Health Centre	2	0	0	0	1	0
4	4	2013	Primary Health Centre	2	0	0	0	2	0
4	4	2014	Primary Health Centre	2	0	0	0	4	2
4	4	2015	Primary Health Centre	2	1	0	0	5	1
4	2	2013	Sub-district hospital	99	7	15	0	19	9
4	2	2014	Sub-district hospital	99	7	15	0	22	11
4	2	2015	Sub-district hospital	99	7	15	0	22	14
5	1	2011	District Hospital	160	36	49	0	21	26
5	1	2012	District Hospital	160	36	49	0	20	24
5	1	2013	District Hospital	160	30	45	0	17	20
5	1	2014	District Hospital	160	26	38	0	15	17
5	1	2015	District Hospital	160	25	38	0	15	13
5	1	2011	Sub-district hospital	80	14	24	0	19	16

OUTPUTS				EXPENDITURE		
Outpatient	Inpatient	Immunization doses	Births	Personnel Exp	Pharma & consumables exp	Other expenditure
115,048	14,139	2,620	337	22,190,270	541,499	1,503,126
39,932	3,420	4,055	680	3,000,807	73,696	250,459
36,807	2,500	36,890	752	3,142,270	73,296	246,145
29,755	2,777	2,646	643	3,220,842	390,370	255,351
28,419	3,588	2,782	510	3,308,405	224,923	641,240
37,765	3,220	1,356	560	3,314,291	292,467	436,603
10,166	422	841	177	914,241	48,699	85,937
9,608	297	819	204	1,373,271	293,953	70,877
11,183	267	772	40	1,475,648	366,626	63,788
12,805	731	824	100	1,684,170	293,386	112,942
18,225	417	813	232	1,262,335	302,752	88,192
5,767	136	185	185	756,246	82,622	178,219
4,404	122	76	76	795,130	357,390	152,115
5,425	140	76	76	1,328,047	224,661	291,487
3,854	157	100	60	1,313,654	542,130	207,825
7,667	262	96	50	1,456,054	491,163	181,811
6,091	236	356	34	1,417,368	451,947	355,014
6,970	216	340	50	1,372,823	13,041	313,489
8,254	415	331	72	1,097,934	587,624	201,956
8,908	365	533	46	1,697,753	189,709	226,632
8,684	320	182	32	1,064,020	263,636	1,273,748
1,265	0	0	12	1,240,865	148,801	102,132
1,428	1	0	16	1,408,421	17,135	75,929
1,603	0	0	20	606,178	222,982	68,193
1,547	0	0	14	385,525	66,759	48,898
2,443	0	0	9	415,899	153,593	61,052
3,638	46	65	8	271,257	119,282	97,978
4,868	125	1,271	56	556,227	292,065	70,020
6,989	253	991	58	869,400	569,225	97,201
8,987	257	1,623	81	1,578,775	685,198	100,676
64,166	11,394	4,893	1,109	17,037,106	1,482,481	2,084,663
77,108	11,385	2,784	1,370	17,589,176	1,924,513	1,863,874
99,437	13,229	4,627	1,337	21,826,428	1,469,231	3,124,744
143,982	53,133	12,843	819	64,790,224	3,520,229	7,951,052
137,575	37,871	14,514	673	60,373,120	3,501,704	10,371,146
124,542	44,615	11,454	813	68,006,232	3,737,330	9,127,889
94,921	47,041	10,646	947	69,381,184	3,154,344	13,128,411
133,511	49,474	10,165	1,127	55,804,708	2,753,985	15,352,245
99,392	15,260	5,087	523	37,324,580	2,752,293	684,794

FACILITY INFORMATION					STAFF				
District	Facility	Year	Platform	Beds	Doctors	Nurses	ANMs	Para-medical	Non-medical
5	1	2012	Sub-district hospital	80	14	24	0	18	16
5	1	2013	Sub-district hospital	80	14	23	0	16	15
5	1	2014	Sub-district hospital	90	14	28	0	15	11
