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State-Level Health Systems Assessments in India Based on Publicly Available Data

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Preface to the Working Paper Series

The India Health Systems Project is motivated by the goal of advancing health system reforms in India to provide equitable access to good quality of care and financial risk protection for its citizens. The Project adopts a system approach to assess the strengths and weaknesses of India’s current health care system, identify underlying causes, propose potential solutions drawing on best practices within India and international experience, and, finally, to monitor and evaluate progress and impacts of reforms.

The Working Paper Series presents products from the project. They include research papers, country cases, and analytical tools for conducting health system and reform analysis. The intended audiences are researchers, health policy analysts and practitioners of health systems reform in India—at the national- and state-level—and worldwide. The Working Papers are available at <https://www.hsph.harvard.edu/india-health-systems/>.

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Executive Summary

This report presents a review of the data available to conduct a state-level health system assessment in India. A health system assessment is an evaluation of the strengths and weaknesses of the system in terms of specific performance goals, necessary to support health reform designs. Since healthcare in India falls under the administration of states, health system assessments are best conducted at the state level. Therefore, the intended audience for this report is state-level policymakers, analysts, and donor institutions engaged in providing technical assistance to state governments for health systems reforms.

Three characteristics of using publicly available data for a health system-level assessment are identified. First is the complete lack of information on some performance goals, such as citizen satisfaction, clinical effectiveness, and patient-centeredness. Second is the lack of sufficient indicators on the performance goals for which some data already exist, including efficiency, access, and patient satisfaction. Third, for performance goals for which good indicators exist, such as financial risk protection, there is a lack of detailed data to diagnose poor performance.

The report proposes three options to overcome the above barriers and expand the current availability of data to improve the quality of health system assessment in a state. The first is to supplement the publicly available data with data to which a state government has access. The second is to carry out a selective data collection effort to discover the causes of poor performance of one or two performance goals. The third is to conduct a comprehensive health system assessment that will discover the many challenges faced by a state along with ways to address them.

We recognize that the feasibility of these three recommendations in a state depends on the objectives of the health system assessment, financial constraints, and the political situation in the state. We also acknowledge that data availability and quality vary across states in the country. We would, thus, advocate that this report be considered keeping in mind the realities of each state.

1 Introduction

India has engaged in several healthcare reforms at the national and state levels since the 2000s and has experienced significant improvements in many health outcomes of its people (Selvaraj et al., 2022). Yet, the nation continues to face challenges in its health system that impedes the progress toward universal health coverage where all people have access to good quality health services they need without financial hardship. Some of these problems were exacerbated during the COVID-19 pandemic and highlighted the urgent need to improve the health system.

Designing effective solutions to improve a health system requires a robust understanding of the performance of the system, which can be obtained through an empirical examination of the system. The most important component of carrying out such an exercise is accurate and up-to-date information on the various aspects of the system. This report presents a review of the data that are available to conduct a health system assessment in the country. Having identified the pros and cons of the current data landscape, this report also provides three recommendations on how to expand data availability and enhance the breadth as well as the depth of a health system assessment. The first option proposes a way to conduct an assessment without new data collection, while the second and third options suggest data collection efforts of increasing resource intensities to address the existing data gaps.

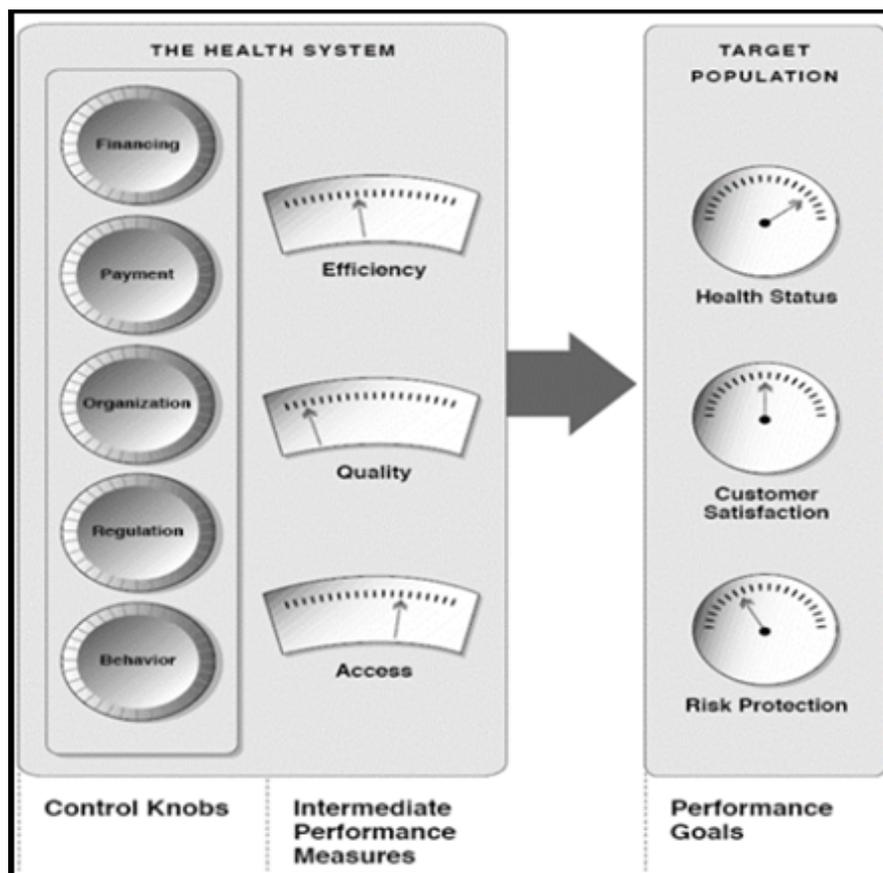
Given that healthcare in India falls under the administration of states, health system assessments are best conducted at the state level. A state-level assessment is also appropriate considering the diversity among states in terms of geographic, social, political, and economic factors. Therefore, the intended audience for this report is state-level policymakers, analysts, and donor institutions engaged in providing technical assistance to state governments for health systems reforms. Although we have considered the state as the unit of health system assessment in this report, our approach can be applied to other units in the country, contingent on the availability of data.

The report is based on a thorough search of data on healthcare in India using multiple sources. Google Scholar was used to identify reports and studies on the Indian health system and the data used in the relevant articles were noted. Citation chaining was applied to search the bibliographies of these articles for additional resources. We also searched the websites of government ministries and other organizations for additional data sources. We drew heavily from the health system assessments - the Indian Health Systems Project conducted in Odisha (Yip et al., 2022) and West Bengal (India Health Systems Project, 2022).

