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THE EVOLUTION OF GEOGRAPHY-BASED

SOUTH ASIA STUDIES

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THEMENSCHWERPUNKT**THE EVOLUTION OF GEOGRAPHY-BASED SOUTH ASIA STUDIES**

Carsten Butsch, Martin Franz, and Mareike Kroll	5
Editorial: The Evolution of Geography-based South Asia Studies	
Tine Trumpp and Frauke Kraas	9
Urban Cultural Heritage in Delhi, India: An Asset for the Future or a Neglected Resource?	
Harald Sterly	31
“Without a Mobile Phone, I Suppose I Had to Go There” — Mobile Communication and Translocal Social Constellations in Bangladesh	
Gregor C. Falk	47
Land Use Change in the Coastal Regions of Bangladesh: A Critical Discussion of the Impact on Delta-Morphodynamics, Ecology, and Society	
Carsten Butsch, Mareike Kroll, Frauke Kraas, and Erach Bharucha	73
How is Rapid Urbanization in India Affecting Human Health? Findings from a Case Study in Pune	
Alexandra Eisenberger and Markus Keck	95
The Blight in the Center: Dhaka’s Kawran Bazar in the Context of Modern Space Production	
Thomas Hennig	121
Energy, Hydropower, and Geopolitics — Northeast India and its Neighbors: A Critical Review of the Establishment of India’s Largest Hydropower Base	
Julia Poerting	143
The Emergence of Certified Organic Agriculture in Pakistan — Actor Dynamics, Knowledge Production, and Consumer Demand	
Stephanie Leder and Erach Bharucha	167
Changing the Educational Landscape in India by Transnational Policies: New Perspectives Promoted Through Education for Sustainable Development (ESD)	

NACHRUF

Obituary — Professor Dr. Hans-Georg Bohle	193
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KONFERENZBERICHTE

Social Movements in Theory and Practice: Concepts and Experiences from Different Regional Contexts, University of Zurich, 24.–25. October 2014 (Silva Lieberherr)	194
Third Conference on Bengal Related Studies for Students and Young Scholars, Halle (Saale), 24.–26. October 2014 (Sukla Chatterjee)	196
Jahrestagung der Deutschen Vereinigung für Chinastudien, Universität Münster, 07.–11. November 2014 (Isea Cieply)	198
Jahrestagung des Arbeitskreises Südostasien in der Deutschen Gesellschaft für Geographie, Köln, 14.–15. November 2014 (Gerrit Peters, Frauke Kraas und Javier Revilla Diez)	199

REZENSIONEN

Rolf Zeiler: Asien mit Anzug und Krawatte (Eva Schwinghammer)	201
Srinath Raghavan: 1971. A Global History of the Creation of Bangladesh (Jürgen Stetten)	202
Arndt Michael: India's Foreign Policy and Regional Multilateralism (Armin Müller)	203
Martin Großheim: Die Partei und der Krieg. Debatten und Dissens in Nordvietnam (Christoph Giebel)	205
Nicholas Herriman: The Entangled State. Sorcery, State Control, and Violence in Indonesia (Friederike Trotier)	207
Yong Wook Lee, Key-young Son (Hgg.): China's Rise and Regional Integration in East Asia: Hegemony or Community? (Nick Gemmell)	209
Hubert Heinelt (Hg.): Modernes Regieren in China (Matthias Stepan)	210
Robert Heuser, Daniel Sprick: Das rechtliche Umfeld des Wirtschaftens in der VR China (Judith Schöne)	211
Tim Pringle: Trade Unions in China. The Challenge of Labour Unrest (Günter Schucher)	212
Jörn Keck, Dimitri Vanoverbeke, Franz Waldenberger (Hgg.): EU-Japan Relations, 1970–2012. From Confrontation to Global Partnership (Frank Rövekamp)	214
Steven Chung: Split Screen Korea. Shin Sang-Ok and Postwar Cinema (Martin Abraham)	215
NEUERE LITERATUR	218
JAHRESINHALTSVERZEICHNIS FÜR 2014	226
AUTORINNEN UND AUTOREN DIESER AUSGABE	233

Als Mitglied der Gesellschaft für Asienkunde erhalten Sie die Vierteljahrszeitschrift *ASIEN* kostenlos. *ASIEN* bietet Ihnen Artikel zur Politik, Wirtschaft, Gesellschaft und Kultur Asiens, viele nützliche Informationen (Konferenzberichte, Rezensionen) sowie 2mal jährlich alle asienkundlichen Lehrveranstaltungen in Deutschland, Österreich und der Schweiz auf der Website.