5	1	2015	Sub-district hospital	90	15	58	0	16	12
5	1	2011	Community Health Centre	25	2	6	0	16	7
5	1	2012	Community Health Centre	25	2	6	0	15	7
5	1	2013	Community Health Centre	25	2	6	0	14	7
5	1	2014	Community Health Centre	25	2	6	0	14	7
5	1	2015	Community Health Centre	25	3	5	0	14	11
5	1	2011	Primary Health Centre	5	1	0	0	6	0
5	1	2012	Primary Health Centre	5	1	0	0	6	1
5	1	2013	Primary Health Centre	5	2	0	0	6	1
5	1	2014	Primary Health Centre	5	1	0	0	6	1
5	1	2015	Primary Health Centre	5	1	0	0	5	1
5	2	2011	Primary Health Centre	7	2	3	0	13	1
5	2	2012	Primary Health Centre	7	2	3	0	13	1
5	2	2013	Primary Health Centre	7	2	3	0	13	1
5	2	2014	Primary Health Centre	7	2	3	0	13	1
5	2	2015	Primary Health Centre	7	2	3	0	13	1
5	2	2011	Community Health Centre	46	3	10	0	17	12
5	2	2012	Community Health Centre	32	3	10	0	17	13
5	2	2013	Community Health Centre	31	3	9	0	18	13
5	2	2014	Community Health Centre	36	3	10	0	17	14
5	2	2015	Community Health Centre	32	2	11	0	18	14
5	3	2011	Primary Health Centre	5	1	0	0	8	2
5	3	2012	Primary Health Centre	5	1	0	0	8	2
5	3	2013	Primary Health Centre	5	1	0	0	9	2
5	3	2014	Primary Health Centre	5	1	0	0	9	2
5	3	2015	Primary Health Centre	5	1	0	0	9	2
5	4	2015	Primary Health Centre	0	1	0	0	0	1
6	1	2011	District Hospital	175	12	35	0	15	25
6	1	2012	District Hospital	175	10	35	0	14	26
6	1	2013	District Hospital	175	9	26	0	12	25
6	1	2014	District Hospital	175	6	26	0	11	25
6	1	2015	District Hospital	175	6	26	0	12	26
6	1	2011	Sub-district hospital	228	10	21	0	13	47
6	1	2012	Sub-district hospital	228	10	21	0	14	49
6	1	2013	Sub-district hospital	228	13	37	0	15	49
6	1	2014	Sub-district hospital	228	14	37	0	18	48

OUTPUTS				EXPENDITURE		
Outpatient	Inpatient	Immunization doses	Births	Personnel Exp	Pharma & consumables exp	Other expenditure
106,091	15,705	6,921	420	44,482,648	1,412,326	713,052
93,430	13,197	3,101	498	50,923,960	1,532,921	628,337
96,584	14,761	3,745	562	53,740,524	1,079,887	647,732
104,734	15,483	4,818	555	57,173,916	1,194,550	724,807
15,642	3,558	377	43	87,139	403,064	282,961
15,411	3,037	708	37	82,710	322,435	276,586
18,657	4,335	507	47	130,503	358,533	299,194
19,816	3,834	446	34	169,346	172,087	223,956
26,302	3,653	339	53	168,030	198,009	273,284
6,744	4	3,936	144	2,002,373	229,669	60,836
7,176	0	3,936	102	2,064,563	162,940	65,847
7,488	4	3,906	51	2,373,335	203,595	57
8,268	0	4,224	22	2,405,022	673,027	57,547
9,316	6	8,362	38	2,983,349	681,986	57,997
14,913	344	9,461	379	1,999,246	298,659	244,938
14,727	247	10,868	342	2,016,942	301,888	98,091
10,459	230	10,338	309	2,516,217	494,270	154,789
12,491	226	9,341	412	2,475,458	907,801	237,548
9,887	302	8,994	340	3,425,560	1,236,720	166,741
47,724	8,397	5,533	803	13,810,937	594,860	273,013
42,336	6,529	5,723	678	19,807,230	685,392	276,185
48,622	8,288	5,957	645	21,576,508	505,107	272,159