2 Our Analytic Approach

To conduct a systematic health systems assessment, we adopt the Control Knob Framework. Under this framework, a health system is conceptualized as a means to an end. The framework is based on a set of relationships in which certain structural components (the means) and their interactions are connected to the goals that the health system is designed to achieve (the ends) (Roberts et al., 2008). The framework identifies five policy levers that can be used in combination to achieve the health system's final and intermediate goals (Figure 1). The final goals are *health status*, *financial risk protection*, and *citizen satisfaction*, while the intermediate goals are *access*, *quality*, and *efficiency*. For each goal, the framework is concerned with the level of performance compared to various benchmarks and with distributional issues that are central to the role of equity in a health system.¹

Figure 1: The Control Knobs Framework

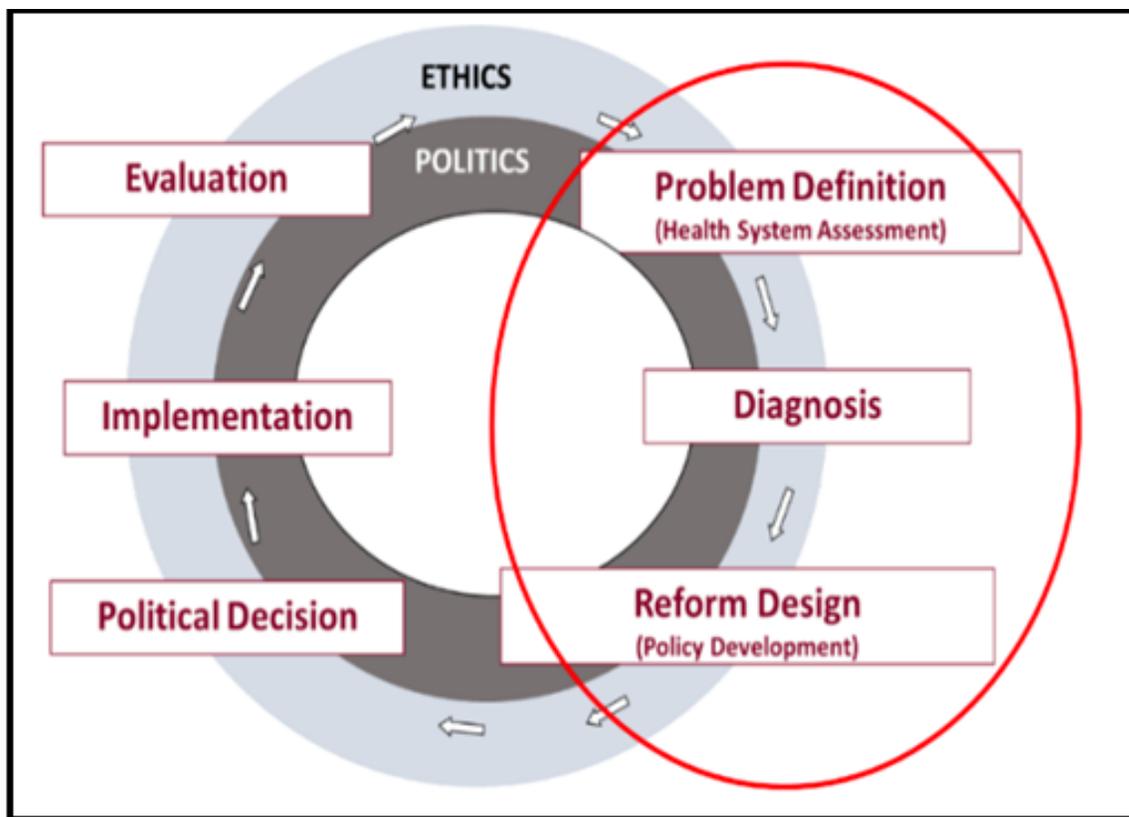


Source: Roberts et al., 2004.

¹ Guidance on how to conduct a health system assessment and how to measure and analyze each performance goal is provided in India Health Systems Project Reports 13 (India Health System Project, 2020), 24 (Haakenstaad, 2020), 25 (Cooper, 2021), 26 (Woskie & Irani, 2021), and 27 (Bose, 2021). Training materials are also available at <https://www.hsph.harvard.edu/india-health-systems/category/events/>

The health system assessment is the first step in the logic of policy cycle in which an evaluation of the strengths and weaknesses of the system in terms of the final and intermediate goals is conducted (Figure 2). This involves the measurement of the goals using data along with their analysis to identify the major problems, typically through comparison with benchmarks. This assessment is followed by diagnoses, in which the underlying causes of good or poor performance are examined. The evidence generated by these analyses, combined with careful reviews of international and Indian experiences, should inform the design and proposal of health system reform options (Roberts et al., 2008).

Figure 2: The Policy Cycle



Source: Roberts et al., 2004.

3 Conducting a State-Level Health System Assessment and Diagnosis

The assessment and diagnosis of a state's health system require detailed information on various aspects of healthcare from individuals, healthcare providers, and health facilities at various levels of care in the public and private health sectors. In this section, we evaluate the availability of such information for the states in India. Given the variability in the availability and quality of data across India, we focus on data that are uniformly available for most states in the country. The first part of this section describes the sources of quantitative data that can be used for the assessment, while the second part lists the indicators of each of the six goals that can be analyzed using the available data. The last part of this section summarizes the data gaps that prevent the complete assessment of a state's health system.

3.1 Quantitative Data Sources

Data on healthcare in India are available from many surveys, each with different objectives, target populations, and topical interests (Dinesh et al., 2020). Table 1 presents the available sources of data followed by descriptions of their coverage, frequency, and thematic areas. We used four criteria to choose the sources to include in the table. First, given the focus on the health system in a state, we exclude sources with national-level data or with data from a few states in the country.² Although we discuss state-level data sources in this report, sources that contain data at a higher granularity are essential to figuring out what is happening within a state. Second, to ensure data reliability, we report data sources compiled by government organizations or well-known multilateral and international agencies. Third, we restrict Table 1 to sources with recent data (within five years of the publication of this report). Consequently, the list predominantly includes sources that collect data either continuously or at regular intervals to allow for an assessment that reflects the current realities of the state.³ Finally, we list sources that make raw data publicly accessible or publish detailed reports with appropriate health system performance indicators.