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Refereed article

How is Rapid Urbanization in India Affecting Human Health? Findings from a Case Study in Pune

Carsten Butsch, Mareike Kroll, Frauke Kraas, and Erach Bharucha

Summary

Rapid urbanization in Africa and Asia is currently changing environmental and societal living conditions for a large number of people. In urban India specifically, the deterioration of local natural environments, the inadequate provision of infrastructure, and socioeconomic disparities are collectively resulting in a “double burden” of disease — namely, high morbidity from both communicable diseases and from environment- and lifestyle-related non-communicable ones. Using the example of Pune, the paper illustrates intra-urban differences in health status and access to healthcare by analyzing: a) the prevalence of diabetes and associated risk factors and b) access to healthcare services.

The analysis of the prevalence of diabetes among different socioeconomic groups reveals that although the disease is currently still more common among the more affluent members of the Indian population, those from poorer backgrounds are also now demonstrating an increasing susceptibility to it due to recent changes in their behavioral choices. The course of the disease also differs across social levels, with a much higher number of complications and comorbidities being found among the lower socioeconomic groups. One reason for this lies in the major disparities that exist in access to adequate healthcare services. Pune’s healthcare system is scarcely able to meet the challenge posed by a growth in population occurring alongside simultaneous changes in local epidemiological patterns. Major barriers to healthcare access exist in terms of affordability and awareness. These intra-urban differences in exposure to health risks and the varied ability to cope with ill health are now resulting in an epidemiological diversification within Indian urban society. Targeted interventions aimed at different social levels are thus needed if the urban health situation in India is to improve.

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Keywords: India, access to healthcare, health status disparities, urbanization, urban health

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Introduction*

The environmental and societal conditions in cities, which influence human health significantly, are by now already of fundamental importance for more than half of the world's population. The World Health Organization (WHO) and United Nations Human Settlements Programme (UN-HABITAT) both consider the rapid growth of urban populations to be one of the most important global health issues of the 21st century. In this context, urban health is gaining increasing attention as an interdisciplinary research topic (Vlahov et al. 2004) — with academics focusing specifically on understanding the mutual feedback loops that exist between human health, social and physical environments in cities, and urban health systems (Butsch et al. 2012, Bork-Hüffer and Kraas 2014). India's rapid urbanization process, the specifics of its healthcare system, and the current epidemiological transition taking place make it a both challenging and fascinating setting in which to study urban health. On this basis, the objective of this paper is to present and explain both human health status and intra-urban disparities therein in the emerging megacity of Pune from both a disease ecological perspective (in other words, health status and health risks) and from a health system one (meaning access to healthcare). In the first section, an overview of the urbanization process in India and the resulting challenges thereof for urban health is provided. Then, the urbanization process in Pune — which serves as a prime example for a fast-growing urban agglomeration existing in the shadows of India's four megacities — will be briefly outlined. In the third section, the methodological approach for studying urban health in Pune will be described and empirical results will be presented. For this, first, the diabetes burden as an “urban” disease with a high incidence rate, as well as its underlying risk factors, will be analyzed for different socioeconomic groups. Then, second, intra-urban differences in access to healthcare services will be discussed. In the Conclusion, challenges present and future for public health in both Pune and urban India at large will be debated.