51,717	8,081	5,707	620	24,557,412	665,992	285,988
47,211	8,166	6,370	483	25,971,094	512,114	125,721
9,288	135	152	26	1,578,895	274,844	103,341
7,900	105	439	9	1,581,795	309,957	114,627
7,233	126	302	9	1,584,695	473,901	41,937
8,887	102	958	38	1,646,995	595,996	52,176
7,966	109	1,003	26	1,649,895	519,667	52,246
60	0	0	0	326,800	84,572	1,680
183,187	23,705	14,664	422	28,362,750	4,804,454	4,844,367
161,218	23,151	12,917	505	38,303,400	2,457,637	2,654,396
109,594	17,854	9,824	912	43,437,088	2,778,440	4,692,411
135,856	18,635	24,753	687	52,454,176	3,334,912	4,116,535
163,787	14,817	12,656	499	33,874,016	2,147,756	24,081,334
17,869	25,053	0	37	13,757,667	2,813,198	5,583,593
12,970	18,535	0	121	13,806,846	1,237,118	5,260,518
27,985	18,883	0	130	14,498,095	1,195,767	5,654,626
75,284	21,690	22	163	18,272,548	627,231	10,499,576

FACILITY INFORMATION					STAFF				
District	Facility	Year	Platform	Beds	Doctors	Nurses	ANMs	Para-medical	Non-medical
6	1	2015	Sub-district hospital	228	10	76	0	19	49
6	1	2013	Community Health Centre	30	3	5	0	1	4
6	1	2014	Community Health Centre	30	4	6	0	2	5
6	1	2015	Community Health Centre	30	2	6	0	3	5
6	1	2011	Primary Health Centre	0	1	0	0	7	2
6	1	2012	Primary Health Centre	0	1	0	0	9	2
6	1	2013	Primary Health Centre	0	1	0	0	9	3
6	1	2014	Primary Health Centre	0	1	0	0	9	3
6	1	2015	Primary Health Centre	1	2	0	0	9	1
6	2	2011	Primary Health Centre	3	1	0	0	4	2
6	2	2012	Primary Health Centre	3	1	0	0	3	3
6	2	2013	Primary Health Centre	3	2	0	0	4	1
6	2	2014	Primary Health Centre	3	2	0	0	3	2
6	2	2015	Primary Health Centre	3	2	0	0	3	2
6	2	2012	Community Health Centre	26	3	6	0	5	4
6	2	2013	Community Health Centre	26	3	207	0	5	4
6	2	2014	Community Health Centre	26	3	6	0	5	4
6	2	2015	Community Health Centre	26	3	6	0	5	4
6	3	2011	Primary Health Centre	3	1	0	0	3	2
6	3	2012	Primary Health Centre	3	2	0	0	3	2
6	3	2013	Primary Health Centre	3	2	0	0	4	2
6	3	2014	Primary Health Centre	3	2	0	0	3	2
6	3	2015	Primary Health Centre	3	2	0	0	3	2
6	4	2011	Primary Health Centre	6	2	0	0	2	3
6	4	2012	Primary Health Centre	6	2	0	0	2	3
6	4	2013	Primary Health Centre	6	2	0	0	2	3
6	4	2014	Primary Health Centre	6	2	0	0	2	3
6	4	2015	Primary Health Centre	6	2	0	0	2	3
7	1	2011	District Hospital	100	10	47	0	36	22
7	1	2012	District Hospital	114	27	46	0	32	22
7	1	2013	District Hospital	127	26	45	0	30	24
7	1	2014	District Hospital	205	26	45	0	35	24
7	1	2015	District Hospital	168	41	46	0	34	20
7	1	2013	Sub-district hospital	135	3	25	1	6	9
7	1	2014	Sub-district hospital	135	3	23	1	6	8
7	1	2015	Sub-district hospital	135	7	24	1	7	7
7	1	2011	Community Health Centre	30	3	6	0	4	8
7	1	2012	Community Health Centre	30	3	6	0	4	8
7	1	2013	Community Health Centre	30	3	6	0	4	8

OUTPUTS				EXPENDITURE		
Outpatient	Inpatient	Immunization doses	Births	Personnel Exp	Pharma & consumables exp	Other expenditure