State-level data are available from the Sample Registration System (SRS) and the Global Burden of Disease (GBD) India Compare. The SRS, one of the largest demographic surveys in the world, covers a sample of 8.2 million population representative at the natural division level for major states and the state level for smaller states (MoHA, 2021). Based on the survey data, the annual statistical reports provide estimates of several demographic, fertility, and mortality indicators for India and the more populous states (MoHA, 2022).

² The Annual Health Survey (AHS), conducted by the Government of India in 2010-2013, is an example of a source excluded from Table 1 because it was carried out in only nine states. Similarly, the National Non-communicable Disease Monitoring Survey report was not considered because it provides national-level statistics only.

³ Examples of data sources that were excluded from Table 1 because of the timing restriction is the District Level Household and Facility Surveys (DLHS 1998–99, 2002–04, 2007–08, 2012–13), the Annual Health Surveys (AHS 2010-2013), and Rapid Survey on Children (RSoc 2013-2014). We also excluded the India Human Development Surveys since the first two waves were carried out in 2004-05 and 2011-12 but the third wave is expected in 2023. Such earlier surveys may be useful for examining changes in health system over time.

Similarly, the GBD India Compare provides national and state-level estimates of mortality, incidence, prevalence, years of life lost, years of life lived with disability, and disability-adjusted life-years for over 300 diseases and injuries from 1991 to 2019 (ICMR, PHFI, HME, 2017). The GBD estimates are based on a standardized analytical approach used to combine all accessible information in every state and union territory of India (Vos et al., 2017).

Table 1: List of data sources with information on health system performance

| Survey Name | Periodicity | Administrative level at which data are available |
|---|---|---|
| Sample Registration System (SRS) | Annual reports | State |
| Global Disease Burden (GBD) India Compare | 1990-2019 | State |
| National Sample Survey (NSS) | 2004, 2014, 2017-18 | District |
| National Family Health Survey (NFHS) | 1992-93, 1998-99, 2005-06, 2015-16, 2019-21 | District |
| Longitudinal Aging Study in India (LASI) | 2017-18 | State |
| Health Management Information System (HMIS) | Monthly data | Sub-district |
| Rural Health Statistics (RHS) | Annual reports | State, District* |
| National Health Profile | Annual reports | State |

Note: * RHS contains district-level reports only for select indicators.

These two data sources, GBD and SRS, allow for the comparison of indicators across states and provide an understanding of a state's performance relative to the rest of the country or other similar states. They also enable visualization of the trends in the indicators since data are available over time in both sources. However, these two sources do not provide data at the district or lower administrative regions within a state, preventing an examination of the circumstances surrounding the indicators. Disaggregation of the indicators by various social, demographic, and economic population groups like religion, caste/tribes, education, wealth status, and others for an equity-oriented analysis is also not always possible when using these two data sources.

The SRS reports present data separately only for rural-urban and male-female while the GBD allows the estimates to be separated by only age and sex.

Well-designed household surveys that include questions related to the health of respondents offer richer information relative to state-level data. The National Sample Survey (NSS), the National Family Health Survey (NFHS), and the Longitudinal Ageing study in India (LASI) are large-scale household surveys in India with health-related individual data.⁴ They are representative at the region, district, and state levels, respectively (MoSPI, 2022; IIPS & ICF, 2022; MoHFW, 2020).⁵ Although the NSS conducts regular household surveys on topics such as consumption and employment, data on special topics including health are collected occasionally. The Social Consumption on Health surveys provide information on morbidity, the nature of ailments, health-seeking behaviors, health expenditures, and the condition of the aged (MoSPI, 2022; IIPS, 2021). The NFHS provides information on several health topics with special attention on reproductive, maternal, and child health (IIPS & ICF, 2022). The LASI is a longitudinal survey that provides information on chronic health conditions, health behaviors and risk factors, health care utilization, and health financing of India's population aged 45 and above (MoHFW, 2020).

These three surveys, NSS, NFHS, and LASI, can be used to measure and compare some of the health system performance indicators across various population groups in a state. The availability of data on the sex, religion, caste/tribe, wealth status, education, and other characteristics of individuals makes richer analysis possible, particularly on the equity across the system. The NSS and NFHS also allow for the comparison of indicators across regions or districts within a state. Since the NFHS and LASI questionnaires are standardized across countries, they also allow for international comparisons.

The disadvantage of household-level data is that data collection is infrequent due to the high cost of conducting sub-nationally representative surveys. It is, therefore, possible that the most recent household survey at the time of an assessment does not provide an idea of the current situation in a state. Another problem with these surveys is that analysis is dependent on the framing of the questions and limited options from which respondents can choose their answers. For example, the NSS does not mention pharmacies as a health provider category, although they are an important source of outpatient care in India (Haakenstaad et al, 2022; Kalita et al, 2022).

Unlike the above-mentioned data sources that deliver data with a substantial time lag, the Health Management Information System (HMIS), a web-based monitoring information system put in place by the Ministry of Health & Family Welfare (MoHFW) to monitor the National Health Mission and other health programs, makes data on healthcare facilities available at regular intervals (MoHFW, 2022a). Healthcare facilities, mostly public facilities and some private facilities, upload their service delivery

⁴ The most recent NSS Health survey was a part of the 75th NSS round conducted from July 2017 to June 2018 with a sample of 555,114 households from every district of the country. The most recent NFHS survey from 2019-21 with a sample of 664,972 household is representative at the district level. The first LASI survey conducted in 2017-18 had a sample size of 72,250 individuals.

⁵ A region is a collection of districts with similar agro-climatic conditions.

data monthly and infrastructure data yearly onto the system.⁶ The facility-level service delivery data are then aggregated to the state, district, and sub-district levels and made accessible for all. The infrastructure data from the HMIS are also used to publish the annual Rural Health Statistics (RHS) report that contains the healthcare worker and infrastructure data for public facilities at the state level, with select variables available at the district level.

Although the HMIS and RHS are the only sources of facility-related data in India and can be used to measure certain performance goals, their drawback lies in the limited set of indicators for which information is reported by the facilities. The service delivery data focus on health services associated with reproductive, maternal health, adolescent health, child health, and outpatient/inpatient services, while the infrastructure data focus on specific physical inputs including manpower, equipment, and buildings. The self-reporting of the data by facilities is a problem as is the lack of data on some key inputs and processes in facilities. Another disadvantage is the aggregation of data to administrative regions, making it difficult to link health inputs used to the health services produced. The HMIS monthly data allow evaluation by ownership (public/private) and location (rural/urban) of facilities whereas the RHS reports present data by public facility types and location (rural/urban/tribal) only, limiting the equity analysis.