Urbanization and urban health in India

Despite India's ancient tradition of having urban centers, dating back to the cities of the Indus Valley civilization, its number of urban dwellers is at present relatively low (32.4 percent) — both in global terms and within the group of less developed countries (53.6 percent and 48.4 percent respectively, UN 2014). This relatively low urbanization rate masks the fact that India's urban population has actually massively grown in absolute numbers during the last two decades. India is one of the hotspots of the current phase of the global urbanization process; not only is its urban population growing in terms of both absolute and relative numbers, but the country's urban system as a whole is also undergoing significant transformation. According to the

* Acknowledgement: The results presented were obtained in the frame of research project “(Mega)Urban Health: Health Disparities and Access to Health Care Services in Pune/India,” which was partly funded by the German Research Council (DFG) (DFG-grant: KR 1764/12-1).

UN's 2014 edition of the *World Urbanization Prospects* publication, India's urban population has grown from 64 million people in 1950 (total population: 376 million) to 410 million in 2014 (total population now: 1.2 billion) — and it will reach 525 million people by 2025 (estimated total population: 1.4 billion). For the period 2010 to 2050 the same source predicts the likely emergence of 289 million additional urban dwellers in India, which by the end of that period will thus have become a predominantly urban country (total population: 1.6 billion). Furthermore, the urban population of the future will live in much larger cities than they did in the past. In 1950, no city in India had more than five million inhabitants and only five cities had more than one million residents; 78 percent of the urban population thus resided in cities with fewer than 500,000 inhabitants each. By 2025, however, 21 percent of India's urban population will live in one of the country's six megacities,¹ with them each having more than 10 million inhabitants by then. The population share of Indian residents situated in comparatively small urban settlements with fewer than 500,000 inhabitants each is estimated to have reached 44 percent by 2025 (UN 2014).

The recent increase in urban growth rates and the transformation of the urban system are related to the gradual destabilization of the agrarian economy (Kundu 2009) and the Indian government's New Economic Policy of the early 1990s (Shaw and Satish 2007). This policy facilitated investment in real estate developments, especially by the emerging middle class and attracted foreign capital in the real estate sector. These investments changed India's cities in different ways: in the urban centers, densification resulted in the creation of high-rise office buildings and apartment complexes; the globalization of urban functions, meanwhile, resulted in the more intense modernization of buildings and structures, often those next to earlier heritage quarters. On the urban fringes, substantial land transformations brought urbanized structures to formerly rural landscapes. In some cases urbanization resulted in massive land grabbing on those urban fringes by both the public and the private sectors, resulting in shifts in local power relations (Narain 2009; Shah and Kumar 2011). The newly built-up areas consist of multistory buildings, mostly in the form of cooperative housing societies. Today, most Indian cities exhibit three readily distinguishable genetic structures: 1) the historic town (precolonial); 2) colonial era urban expansions (often as distinct areas: cantonments and civil lines); and, 3) large post-independence urban expansions. These specific structures can also be found in Pune, and are reflected in the geographical areas of study selected. The old town centers and urban expansions in particular are interspersed with slum pockets housing a large proportion of the local population — ranging from 18 percent of households in Hyderabad to 56 percent in Mumbai (Gupta et al. 2009). Though slum areas are often characterized by substandard housing conditions and inadequate infrastructures, the slums are not necessarily exclusively made up of the poor. In Hyderabad,

1 In descending order: Delhi, Mumbai, Kolkata, Bangalore, Chennai, and Hyderabad.

for example, 17 percent of the slum population live below the poverty line compared to 11 percent of the city's non-slum population (Gupta et al. 2009).

