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India's Healthcare Industry: A System Perspective

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India's Healthcare Industry: A System Perspective

Abstract

To western readers, analyzing a new healthcare system in the East might seem daunting. Indeed, it takes some of us decades to master an understanding of the healthcare system of our country of origin. Nevertheless, there are several methods for approaching an analysis of another country's healthcare system. These include exposition of some (hopefully) invariant principles regarding healthcare that apply across contexts, analysis of what a system of health might look like, comparison with the US system (with which many are already familiar), comparison with other emerging systems such as that of China, application of existing frameworks for healthcare system analysis, appraisal of the major transitions underway in the country's demographic, socioeconomic, political, and epidemiologic profile, and an analysis of the country's public health issues. The chapter analyzes India's healthcare system using each of these methods.

Disciplines

Business Administration, Management, and Operations | Health and Medical Administration |
Management Information Systems | Marketing | Organizational Behavior and Theory

India's Healthcare Industry

A System Perspective

Lawton Robert Burns

Introduction: A system perspective

To western readers, analyzing a new healthcare system in the East might seem daunting. Indeed, it takes some of us decades to master an understanding of the healthcare system of our country of origin. Nevertheless, there are several methods for approaching an analysis of another country's healthcare system. These include exposition of some (hopefully) invariant principles regarding healthcare that apply across contexts, analysis of what a system of health might look like, comparison with the US system (with which many are already familiar), comparison with other emerging systems such as that of China, application of existing frameworks for healthcare system analysis, appraisal of the major transitions underway in the country's demographic, socio-economic, political, and epidemiologic profile, and an analysis of the country's public health issues. The chapter analyzes India's healthcare system using each of these methods.

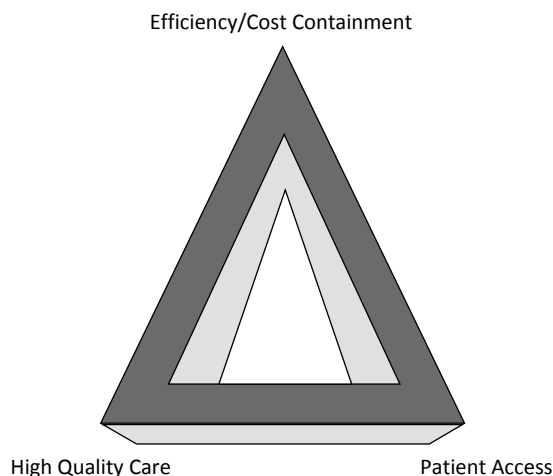
Some invariant principles of healthcare systems

The iron triangle

One way to analyze a healthcare system is in terms of a set of principles that are (or at least seem to be) invariant across cultural contexts. One such principle is the "iron triangle" depicted in

Figure 1.1. The logic of this triangle is that there are inevitable societal trade-offs in pursuing any of the goals (vertices) in the triangle.¹ If the triangle is an equilateral triangle, and thus each angle is 60°, policy initiatives that expand one angle beyond 60° force one or both of the other two angles to contract below 60°. Thus, efforts to promote access to care (e.g., via insurance coverage) will lead to higher demand for care, rising utilization, and higher costs. Similarly, efforts to promote quality by virtue of enabling access to modern technologies (drugs, medical devices and equipment) will also likely raise costs. Determining the right thrust and mix among the three angles constitutes the balancing act in resource allocation faced by most countries.

Figure 1.1: The Iron Triangle of Health Care: Balancing Act among Intermediate Outcomes



Source: Author.

Perhaps no country allocates equal attention to all three goals in the manner of an equilateral triangle. Indeed, healthcare policy in the US has alternated its focus and attention across these three angles since the late 1920s. In the 1960s, policy-makers focused on expanding access to healthcare services via broader insurance coverage by enacting the Medicare and Medicaid programs (to cover the elderly and poor, respectively). In subsequent decades, the policy focus shifted to cost containment to deal with the rising utilization and cost of services that naturally followed from expanding access to insurance for population segments with greater need for healthcare services. During the past decade, policy-makers have devoted more attention to quality via such initiatives as pay for performance (P4P), value-based purchasing (VBP), accountable care organizations (ACOs), and “never events” (reimbursement withheld for controllable adverse events in hospital episodes).

India faces challenges in pursuing each of these three goals.² With regard to *cost*, nearly 70 percent or more of all healthcare is financed out of pocket by the population. There is little health insurance or other forms of risk pooling, little regulation and accountability of providers, and a predominance of fee-for-service payment, all of which are associated with high costs.

There is also questionable efficiency of the roughly 30 percent of healthcare system financed by government sources, and great distrust of the public sector overall.

With regard to *quality*, there is little regulation of providers, treatments, and medical products (often from spurious sources), considerable variation in the training and education of providers, and little enforcement of laws and regulations at the state level. There is also evidence of poor health outcomes among the Indian population. Compared to the rest of the world, India ranks low on such indicators as infant mortality and life expectancy at birth; while much progress has been made since independence in 1947, the nation still lags behind other developing countries.³

With regard to *access*, a substantial majority of the population dwells outside of the cities where most healthcare facilities exist. Access is also particularly problematic for the poor, the low-income population, women, and marginalized groups. Inadequate roads and transportation systems limit proximity to healthcare facilities, further compromising access. An estimated 10 percent of hospitalization costs go toward lodging of the patient and his/her escort, transportation, and personal medical supplies; data from 2001–02 suggest that such costs comprise as much as 25 percent of private out-of-pocket spending (see Chapter 3).⁴ The provision of health insurance thus requires adequate supply of delivery sites near insured patients (to offset lost wages and the large travel and lodging costs incurred). Huge variations also exist in the population's access to healthcare across India's states. In terms of illness and disease, India accounts for a large share of the global burden of maternal deaths (19 percent), undernourished children (33 percent), neonatal deaths (29–30 percent), under-vaccinated children (37–44 percent), leprosy (50 percent), and tuberculosis (25–26 percent).⁵

Countries like the US and India face similar “iron triangle” trade-offs in sectors other than healthcare. For example, in the policy domain of energy, countries must balance their need for low-cost and efficient energy (cost angle) with low-emission and green energy (quality angle) and with rising demand and sustainable energy (access angle).

The balancing acts here seem formidable. Most economists believe that it is impossible to achieve all three goals simultaneously and, thus, that trade-offs must be made.⁶ After all, marketing executives believe that in order to position their product against the offerings of competitors, they must excel on one dimension (product cost, quality, or service) and seek parity on the other two. Optimization on all three is rarely considered (and is more rarely observed).⁷ Nevertheless, there have been periodic efforts in the US to pursue all three goals, usually in the context of national healthcare reform. The Health Security Plan (better known as the Clinton Health Plan) sought to do all three; more recently, the Patient Protection and Affordable Care Act (PPACA, better known as ObamaCare) is likewise seeking to achieve all three. Underlying the new reform is “the triple aim”: improved quality, reduced cost, and improved “population health” (accomplished partly by enabling access to preventive services).⁸ The jury is out regarding whether the triple aim is achievable, although there are organizations (IHI) actively involved in training providers on how to do so. Even its proponents recognize, however, that while the three goals are interdependent, sometimes they are negatively associated with one another (i.e., trade-offs are required).

This discussion is pertinent to India's healthcare system and subsequent chapters in this volume because there are at least two efforts underway on the subcontinent to solve the iron triangle in the delivery of healthcare services. First, medical tourism holds out the promise of high quality, lower cost, and more accessible care compared to what patients in other countries can find (see Chapter 6). Second, some specialty hospitals in India appear to achieve all three goals in providing care to the "bottom of the pyramid" (see Chapter 11). These hospitals are profiled here in Chapter 6 (Narayana Hrudayalaya) and Chapter 7 (Aravind Eye Care).

Market failure

Other principles observed in the US healthcare system also likely apply to India and elsewhere. These include the principle of market failure: that is, the features of markets described in economic textbooks are not found in the healthcare industry and thus inhibit efficient operation of supply and demand. These features include lack of price information and pricing transparency; lack of data on product quality; the resulting inability to assess the comparative value (defined as quality divided by cost) of products and services; asymmetric information between providers and consumers; imperfect agency relationships between physicians and their patients; the heavy role of government as both a buyer and regulator; and moral hazard flowing from insurance coverage leading to distortions in market efficiency.

Principles inherent in healthcare reform

Several principles emanating from healthcare reform efforts around the world may comprise an additional set of invariant principles. These include the reality of ever-rising healthcare costs (driven by population demographics and technological improvements, among other factors), rising public expectations from healthcare (driven by economic growth and rising national incomes, as well as increased global travel and immigration), the limited capacity of nations to afford the growing demand of their populace for increasingly expensive healthcare, and increased skepticism regarding traditional methods of organizing and managing healthcare finance and delivery (e.g., the breakdown of centrally planned systems, as well as the recognition of market failures).⁹

Healthcare system defined

A second way to study another country's healthcare system is through formal definitions. The phrase "health system" is widely used in the discourse on global health (e.g., health systems strengthening) but enjoys no agreed-upon definition.¹⁰ "Health system" actually combines two nebulous terms. The first is "health." According to the World Health Organization (WHO), health is "a State of complete physical, mental, and social well-being, and not merely the

absence of disease and infirmity.”¹¹ Health has also been defined as an important capability “that enables individuals to pursue things they might value.”¹² There are as many indicators of health as there are definitions. These include life expectancy at birth, infant mortality rates (IMRs), the percentage of children underweight, the percentage of women with body mass index (BMI) below 18.5, quality-adjusted life years (QALYs), and disability-adjusted life years (DALYs). Comparative, historical data suggest that India has lagged behind other developing countries (e.g., China, Brazil) on many of these indicators. Getting a comprehensive picture of a country across lots of indicators is impossible and probably futile. The US, for example, is commonly lambasted for ranking relatively poorly among developed countries on infant mortality; on other indicators, however, such as cancer survival, the US ranks quite highly.

The concept of a “system” is also rather elusive. Piecing together definitions from several dictionaries, we might define a system as a whole comprised of several interdependent parts that have differentiated roles, are interconnected by three processes (input, throughput, output), and are thus integrated in a holistic fashion. Such a comprehensive definition begs the question: does any country have a “system” of healthcare? The payer, provider, and producer components found in any country’s healthcare industry are surely interdependent and interconnected (in the sense of serving one another as buyers and suppliers). But are they really integrated? And do they commonly focus on the provision of “health” as defined above?

The answer to both questions is likely “no.” There are few collaborative partnerships between these sectors in the US.¹³ As noted earlier, there are huge disconnects between them in terms of their goals and incentives. Moreover, these sectors are commonly oriented to funding and delivering acute *care*, rather than promoting the *health* of the population. The latter would require greater emphasis and funding of prevention, healthcare promotion, and public health activities. Health, as defined in this section, is typically left to the public health system in most countries. What, then, does the US have if not a system that delivers health? The reality more closely resembles a collection of public- and private-sector entities (e.g., firms, individuals, governmental bodies, professional associations) that pursue their individual interests, pursue one or more of the goals in the iron triangle, and may or may not interact with the patient.

Harvard University researchers define a healthcare system in a similar fashion as the collection of institutions and actors who provide healthcare (e.g., doctors, nurses, hospitals, pharmacies, traditional healers, etc.); the organizations that provide specialized inputs to the providers (e.g., training schools, manufacturers of products); the financial intermediaries, planners, and regulators who control, fund, and influence the providers (e.g., insurers, government agencies, regulatory bodies); the organizations that offer preventive services; and the financial flows that finance the provision of healthcare.¹⁴

WHO defines a healthcare system more simply but more broadly as “all of the activities whose primary purpose is to promote, restore or maintain health.”¹⁵ In addition to the list of actors and institutions mentioned throughout this section, this definition of a healthcare system also includes health-enhancing interventions such as road improvements and environmental safety efforts. It also includes the efforts of informal healthcare givers in the home, behavioral change interventions conducted by employers, and efforts to promote female education.

The WHO explicitly acknowledges that their system definition does not imply any degree of integration among the activities and services performed.

US versus India: Convergences and divergences

A third method to approach another country's healthcare system is by way of comparisons and contrasts with one's own. There are a few commonalities at the national level worth noting. The US is one of the world's oldest democracies, while India is the largest. Both are distinguished by decentralized systems of healthcare financing and ownership; both are currently seeking to simultaneously reform their financing and delivery systems; and both need a concerted effort by their federal and state governments, along with considerable help from the private health-care sector, in order to accomplish this reform. Both systems focus on the treatment of disease rather than the promotion of health. Finally, both are witnessing a comeback of complementary and alternative medicine that formed the roots of their earlier healthcare delivery: for example, homeopathy in the US, ayurveda in India.

As noted in the Preface, healthcare systems in rapidly developing countries like India bear a number of remarkable similarities with the US context (see Figure 1.2). Both countries (indeed, most countries around the world) worry about managing the iron triangle of healthcare: i.e., the difficulty in simultaneously pursuing the three goals of controlling healthcare costs while also expanding health insurance access to the population and improving the quality of care – for example, by ensuring access to new technologies and medicines. The affordability of healthcare is a common concern, especially with high and rising costs of hospitalization being a cause of impoverishment and personal bankruptcy in both countries.