Most of the information from the data sources listed above is summarized in the National Health Profile (NHP) published annually by the Central Bureau of Health Intelligence (MoHFW, 2022c). These reports also contain additional data that can be utilized for the health system assessment, but their usefulness is restricted by the availability of state-level statistics only.⁷

3.2 Health System Performance Indicators Available for Indian States

We now examine how the existing publicly available quantitative data can be utilized to assess the performance of the six health system goals in a state in India. The final goals - health status, financial risk protection, and citizen satisfaction - reflect the 'results, consequences, or outcomes' of the health system, while the intermediate goals - access, quality, and efficiency - are the 'critical links' connecting the final goals to the main causes of performance difficulties (Roberts et al., 2008). Since there are typically several conceptual frameworks and methods to measure each goal, we focus on a few fundamental indicators only.

3.2.1 Health Status

Improvements in the health status of the state population are one of the primary goals of any health system, and its investigation is an important part of any health system assessment. Health status is summarized by a set of health outcome indicators that are

⁶ HMIS coverage is about 94% of government health facilities (MoHFW, 2022a). There is no information coverage of the private facilities.

⁷ The State health index ranking published by the NITI Aayog is also a similar report but focuses on ranking states and does not provide statistics on any of the performance goal indicators.

quantitative measures that capture one or more dimensions of the health of a target population at a given period of time. Although numerous health outcome indicators have been developed by various countries, organizations, and academicians, an examination of the core indicators of mortality, fertility, and morbidity is adequate for the assessment.

Table 2 lists the health outcomes indicators along with the corresponding sources of data in India. The SRS and the GBD India Compare provide information on many of the health outcomes indicators but only up to the state level. This deficiency can be overcome by using region or district-level data from the NSS and NFHS that ask respondents whether they suffered from specific diseases. These two surveys, along with the LASI, are also valuable for an assessment of health outcomes from an equity standpoint. They allow the comparison of the indicators across people in different demographic, social, and economic categories like female-male, rural-urban, tribal-nontribal, religion, and wealth quintiles which is crucial for the assessment. Such disaggregated analyses are limited when using the SRS and GBD. Survey data on mental health outcomes are available only in the LASI.

Table 2: Health status indicators measurable for Indian states

| Indicators | Sources |
|---|-------------------|
| Mortality | |
| Life expectancy, Crude death rate, Maternal mortality rate | SRS |
| Neonatal mortality rate, Infant mortality rate, Under-5 mortality rate | SRS, NFHS |
| Fertility | |
| Crude birth rate, Stillbirth rate, Total fertility rate, Age-specific fertility rates for ages 15-19 | SRS, NFHS |
| Morbidity | |
| Disability-adjusted life years (DALYs), incidence of communicable and non-communicable diseases, prevalence of communicable and non-communicable diseases | GBD India Compare |
| Prevalence of select diseases among children, communicable diseases, and chronic diseases | NSS, NFHS, LASI |

3.2.2 Financial Risk Protection

Financial risk protection (FRP) is “achieved when direct payments made to obtain health services do not expose people to financial hardship and do not threaten living standards” (WHO, 2022). FRP in health is focused on out-of-pocket (OOP) payments which are direct payments made for healthcare-related goods and services received. The most common measure of FRP is catastrophic health expenditure (CHE), or when OOP health spending exceeds a pre-defined share of household income or household

consumption spending. Another common measure is impoverishing health expenditure (IHE), which measures whether, once health spending is subtracted, consumption expenditure falls below the poverty line.⁸ In the absence of data on household budgets, ‘distress financing’ is used as an alternative measure of financial risk. This measure focuses on whether patients sell assets or borrow funds to cover healthcare costs. Another common analysis is to compare OOP spending to total health spending across states, where the more the OOP, the worse financial protection is presumed to be.

Table 3 lists the FRP indicators along with sources of data that can be used to construct these indicators. CHE and IHE require data on OOP costs of a health care encounter and a patient’s household income or consumption expenditure. Both variables are available in the NSS and LASI for outpatient care and hospitalizations, while NSS also contains expense data for immunization and childbirth. NFHS 4 and 5 contain data on expenses during childbirth only, but the absence of household income or consumption expenses prevents the construction of CHE or IHE indicators. All three surveys also confirm whether any of the healthcare expenses were covered by insurance or other government schemes to allow the accurate calculation of OOP expenditures and contain questions on distress financing. They also make the analysis of the FRP indicators from an equity perspective possible.

Data on health expenditure, government health expenditure, and OOP expenditure for all states are frequently compiled by the MoHFW and can be used to gauge financial risk protection across states (MoHFW). The problem is that the publicly available MoHFW reports, state budgets, and other documents needed for the calculations are usually not current.

Table 3: FRP indicators measurable for Indian states

| Indicators | Sources |
|--|--|
| CHE for outpatient and inpatient care (OOP spending + income or consumption) | NSS, LASI |
| IHE for outpatient and inpatient care (OOP spending + income or consumption) | NSS, LASI |
| OOP spending for childbirth | NSS, NFHS |
| Distress financing | NSS, NFHS, LASI |
| Health expenditure in a state | State budgets/ public expenditure reports/ health accounts |

⁸ Alternatives to the CHE and IHE metrics have been proposed by researchers to overcome identified shortcomings in these measures. None of these have yet been standardized and widely used (Haakenstad, 2020)

3.2.3 Citizen Satisfaction

Citizen satisfaction is the degree to which citizens, or the public, are satisfied with the health system (Roberts et al., 2008). Citizen satisfaction, unlike patient satisfaction,⁹ pertains to both non-users and users of health services and incorporates people’s perceptions, as well as their confidence and trust in the health system. Typical household survey questions on citizen satisfaction are citizens’ overall impression of the health system, their perception of the need for reforms, and their trust or confidence to receive care from the health system if they were to fall ill. There are no publicly available datasets that include variables needed to assess citizen satisfaction in India.

3.2.4 Access

Access ‘is about enabling a patient in need to receive the right care, from the right provider, at the right time, in the right place, dependent on context’ (Saurman, 2016). It has predominantly been examined as the physical availability of services in a specific area including the distribution of available inputs, like beds, doctors, or nurses, compared to the population. Part A of Table 4 shows which data sources in India contain information on the physical availability of inputs. Data on several health inputs are available but most of the sources provide information at the state level only, making it difficult to determine what is occurring within the state.