The percentage of the urban population living below the poverty line² in the different Indian federal states ranges between 44 percent (Orissa) and 3 percent (Assam) (GOI/UNDP 2009: 10). For India as a whole, the proportion of the urban population living below the poverty line fell from 25.7 percent in 2004/05 to 20.9 percent in 2009/10 (Planning Commission 2012: 9). Nevertheless, several indicators reveal the socioeconomic fragmentation existing within Indian urban society: The Gini coefficient³ for the country's cities rose from 0.27 in 1972/73 to 0.38 in 2008/09, while the Gini coefficient for rural India fell in the same time period (Planning Commission 2012: 22). The literacy rate for slum dwellers reported in the 2011 census was 77.7 percent compared to 84.5 percent for those living in urban areas in general (Office of the Registrar General and Census Commissioner India 2013: 27). The socioeconomic gradients in India's urban societies are reflected in the severe health disparities that exist: for example, the under-five mortality rate of the poorest urban quartile in Uttar Pradesh is four times as high as for the three more affluent quartiles in Maharashtra and Madhya Pradesh. Nationwide, 54 percent of children in the poorest quartile of the urban population were stunted as compared to 33 percent in the rest of the urban population (Agarwal 2011: 16–17). This "health divide" (WHO/UN-Habitat 2010) is caused by variation in nutritional intake and by disparities in living conditions, with those concerned having different levels of exposure to social and environmental risk factors.

As well as increasing social fragmentation, the growth of cities in India is being accompanied by several other adverse effects besides — namely infrastructure failures, a lack of housing facilities, and shortfalls in the provision of services. These issues are related partly to the decoupling of urban growth from economic growth, and partly to weak planning and poor governance structures. However, comparable and countrywide data at the city level is scarcely available and difficult to access (Gupta et al. 2009). Furthermore, data for different time periods is often not comparable; the definition of what constitutes living below the poverty line, for example, was altered by the Planning Commission from a calorie-based measurement to a basket of goods in 2009.

The current environmental degradation of cities in India is to a large extent related to municipal corporations' lack of capacities (financial, legal and managerial) (Nandi and Gamkhar 2012). Shortfalls in sewage treatment facilities in many of the country's cities result in significant water pollution. According to the Central Pollution Control Board of India (CPCB), at current capacity the relevant authorities are only sufficiently able to deal with 51 percent of the sewage generated in metropolitan

2 As defined by the Government of India (cf. GOI/UNDP 2009; Planning Commission 2012).

3 The Gini coefficient is a measure for the distribution of income, varying from 0 (total equality) to 1 (total inequality) (Gastwirth 1972).

cities (those having more than 1 million inhabitants) — with their individual abilities ranging from 100 percent in Hyderabad to a mere 6 percent in Bhopal (CPCP 2013: 4). Poor air quality, meanwhile, is related to both polluting industries and to the increased use of motorized private transport. In particular, the large number of two-wheeled vehicles with two-stroke engines is contributing to rising values for suspended particulate matter (SPM) — specifically NO_2 and SO_2 . The CPCB monitors air pollution under the National Air Quality Monitoring Programme, with it being implemented at 456 measuring points countrywide (as of March 31, 2011, cf. CPCB 2012: 3). For SPM, the measurements permanently exceed the designated “critical” level ($>90\mu\text{g}/\text{m}^3$) at more than 50 percent of these stations and are permanently “high” ($61\text{--}90\mu\text{g}/\text{m}^3$) at another 28 percent thereof.

One problem related to municipal managerial capacities is the organization of effective waste management services. Large quantities of the on average 300g to 500g of solid waste that is generated per person per day in urban India are not properly treated (Zhu et al. 2008: 175). Waste collection is organized partly privately (in both the informal and formal sectors) and partly by the municipalities, with the means of collection and treatment of waste often failing to adhere to prescribed environmental standards. Leaking landfills, for example, contribute to the contamination of groundwater resources (Zhu et al. 2008).

These living conditions have a hugely detrimental effect on human health: in 2008, the mortality rates from diarrheal diseases and non-communicable respiratory diseases in India were 132.7 and 153.6 people per 100,000 inhabitants respectively (WHO 2011).⁴ Furthermore, the creation of artificial landscapes and sealed surfaces has for instance resulted in the increasing urban presence of malaria, as well as of other vector-borne diseases such as dengue fever (Akthar et al. 2010; Kumari et al. 2011). Urbanization also results, among other things, in social and behavioral changes, altered working conditions, and modifications in dietary patterns. The general increase in the pace of life, in stress levels, and the accompanying growth in psychological uncertainty leads to a hike in the number of those suffering from so-called “lifestyle diseases” such as cardiovascular issues and diabetes (cf. Kale 2010; Mohan et al. 2007; Pandey 2009; Ramachandran and Snehalatha 2009). The latter is a growing public health challenge in India: an estimated 65.1 million people (for the age group 20–79 years old) suffer from diabetes; that number is expected to rise to 109 million by 2035 (IDF 2013: 34). Although diabetes and cardiovascular diseases are on the rise among the Indian population as a whole, their incidence is currently much higher in urban India than it is in the country’s rural settings (Mohan et al. 2008, Ramachandran and Snehalatha 2009).