77,136	23,562	240	120	31,413,512	407,150	5,800,009
2,775	37	1,042	14	1,212,207	200,703	65,070
9,789	76	851	21	2,075,489	32,819	122,837
14,433	184	1,184	14	1,879,168	74,276	164,705
3,660	0	2,522	0	486,942	44,860	50,329
3,122	0	704	0	830,355	87,780	41,050
2,782	0	854	0	705,357	223,988	65,308
4,128	0	563	0	439,147	630,441	69,940
5,118	1	685	5	685,420	406,954	91,808
7,125	0	6,350	6	1,056,465	123,680	92,617
6,046	0	7,393	4	1,233,616	171,700	120,353
6,025	4	7,294	7	1,519,693	218,128	109,223
5,787	19	6,155	18	1,830,391	362,358	133,786
5,754	2	6,362	31	2,272,585	360,129	141,375
1,662	66	0	10	3,167,655	192,054	55,800
7,136	251	0	6	3,388,141	1,517,842	64,548
11,040	577	0	8	4,587,950	194,855	397,359
13,459	579	16	34	3,625,757	1,269,352	596,166
5,488	3	7,087	6	1,301,290	192,017	29,854
4,392	10	7,650	4	1,767,126	172,527	44,552
4,333	27	8,053	10	1,983,183	136,332	39,094
4,312	70	3,005	22	2,140,816	838,302	35,774
4,285	55	3,647	12	1,389,721	817,972	37,939
3,377	3	9,126	3	1,034,692	322,350	2,050
2,340	0	5,599	3	962,018	184,609	3,750
1,896	0	7,967	1	1,178,209	175,807	22,326
1,702	0	2,365	2	1,546,538	406,091	6,079
3,323	9	1,859	2	1,387,070	387,574	33,986
130,309	44,282	7,243	156	63,773,632	7,178,168	3,826,269
123,304	49,270	8,130	141	69,502,576	5,376,876	4,229,423
145,337	54,257	5,580	291	71,488,856	4,868,413	5,380,481
178,686	56,727	8,069	317	122,800,000	2,106,899	10,789,599
205,616	65,985	8,837	432	109,000,000	1,934,779	8,735,618
56,353	18,319	3,806	405	13,024,664	1,594,033	1,464,762
59,402	20,951	4,420	465	21,035,844	583,223	2,403,810
59,770	24,682	5,546	877	21,087,000	343,999	3,219,320
20,519	5,133	479	58	4,525,900	194,491	482,110
16,299	4,425	429	66	4,726,598	332,972	499,793
14,026	4,482	321	40	5,293,900	320,348	552,876

FACILITY INFORMATION					STAFF				
District	Facility	Year	Platform	Beds	Doctors	Nurses	ANMs	Para-medical	Non-medical
7	1	2014	Community Health Centre	30	3	6	0	4	8
7	1	2015	Community Health Centre	30	3	6	0	4	8
7	1	2011	Primary Health Centre	6	2	0	6	3	1
7	1	2012	Primary Health Centre	6	2	0	6	3	1
7	1	2013	Primary Health Centre	6	2	0	6	6	1
7	1	2014	Primary Health Centre	6	2	0	6	6	1
7	1	2015	Primary Health Centre	6	2	0	6	6	1
7	2	2011	Primary Health Centre	6	2	0	0	2	1
7	2	2012	Primary Health Centre	6	2	0	0	3	1
7	2	2013	Primary Health Centre	6	2	0	0	3	1
7	2	2014	Primary Health Centre	6	2	0	0	2	1
7	2	2015	Primary Health Centre	6	2	0	0	2	1
7	2	2011	Community Health Centre	30	3	7	0	5	7
7	2	2012	Community Health Centre	30	2	6	0	6	6
7	2	2013	Community Health Centre	30	3	7	0	7	7
7	2	2014	Community Health Centre	30	2	7	0	7	7
7	2	2015	Community Health Centre	30	3	6	0	6	7
7	3	2011	Primary Health Centre	6	2	0	0	2	1
7	3	2012	Primary Health Centre	6	2	0	0	2	1
7	3	2013	Primary Health Centre	6	2	0	0	2	1