Table 4: Access indicators measurable for Indian states

| Indicators | Source |
|---|-----------------|
| A: Physical availability | |
| Number of healthcare facilities | RHS |
| Number of labor rooms/operating theatres in facilities | RHS |
| Number of doctors and other health workers | RHS |
| Number of hospital beds | NHP |
| Number of essential medicines/vaccines in stock in healthcare facilities | HMIS |
| Number of medical consumables and equipment in healthcare facilities | HMIS |
| B. Utilization rates | |
| Share of individuals who received care in a certain period | NSS, NFHS, LASI |
| C. Structural barriers | |
| Distance to healthcare facility | NFHS |
| Time to reach nearest healthcare facility | n/a |
| Share of individuals who sought care (did not seek care) due to (in)convenient location, (in)convenient hours | NSS |

⁹ See details on patient satisfaction under Section 3.2.5.

| | |
|--|-----------------|
| Share of individuals who sought care (did not seek care) due to quality issues | NSS, LASI |
| D. Financial barriers | |
| Share of respondents with insurance coverage | NSS, NFHS, LASI |
| Full costs of services | NSS, NFHS, LASI |
| Indirect costs of care such as travel, accommodation, time away from work | NSS, NFHS, LASI |
| Share of individuals who sought care (did not seek care) due to low prices (unaffordability) | NSS, NFHS, LASI |
| E. Personal barriers | |
| Share of individuals who sought care (did not seek care) due to cultural/religious/language/family reasons | NSS |

Moreover, the physical availability indicators capture the ‘potential to utilize a service if required as opposed to ‘actual entry of a given individual or population group into the health care system’ (Millman, 1993). Realized access or utilization of health services is an alternative measure and frequency of visits to a health care provider or the use of medical procedures is one of the most common indicators (Millman, 1993). As shown in Part B of Table 4, the NSS, NFHS, and LASI can be used to calculate utilization rates, albeit for different kinds of services. These surveys also contain the necessary details of each care-seeking event such as the type of provider and care setting (primary, secondary, tertiary).

Additionally, indicators of barriers to access – structural, financial, and personal – are considered when assessing access to healthcare. For the healthcare services on which each survey has information, they ask the respondents for reasons why they choose a facility/provider or why they did not seek care. The answer options provided to these questions can be used to get a sense of the barriers, as shown in Part C of Table 4. Note that the three household surveys together permit a detailed examination of the level of access as well as its distribution of various population groups.

3.2.5 Quality of Care

Quality of care can be assessed based on three concepts: clinical effectiveness, patient safety, and patient-centeredness. Clinical effectiveness is defined as the provision of health services based on scientific knowledge and avoiding both overuse of inappropriate care and the underuse of effective care (NASEM, 2018). The most important consideration for clinical effectiveness is the extent to which a diagnosis or treatment is based on evidence or standard guidelines and is shown to influence clinical

outcomes. Clinical effectiveness is usually assessed through three methods: chart reviews, clinical vignettes, and standardized patients.¹⁰

Patient safety is defined as the “prevention of harm to patients” (Kohn et al., 2000) and its indicators reflect the quality of care provided, generally in inpatient or outpatient settings where care has a physical component (surgery) and has the potential to cause physical harm to the patient. The focus is generally on potentially avoidable adverse events, or medical errors and complications. Patient safety can be measured using chart reviews of all patients or those who have experienced a safety event, voluntary error reporting by providers or patients, or a survey of hospital staff on patient safety culture.

Lastly, patient-centeredness is defined as care that is respectful of and responsive to individual patient preferences, needs, and values, and that allows patients to help guide clinical decisions (IOM, 2001). The ideal method for collecting information on person-centeredness is from patients through patient experience surveys, structured interviews, focus groups, or other methods, with the first method being the most common.

There are no publicly available datasets in India with indicators of clinical effectiveness and patient safety.¹¹ The HMIS contains an indicator of patient-centeredness, the patient satisfaction score which is calculated as the weighted average of the number of satisfied and dissatisfied patients in a particular health facility. This is based on patients’ feedback on their experiences at secondary and tertiary care public and empaneled private health facilities in the country that are voluntarily collected through the ‘Mera Aspataal (My Hospital)’ application (MoHFW, 2022b). Although patients rate their experience on various dimensions, only a single score aggregated at the district or state level is available. LASI also contains some questions on the respondents’ impressions of wait time, respectful treatment, clarity of explanations, privacy, and cleanliness at their last outpatient visit or overnight hospital stay.

3.2.6 Efficiency

The concept of efficiency is based on the relationship between health outputs and the health inputs required to produce them. In an efficient system, there should be no wastage of inputs used to produce one output (technical efficiency) or when allocating resources across multiple outputs (allocative efficiency). Even though there are different ways of measuring efficiency, all methods require data on costs or physical units of health inputs used and health outputs produced. Since there are numerous inputs and outputs in a health system, it is adequate in the Indian context to focus on the key sources of inefficiencies identified by the World Health Organization (WHO, 2010).

¹⁰ Chart review involves the retrospective review of the medical records of patients in a healthcare facility. The use of standardized patients involves sending training actors to seek care while presenting with a pre-determined set of clinical symptoms and documenting what advice clinicians provide in response. Clinical vignettes are like standardized patients but in this case the provider is informed of what is occurring.

¹¹ Reports on the National Quality Assurance Program provide information on the number of public secondary and tertiary care facilities that are certified under the various schemes but doesn’t provide data on quality indicators (NHSRC, 2021).

In Table 5, we report the availability of data on indicators of the dominant technical inefficiencies. Since some of the indicators listed can be measured at the patient, provider, or facility level, we account for data available at any of the levels. Despite the information on a handful of these indicators for public and private facilities provided in the HMIS, there is a lack of data on many dimensions of technical efficiency. Consequently, analysts have typically measured efficiency by linking data on health inputs from sources such as the RHS or state finance reports of the Reserve Bank of India (RBI, 2021) to broad health outcomes noted in Section 3.2.1. The problem is that such measures are often constructed at the state level and make it impossible to ascertain which specific part of the health system is being wasteful or the reasons for them.

There are no publicly available data in India to measure allocative efficiency through indicators such as avoidable hospital admissions rates or the average share of referrals by primary care physicians to hospital specialists.