4 For comparison: in the same year, in China 1.7 people in 100,000 died from diarrheal diseases and 123.8 in 100,000 from non-infectious respiratory diseases; in Brazil 3.9 deaths per 100,000 inhabitants were attributed to diarrheal diseases and 56.5 per 100,000 to non-infectious respiratory diseases (WHO 2011).

As a result of all these factors, urban dwellers in India — caught up in a now more rapidly unfolding epidemiological transition — suffer from the so-called “double burden” of both communicable and non-communicable diseases (Harpham 2009: 111). Although urban health systems are often regarded as an asset, not all urban dwellers have access to the available healthcare facilities: a large proportion of the latter (and especially the most advanced ones) are operated by private practitioners, trusts, or companies who only treat those patients that are able to pay. Eighty percent of ambulatory care and 60 percent of inpatient care in India are delivered by the private healthcare sector — that despite the fact that the public sector should, in theory at least, offer the full spectrum of healthcare services at minimal charge (Nagpal 2013: 1). The National Health Policy of 2002 addressed the deficits in the public and private healthcare sectors in India, and highlighted the differences in the performance of the healthcare sector as a whole across the different union states. These disparities had resulted from different priorities being given to the field of health by the respective state governments in the past (Balarajan et al. 2011). One of the reactions to this reappraisal was the creation of the National Rural Health Mission, launched in 2005 — it is striving to improve the health status of the country’s entire rural population. Focus was hereby directed toward rural areas, since urban centers have generally been regarded as better off vis-à-vis general health status (Ministry of Health and Family Welfare 2008). However, this assumption only holds true if the averages for key health indicators are compared; health status disparities within Indian cities have actually been neglected in the national discourse for many decades now.

Pune — Urban development trends

According to the Census of India (2013), the city of Pune had 3.1 million inhabitants in 2011 — while the Pune Urban Agglomeration, with a population of 5.5 million, was the country’s eighth-largest agglomeration. The agglomeration is located at the eastern end of a 180 kilometer-long economic corridor connecting Pune and Mumbai as part of an industrialization and urbanization belt that extends along India’s northwestern coast from Ahmedabad, via Mumbai, to Pune (Shaw 1999). Pune’s population has grown more than tenfold in the last 80 years: Bapat (1981:174) cites the 1941 census, according to which the urban agglomeration then had 375,000 inhabitants. The city’s rapid growth began in the 1940s, being initially fueled by an increase in available employment due to intensified armament production during World War II. Since the 1960s, people have been attracted by the newly established industrial estate north of Pune, situated in Pimpri-Chinchwad (Bapat 1981; Khairkar 2008). Today, Pune is an important location for the Indian automotive, pharmaceutical, and chemical industries, and for food processing, information technology and communication, and higher education. Pune has furthermore become the preferred investment location within India for German companies: as of 2011, 225 German companies had a branch in Pune — including Mercedes Benz, Siemens

and Volkswagen (Joshi 2011). With economic development having attracted migrants, today around half of the city's population growth trend can be attributed to internal migration (PMC 2009).