7	3	2014	Primary Health Centre	6	2	0	0	2	1
7	3	2015	Primary Health Centre	6	2	0	0	2	1
7	4	2011	Primary Health Centre	6	1	0	0	4	3
7	4	2012	Primary Health Centre	6	1	0	0	4	3
7	4	2013	Primary Health Centre	6	1	0	0	4	3
7	4	2014	Primary Health Centre	6	1	0	0	4	3
7	4	2015	Primary Health Centre	8	1	0	0	4	4
8	1	2011	District Hospital	200	37	91	0	62	35
8	1	2012	District Hospital	200	34	76	0	59	35
8	1	2013	District Hospital	200	34	76	0	57	35
8	1	2014	District Hospital	200	34	76	0	57	35
8	1	2015	District Hospital	200	34	76	0	57	35
8	1	2011	Community Health Centre	50	3	8	0	8	5
8	1	2012	Community Health Centre	50	3	8	0	8	5
8	1	2013	Community Health Centre	50	3	8	0	8	5
8	1	2014	Community Health Centre	50	4	5	0	9	5
8	1	2015	Community Health Centre	50	3	10	0	9	7
8	1	2011	Primary Health Centre	4	1	0	0	4	2
8	1	2012	Primary Health Centre	4	1	0	0	4	2

OUTPUTS				EXPENDITURE		
Outpatient	Inpatient	Immunization doses	Births	Personnel Exp	Pharma & consumables exp	Other expenditure
12,467	3,254	333	56	5,498,000	159,997	505,533
15,784	4,428	287	62	6,725,000	9,936	477,602
9,792	81	747	7	1,773,889	172,843	0
10,121	108	1,046	11	2,303,233	215,738	0
9,978	87	2,104	6	2,642,617	230,908	0
10,948	91	1,448	21	2,622,904	379,545	0
11,564	116	1,408	29	2,705,582	285,088	0
12,179	781	2,001	361	1,588,923	81,686	120,403
10,970	539	2,392	319	1,373,745	107,620	111,701
11,219	493	2,306	572	1,520,517	475,395	104,377
12,411	256	3,399	629	2,006,986	577,288	143,465
12,236	170	4,814	1,003	2,590,383	553,768	106,577
16,878	2,275	278	150	8,420,654	528,160	730,447
15,648	2,268	179	163	12,238,644	310,260	1,151,309
14,250	2,472	517	143	12,281,900	368,058	1,023,693
15,527	3,071	521	156	16,363,366	159,947	1,167,537
19,464	3,901	644	178	19,577,176	0	2,704,545
6,720	166	342	4	1,495,116	362,003	106,677
6,530	186	267	3	1,787,758	201,656	106,677
7,120	191	268	4	1,022,792	267,014	106,677
6,070	213	693	5	1,058,335	615,737	106,679
7,752	202	347	5	2,183,029	440,078	106,677
7,475	61	1,037	0	2,234,153	331,524	99,266
6,164	91	958	0	1,973,784	260,500	539
6,957	160	799	2	2,585,177	310,656	20,768
7,196	171	1,117	0	2,627,519	500,720	26,560
7,273	166	1,107	0	2,958,607	511,032	0
48,028	19,577	4,634	870	21,144,012	4,253,079	1,481,477
48,880	15,556	6,030	1,290	20,141,918	2,362,060	3,165,587
68,588	35,864	6,061	1,374	26,801,916	2,273,531	6,176,039
43,724	45,877	8,024	2,168	23,755,876	5,202,763	14,795,087
53,468	52,672	8,265	2,570	29,785,222	18,339,780	3,664,452
53,125	13,501	11,090	387	24,940,216	631,195	2,405,979
55,622	15,459	21,798	349	26,347,972	700,370	1,967,251
61,253	18,061	13,590	369	29,348,348	1,038,452	2,381,184
70,672	18,766	13,450	444	33,586,824	964,300	3,011,117
95,014	25,304	12,865	477	34,840,992	807,342	3,543,709
11,647	43	203	14	1,700,503	752,034	88,539