There is also a common concern with geographic variations in healthcare spending, whereby more money is spent in some regions than in others (e.g., rich versus poor states, urban versus rural areas); there is the parallel concern with geographic disparities in health status (which may

Figure 1.2: India and US: Convergences in Healthcare Systems

- Concern with Iron Triangle
- Affordability of health care
- Concern with high hospital costs as cause of impoverishment/bankruptcy
- Concern with geographic variations in spending
- Concern with geographic disparities in health status
- Concern with conflicts of interest and supplier-induced demand
- Concern with lifestyle issues and behaviors
- Preference for private sector provision of health care
- Need for investment in primary care system
- Fee-for-service payment system
- Mixture of financing mechanism: government, employer, individual
- Fragmentation between federal and state government similar to Medicaid
- Low consumer literacy and information
- Local governments have competing priorities: education, social services, health care

Source: Author.

or may not result from spending variations). Another common concern is that the population's lifestyle and personal behaviors contribute to chronic illness and increase healthcare spending. There is a common concern with supplier-induced demand – that providers overprescribe and overtreat as one means to increase their incomes – and the conflicts of interest that providers have with one another (e.g., incentives and kickbacks for referrals) and with product manufacturers whose products they may be incented to (over)use. For example, there is evidence that private-sector physicians in India prescribe more drugs than their public-sector counterparts, and that C-sections occur three times more frequently in private than public hospitals.¹⁶ There is also a common preference among the populations in both countries for care delivered in private-sector over public-sector facilities; an estimated three quarters of the Indian population prefer treatment in private hospitals (better staffing and equipment, higher-quality care, shorter waiting periods), although over 60 percent of all hospitals are publicly owned (see Chapter 3).¹⁷

There are numerous other similarities between the US and India. Both operate a fee-for-service system to reimburse providers. Both also include a mix of financing mechanisms that include payments from the federal government, state governments, employers, and individuals. As a result, both feature fragmentation between federal and state government efforts, and contend with the reality that state governments have many competing priorities for their limited budgets (e.g., education, social services, healthcare). Both desperately need to develop and invest in a broader capacity for primary care delivery (in terms of numbers and accessibility of providers), and both must confront a low degree of consumerism in getting their populations to take better care of themselves.

Despite the evident similarities, there are important differences in the details between the two countries.

- The US spends over 17 percent of GDP on healthcare, with wide spending variations across geographic regions (as reported in the Dartmouth Atlas). Concerns over geographic variations in the US stem from parallel concerns with overutilization and wasted resources. India spends barely 4 percent of GDP on healthcare. In India, geographic variations are framed as issues of societal inequities in resource allocation and access to healthcare.
- Compared to the US where government accounts for nearly half of national health expenditures, central and state governments in India account for little more than one-fourth of the total spent on healthcare.
- In the US, most of the population has health insurance; as a result, the fee-for-service issues deal with the volume-driven incentives of physicians and hospitals. In India, by contrast, there has been little insurance coverage until only recently (see Chapter 10); fee for service characterizes not only how providers get paid but also how most of the population pays for health services (with huge out-of-pocket expenditures).
- In the US, the primary care movement argues for patient-centered medical homes (PCMHs) that augment the solo physician's office with information technology (e.g., an electronic medical record) and physician extenders (e.g., nurse-practitioners). In India, by contrast, the concern is with the low-level and variable (and sometimes nonexistent) training of primary care practitioners outside of major cities, as well as regulatory

impediments in the use of nonphysician personnel (e.g., nurses are not allowed to give intravenous injections or prescribe medicines).¹⁸

- In the US, consumerism is focused heavily on getting people to respond to financial incentives (e.g., through cost sharing), to utilize information on provider costs and quality in their provider search and purchasing decisions, and to change their lifestyles. In India, by contrast, consumerism is much more basic: it seeks to address the low level of literacy as well as the lack of information among the population regarding the availability of healthcare services (as well as healthy behaviors).
- Finally, the hospital and insurance sectors in the US have suffered stagnating growth for the past decade; in India, by contrast, these two sectors are booming.

Beyond these differences in institutional details, there are several divergences between the two countries' healthcare systems (see Figure 1.3). These divergences cover financing, delivery, and regulation. In contrast to the US, (a) India has spent very *little* per capita on healthcare; (b) its government (at least until recently) accounted for a *decreasing* share of national spending on healthcare, while out-of-pocket costs represented a *rising* proportion of total healthcare spending; (c) the central government has a weakly developed role in healthcare financing and regulation; (d) there are no powerful, centralized purchasers of healthcare dealing with providers; (e) there has been (at least until recently) little private or public health insurance coverage, and what coverage is provided lacks depth; (f) there are only weakly developed governance mechanisms overseeing providers' behavior, with resulting concerns dealing with overutilization; and (g) there is only a weakly developed system of outpatient care.

Figure 1.3: India vs. US: Divergences in Healthcare Systems

- Low vs. High spend per capita on healthcare
- Falling vs. Rising government spend as percent of NHE
- Rising vs. Falling out-of-pocket spend as percent of NHE
- Absence vs. Presence of private health insurance
- Low vs. High depth and breadth of insurance coverage
- Absence vs. Presence of centralized purchasers
- Weakly vs. Strongly developed role of central government in healthcare
- Weakly vs. Strongly developed governance mechanisms to monitor providers
- Weakly vs. Strongly developed measures of utilization, appropriateness of care
- Weakly vs. Strongly developed system of outpatient care

Source: Author.

China, India, and other emerging countries

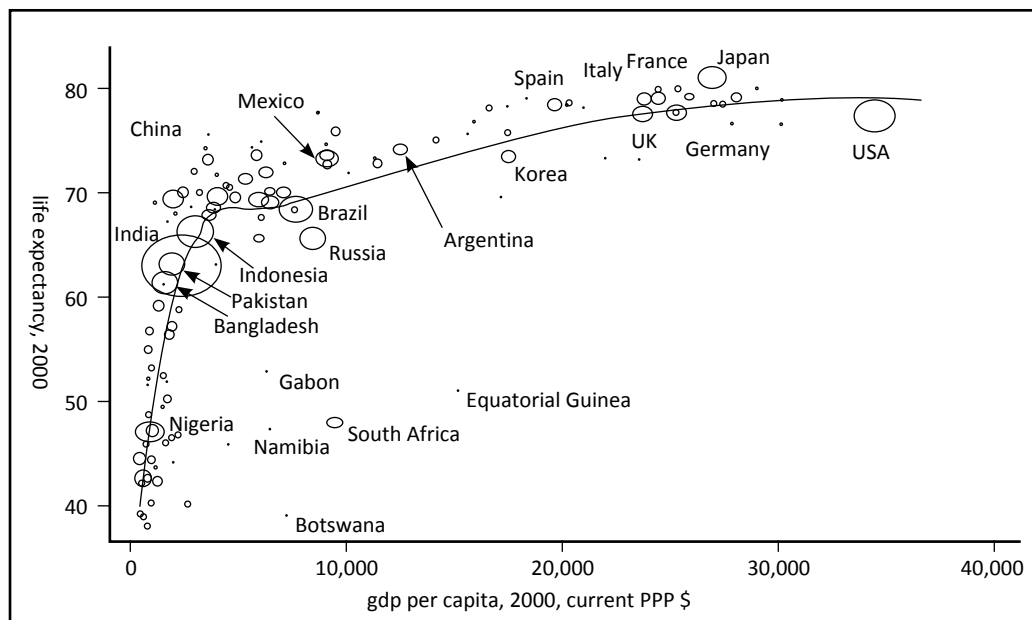
A fourth approach to understanding the healthcare system in India is by comparison with other emerging countries. In each of these countries, the government lacks the infrastructure to levy taxes on workers in the large informal sector of the economy. This limits the tax base (which is relatively low compared to GDP) and thus the public funds available for healthcare

investments. Cultural issues and the lack of political will prevent efforts to redistribute what is collected. Moreover, raising tax rates on workers in the formal sector may drive more employment into the informal sector. To the degree that public funds are invested in healthcare, they tend to go toward large public hospitals in urban areas and smaller primary care-oriented clinics in rural areas. Both are poorly capitalized, are poorly staffed and equipped, and offer poor access with long waiting times. Most patients pay for healthcare out of pocket, and often pay providers “informal payments” for better treatment and greater access.

We can draw these analyses more sharply by comparing India and its neighbor China. Both countries have largely rural populations, but rapidly growing economies and rising demand for healthcare services. As a result, both countries have lacked until now widespread insurance coverage and access to affordable primary and specialty care, are increasingly concerned with the rising costs of healthcare, and are witnessing rising healthcare costs as a significant cause of impoverishment. Nevertheless, both countries spend a small percentage of their GDP on healthcare. In addition, both countries are located on the upward sloping portion of the Millennium Preston curve, which depicts the association between GDP per capita and life expectancy (see Figure 1.4). Both India and China can be expected to move up this curve as their GDP grows; the US is an outlier.

Indian states can be arrayed along a similar curve: states with higher per capita incomes also exhibit higher life expectancy at birth.¹⁹ The logic behind the association depicted in the curve is straightforward. Increased societal wealth can be channeled to greater investments in education, literacy, and public health, as well as purchases of health insurance and healthcare services that improve health status and longevity. The curve suggests that further improvements in

Figure 1.4: The Millennium Preston Curve



Source: <http://download.thelancet.com/journals/lancet/article/PIIS0140673606697468/images?imgid=gr6>.

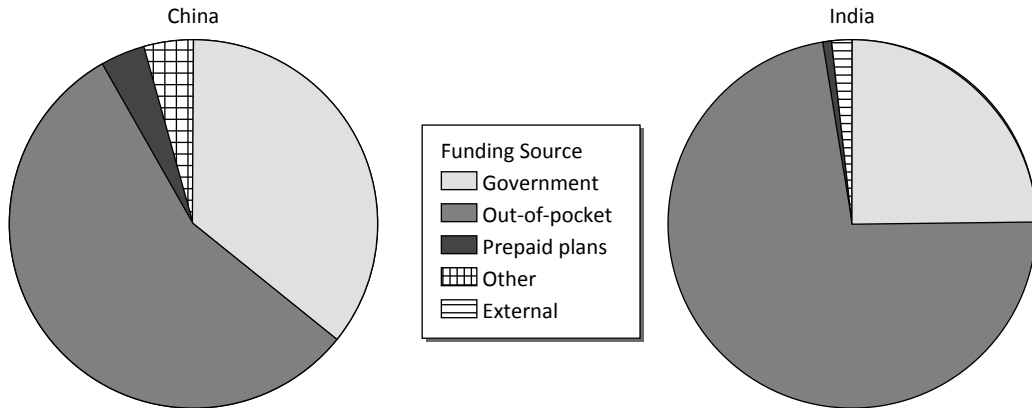
health status (i.e., reduced mortality) may be achieved in these developing countries by greater societal spending on healthcare as a percentage of GDP.

Box 1.1: Why does the Millennium Preston curve quickly bend and begin to flatten out?

Not all spending is productive toward the end of greater longevity. Recent research suggests that greater spending on “home run” technologies and treatments – that is, those that are cost-effective and useful for nearly all patients in the population, such as antibiotics for bacterial infections, aspirin and beta-blockers for heart attack patients, antiretroviral drugs for patients with HIV/AIDS, improved health behaviors – contributes the most to improved health outcomes and survival. Greater spending on potentially cost-effective technologies with heterogeneous benefits across patients (e.g., angioplasties with stents, imaging tests, antidepressants, Cesarean sections) can also improve productivity and health but with rapidly diminishing returns as more of the population uses these treatments. Finally, greater spending on technologies with modest or uncertain effectiveness (e.g., arthroscopic surgery for knee osteoarthritis, referrals to specialist physicians, vertebroplasty, intensity-modulated radiation therapy for prostate cancer) is likely to result in only marginal health improvements while substantially increasing costs.²⁰

Both India and China emerged out of the chaos of World War II and have constitutions that define healthcare as the responsibility of the provincial states, which have many duties and inadequate funds to perform them. Both countries have divided public responsibility for healthcare between the federal government (regulation and a relatively low level of financing) and state/provincial governments (financing and provision of care). Both governments assume a small share of total healthcare spending and require their populations to bear a huge percentage of total healthcare costs by paying out of pocket for services (see Figure 1.5). The bulk of public funding goes for wages and salaries of employees in public facilities (an estimated 70 percent of public budgets in India), in lieu of the financing of technologies or advanced services (12 percent of budgets for drugs and supplies, 8 percent for machinery and equipment in India).²¹ There is thus little money available to actually target health conditions. Both countries also feature a three-tiered structure of healthcare delivery to a largely rural population (e.g., subcenters at the supra-local level, primary health centers at the local level, and community health centers and hospitals at the district and small city level). In both countries, providers are paid primarily on the basis of fee for service, have incentives for overutilization and problems of induced demand, receive informal payments from patients, and face issues of corruption in the management of public hospitals. And in both countries there is the “double disease burden” of communicable and noncommunicable diseases to tackle among the increasingly affluent urban population.

There are several important institutional differences between the two countries, however. China has placed greater emphasis on the public-sector provision of healthcare services, as evidenced by the high percentage of beds found in public hospitals; by contrast, India has a more developed private sector of delivery and more private investment in public hospitals. China’s

Figure 1.5: Health Care Financing Structures in China and India in 2005

Source: Ma and Sood, *A Comparison of the Health Systems in China and India* (RAND, 2008).

government has also pursued more public financing of healthcare and wider population coverage via public insurance schemes, has set prices that private-sector providers can charge, and has a more developed regulatory apparatus (although with weak enforcement). In contrast to India, China has also increased its healthcare spending as a percentage of GDP at a faster rate since the mid-1990s. China's system also features a more developed system of primary care, and a tiny private sector in the provision of services. In contrast to China, however, India has benefitted from greater involvement of international donors (e.g., World Bank, International Monetary Fund, Gates Foundation, Clinton Foundation) in the direct financing of services and in supporting healthcare reforms (e.g., encouragement of partnerships with the private sector). China has also made a sustained commitment to disease eradication among the young and pursued policies backed by resources and social mobilization, unlike India.²² Finally, China embarked on economic reforms a full decade earlier than India (1980s versus 1990s), giving China a head start on economic growth and attraction of foreign direct investment (FDI).