Table 5: Efficiency indicators measurable in Indian states

| | Indicators | Data sources |
|--|---|---------------------|
| Health care workers: Inappropriate or costly staff mix | Trained nurse to allopathic doctor ratio | HMIS |
| | Pharmacist to allopathic doctor ratio | n/a |
| | Technician to allopathic doctor ratio | n/a |
| | Share of worked days missed by healthcare worker (absenteeism rates) | n/a |
| | Number of patient visits or consultations conducted per day by a physician (productivity rates) | n/a |
| Medicines: Under-use and overpricing of generic drugs | Number of generic medicines prescribed per patient encounter by a provider or at a facility | n/a |
| | Share of facilities with stockouts of essential medicines | HMIS |
| Medicines: Irrational use of drugs | Number of medicines prescribed per patient encounter by a provider or at a facility | n/a |
| Medicines: Sub-standard or counterfeit drugs | Share of medicines at a facility/ pharmacy that is sub-standard | n/a |

| | | |
|--|--|--|
| Healthcare products: Over-use of procedures, investigations, and equipment | Share of patient encounters for which a specific procedure is prescribed by a physician or at a facility | HMIS (cesarean section or certain laboratory tests) |
| Healthcare services: Sub-optimal quality of care and medical error | Share of patient encounters with medical errors | HMIS (post-operative surgical site infection rate) |
| Healthcare services: Inappropriate hospital size | Bed occupancy rate | n/a |
| Healthcare services: Inappropriate hospital admissions or length of stay | Length of stay | HMIS (share of women with institutional deliveries discharged in 48 hours) |
| Health system leakages: Corruption and fraud | OOP expenditure as gifts or bribes | n/a |

3.3 Summarizing the Data Gaps

Section 3.1 showed that the accessible data sources provide information only on a subset of a state’s health system. No data on pharmacies (public and private) in India are publicly available, while limited data are available for private practitioners and informal healthcare providers. Individual-level data for healthcare workers in public and private facilities are also missing. Data on private facilities are limited to those that choose to upload information on the HMIS. The absence of linkages between the demand and supply side data is another limitation, as is the availability of only state-level information in some of the data sources.

Section 3.2 highlighted that the existing surveys or monitoring mechanisms used to generate data often focus on select topics or illnesses, leaving a gap in terms of indicators that can be constructed and assessed. For example, the NFHS provides information primarily on child, maternal, and reproductive health. The HMIS reports several indicators on health services, especially for children and mothers, but none on some key inputs and processes in a facility. Also, no existing household survey in India asks questions related to citizen satisfaction. Similarly, no information on clinical effectiveness or patient safety is obtained from facilities or healthcare providers.

Both these barriers make the diagnosis of the causes of good or poor performance difficult. The narrow focus of surveys, often from the perspective of a specific group of individuals or health facilities, prevents analysts from identifying the determinants of the observed results. Analysis of the causes of CHE, a problem affecting a large proportion of the Indian population (Ambade et al., 2022), is a good case in point. Although the NSS, NFHS, and LASI have questions that help quantify the extent of CHE, the lack of information from the patient on disease severity, the number of medicines or tests prescribed, or branded/generic nature of medicines prescribed/taken

as well as no input on the issue from healthcare providers or pharmacies prevent disentangling variations in CHE to healthcare, health, social and other determinants (Haakenstad et al., 2022).

Further, the answer options provided to the multiple-choice questions in surveys are often restrictive and hinder the diagnostic process. An example is the answers to the questions on which healthcare provider a patient visited for an illness. The NSS aggregates the diverse set of healthcare providers in the country into 5 answer options – government/public hospitals, private hospitals, charitable/NGO/trust-run hospitals, private doctor/clinics, and informal healthcare providers (Haakenstad et al., 2022); making it impossible to separate what happens when a patient visits a lower-level versus higher-level public facility or a private pharmacy versus a traditional healer for care.

That is, there are three gaps in the available data. First is the complete lack of information on some performance goals such as citizen satisfaction and some aspects of quality of care (clinical effectiveness, patient safety). Second is the lack of sufficient indicators on some performance goals including efficiency. This gap is worsened by the lack of data at granular levels above the state. The third is the lack of detailed data essential for the diagnosis of the causes of poor performance in some goals like FRP and access.

Some of these data deficiencies can be overcome by conducting a systematic review of the literature on each performance goal. Instead of making data openly accessible, some data collection projects publish reports or journal articles, qualitative or quantitative, based on an evaluation of the primary data which can be identified using a carefully formulated search strategy. This is also likely to yield one-off studies conducted by government bodies on a specific topic.

However, it is difficult to find reliable studies that analyze primary data. Most original studies are based on small samples, chosen from one healthcare facility or one district, that are not representative of the population of interest. Moreover, the publication process introduces a lag in the timing of the data collection and public availability of the study, resulting in the dearth of updated information pertinent at the time of the assessment. Therefore, literature reviews, though helpful, do not necessarily fill in the data gaps. In a literature review conducted for West Bengal, we found no studies on citizen satisfaction or efficiency of private clinics or doctors, only one recent study on clinical effectiveness, and four studies assessing patient satisfaction, with very small samples (India Health System Project, 2022).

4 Recommendations for Filling in the Data Gaps

In this section, we discuss the different options that state governments can consider to supplement the existing information on their state's health system to conduct a good quality health system assessment. This is necessary to achieve the goal of designing reform options to address the areas of poor performance in their health system. Our recommendations aim to balance any expansion of a health system assessment with the resources necessary for it, thereby guaranteeing value from any investment undertaken.

Option 1: Use existing information for the health system assessment

A state government can decide to base its health system assessment on existing information only. This will involve the analysis of publicly available data along with findings from literature reviews. As noted above, the gaps in the data will lead to a weak assessment. However, some of these gaps can be filled in using data that the government has access to but is not publicly available. This does not involve any new data collection but concentrates on the utilization of government records by analysts to further the extent of the assessment.

Examples of such data in Indian states include detailed state health accounts, facility monitoring reports, administrative data on health insurance claims, disaggregated data on staff behavior, cleanliness, cost of treatment, and patient satisfaction from Mera Aspataal (MoHFW, 2022b), accounting and management records from public healthcare facilities and pharmacies, and data related to specific health schemes or programs. While the additional information will prove useful, certain deficiencies, especially in terms of limited private sector data on clinical quality of care, will continue to undermine the assessment.

Option 2: Selective data collection for a moderate health system assessment

A state government can choose to invest in the implementation of selective data collection efforts to obtain detailed information on one or two performance goals. In-depth knowledge of a goal will allow the critical examination of its determinants, which in turn will enable the formulation of targeted reforms. In such a situation, the choice of what data collection to prioritize becomes important.