9,243	29	356	12	1,720,885	215,518	126,495

FACILITY INFORMATION					STAFF				
District	Facility	Year	Platform	Beds	Doctors	Nurses	ANMs	Para-medical	Non-medical
8	1	2013	Primary Health Centre	4	1	0	0	4	2
8	1	2014	Primary Health Centre	4	1	0	0	4	1
8	1	2015	Primary Health Centre	4	1	0	0	4	2
8	2	2011	Primary Health Centre	5	1	0	0	2	2
8	2	2012	Primary Health Centre	5	1	0	0	2	2
8	2	2013	Primary Health Centre	5	1	0	0	2	1
8	2	2014	Primary Health Centre	5	1	0	0	2	1
8	2	2015	Primary Health Centre	5	1	0	0	2	1
8	2	2011	Community Health Centre	30	2	7	0	5	5
8	2	2012	Community Health Centre	30	2	7	0	6	7
8	2	2013	Community Health Centre	30	4	7	0	6	6
8	2	2014	Community Health Centre	30	4	5	0	6	5
8	2	2015	Community Health Centre	30	4	5	0	6	7
8	3	2011	Primary Health Centre	5	1	0	0	2	1
8	3	2012	Primary Health Centre	5	1	0	0	2	1
8	3	2013	Primary Health Centre	5	1	0	0	2	2
8	3	2014	Primary Health Centre	5	1	0	0	2	2
8	3	2015	Primary Health Centre	5	1	1	0	2	2
8	4	2011	Primary Health Centre	5	1	3	0	2	2
8	4	2012	Primary Health Centre	5	1	0	0	3	1
8	4	2013	Primary Health Centre	5	0	0	0	2	1
8	4	2014	Primary Health Centre	5	1	2	0	2	2
8	4	2015	Primary Health Centre	5	1	2	0	2	2
9	1	2011	Sub-district hospital	71	9	11	1	17	9
9	1	2012	Sub-district hospital	84	11	6	1	16	8
9	1	2013	Sub-district hospital	84	14	12	1	18	10
9	1	2014	Sub-district hospital	150	11	16	1	12	9
9	1	2015	Sub-district hospital	150	14	20	1	14	7
9	1	2011	Community Health Centre	30	2	7	0	5	3
9	1	2012	Community Health Centre	30	2	7	0	5	3
9	1	2013	Community Health Centre	30	3	6	0	5	3
9	1	2014	Community Health Centre	30	3	6	0	5	3
9	1	2015	Community Health Centre	30	4	6	0	5	3
9	1	2011	Primary Health Centre	8	2	0	0	6	2
9	1	2012	Primary Health Centre	8	2	0	0	6	2
9	1	2013	Primary Health Centre	8	2	0	0	7	2
9	1	2014	Primary Health Centre	8	2	0	0	7	2
9	1	2015	Primary Health Centre	8	2	0	0	7	2
9	2	2011	Primary Health Centre	3	1	0	0	4	2

OUTPUTS				EXPENDITURE		
Outpatient	Inpatient	Immunization doses	Births	Personnel Exp	Pharma & consumables exp	Other expenditure
9,070	41	307	12	1,549,708	134,029	124,547
9,875	110	213	23	1,516,567	288,888	86,366
10,194	119	247	21	2,072,431	273,090	196,494
4,700	0	3,892	0	983,130	680,574	107,037
6,360	0	3,399	0	1,080,072	161,222	145,276
6,988	0	4,122	0	1,124,540	11,430	132,561
6,427	0	2,587	0	1,560,965	75,056	115,682
6,061	0	2,317	0	1,783,644	108,718	127,389
28,811	5,841	4,330	254	24,655,000	751,905	1,818,000
31,695	4,807	5,941	256	25,937,000	259,221	1,629,000
31,973	5,352	6,142	269	28,891,000	596,280	1,891,000
34,567	6,714	6,018	284	33,196,000	188,917	2,597,000
33,205	9,143	6,689	360	33,435,000	263,743	3,210,130
2,631	111	84	0	984,386	311,453	183,520
3,019	137	87	0	995,807	136,474	41,970
2,812	100	125	0	605,115	355,330	179,053
3,251	92	191	0	1,341,400	220,103	190,475