All of these differences manifest themselves in divergences in the health statistics of the two countries, according to WHO. India's IMR (47 per 1,000 live births; 2011 data) is more than twice that of China; the mortality rate for children under 5 years of age (61 per 1,000 live births; 2011 data) in India is also double that of China. The percentage of the population that is fully immunized in India (estimates ranging from 53 percent to 67 percent) falls below that of China (84 percent). Likewise, the percentage of births by skilled attendants in India (estimates ranging from 43 percent to 58 percent) is roughly half of the percentage achieved in China (97 percent).²³

There are also important demographic differences between the two nations. Unlike China, India did not impose family planning restrictions on its population. China thus has an older population than India, whose young citizens represent a quickly increasing proportion of the population (see Figure 1.6): 28 percent of India's population is 0–14 years old, while only 8.1 percent are 60+ years old (2011 data).²⁴ India thus faces issues dealing with the unmet need for contraception and the need to ensure access to maternal, adolescent, and child care.²⁵ For its

Figure 1.6: Age Distributions in China and India

Source: RAND, *China and India: The Asian Giants are Heading Down Different Demographic Paths* (2011).

part, China has a lower “dependency ratio” – defined as the percentage of nonworking population to working population (42 percent versus 60 percent in India).²⁶ China has a more literate population (due to its focus on primary education versus India’s focus on advanced education) that allows healthcare promotion to be more effective. These factors among others contribute to China’s lower mortality rates and higher life expectancy.

Frameworks for analyzing healthcare systems

A fifth way to approach a new healthcare system is through analytical frameworks. There are multiple frameworks one can use to analyze a country’s healthcare system.²⁷ An early framework is the “Actors” framework, which classifies four major actors in a health system: providers, payers, regulators, and the population served. Another is the “Funds Flow and Payment” framework, which identifies seven major subsystems of financing (e.g., out of pocket, private reimbursement and public reimbursement).²⁸

One widely used framework is the analysis of a country’s “national health accounts” (NHA). These accounts rigorously classify the types and purposes of all expenditures made by/to all the actors in a healthcare system. Stated more simply, the accounts depict the sources and destinations of all healthcare spending in that country. Sources include government (both federal and state, and by public program) and nongovernment (employers, community insurance schemes, individual payments out of pocket); destinations include hospitals, physicians, dentists, retail pharmaceuticals and other products, public health, construction, etc. An NHA scheme allows for ongoing analysis of time trends in these money flows, which can serve as the basis for performance appraisal and stewardship. The Centers for Medicare and Medicaid Services (CMS) maintains these data for the US over time. The Organisation for Economic

Co-Operation and Development (OECD) has developed an International Classification for Health Accounts to facilitate international comparisons.²⁹ The Indian government, through its Ministry of Health and Family Welfare (MoHFW), has occasionally developed and published the country's national health accounts; these data are analyzed in Chapter 3.

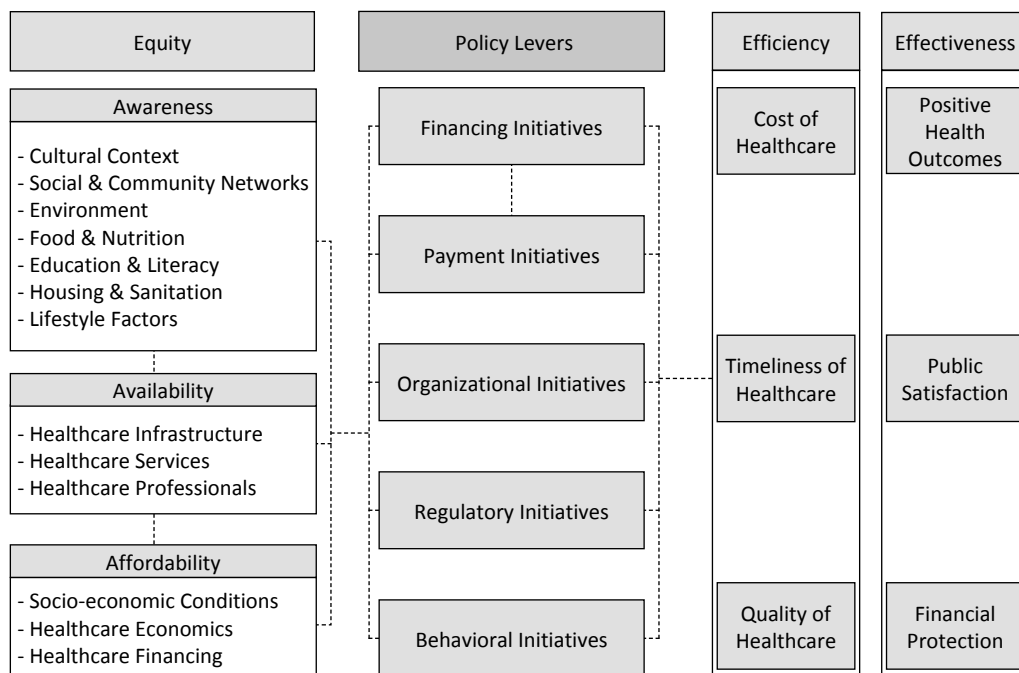
The NHA scheme itemizes investments at the country level, and typically focuses on the investments undertaken by that country. In contrast, developing countries often are also the recipient of investments and income transfers from outside organizations and donors to tackle specific problems. The "health systems strengthening" framework tracks the activities and investments undertaken by different donors/funders to strengthen specific system components.³⁰ These investments are typically designed to make changes in the healthcare system and accomplish certain system goals. The components targeted include "health services" (staffing infrastructure, operational support systems), the "financing system" (e.g., health financing policies and legislation, resource generation, fund pooling, provider reimbursement system), "monitoring/evaluation and information system" (data analysis and reporting, disease surveillance), and "stewardship and governance" (e.g., planning, priority setting, management).

Another method to analyze healthcare systems is to examine what they do: that is, what functions they perform and what objectives they pursue. Functions include the creation of resources and inputs (investments, training), stewardship (oversight) of these resources, financing (pooling and purchasing), and the provision (delivery) of services. Objectives served include the production of health, fairness, and responsiveness to societal expectations.³¹ Thus, for example, one framework analyzes the interplay between four functions (regulation, financing, resource allocation, and service provision) and four key actors (government, providers, payers, and patients).³²

A complementary approach is to categorize the country's healthcare priorities (e.g., the various initiatives and interventions to reduce the disease burden in the population), the types of provider organizations and incentives given them to deliver the interventions, the other resource inputs required to achieve these initiatives (budgets, manpower, technology), and the specific financing mechanisms (e.g., revenue collection, pooling, purchasing).³³

WHO has described the framework of a healthcare system in terms of its basic building blocks. These include service delivery of effective, safe, quality personal and nonpersonal interventions; a health workforce that is adequate in numbers, competently trained, and fairly distributed; a health information system that produces, analyzes, and disseminates reliable and timely information; medical products and technologies that are safe, efficacious, cost-effective, and accessible; a financing system that raises adequate funds to ensure the population can use needed services and is protected from financial catastrophe; and governance and oversight of the above.³⁴ All six building blocks are viewed as essential for improving health outcomes.

Researchers at the World Bank and the WHO have developed another framework ("Control Knobs") that analyzes the policy levers that can be used to impact the intermediate outcomes of cost, access, and quality (the vertices of the iron triangle) and hopefully the ultimate outcomes of improved health status, protection from the financial risks of illness, and consumer satisfaction.³⁵ These policy levers – the financing, payment, organizational, regulatory, and behavioral initiatives – are themselves conditioned by the country's economic, social, and cultural context

Figure 1.7: Policy Levers, Intermediate Outcomes, and Ultimate Ends of a Health System

Source: Hsiao (2003).

(see Figure 1.7). Such a framework is helpful for understanding the broader societal and regulatory constraints within which a healthcare system operates.

As an illustration, we can apply a portion of Figure 1.7 to explicate some of the issues facing India's healthcare system. Looking at the left-hand column, the historical context that both directs and constrains policy initiatives includes the de-emphasis on public health, the location of health as the responsibility of the state, and a two-tiered system that segregates the mass of the (poor) population in public and rural facilities from the largely urban-based middle and upper classes, who utilize private facilities. The cultural context includes the class system of scheduled castes (SCs), scheduled tribes (STs), and other backward castes (OBCs), who face limited access to urban and private healthcare services. This system also finds its expression in a select group of physicians receiving training in and practicing allopathic medicine, while other classes practice and deliver more traditional forms of healing. The cultural context also includes lower status of women, who face restricted access to healthcare services, as well as India's rich variety of festivals, which run for days and include overeating and reduced access to and utilization of providers. Social and community networks, such as the role of grandparents in the nuclear family and the use of *bais* (family helpers, e.g., for parents with dementia), provide an informal system of care, which substitutes for organized initiatives in home health and long-term care. Community networks have also facilitated the formation of voluntary insurance schemes that have widely expanded coverage for catastrophic care. Finally, the system is shaped by environmental factors, such as the prevalence of infectious diseases, which led governmental health

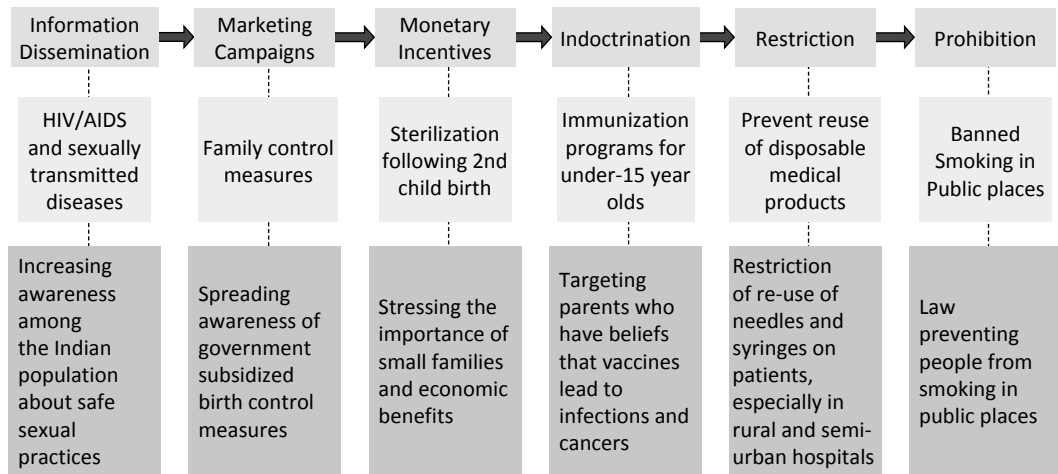
policy following the independence to orient around “vertical health programs” to deal with such diseases on an individual basis rather than develop a comprehensive public health approach.

Looking at the next column in Figure 1.5, we see that India is also hampered in terms of the “policy levers” at its disposal to change the system. With regard to financing, India spends roughly 4 percent of its GDP on healthcare, and only about \$54 per capita (2010 data, current US dollars) or \$132 per capita (2009 data, adjusted for purchasing power parity). The vast majority of healthcare expenditures (ranging from 67 percent to 70 percent over the last few years) are paid out of pocket by the population, whereas the government accounts for only 30–33 percent.³⁶ While there is an emergent microinsurance and private insurance sector, there is little means to finance broader access to healthcare. With regard to payment, as noted above, India has a fee-for-service system that is regulated and monitored less than in the US. Providers typically set their own prices in the absence of national fee schedules and bargaining from central purchasers of care. Among physicians, there is also little price (fee) transparency, few medical audits, deficiencies in accountable record-keeping, and meager standard setting.³⁷ With regard to organization, most providers work in the private sector and are not employed by hospitals or other large firms. While a large percentage of beds are publicly provided, the population prefers the private sector. With regard to regulation, there has been little regulatory oversight and even less enforcement. Regulatory structures are relatively underdeveloped and diffused across central and state governments. For example, there are few efforts at mandatory registration, accreditation, and credentialing of providers, little in the way of regular service evaluations, and substandard quality control. There is also wide variation among hospitals (even in the private sector) regarding availability of equipment, record-keeping, and staffing.³⁸ Finally, with regard to behaviors, there is little consumerism, little professional self-control, and monitoring, and few effective educational campaigns due to the low literacy of the population. Figure 1.8 describes some of the government’s initiatives.