Given the scant information on quality of care across the Indian states, gathering data on it is vital. Chart reviews in hospitals, especially those empaneled under government health insurance programs, can be easily undertaken to assess clinical effectiveness. Clinical vignettes can be an alternative in which healthcare providers, in the public and private sectors, are presented with pre-specified cases and their responses are noted to quantify the level of their knowledge and adherence to treatment guidelines can be an important addition to a health system assessment.

Fielding a brief household survey with questions on citizen satisfaction can also fill in a major gap in the data availability on a performance goal. Such a survey can be augmented with targeted questions on patient behavior to help diagnose the causes of

any poorly performing goal. For example, a few questions on the choice of healthcare providers, and medicine prescription/purchase can provide insights into why individuals experience low financial risk protection.

Another option is to survey healthcare facilities and/or providers, especially those in the private sector, to get a better sense of patient-centeredness and efficiency through multiple indicators such as absenteeism rates, productivity rates, irrational medicine prescriptions, and others. Implementing one or more of these data collection options can be a valuable addition to a health system assessment, especially if administered to correctly sampled patients and providers.

Option 3: Comprehensive health system assessment

The first two options can lead to reforms that bring about small and short-term changes to the health system. However, transformational policies that create a health system empowered to provide universal health coverage demand a comprehensive health system assessment. This involves fielding multiple comprehensive surveys that collect data from a wide range of stakeholders: individuals, patients, public and private sector facilities across different levels of care, including hospitals, nursing homes, and primary care facilities, individual providers at facilities, and engaged in solo practice, and private and public pharmacies. Triangulating findings across the surveys is important to understand health system performance from multiple perspectives with reliable, up-to-date data. This represents the new gold standard of health system assessment for the health system.

Although it is difficult to implement frequently or widely due to cost and time considerations, it can identify the critical problems in the state's health system and suggest reforms to address the fundamental causes of poor performance. An example of this option involving intensive data collection is the comprehensive study in Odisha in 2019-2020 conducted by the Harvard T.H. Chan School of Public Health (Yip et al., 2022). Using ten new field-based surveys, this project assessed the performance of Odisha's health system and diagnosed the underlying causes of its strengths and challenges from multiple perspectives. The project pinpoints the significant performance challenges in the state's health system and diagnoses the underlying causes of these challenges.

5 Conclusion

This report presents a review of the data that are available to conduct a state-level health system assessment in India. While several data sources exist, there is a shortage of accurate up-to-date data on all aspects and participants of a health system. Specifically, three barriers are identified in this report. First, is the complete lack of information on some performance goals such as citizen satisfaction, clinical effectiveness, and patient-centeredness. Second, is the lack of sufficient indicators on the performance goals for which some data already exists, particularly disaggregated at the district or sub-population levels. Efficiency, access, and patient satisfaction are examples. Third, for performance goals for which good indicators exist, there is a lack of detailed data to allow for a diagnosis of poor performance. For instance, various household surveys can allow us to quantify the extent of financial risk protection but not necessarily understand the dynamics around it.

Based on these shortcomings and the experiences of health system assessments in Odisha and West Bengal, we recommend three ways to expand the current availability of data to improve the quality of health system assessment in a state. The first is to supplement the publicly available data with data to which a state government has access. The second is to carry out a selective data collection effort to discover the causes of poor performance of one or two performance goals. The third is to conduct a comprehensive health system assessment that will expose the many challenges faced by a state along with ways to address them. An understanding of the objectives of the health system assessment, financial constraints, and political realities in a state is needed to figure out which recommendation is most apt.

Although the gains from the health assessment increase from the first to the third recommended options, the resources needed to conduct them also increase in the same direction. Keeping this tradeoff in mind, we provide basic estimates of the resources needed to implement the least resource-intensive and comprehensive options. The India Health System Project conducted a similar analysis in West Bengal using publicly available data, in consultation with the state government (India Health Systems Project, 2022). This required more than two months of full-time work by a junior researcher and two mid-level researchers under the supervision of the project lead. On the other end, was the comprehensive Odisha study with ten new surveys which engaged two senior researchers, three junior researchers, and three mid-level researchers for 12 months in addition to a data-collecting firm (Yip et al., 2022).

We recognize that the data availability and quality vary across states and therefore, this report should be considered in the context of each state's data landscape. We also acknowledge that this report highlights only data that is collected within five years of the publication of this report. Some of the data gaps we noted in this report can be filled in by the Ayushman Bharat Digital Health Mission (ABDM). With its vision of creating a national digital health ecosystem to foster universal health coverage in India, ABDM promises to provide health data, including de-identified health records, a health facility registry, a healthcare professional registry, and a drug registry, for academic and clinical research (NHA, 2022). Our review of existing data sources in the country offers

important suggestions for the platform in terms of performance indicators to make available, the level of data aggregation, and the frequency of data sharing to ensure the optimal use of the ABDM data for health system assessments. It also hints at potential improvements in the existing household surveys and other reporting mechanisms to support future health system assessment and research.

6 References

1. Ambade, M., Sarwal, R., Mor, N., Kim, R., & Subramanian, S. V. (2022). Components of Out-of-Pocket Expenditure and Their Relative Contribution to Economic Burden of Diseases in India. *JAMA Network Open*, 5(5), e2210040. <https://doi.org/10.1001/jamanetworkopen.2022.10040>
2. Bose, B. (2021). *A Guide to Assessing the Efficiency of Health Systems*. Report No. 27. India Health Systems Project, Harvard Chan School of Public Health.
3. Cooper, J. (2021). *A Guide to Assessing Access within Health Systems*. Report No. 25. India Health Systems Project, Harvard Chan School of Public Health.
4. Dinesh, A. S., Mathur, V., Ansil, B. R., Chandru, V., Chellam, R., Vanak, A. T., Ramakrishnan, U., & Rajagopal, P. (2020). Health Heatmap of India: An Open Data Platform. *Journal of the Indian Institute of Science*, 100(4), 701–716. <https://doi.org/10.1007/s41745-020-00196-z>
5. Haakenstad, A. (2020). *A Guide to Assessing Financial Risk Protection*. Report No. 24. India Health Systems Project, Harvard Chan School of Public Health.
6. Haakenstad, A., Kalita, A., Bose, B., Cooper, J. E., & Yip, W. (2022). Catastrophic health expenditure on private sector pharmaceuticals: A cross-sectional analysis from the state of Odisha, India. *Health Policy and Planning*.
7. India Health Systems Project. (2021). *Conceptual Report on Health Systems Performance Assessment*. Report No. 13. India Health Systems Project, Harvard Chan School of Public Health.
8. India Health Systems Project. (2021). *Odisha Health System Assessment Study*. Report No. 19. India Health Systems Project, Harvard Chan School of Public Health. <https://sites.sph.harvard.edu/india-health-systems/2021/04/02/odisha-findings/>
9. India Health Systems Project. (2022). *West Bengal Health System Assessment Study*. India Health System Project, Harvard Chan School of Public Health.
10. Indian Council of Medical Research (ICMR), Public Health Foundation of India (PHFI), and Institute for Health Metrics and Evaluation (IHME). GBD India Compare. (2020). *The India State-Level Disease Burden Initiative*. New Delhi: ICMR, PHFI, and IHME. <https://www.healthdata.org/disease-burden-india>
11. International Institute for Population Sciences (IIPS) and ICF. (2022). *National Family Health Survey (NFHS-5) 2019–21*. Mumbai: IIPH. <http://rchiips.org/nfhs/>
12. Institute of Medicine (IOM). (2001). *Crossing the Quality Chasm: A New Health System for the 21st Century*. National Academies Press (US). <http://www.ncbi.nlm.nih.gov/books/NBK222274/>