3,851	183	161	0	2,042,679	275,116	131,800
4,983	61	403	2	1,153,472	317,548	196,362
4,966	48	311	0	1,076,776	110,517	173,058
5,585	48	305	0	1,257,433	337,393	176,153
5,987	68	250	0	784,720	233,948	193,063
8,183	84	122	0	896,823	219,941	151,848
65,429	35,815	2,560	944	8,665,541	4,209,421	7,151,039
68,311	47,676	3,005	1,516	8,310,364	3,981,726	5,198,383
103,328	47,942	2,715	1,509	19,908,730	4,889,337	7,351,650
112,179	57,856	5,969	2,106	24,162,236	3,688,324	10,676,288
129,074	59,436	7,785	2,208	26,753,316	1,890,027	8,401,341
35,422	4,186	165	5	4,870,717	190,713	240,645
37,081	3,122	218	7	5,053,552	274,311	216,601
35,597	2,409	267	5	6,038,718	494,124	284,486
33,669	3,530	175	16	7,339,612	371,212	480,737
48,167	5,518	185	24	6,648,826	419,545	288,357
15,333	469	12,915	9	3,044,685	474,879	50,450
16,800	339	10,378	27	2,851,906	160,939	68,405
17,658	288	10,328	15	2,729,535	343,292	264,675
15,405	351	4,299	13	2,753,342	61,701	231,872
16,461	725	9,436	8	3,649,849	876,732	104,150
1,564	8	3,993	14	212,187	426,464	42,233

FACILITY INFORMATION					STAFF				
District	Facility	Year	Platform	Beds	Doctors	Nurses	ANMs	Para-medical	Non-medical
9	2	2012	Primary Health Centre	3	1	0	0	3	2
9	2	2013	Primary Health Centre	2	1	0	0	3	1
9	2	2014	Primary Health Centre	3	1	0	0	3	1
9	2	2015	Primary Health Centre	4	1	1	0	2	1
9	2	2011	Community Health Centre	56	3	9	1	10	11
9	2	2012	Community Health Centre	56	4	9	1	10	9
9	2	2013	Community Health Centre	56	4	9	1	10	9
9	2	2014	Community Health Centre	56	4	9	1	8	10
9	2	2015	Community Health Centre	56	6	9	1	10	11
9	3	2011	Primary Health Centre	6	1	0	0	2	1
9	3	2012	Primary Health Centre	6	1	0	0	1	1
9	3	2013	Primary Health Centre	6	1	0	0	0	1
9	3	2014	Primary Health Centre	6	1	0	0	1	1
9	3	2015	Primary Health Centre	6	1	0	0	1	1
9	4	2014	Primary Health Centre	0	1	1	0	3	3
9	4	2015	Primary Health Centre	0	1	0	0	2	2
9	4	2011	Sub Health Centre	1	0	0	0	1	0

OUTPUTS				EXPENDITURE		
Outpatient	Inpatient	Immunization doses	Births	Personnel Exp	Pharma & consumables exp	Other expenditure
2,830	6	4,509	14	78,992	121,783	43,483
984	6	3,920	12	101,592	223,195	205,633
2,689	8	3,317	16	131,463	401,183	121,758
815	5	3,016	12	138,970	394,466	44,475
20,717	10,384	2,685	553	11,033,330	736,886	665,140
20,902	8,878	2,794	478	14,323,029	516,544	717,840
22,340	13,138	3,327	743	14,579,150	993,804	832,782
23,085	13,306	4,237	1,084	14,071,384	517,183	357,887
25,160	15,570	3,320	1,013	13,902,084	802,609	466,675
109	0	22,290	0	504,936	23,325	343
7,019	0	14,007	0	683,964	123,753	47,508
7,878	0	12,861	0	1,046,380	260,774	43,233
9,506	0	1,145	0	493,092	360,676	48,230
10,043	0	1,984	16	1,415,769	390,864	50,818
4,484	0	1,358	0	149,562	141,462	150,400
4,512	0	1,145	0	537,382	30,038	113,608
2,209	0	173	0	24,500	0	832

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