Of course, the model depicted in Figure 1.7 suggests a one-way causation that is likely inaccurate. Not only are the intermediate and ultimate outcomes of a healthcare system impacted by macroeconomic conditions, they can also determine them. There is growing evidence that societal health shapes societal wealth, as well as vice versa. For example, poor health is positively associated with absence from work, job loss, higher out-of-pocket spending, debt levels, and loan defaults – all of which contribute to lower income. In addition, poor health among pregnant mothers and children is negatively associated with education and long-term cognitive development. There is also evidence that societal health shapes nation-state security, which, in turn, fosters economic growth.³⁹ Economists argue that a country’s health status, incidence of illness, and likelihood of catastrophic illness heavily influence the country’s labor force participation rates, labor productivity, savings and poverty rates, and healthcare demand and consumption. These latter forces influence, in turn, inflation rates, wage rates, exchange rates, and the country’s fiscal health.⁴⁰

Another complementary framework is the healthcare value chain outlined in the Preface. According to this framework, a healthcare system can be studied in terms of the buyers and suppliers of products and services that make up this chain, who engage in the important market exchanges that comprise this system, and whose activities add value to system outputs as they

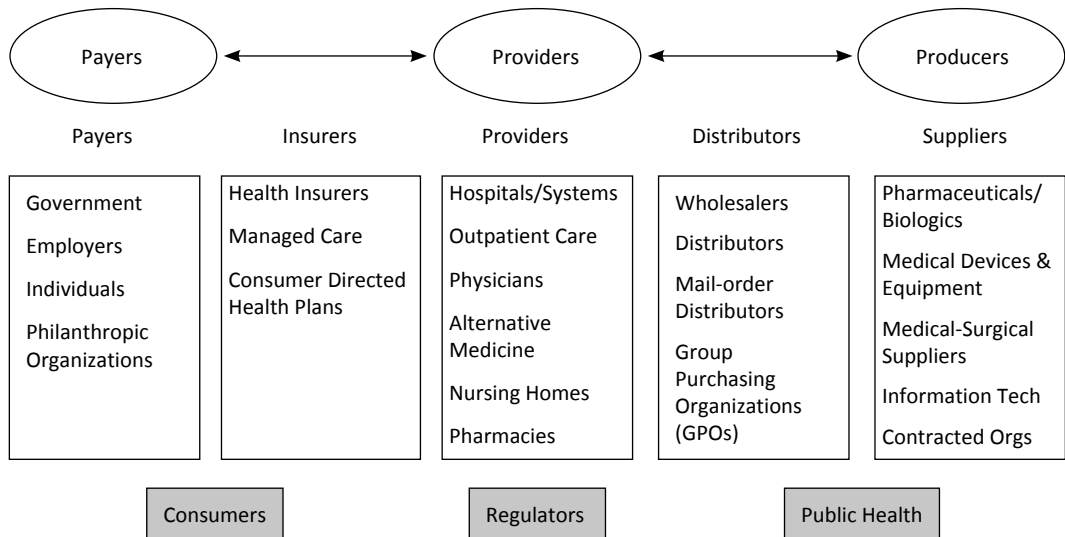
Figure 1.8: Government Initiatives to Drive Behavioral Change, from Disseminating Information to Prohibiting Behavior



Source: adaptation of Roberts, Hsiao, Berman and Reich, *Getting Health Reform Right* (2003), by Jay Patel, Universal Consulting, Presentation to the Wharton School (November 4, 2009).

move along the chain. The value chain of the US healthcare system is presented in Figure 1.9. This framework highlights the upstream (supplier) and downstream (buyer) trading partners of any firm operating in a healthcare industry, the parties that may mediate these transactions, and the possible competitors and substitutes for the firm’s product/service. India has not yet developed all of the value chain players depicted in Figure 1.9, but the nation’s trajectory suggests

Figure 1.9: The Healthcare Value Chain



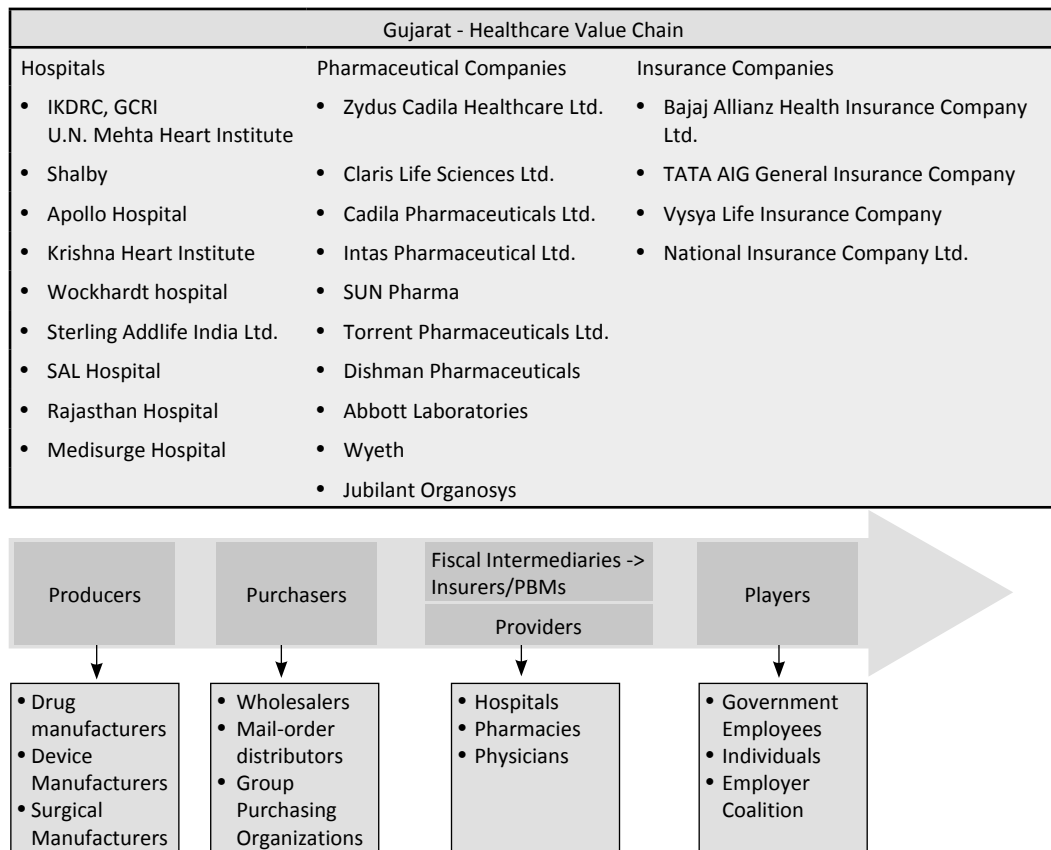
Source: Lawton Robert Burns, *The Health Care Value Chain* (2002).

continued expansion and eventual development of these stages. Indeed, some of the Indian states have modeled what a value chain might look like and where their efforts to develop on this framework currently stand (see Figure 1.10).

Two additional frameworks focus on analyzing the dynamics of healthcare system development. The first discusses trends over time in the iron triangle dimensions of cost, access, and quality/outcomes across nations.⁴¹ The analysis here examines health expenditures per capita, percent of GDP spent on healthcare, insurance coverage, hospital utilization, and expenditures per capita, physician visits per capita, and such outcomes as life expectancy at birth, infant mortality, and disability days. Inferences in healthcare system development are derived from cross-national comparisons among these trends. One limitation of this framework for our purposes is that nearly all of the data (e.g., statistics assembled by the OECD) are drawn from western and fully developed nations, with little data from the developing countries in Asia.

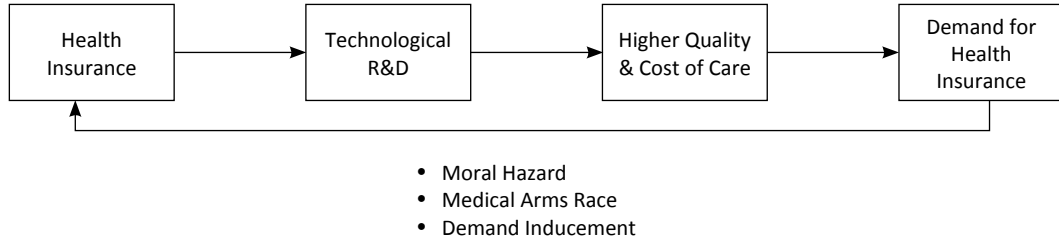
The second framework shows the interplay of cost, access, and quality. The “health-care quadrilemma” model suggests that efforts to address problems in access to healthcare by

Figure 1.10: The Value Chain in India



PBMs = Pharmacy Benefit Managers.

Source: Health and Family Welfare Department, Government of Gujarat.

Figure 1.11: The Healthcare Quadrilemma

Source: Weisbrod, *Journal of Economic Literature* (1991).

extending insurance coverage to previously uncovered segments of the population have multiple downstream effects (see Figure 1.11).⁴² These include financial incentives to manufacturers and producers to invest more in technological research and development (R&D), since the costs of innovation are more likely to be covered. The resultant innovation appeals to both providers and patients and thus leads to widespread adoption; the innovation carries a higher price tag as well, leading to simultaneously higher costs and higher quality. As costs rise and care improves, there is a subsequent demand for greater insurance coverage. This cycle offers one plausible explanation for the iron triangle dilemma noted above.

Of course, this model suffers several breakdowns when applied to India today. Due to the country's low literacy rate and education level, there is a widespread lack of awareness among the population of advanced insurance schemes, medical technologies, and infrastructure. At present, private insurance premiums are unaffordable for the mass of the population. There are also few mechanisms for pooling risks and collecting premiums (with some exceptions such as the Yeshasvini farmers' collective scheme organized in rural Karnataka in 2003, and the recent growth of community insurance schemes) due to the predominantly informal and unorganized labor force (i.e., few large group employers), the agricultural basis of the society, and the concentration of the population in rural areas. There is also a lack of governmental regulation and oversight of the provider industry, which retards quality assurance and improvement. Role overlaps and gaps between central and state governments exacerbate these problems in regulatory authority. These considerable issues pose a strong deterrent to private insurance development, especially in rural areas. Lack of quality standards and oversight also leads to high costs and provider claims, which reduces the attractiveness of market entry to insurance companies. Finally, there is a natural reticence among many governmental officials to pursue health insurance as a solution to India's healthcare problems; they only have to look at the high and rising costs of care in the US as a cautionary tale.

Major transitions underway in India

In addition to studying India's healthcare system from the vantage point of the frameworks above, we can also highlight the dynamic changes underway – in the country's demographic, socioeconomic, political, and epidemiologic characteristics – that present opportunities and

pose challenges for the country. These are outlined below. We begin first with a description of the country's political divisions and religious composition.

Political and religious diversity

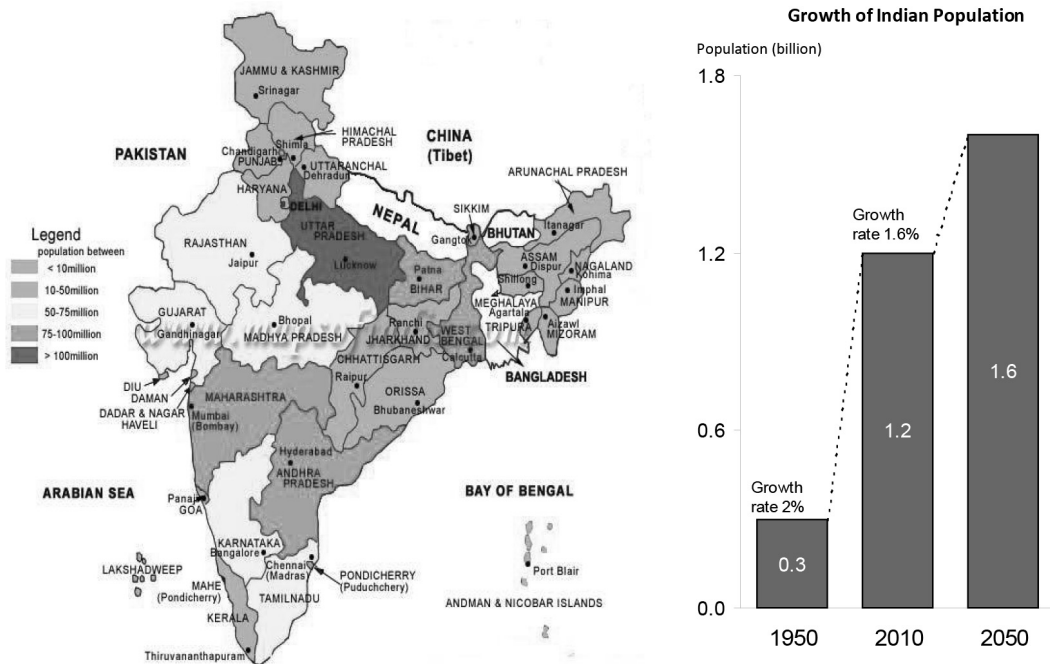
India is a large country, comprising more than 17 percent of the world's population (as of 2011) and 42 percent of the landmass of the US. It is also a very diverse country, with 28 States and 7 union territories, at least 6 major religions (81 percent Hindu, 13 percent Muslim, 2 percent Christian, 2 percent Sikh, 1 percent Buddhist, and 0.5 percent Jain; 2001 data), and 22 percent officially recognized languages and 1,700 dialects. There are enormous variations across Indian states in their healthcare financing and expenditures, healthcare infrastructure, and healthcare outcomes.⁴³ Some of these variations reflect differences in state incomes, which, in turn, reflect differences in commercial activity and private-sector development and the presence of capitalists investing in healthcare. Some of these variations reflect differences among states in their willingness to invest in sectors that complement healthcare such as water, sanitation, nutrition, education, and basic infrastructure.

Demographic transitions

India is the world's second most populous nation (1.21 billion people in 2011) and is expected to reach 1.35 billion by 2022 and 1.6 billion by 2050, thereby becoming number one (see Figure 1.12). There is growing urbanization and concentration of the Indian population; whereas only 25 percent of the population of 850 million resided in cities at the end of the 1980s, that percentage increased to 28 percent (2001) and 31 percent (2011) and is expected to exceed 55 percent by 2050.⁴⁴

This agglomeration is occurring in massive urban areas of more than 10 million population (Delhi, Mumbai, Kolkata), massive metropolises of 5–10 million (Hyderabad, Bangalore, Chennai, Ahmedabad), and a host of large cities with 3–5 million inhabitants (Pune, Surat, Jaipur, Kanpur, Nagpur, Lucknow, etc.).⁴⁵ In addition to the 53 “million-plus” urban centers throughout the country, 415 urban towns with over 100,000 population have seen considerable growth over the past decade. The 2011 census confirmed that while urbanization rates are skyrocketing in cities and towns with 100,000+ population, they have finally begun to slow down in the three megacities: Delhi, Mumbai and Kolkata.⁴⁶ Together with these major urban areas that represent 70 percent of the urban frame, the 7,467 urban towns with 5,000–100,000 population accounting for the remaining 30 percent have remained largely steady population-wise.