13. Kalita, A., Bose, B., Woskie. L., Haakenstad, A., Cooper, J. E., & Yip, W. (2022). Private pharmacies as healthcare providers in India's health system: Analysis and Implications for Universal Health Coverage. *BMJ Global Health*.
14. Kohn, L. T., Corrigan, J. M., & Donaldson, M. S. (Eds.). (2000). *To Err is Human: Building a Safer Health System*. National Academies Press (US). <http://www.ncbi.nlm.nih.gov/books/NBK225182/>
15. Millman, M. (1993). *Access to Health Care in America*. National Academies Press (US). <http://www.ncbi.nlm.nih.gov/books/NBK235882/>
16. Office of Registrar General & Census Commissioner, Ministry of Home Affairs (MoHA). (2021). *Sample Registration System*. New Delhi: Government of India. <https://censusindia.gov.in/census.website/node/294>
17. Office of Registrar General & Census Commissioner, Ministry of Home Affairs (MoHA). (2022). *India—Sample Registration System (SRS)-Statistical Report 2019*. New Delhi: Government of India. <https://censusindia.gov.in/nada/index.php/catalog/40526>
18. Ministry of Health and Family Welfare (MoHFW). . *Health Sector Financing by Centre and States/UTs in India [2015-16 to 2017-18]*.New Delhi: Government of India. <https://tinyurl.com/2p9b7caz>
19. Ministry of Health and Family Welfare (MoHFW). (2020). *Longitudinal Ageing Study in India (LASI)*. New Delhi: Government of India. <https://www.iipsindia.ac.in/content/LASI-data>
20. Ministry of Health and Family Welfare (MoHFW). (2022a). *HMIS-Health Management Information System*. New Delhi: Government of India. <https://hmis.nhp.gov.in/#/>
21. Ministry of Health and Family Welfare (MoHFW). (2022b). *My Hospital*. New Delhi: Government of India. <https://meraaspataal.nhp.gov.in/>
22. Ministry of Health and Family Welfare (MoHFW). (2022c). *National Health Profile: Central Bureau of Health Intelligence*. New Delhi: Central Bureau of Health Intelligence, Government of India. <https://tinyurl.com/2zjayajf>
23. Ministry of Statistics and Program Implementation (MoSPI). (2022). *National Sample Survey (NSS)* New Delhi: Government of India. <http://164.100.161.63/national-sample-survey-nss>
24. National Academies of Sciences, Engineering, and Medicine (NASEM). (2018). *Crossing the Global Quality Chasm: Improving Health Care Worldwide*.

25. National Health Authority. (2022). Ayushman Bharat Digital Health Mission. New Delhi: Government of India. <https://abdm.gov.in/>
26. National Health System Resource Centre (NHSRC). (2021). *Quality Darpan: An Update on National Quality Assurance Program*. <https://nhsrindia.org/quality-darpan-update-national-quality-assurance-program>
27. Reserve Bank of India (RBI). (2021, November 30). *Reserve Bank of India—State Finances: A Study of Budgets*. Mumbai: RBI. <https://tinyurl.com/bde6c7sf>
28. Roberts, M. J., Hsiao, W., Berman, P., & Reich, M. R. (2008). Assessing Health-System Performance. In *Getting Health Reform Right*. Oxford University Press.
29. Saurman, E. (2016). Improving access: modifying Pechansky and Thomas's theory of access. *Journal of Health Services Research & Policy*, 21(1), 36-39.
30. Selvaraj, S., Karan, A. K., Srivastava, S., Bhan, N., & Mukhopadhyay, I. (2022). India: Health system review. *Health Systems in Transition*, 11(1). <https://apps.who.int/iris/handle/10665/352685>
31. Vos, T., Abajobir, A. A., Abate, K. H., Abbafati, C., Abbas, K. M., Abd-Allah, F., Abdulkader, R. S., Abdulle, A. M., Abebo, T. A., Abera, S. F., Aboyans, V., Abu-Raddad, L. J., Ackerman, I. N., Adamu, A. A., Adetokunboh, O., Afarideh, M., Afshin, A., Agarwal, S. K., Aggarwal, R., ... Murray, C. J. L. (2017). Global, regional, and national incidence, prevalence, and years lived with disability for 328 diseases and injuries for 195 countries, 1990–2016: A systematic analysis for the Global Burden of Disease Study 2016. *The Lancet*, 390(10100), 1211–1259. [https://doi.org/10.1016/S0140-6736\(17\)32154-2](https://doi.org/10.1016/S0140-6736(17)32154-2)
32. World Health Organization (WHO). (2010). *The World Health Report 2010*. <https://www.who.int/publications-detail-redirect/9789241564021>
33. World Health Organization WHO. (2022). *Financial protection*. World Health Organization. <https://www.who.int/health-topics/financial-protection>
34. Woskie, L., & Irani, M. (2021). *A Guide to Assessing the Quality of Care: Patient Centeredness & Safety Culture*. Report No. 26. India Health Systems Project, Harvard Chan School of Public Health.
35. Yip, W., Kalita, A., Bose, B., Cooper, J., Haakenstad, A., Hsiao, W., Woskie, L., & Reich, M. R. (2022). Comprehensive Assessment of Health System Performance in Odisha, India. *Health Systems & Reform*, 8(1), 2132366. <https://doi.org/10.1080/23288604.2022.2132366>