Roughly one quarter of the overall urban population lived in slum areas in 2001 with a similar provisional estimate for 2011, and in the megacity of Mumbai slum-dwellers account for half of the urban population.⁴⁷ The bulk of India's population, however, remains in rural areas: in 2011, 69 percent of Indians continued to live in 638,588 villages of less than 5,000 population.

Figure 1.12: India States and Population Growth

Source: Maps of India, www.worldstatesman.org, World Fact Book India, www.cia.gov, (accessed 27 August 2009).

Two additional demographic trends are longer life expectancy and the growth of the elderly population (in absolute numbers, not as a percentage of the total population). Life expectancy at birth for males soared from 32.1 years prior to independence (1941) to 58.1 (1991), 62.3 (2001–05), and 65.8 (2006–2010), and continues to rise.⁴⁸ This growth will swell the ranks of the chronically ill and increase demand for both acute hospital care and long-term care. Demand will also be fueled by the growing literacy of the population and their growing awareness of the treatments available.

Moreover, like other societies in transition, India simultaneously faces a decline in fertility and the breakdown of the extended family (particularly as women join the labor force and the young migrate to cities in search of work). The birth rate per 1,000 population declined from 29.5 (1991) to 25.4 (2001) and further to 22.1 (2010). The population growth rate slowed from 1.98 (1991) to 1.62 (2001) and to 1.34 (2009), while the natural growth rate slowed from 19.7 (1991) to 17.0 (2001) and to 14.9 (2010). Finally, during the same time period, the total fertility rate dropped from 3.6 (1991) to 3.1 (2001) and to 2.5 (2010).⁴⁹ These declines will compound problems of financial and caregiver support of the elderly as time goes on, and create demand for long-term care services. Indeed, new social programs are being developed for the elderly and other vulnerable populations left without the social security of the extended family, including the disabled, drug addicts, street children, child laborers, and those infected with HIV.

India has also witnessed an increase in accidents, injuries, and road fatalities. This increase stems from a rise in the number of vehicles on the road, the variety of road users, and the somewhat chaotic nature of driver behavior (observable to any visitor to India). This has placed even greater burdens on a healthcare delivery system that lacks a “911” system as found in the US, public awareness of the emergency medical system (EMS), public knowledge of first aid skills, sufficient availability of emergency (e.g., ambulance) and trauma services, and proper emergency equipment.⁵⁰ As a result of delays in treatment and lack of access to specialized care, injury is the third leading cause of death in India.

Socio-economic transitions

India has been hailed for its rapid economic development between 1990 and 2010 following economic liberalization (see Box 1.2). The country's rate of growth in GDP averaged 6.6 percent over this time period. The average rate masks the acceleration of growth, however. The rate of growth in GDP increased from 5.7 percent (average rate in the 1980s) to 6.1 percent (average rate in the 1990s) to 8.1 percent (2003–04) and as much as 9–9.5 percent (2005–07), before falling after the financial crisis of 2008. Economic growth has also been abetted by the “green revolution,” based on the introduction of a package of industrial technologies in the 1970s such as chemical fertilizers and hybrid seeds. This revolution fostered growing productivity of India's agricultural sector (for certain commodities), which raised the standard of living in rural areas.

As a result, the incidence of poverty was nearly halved between the late 1970s (51.3 percent) and the late 1990s (28.6 percent). By 2004–05, urban poverty levels had declined to 26 percent, while rural poverty rates dropped to 28 percent.⁵¹ The varying definitions of poverty-line status suggest the absolute number of poor ranges from 330 to 480 million people (see Chapter 11). According to census data, literacy rates have also risen from 52.2 percent (1991) to 64.8 percent (2001) and 74.0 percent (2011).

However, despite the economic growth and the resultant increase in personal incomes and tax revenues, the country has not increased public spending on healthcare (or on other social sectors) in a commensurate fashion.⁵² In fact, liberalization was accompanied by reductions in central government spending on healthcare and other social services in order to shrink public deficits and encourage the development of the private sector.

Political transitions

During the past two decades, India has undergone two tremendous political changes as well. First is the waning dominance of the Indian National Congress (INC, also known as the Congress party), which ruled India for the first 30 years since independence before suffering its first national defeat in 1977. Its hegemony has declined due to a fracture within the party (and formation of a rival party) and the ascendance of other parties. This has given rise to more of a

Box 1.2: The 1991 economic reforms

India embarked on economic reforms in 1991, 10 years after China did so, following a severe balance of payments crisis. The crisis was caused by high, combined fiscal deficits at both central and state government levels, which totaled 9.4 percent of GDP (1990–91). Faced with high debt, the country was pressured by the World Bank and International Monetary Fund to initiate liberalization reforms in order to obtain outside loans.⁵³

The substance of these reforms was laid out in a report from the World Bank, called the *World Development Report 1993*.⁵⁴ The report prescribed a three-pronged strategy in government policy to improve healthcare in developing countries. The first thing governments needed to do was foster an economic environment in which households could improve their health status. This meant a policy of economic growth that emphasized investments to improve poverty, including investments in education. The second thing that governments needed to do was improve (but not necessarily increase) government expenditures on health. This meant reduced spending on less cost-effective health interventions such as secondary and tertiary care, greater spending on public health, and decentralization of administrative and budgetary authority for health services to local bodies. The third thing was to promote diversity and competition. This meant encouragement of the private insurance sector, fostering competition among public and private suppliers, and eliminating tariff and other protections from international competition for domestic suppliers.

The central government responded by signaling a policy shift from a mix of state-led and market-based policies to a more open economy that relied heavily on market forces and the private sector. Liberalization included a number of reforms. These included: (a) industrial and trade policies such as privatization of many industries, abolition of import licensing, tariff reductions, and FDI; (b) financial sector reforms in banking and stock market; and (c) reductions in federal spending on social services, rural development, and healthcare.

coalition government at the national level. Second, during the early 1990s, the central government revitalized the traditional local governmental bodies (*panchayats*) and created a three-tier structure of administration below the state level. As a result of these changes, there is growing pluralism and decentralization in Indian government that requires consensus building not only at the federal level but also between federal and state levels. There is also a greater administrative burden to try to coordinate policy decisions made at the federal level with the implementation activities undertaken at state and local levels. As one illustration, central government policies and programs to promote primary care in rural areas must find a way to work alongside the various levels of local governmental bodies.

Epidemiologic transitions

On the epidemiologic front, there is a growing prominence of chronic illness in the population, which is typical of countries that increase in national wealth. In particular, India has a rising incidence of western-style conditions such as diabetes, hypertension, and obesity, as well as a growing presence of lifestyle conditions (e.g., heart disease), and cancer-related illnesses. For example, 700,000 new cancer cases are diagnosed in India every year; 800,000 people die of the disease each year.⁵⁵ Chronic diseases accounted for an estimated 50 percent+ of the 10 million

deaths occurring in India in 2004, compared to 37 percent of deaths due to communicable diseases, maternal and perinatal disorders, and nutritional deficiencies.⁵⁶ Cardiovascular diseases and diabetes are the second leading cause of death in India (behind TB, covered below). Among the population aged 25–69, cardiovascular diseases account for roughly one quarter of all deaths; ischemic heart disease is widespread in the West but not prevalent in other developing and lower-income countries. This reflects a mixture of India's rapid change in lifestyle, change in diets, increasing levels of stress due to urbanization, decrease in physical activity, and genetic predisposition to heart disease risk factors (obesity, diabetes, hypertension).⁵⁷

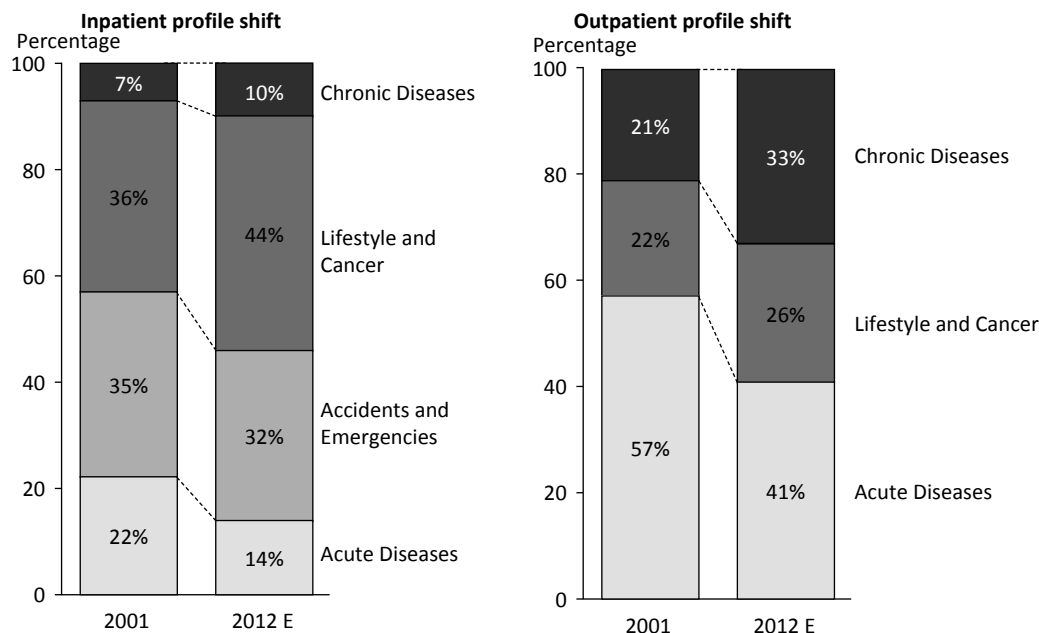
In addition to chronic disease, India has witnessed the growth of communicable illnesses such as HIV/AIDS and TB. TB is the number one cause of death in India, which now accounts for over one quarter of all cases worldwide (total of 8.8 million). India's TB rate is double that of China. Barriers to combating the disease include the lack of geographic and financial access to treatment, the need to continue treatment for months, the cost of missing work in order to seek treatment, and the stigma attached with the treatment. As a result of all of these factors, there is a growing problem of drug-resistant TB in India that not only requires a longer and more expensive treatment regimen, but also threatens the entire world.⁵⁸ Communicable diseases afflict primarily the urban poor and rural populations; these segments also increasingly suffer from chronic ailments. As a result, the Indian population suffers from a “dual disease burden.”

India has made progress in attacking chronic diseases through a series of national policies and programs. However, these programs have focused on specific targets (cancer, vision, mental health, diabetes, TB) with technological responses – eschewing integrative, multicomponent interventions – and have oftentimes been unevenly implemented geographically.⁵⁹ The disparities in treatment for chronic disease are enormous between urban and rural populations and between wealthy and poor populations (2–20 times). Episodes of hospital care for chronic disease are twice those for infectious disease, with higher expenditures overall and higher expenditures on private-sector services. Expenditures on chronic diseases accounted for 45 percent of average monthly income for the highest-income group and 70 percent for people in the low-income groups.⁶⁰

The interaction of these two transitions – urbanization and chronic illness – will have enormous effects on India. The rise in lifestyle diseases in urban areas will spur an increase in inpatient hospital admissions and costs, and is projected to account for a \$236 billion in lost productivity between 2005 and 2015.⁶¹ The relative frequency of treatment for lifestyle and chronic illness conditions varies between inpatient and outpatient settings (see Figure 1.13). Compounding both of these trends is longer life expectancy and the growth of the elderly population (described above).

Implications for India's healthcare system

All of these transitions will increase demand for healthcare services and insurance coverage to pay for them. They are reinforced by a series of parallel transitions enabling this demand to be

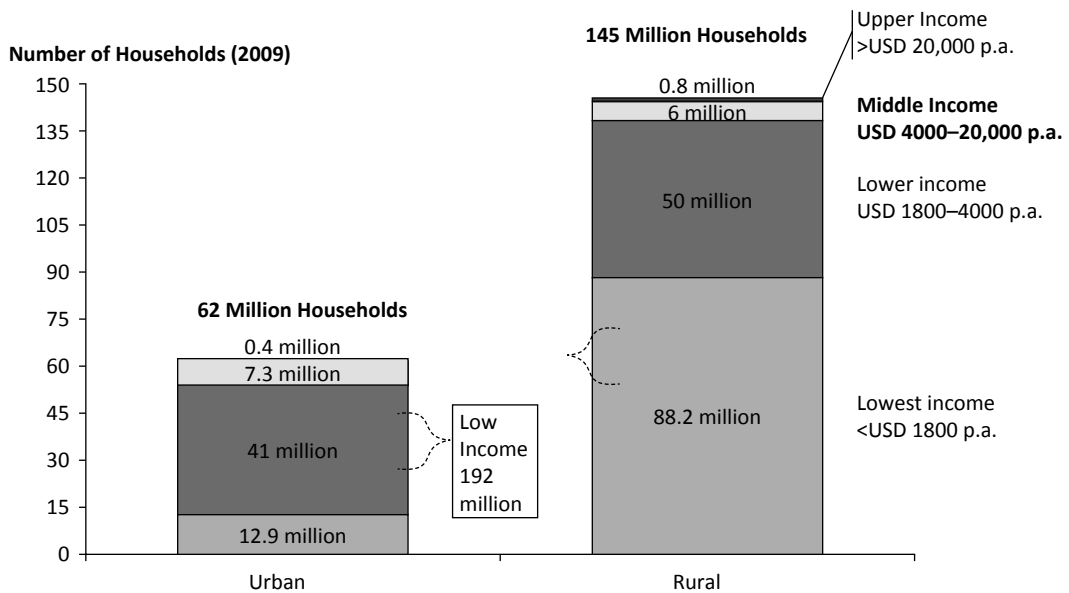
Figure 1.13: Lifestyle and Chronic Diseases by Inpatient/Outpatient Treatment

Note: Acute diseases include infectious/communicable diseases

Source: Global burden of disease, WHO, http://www.who.int/topics/global_burden_of_disease/en (accessed 11 September 2008). Jay Patel, Universal Consulting.

realized: private-sector employment, rising income levels, a growing supply of medical professionals, increased investment in healthcare infrastructure, and increased government investment in transportation and telecommunications infrastructure that will extend the reach of providers and manufacturers into rural areas. The growth of industry and government in Indian cities has led to rising nonagricultural, formal corporate employment – often in jobs that offer higher wages and health insurance. In the short period from 2005 to 2010, India has witnessed rising per capita income (in current prices, from \$463 in 2001 to \$1,058 by 2009 and to \$1,389 in 2011; or in PPP, from \$1,585 in 2001, to \$3,039 in 2009, and to \$3,694 in 2011) and a growing middle class.⁶² As a “share of wallet,” healthcare is expected to grow from 7 percent in 2005 to 13 percent by 2025.⁶³ By 2015, an estimated 250+ million Indians would be able to afford western allopathic medicine.⁶⁴

This growth has led to the copresence of “two Indias”: a shimmering India with an urban and increasingly middle and upper-middle class that purchases allopathic medicine in the private sector, and a shivering India with a large population of rural and urban poor who rely more on traditional medicine and the public sector. This segmentation of Indian households is depicted in Figure 1.14. The two Indias are characterized further by a mismatch in population and healthcare infrastructure: whereas 69 percent of the population resides in rural areas, three quarters of the allopathic medical infrastructure is located in urban areas.

Figure 1.14: Shimmering and Shivering India Households

Source: The Great Indian Market, National Council for Economic Research, India, www.ncaer.org/downloads (accessed 3 September 2009).

Medical tourism

Finally, rising medical tourism to India is also swelling demand for healthcare in private facilities. It is estimated that the number of patients visiting India for medical treatment grew from 150,000 in 2002–04 to 600,000 by 2011 (see Chapter 6). The lure of India is the lower cost of procedures, the perceived “cost-effectiveness” of Indian healthcare, the fact that Indian providers speak English, and providers’ familiarity with western healthcare (by virtue of having trained abroad).⁶⁵ The government has also promoted medical tourism by introducing a new category of “medical visa” to facilitate visits by foreign patients to Indian hospitals. The Government’s National Health Policy of 2002 also encouraged the provision of healthcare services to non-Indian patients to help the country with foreign exchange. Some medical tourists are not foreigners at all but natives of the Indian states who want to keep in touch with their roots and hold onto their traditions, and thus come home and avail themselves of the facilities serving foreigners.⁶⁶ Private-sector facilities cater to these patients (who may crowd out the indigenous population that seeks care there).

A different but important driver of medical tourism is the availability of assisted reproductive technologies (ARTs) to western patients, such as *in vitro* fertilization and surrogate parenthood. These technologies are not tightly regulated, and regulations vary considerably across Asia, where several countries compete with one another for medical tourism business.

Medical tourism has had several unanticipated effects. First, it has reportedly induced many healthcare professionals to move from the public to private sector, exacerbating the

shortages of public-sector manpower and perhaps lowering standards as well.⁶⁷ Second, it may have increased the concentration of providers not only in the private sector but also in urban areas. Third, the monies raised through medical tourism have not yielded the expected tax revenues for the government. The hospitals catering to medical tourists – often the larger, for-profit corporate facilities – have received various subsidies and financial benefits, including lower import duties, increased rates of depreciation on medical equipment, and land concessions. However, they have not necessarily reciprocated by setting aside capacity to treat indigent patients. Moreover, they have attracted a number of physicians who were trained in the public sector at government expense.⁶⁸

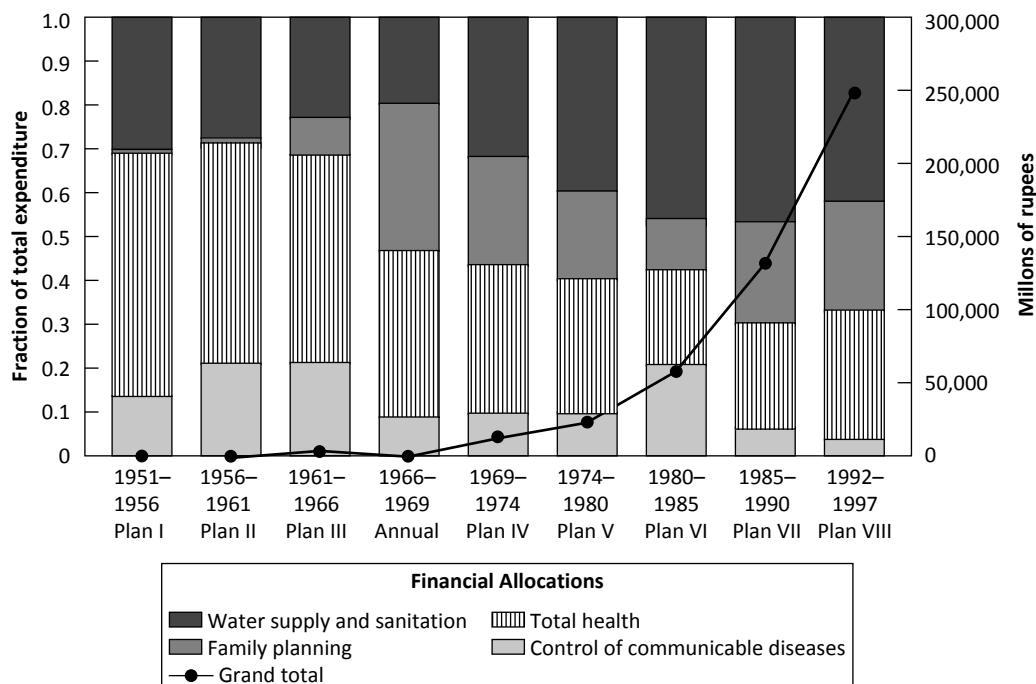
Public health issues

A final method used to analyze a country's healthcare system is to analyze its approach to public health and its health status indicators. India's healthcare system has evolved in an evolutionary and organic fashion since independence. Development during the first phase (1947–83) was guided by the principles that (1) no one should be denied care based on inability to pay and (2) healthcare is the government's responsibility. The government, through the Bhole Committee, sought to plan and deliver services to all through the building of infrastructure (institutions, manpower, research, pharmaceuticals, technology) and a strong primary care system supported by secondary and tertiary systems.⁶⁹ Efforts during this period focused on disease eradication and reductions in infant mortality, as well as the erection of a network of urban and rural healthcare services in the public sector – much of it at the secondary and tertiary level during the 1960s.

During the second phase (1983–2000), the country articulated its first National Health Policy, stating the need for private-sector involvement in addition to an expansion of primary care funded by public sources and continued emphasis on disease eradication via targeted, vertical “National Health Programs.” There were major cutbacks in public funding due to the country's fiscal crisis of the late 1980s and the economic reforms (liberalization) of the early 1990s, which marked a major shift in the government's policy toward healthcare. The government reduced its share of spending on health, reduced direct taxes, increased administered prices, reduced tariffs on trade, and provided incentives for FDI.⁷⁰ These moves conferred legitimacy on the private sector, perhaps covered for the declining allocations to healthcare in the country's successive Five-Year Plans (see Figure 1.15), and led to its crowding out the public sector. Moreover, lack of funding hurt the public-sector infrastructure, leading many public providers to migrate to the private sector.

Most recently, in the third phase (since 2000), the country has facilitated the rise of private-sector health insurance, sought to mobilize private-sector infrastructure to address public healthcare ends, and increased the government's role in financing healthcare.⁷¹ The country has also accessed loans from the IMF and World Bank to refashion delivery in the public sector.

Since independence, India has made great strides in public health. IMR – the number of infant (less than 1 year old) deaths per 1,000 live births – was nearly halved from 148

Figure 1.15: Financial Allocations for Health Sectors in India Between 1951 and 1997

Source: Ma and Sood, A Comparison of the Health Systems in China and India (RAND, 2008)

deaths (1951) to 80 (1991). More recently, the IMR has declined further to 70 deaths (2001), 53 deaths (2007), and down to 47 deaths (2010).⁷² The death rate likewise fell from 25.1 deaths per 1,000 (1951) to 9.8 (1991) and 7.2 (2010). Cases of malaria have also dropped, and smallpox, polio, and leprosy are nearly contained.⁷³ Nevertheless, there are huge differentials between urban and rural areas here. For example, the IMR in rural areas (55 per 1,000 births) dwarfs that in urban areas (34). The country also faces a host of public health issues. For example, India contributes to one-fifth of the world's share of diseases and accounts for 18 percent of deaths worldwide.⁷⁴ Seventeen major classes of health conditions account for over 80 percent of this burden of illness.⁷⁵

These problems are exacerbated by the country's large population, rapid growth, (largely unplanned) urbanization, industrialization, and widespread use of pesticides and fertilizers in agriculture. Chief among these are problems traditionally related to poverty and underdevelopment: water supply and sanitation. India lags behind fellow BRIC countries Brazil, Russia, and China as well as most other developing nations in the percentage of its population with access to safe drinking water and improved sanitation.⁷⁶ With regard to safe drinking water, China improved from 67 percent to 89 percent between 1990 and 2008, compared to India's improvement from 72 percent to 88 percent; with regard to sanitation, China improved from 41 percent to 55 percent, while India improved from 18 percent to 31 percent.⁷⁷

These problems stem from a lack of water treatment plants (a mix of capacity, maintenance, and supply issues), poor water distribution systems, lack of a continuous water supply,

lack of quality monitoring systems in local municipalities, untreated water runoff from agricultural areas, and insufficient waste collection (72 percent in cities). Water supply and sanitation problems have persisted over decades, despite increasing public-sector outlays from Five-Year Plan I to Plan X (see Figure 1.15). Unfortunately, no government public health agency oversees water supply and sanitation. At the federal level, responsibility rests with the central Ministry of Rural Development (not the Ministry of Health and Family Welfare). At the state level, Departments of Public Health and Engineering have the responsibility, but they tend to focus more on building infrastructure rather than ensuring access.⁷⁸ A related issue is the lack of sewage systems and lack of access to toilets. This problem is most acute among rural households (76 percent lack access), but also persists in urban areas (18 percent) as of 2002.⁷⁹ Poor sanitation leads to a high incidence of waterborne diseases. Such diseases, related to unclean drinking water, play a major role (along with other vector-borne illnesses) in the spread of typhoid, malaria, cholera, diarrhea, and hepatitis. Collectively, waterborne conditions account for over 20 percent of all communicable illness in India.⁸⁰ The environmental problems enumerated above have also contributed to a growing air pollution problem, leading to increased prevalence of respiratory conditions in the cities.

A second related problem is illiteracy: an estimated 26 percent of the Indian population (roughly 300 million people, 2011 data) is illiterate. This represents the largest group (34 percent of adults) in the world, but is down from 35 percent illiteracy 10 years earlier.⁸¹ The largest block of illiterates is between 15 and 65 years old, comprising roughly 40 percent of the labor force. Due to their inability to read, they have limited understanding of the importance of sanitation and personal hygiene, which contributes to the problem of waterborne illness.

A third major problem is malnourishment. According to 2011 survey data, an estimated 42 percent of Indian children below the age of 5 suffer from malnourishment (defined as being moderately or severely underweight).⁸² Malnutrition in India accounts for roughly one-third of the world's total and causes one-third to one-half of all deaths among children below the age of 5. India's IMR (47.6 deaths per 1,000 live births, 2011 estimate) ranks among the highest 25 percent worldwide; by comparison, estimated 2011 IMRs were 6.1 in the US and 16.1 in China.⁸³ Lack of nutrition also contributes to poor health, which in turn affects productivity and income. Malnourishment is higher in rural areas than in urban areas: the percentage of children who were underweight in 2005–06 was 49 percent in rural India versus 36 percent in urban areas (with huge variation among the states). Malnutrition is also present among adults: in 2005–06, the percentage of adults whose BMI was less than 17 was 20 percent in rural areas and 21 percent in urban areas. The converse problem of obesity – high BMI, above 25 – is more prevalent in urban areas (16 percent of adults) than in rural areas (5 percent).⁸⁴ Malnutrition is exacerbated by the problems noted above in water, sanitation, habitat, pollution, and food security.

A fourth problem is the range and burden of infectious diseases, including TB, malaria, leprosy, HIV/AIDS, lymphatic filariasis, leishmaniasis, and dengue.⁸⁵ Together, infectious and parasitic diseases are the second leading cause of death in India, only recently surpassed by cardiovascular diseases. The country has not succeeded in controlling infectious diseases – whether old, new, or resurgent. Part of the problem is a lack of a formal department of public health in the central government ministry with responsibility for healthcare. Although the

Bhore Committee report (1946) recommended that public health be integrated with healthcare, country leaders pursued science, technology, and a biomedical model of health and disease instead. The problem also stems from the medical profession's lack of appreciation for public health, misguided public beliefs about the origins of diseases, the lack of integration and coordination between various levels of government in their healthcare and public health efforts, and the issues noted earlier in this section regarding sanitation. Historically, the government has attacked these diseases in singular fashion through vertical disease control programs, with great duplication across programs and no coordination between them. Moreover, the program funding was oriented to new infrastructure, leaving the states to finance their continuing operations and staffing (which they were often unable to do).

Summary and overview of the volume

This chapter has described a variety of lenses and frameworks through which one can begin to analyze India's developing healthcare system. None are inherently superior or inferior. Instead, they alternatively highlight goals and tensions, structures, functions, corporate and individual actors, flows and exchanges, and dynamic transitions. One might wisely employ multiple approaches to develop a comprehensive understanding of India or any other healthcare system in an emerging economy.

In analyses of the US healthcare system, we typically rely on a value chain framework that focuses on the major actors and the economic exchanges (as buyers and sellers) between them. We loosely adopt that framework (see Figure 1.9) in this volume to focus on several of the key actors in India's healthcare system: hospitals, physicians, insurers, other payers and financiers (e.g., foundations and private equity), pharmaceutical firms, biotechnology firms, and medical device firms. Consistent with the Control Knobs approach depicted in Figure 1.7, we also spend considerable time describing the wider societal context underpinning India's healthcare system, and the policy levers used in the past to achieve its desired intermediate and ultimate ends.

There are two additional introductory chapters in this first section of the book. Chapter 2, written by Stephen Sammut, expands upon some of the issues dealt with in this chapter. The chapter discusses the balancing act in India between the iron triangle issues of access and cost, as well as six major public health challenges facing the country. It also addresses the question of whether India's healthcare system can keep pace with the country's economic growth, or will encumber the burgeoning economy. Chapter 3, written by Lawton Robert Burns, provides an in-depth overview of India's value chain and the efforts undertaken since independence to reform it. This chapter serves as an introduction to many of the topics and trends discussed throughout the remainder of the volume. It also discusses some of the key historical events in the evolution of India's healthcare system and the wider Indian economy.

The second section of the book focuses on healthcare provision. Chapters 4 and 5 provide an introduction to the two main providers in India's healthcare system: physicians and hospitals. Chapter 4, written by Ajay Bakshi and Lawton Robert Burns, describes the different

systems of medicine in India and focuses on the training and professional organization of allopathic physicians. Chapter 5, written by Lawton Robert Burns, Bhuvan Srinivasan, and Mandar Vaidya, focuses on the three largest hospital systems in the country – Apollo, Fortis, and Max Healthcare – as well as smaller hospitals in the public and private sectors. Chapter 6, coauthored by Lawton Robert Burns, Prashanth Jayaram, and Richa Bansal, provides an overview of the medical tourism industry in India. Chapters 7–9 serve as in-depth case studies of hospitals and systems in niche areas (e.g., eye care). Chapter 7, written by James Calderwood, Carter Clement, Arunavo Roy, Ravi Shah, and Lawton Robert Burns, examines the Aravind Eye Care System. Chapter 8, coauthored by Sashi Mohan and colleagues, profiles the L.V. Prasad Eye Institute. Chapter 9, written by Colleen Murphey, profiles the Vaatsalya Hospitals.

The third section of the book focuses on three sources of healthcare finance. Chapter 10, written by Aditi Sen, Jessica Pickett, and Lawton Robert Burns, describes India’s healthcare insurance sector, stemming from its roots in the public sphere and its expansion into the private sphere over the past decade. It also includes a discussion of community-based insurance schemes and microinsurance. Chapter 11, written by Neil Parikh and Vimala Raghavendran, then discusses in detail the efforts to extend healthcare financing and service provision to the “bottom of the pyramid”; such efforts primarily include the work of foundations and public-private partnerships. Chapter 12, written by Aman Kumar, outlines some of the efforts made by private equity firms to build India’s healthcare infrastructure.

The fourth section of the book focuses on three sectors of producers in India’s healthcare system: pharmaceutical manufacturers (Chapter 13 by Vishwas Seshadri), biotechnology firms (Chapter 14 by Sarah Frew), and medical device and equipment manufacturers (Chapter 15 by Lawton Robert Burns, Kalyan Pamarthy, Arunavo Roy, and Tanmay Mishra). Due to their historical prominence, multinational corporations are a major topic of discussion when considering these sectors; we endeavor to counterbalance that discussion with a description of the domestic players developing within each of these sectors. Chapter 16 revisits the themes introduced in the first section of the book in light of the development of these technological sectors. Written by Ashoke Bhattacharjya and Brian Corvino, the final chapter describes the balancing act between efforts to promote access to modern technology and the need to make such technologies affordable.

Notes

1. Oftentimes these trade-offs are described as the tension between promoting access to care for everyone versus using price as a rationing tool to healthcare services, or the tension between balancing equitable access and efficiency in the provision of services.
2. Bibek Debroy and Ajay Mahal. 2010. “Health Reform: A Historical Perspective and the Future.” In *India Health Report 2010*, edited by Ajay Mahal, Bibek Debroy, and Laveesh Bhandari, chapter 9. New Delhi: Business Standard Books.
3. Ajay Mahal and Victoria Fan. 2011. “The Case for Improving Health in India.” In *India Health Report 2010*, chapter 1.
4. Laveesh Bhandari and Aali Sinha. 2011. “Access to Healthcare.” In *India Health Report 2010*, chapter 2.

5. Estimates come from the following sources: World Health Organization (WHO). 2012. *Trends in Maternal Mortality: 1990 to 2010 – WHO, UNICEF, UNFPA and The World Bank Estimates*. Geneva: World Health Organization. Accessed November 10, 2012. http://www.unfpa.org/webdav/site/global/shared/documents/publications/2012/Trends_in_maternal_mortality_A4-1.pdf; WHO and UNICEF. 2012. *Neonatal Mortality*. ChildInfo. Accessed October 30, 2012. http://www.childinfo.org/mortality_neonatal.php; WHO. 2011. “Newborn Deaths Decrease But Account for Higher Share of Global Child Deaths.” Accessed October 30, 2012. http://www.who.int/mediacentre/news/releases/2011/newborn_deaths_20110830/en/index.html; Prasenjit Chowdhury. 2012. “India Is Still World’s Hunger Capital.” *Deccan Herald*. Accessed October 30, 2012. <http://www.deccanherald.com/content/21720/india-still-worlds-hunger-capital.html>; Bhalla, Nita. 2009. “One Third of the World’s Undernourished Children Lives in India.” National Confederation of Human Rights Organizations, India. Accessed October 30, 2012. http://nchro.org/index.php?option=com_content&view=article&id=7009%3Aone-third-of-worlds-undernourished-children-lives-in-india&catid=50%3Achildren&Itemid=4; Centers for Disease Control and Prevention. 2011. “Global Routine Vaccination Coverage, 2010.” Author, November 11. Accessed October 30, 2012. <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6044a3.htm>; WHO. 2012. *The Tuberculosis Epidemic*. Accessed October 30, 2012. http://www.wpro.who.int/mediacentre/factsheets/20120306_tuberculosis/en/index.html; David Greeley and Renuka Gadde. 2012. “World TB Day 2012: Ensuring a Treatable Disease Is Actually Treatable.” *Huffington Post*, March 24. Accessed October 30, 2012. http://www.huffingtonpost.com/david-greeley/world-tb-day-2012-ensurin_b_1375676.html. A different set of estimates are based on earlier data from the National Family Health Survey 2005–06: maternal deaths (25%), undernourished children (34%), neonatal deaths (25%), unvaccinated children (45%), and tuberculosis (20%). Available at <http://www.unicef.org/india/nutrition.html>. And at <http://motherchildnutrition.org/india/resources.html>. Accessed November 21, 2011.
6. David Dranove. 2008. *Code Red*. Princeton, NJ: Princeton University Press. William Kissick. 1994. *Medicine’s Dilemmas: Infinite Needs versus Finite Resources*. New Haven, CT: Yale University Press.
7. One global firm that came close to achieving all three simultaneously (at least in past decades) was the Swedish furniture-maker Ikea. In the healthcare industry, Becton, Dickinson, and Co. also achieved strong performance on all three dimensions in prior decades.
8. Donald Berwick, Thomas Nolan, and John Whittington. 2008. “The Triple Aim: Care, Health, and Cost.” *Health Affairs* 27(3):759–769.
9. Marc Roberts, William Hsiao, Peter Berman, and Michael Reich. 2008. *Getting Health Reform Right*, chapter 1. New York: Oxford University Press.
10. Richard Smith and Kara Hanson. 2011. “What Is a ‘Health System’?” In *Health Systems in Low and Middle Income Countries*, edited by Richard Smith and Kara Hanson, chapter 1, 3–19. Oxford, UK: Oxford University Press.
11. Daniel Callahan. 1973. “The WHO Definition of ‘Health.’” *The Hastings Center Studies* 1(3): 77–87.
12. Amartya Sen. 1999. *Development as Freedom*. New York: Alfred A. Knopf.
13. Lawton R. Burns. 2002. *The Health Care Value Chain: Producers, Purchasers, and Providers*. San Francisco, CA: Jossey-Bass.
14. Roberts, Hsiao, Berman, and Reich (2008).
15. WHO. 2000. *The World Health Report 2000 – Health Systems: Improving Performance*. Geneva: Author.
16. V. R. Patel, Vaidya, D. Nail, and P. Borker. 2005. “Irrational Drug Use in India: A Prescription Survey from Goa,” *Journal of Postgraduate Medicine* 51: 9–12; A. Phadke, 1998. *Drug Supply and Use: Towards a Rational Policy in India*. New Delhi: Sage.
17. According to the National Sample Survey Organisation (NSSO), 81 percent of patients choose the private sector for outpatient care, while 62 percent of patients opt for the private sector for inpatient care. Government of India. 2006. *Morbidity, Health Care and the Condition of the Aged*. NSS 60th Round (January–June 2004), Report No. 507. Delhi: Ministry of Statistics and Programme Implementation.

- See also: Jeffrey Hammer. 2009. "The Healthcare Debate, in Bharat." *Financial Express*, July 6. Accessed November 21, 2011. <http://www.financialexpress.com/news/the-healthcare-debate-in-bharat/485330/>; International Knowledge Millennium Conference (IKMC). 2006. *Improving Public Health in India*, December 19–20. Hyderabad, India: Author; Laveesh Bhandari. 2006. "Social Infrastructure: Urban Health and Education." In *India Infrastructure Report 2006*, edited by Anupam Rastogi, chapter 11. New Delhi: Oxford University Press; India Knowledge@Wharton. 2010. "Compassion vs. Cost: Improving the Prognosis for India's Healthcare Sector," February 11. Accessed December 13, 2011. <http://knowledge.wharton.upenn.edu/india/article.cfm?articleid=4447>.
18. Dr Devi Shetty. Personal communication.
 19. Mahal and Fan (2011), "The Case for Improving Health in India."
 20. Amitabh Chandra and Jonathan Skinner. 2011. "Technology Growth and Expenditure Growth in Health Care." *NBER Working Paper 16953*. Cambridge, MA: National Bureau of Economic Research.
 21. Ministry of Health and Family Welfare. 2005. *Report of the National Commission on Macroeconomics and Health*. New Delhi: Government of India's Ministry of Health and Family Welfare.
 22. R. Srinivisan. 2004. *Healthcare in India – Vision 2020: Issues and Prospects*. Accessed November 21, 2011. http://planningcommission.nic.in/reports/genrep/bkcpap2020/26_bg2020.doc.
 23. The statistics ranges here are drawn from several sources: Ministry of Health and Family Welfare (2005), *Report of the National Commission on Macroeconomics and Health*; Planning Commission of India. 2011. *High Level Expert Group Report on Universal Health Coverage for India*. New Delhi: Planning Commission of India). Accessed October 20, 2012. http://planningcommission.nic.in/reports/genrep/rep_uch0812.pdf. Data on immunization: Ahmad Imteyaz, Ranabir Pal, Mohd Akram, Mashkooor Ahmad, and Hossain Shah. 2008. "Correlates of the Immunization Status of Children in an Urban Slum of Delhi." *Annals of Tropical Medicine and Public Health* 1(2):59–63. Accessed November 11, 2012. <http://www.atmph.org/article.asp?issn=1755-6783;year=2008;volume=1;issue=2;spage=59;epage=63;aulast=Imteyaz>; The World Bank. (2010). *Helping India's Bihar State Boost Public Services through Better Management*. Washington: World Bank. Accessed October 30, 2012. <http://web.worldbank.org/WBSITE/EXTERNAL/NEWS/0,contentMDK:22491125~pagePK:64257043~piPK:437376~theSitePK:4607,00.html>. Data on infant mortality rates: UNICEF, WHO, World Bank, UN DESA, and UNPD. 2011. *Level and Trends in Child Mortality: Estimates Developed by the UN Inter-Agency Group for Child Mortality Estimation*. Accessed October 30, 2012. <http://data.worldbank.org/indicator/SP.DYN.IMRT.IN>. Data on mortality rates below 5 years of age: UNICEF, WHO, World Bank, UN DESA, and UNPD. 2011. *Mortality Rate Under-5 (per 1,000 Live Births): Estimates Developed by the UN Inter-Agency Group for Child Mortality Estimation*. Accessed October 30, 2012. <http://data.worldbank.org/indicator/SH.DYN.MORT>. Data on percent births with skilled attendant: Kaiser Family Foundation. 2012. *Births Attended by Skilled Health Personnel (percent of Births) 2005–2011*. Accessed October 30, 2012. <http://www.globalhealthfacts.org/data/topic/map.aspx?ind=77>.
 24. Registrar General of India provide data for 2011. For 2010 data, see Central Bureau of Health Intelligence. 2010. *National Health Profile 2010*. New Delhi: Government of India. According to 2001 census data, the percentage of the population 0–14 was 35.5 percent; the percentage 60+ years old was 6.9 percent.
 25. Vinod Kumar Paul, Harshpal Singh Sachdev, Dileep Mavalankar, Prema Ramachandran, Mari Jeeva Sankar, Nita Bhandari, Vishnubhatla Sreenivas, Thiagarajan Sundaraman, Dipti Govil, David Osrin, and Betty Kirkwood. 2011. "India: Towards Universal Health Coverage 2 – Reproductive Health, and Child Health and Nutrition in India: Meeting the Challenge." *The Lancet*, January 12. Accessed November 21, 2011. <http://www.thelancet.com/series/india-towards-universal-health-coverage>.
 26. A second definition of the dependency ratio is the "age dependency ratio": the number of people aged 0–14 plus the number of people aged 65+ divided by the number of people aged 15–64. Using 2007–11 data from the World Bank, China's age dependency ratio is .38 compared to India's ratio of .54. A third definition of the "dependence ratio" is the number of people aged 65+ divided by the number of people

- aged 15–64. This ratio reached roughly 7.5 percent in 2005 and will rise to 20 percent by 2050. Mahal and Fan (2011), “The Case for Improving Health in India.”
27. George Shakarishvili. 2009. “Building on Health Systems Frameworks for Developing a Common Approach to Health Systems Strengthening.” Paper prepared for the World Bank, the Global Fund, and the GAVI Alliance Technical Workshop on Health Systems Strengthening, Washington, DC, June 25–27.
 28. J.W. Hurst. 1991. “Reforming Health Care in Seven European Nations.” *Health Affairs* 10(3):7–21.
 29. WHO. 2003. *Guide to Producing National Health Accounts*. Geneva: Author.
 30. George Shakarishvili, Mary Ann Lansang, Vinod Mitta, Olga Bornemisza, Matthew Blakeley, Nicole Kley, Craig Burgess, and Rifat Atun. 2011. “Health Systems Strengthening: A Common Classification and Framework for Investment Analysis.” *Health Policy and Planning* 26:316–326.
 31. WHO (2000), *The World Health Report 2000*.
 32. Anne J. Mills and M. Kent Ranson. 2001. “The Design of Health Systems.” In *International Public Health: Diseases, Programs, Systems, and Policies*, edited by Michael H. Merson, Robert E. Black, and Anne J. Mills, chapter 11. Gaithersburg, MD: Aspen.
 33. WHO (2000), *The World Health Report 2000*; Jane Menken and M. Omar Rahman. 2001. “Reproductive Health.” In *International Public Health*, chapter 3; Arthur L. Reingold and Christina R. Phares. 2001. “Infectious Diseases.” In *International Public Health*, chapter 4.
 34. WHO. 2007. *Strengthening Health Systems to Improve Health Outcomes*. Geneva: Author.
 35. William Hsiao. 2003. *What Is a Health System? Why Should We Care?* Cambridge, MA: Harvard School of Public Health.
36. Recent 2011 data from the government suggest that public expenditures now account for one-third of all healthcare spending. Planning Commission of India (2011), *High Level Expert Group Report on Universal Health Coverage for India*.
 37. Srinivisan, *Healthcare in India – Vision 2020: Issues and Prospects*.
 38. Mohan Rao, Krishna Rao, A.K. Shiva Kumar, et al. 2011. “India: Towards Universal Health Coverage 5 – Human Resources for Health in India.” *The Lancet*, January 12. Accessed November 21, 2011. <http://www.thelancet.com/series/india-towards-universal-health-coverage>.
 39. D. C. Esty, Jack A. Goldstone, Ted Robert Gurr, Barbara Harff, Marc Levy, Geoffrey D. Dabelko, Pamela T. Surko, Alan N. Unger. 1999. “State Failure Task Force Report: Phase II Findings.” *Environmental Change and Security Project Report*, no. 5, Summer, 49–72. Washington, DC: Woodrow Wilson Center.
 40. Hsiao (2003), *What Is a Health System?*
 41. Gerard Anderson and Peter S. Hussey. 2001. “Trends in Expenditures, Access, and Outcomes among Industrialized Countries.” In *Global Health Care Markets*, edited by Walter Wieners, 24–40. San Francisco, CA: Jossey-Bass.
 42. Burton Weisbrod. 1991. “The Healthcare Quadilemma: An Essay on Technological Change, Insurance, Quality of Care, and Cost Containment.” *Journal of Economic Literature* 29(2):523–552.
 43. See table 2 in A.K. Shiva Kumar, Lincoln C. Chen, Mita Choudhury, Shiban Ganju, Vijay Mahajan, Amarjeet Sinha and Abhijit Sen. 2011. “India: Towards Universal Health Coverage 6 – Financing Health Care for All: Challenges and Opportunities,” *The Lancet*, January 12. Accessed November 21, 2011. <http://www.thelancet.com/series/india-towards-universal-health-coverage>.
 44. United Nations. 2008. *World Urbanization Prospects: The 2007 Revision Population Database*. New York: Author. Accessed December 16, 2011. <http://esa.un.org/unup/index.asp?panel=1>.
 45. There are multiple frameworks for classifying the cities of India. The Indian government uses two schemes to allocate compensatory allowances to the cities: the city compensatory allowance (CCA) and the house rent allowance (HRA). The classification of major cities can be found at http://en.wikipedia.org/wiki/Classification_of_Indian_cities. Accessed October 25, 2011.

46. Census of India 2011. *Provisional Population Totals Urban Agglomerations and Cites*. New Delhi: Government of India. Accessed December 16, 2011. http://www.censusindia.gov.in/2011-prov-results/paper2/data_files/India2/1.%20Data%20Highlight.pdf.
47. Numbers provided are by necessity estimates within a few percentage points. The 2011 census was conducted with an expanded definition of slum areas and collected data for urban areas with less than 20,000 population, which were not previously accounted for; in addition, the Committee on Slum Statistics/Census calculated that 26.3 percent was a more accurate figure based on 2001 data than the published 23.5 percent, hence “roughly” 25 percent. Ministry of Housing and Urban Poverty Alleviation, National Buildings Organisation. 2010. *Report of the Committee on Slum Statistics/Census*. New Delhi: Government of India. Accessed December 16, 2011. http://mhupa.gov.in/W_new/Slum_Report_NBO.pdf. Ministry of Home Affairs. 2001. “Census of India 2001 (Provisional) Slum Population in Million Plus Cities.” New Delhi: Government of India. Accessed December 16, 2011. http://censusindia.gov.in/Tables_Published/Admin_Units/Admin_links/slum1_m_plus.html.
48. Planning Commission. 2012. *Data for Use of Deputy Chairman, Planning Commission: Databook for DCH*, April 10. Author; Government of India.
49. The World Bank. 2011. *World Development Indicators Databank*. Washington, DC: The World Bank. Accessed December 13, 2011. <http://databank.worldbank.org/ddp/home.do?Step=12&id=4&CNO=2>. Planning Commission (2012), *Databook for DCH*.
50. Ministry of Road Transport and Highways. 2010. *Report of the Working Group on Emergency Care in India*. Delhi: Government of India.
51. Central Bureau of Health Intelligence (2010), *National Health Profile 2010*.
52. Between 1993–94 and 2004–05, real per-person income rose 67 percent and per-person tax collections rose 82 percent, but real per-person public health spending increased only 48 percent. Kumar, Chen, Choudhury, et al. (2011).
53. Montek Ahluwalia. 2002. “Economic Reforms in India since 1991: Has Gradualism Worked?” *Journal of Economic Perspectives* 16(3):67–88.
54. World Bank. 1993. *World Development Report 1993: Investing in Health*. New York: Oxford University Press.
55. Sevantika Bhandari. 2012. “Health Insurance in India.” Presentation to the Indian School of Business, Mohali, October 29.
56. Vikram Patel, Somnath Chatterji, Dan Chisholm, Shah Ebrahim, Gururaj Gopalakrishna, Colin Mathers, Vishwanathan Mohan, Dorairaj Prabhakaran, Ravilla D. Ravidran, K. Srinath Reddy. 2011. “India: Towards Universal Health Coverage 3 – Chronic Diseases and Injuries in India,” *The Lancet*, January 12. Accessed November 21, 2011. <http://www.thelancet.com/series/india-towards-universal-health-coverage>; Y. Balarajan, S. Selvaraj, and S.V. Subramanian. 2011. “India: Towards Universal Health Coverage 4 – Health Care and Equity in India,” *The Lancet*, January 12. Accessed November 21, 2011. <http://www.thelancet.com/series/india-towards-universal-health-coverage>; WHO. 2011. *Deaths Estimates for 2008 by Cause for WHO Member States*. Geneva: Author. Accessed December 16, 2011. http://www.who.int/healthinfo/global_burden_disease/estimates_country/en/index.html. The latest WHO data paint an even more worrying picture: at present: out of every 10 deaths in India, 8 are caused by noncommunicable diseases (NCDs). In rural India, 6 out of every 10 deaths are caused by NCDs. Kounteya Sinha. 2011. “Cancer, Diabetes, Hypertension Largest Cause of Death.” *Times of India*, August 24. Accessed October 30, 2012. http://articles.timesofindia.indiatimes.com/2011-08-24/india/29921597_1_ncds-diseases-diabetes.
57. Sumita Kale. 2011. “Emerging Issues in Health.” In *India Health Report 2010*, chapter 3.
58. Geeta Anand. 2012. “A Woman’s Drug-Resistant TB Echoes around the World.” *Wall Street Journal*, September 8. Accessed November 10, 2012. <http://online.wsj.com/article/SB10000872396390444273704577633431646496346.html>; Geeta Anand and Shreya Shah. 2012. “Indian Bureaucracy Slows

- Treatment of Tuberculosis.” *Wall Street Journal*, October 11. Accessed November 10, 2012. <http://online.wsj.com/article/SB10000872396390444799904578048560180386162.html>.
59. Patel, Chatterji, Chisholm, et al. (2011).
 60. Ibid.
 61. McKinsey & Company. 2007. *India Pharma 2015 Prescribed Growth*, August.
 62. Data from www.economywatch.com/economic-statistics. Accessed April 1, 2013.
 63. McKinsey Global Institute. 2007. *The 'Bird of Gold': The Rise of India's Consumer Market*. Accessed December 13, 2011 http://www.mckinsey.com/locations/india/mckinseyonindia/pdf/India_Consumer_Market.pdf.
 64. IBM. 2008. *Healthcare in India: Caring for More Than a Billion*. Accessed November 21, 2011. http://www-05.ibm.com/innovation/cz/thesmartercity/pdf/gbe03064-usen-00_hc_india_sum.pdf.
 65. Amit Sengupta. 2010. *Study of National Health System in India with Regards Access to Health Care and Medicines*. New Delhi: National Campaign Committee for Drug Policy.
 66. Industrial Extension Bureau. 2011. *Vibrant Gujarat: Healthcare Sector Profile*. Gandhinagar, India: iNDEXTb.
 67. Rao, Rao, Kumar, et al. (2011).
 68. Sengupta (2010), *Study of National Health System in India*.
 69. Ibid.
 70. Ibid.
 71. Ministry of Health and Family Welfare (2005), *Report of the National Commission on Macroeconomics and Health*.
 72. Planning Commission of India (2011), *High Level Expert Group Report on Universal Health Coverage for India*.
 73. Ministry of Health and Family Welfare (2005), *Report of the National Commission on Macroeconomics and Health*.
 74. This figure is remarkable given that over half of its citizens are under age 25 and more than 65 percent under age 35; recall that India comprises 17 percent of the global population. Balarajan, Selvaraj, and Subramanian (2011).
 75. Balarajan, Selvaraj, and Subramanian (2011), table 1.3.
 76. Laveesh Bhandari and Ankur Gupta. 2011. “Inputs for Health.” In *India Health Report 2010*, chapter 4; UNICEF. 2010. *Progress on Sanitation and Drinking Water. 2010 Update*. Geneva: WHO.
 77. Planning Commission of India (2011), *High Level Expert Group Report on Universal Health Coverage for India*.
 78. Bhandari and Gupta 2011. “Inputs for Health.”
 79. Ibid.
 80. Justin DeNormandie and Janette Sunita. 2002. *Combating Diarrhoeal Disease in India through Safe Drinking Water*. Delhi: Population Services International, 2002. Accessed December 13, 2011. http://www.who.int/mediacentre/multimedia/2002/ind_sanitation/en/index.html.
 81. Planning Commission of India 2011. *High Level Expert Group Report on Universal Health Coverage for India*.
 82. Naandi Foundation. 2011. *HUNGaMA Survey Report: Fighting Hunger and Malnutrition*. Hyderabad, India: Naandi Foundation.
 83. Paul, Sachdev, Mavalankar, Ramachandran, et al. (2011); Central Intelligence Agency. 2011. *The World Factbook*. Washington” Central Intelligence Agency. Accessed December 13, 2011. <https://www.cia.gov/library/publications/the-world-factbook/rankorder/2091rank.html>.
 84. Bhandari and Gupta (2011), “Inputs for Health.”
 85. T. Jacob John, Lalit Dandona, Vinod Sharma, and Manish Kakkar. 2011. “India: Towards Universal Coverage 1 – Continuing Challenge of Infectious Diseases in India,” *The Lancet* 377: 252–269, January 15.