Pune has changed in character in recent decades from previously being a quiet hill station overshadowed by Bombay to becoming a congested and hectic metropolis in its own right. The aforementioned growth in population numbers was not, however, accompanied by a corresponding increase in housing provisions, and therefore the number of slum settlements has risen significantly: in the 1930s poor families squatted on the banks of *nullahs* (small streams) in the city center; in the 1940s hut settlements were erected around Poona railway station; and, after 1960 larger slums emerged south of the historic city center (Bapat 1981; Didee and Gupta 2003). According to the 2001 census (the 2011 data has not been published for the city level yet), 19.4 percent of Pune's population lived in slums (Sawhney 2013: 49); according to the Pune Municipal Corporation, however, more than 40 percent of the city's population lives in slums, as they use different criteria to define the latter (PMC 2007: 4–3, cf. also Sen et al. 2003).

The negative social and environmental consequences of rapid urbanization and their impact on human health, as already described for Indian cities in general, are also pertinent to the case of Pune as well (Kroll et al. 2014). The city faces continuing and increasing environmental degradation due to land use changes, greater traffic on its roads, the improper management of household and industrial waste, and sewage water going untreated (PMC 2008). Despite the upper middle class trying to isolate itself by living in semi-gated housing societies, those from every socioeconomic strata are in fact exposed to these risk factors — yet the degree of exposure varies for the members of each different risk group. The local healthcare system reflects the general state of the wider national one: in the wake of the city's growth, the relative capacity of the public sector has shrunk in the last decades — in other words, the number of people to each doctor ratio has increased. The private sector is compensating for these shortfalls with a steady increase in the number of facilities, according to the rules of the market. Due to this growth being hardly regulated, a very heterogeneous health system has emerged over the past decades.

Two perspectives on urban health in Pune

In the empirical part of this paper we present findings from a research project that aimed to analyze intra-urban health differences from a disease-ecological and a healthcare system perspective. The first looks at the demand side of urban health: what diseases affect different socioeconomic groups within the urban population, and what factors might explain the different disease burdens? In this section, differences in the burden of diabetes and exposure to its accompanying risk factors will be discussed. Diabetes was chosen as a representative example due to its high rate of occurrence and due to its links with behavioral risk factors, which appear to gain

relevance in the urbanization process due to associated lifestyle changes. The healthcare system perspective focuses on access thereto in Pune: why and how does this vary? How do both the users and providers of healthcare perceive and react to these differences? Together, these two research strands combine to provide a broader, more differentiated picture of the health status of the different population subgroups in the city — and also of their ability to cope adequately with ill health.

Some of the data for the two research angles of the project was collected in tandem, some separately. The following methods were applied: a household survey was conducted in two waves across six geographical research areas. These were selected according to their historic urban morphological setting and type of housing structure. As such, three pairs of relatively homogenous neighborhoods — always a non-slum one along with one or more adjacent slum pockets — were selected in order to successfully represent specific socioeconomic groups within Pune's population in: 1) the historic city center (lower middle class and low income/established slum population); 2) the colonial era part of the city (upper middle class and low income/temporary migrants in an unregistered slum); and, 3) a recently developed area (middle class and low income/recently legalized slum). The selection of these areas was based on preliminary field visits, while the presumed socioeconomic status of those to be interviewed was verified during the household survey. In each wave, data on 450 households (75 households in each area) was collected using random walk sampling (Kromrey 2009). The first wave included questions on access to healthcare services and the disease burden among all household members, while the second wave focused exclusively on the disease burden and associated risk factors. In total 900 standardized interviews were conducted either in English or in the local language, Marathi. These were then coded and statistically analyzed (mainly using descriptive statistics). Additionally the locations of healthcare facilities were mapped in and around the geographical research areas, and detailed information was collected on practitioners' qualifications, the system of medicine (allopathy, ayurveda, homeopathy etc.) practiced, and so on. Furthermore, in-depth interviews with participants from the household survey were carried out either in English or in Marathi. Expert interviews were conducted with medical practitioners, hospital administration personnel, and those working for public healthcare services as well as nongovernmental organizations. All interviews were transcribed, translated (if necessary), and analyzed. In addition, secondary data, like morbidity and mortality statistics were used for data triangulation.

Disease ecological perspective: the example of diabetes

Transformations in both social and physical environments together with significant demographic changes (such as increasing life expectancy) are the underlying causes for the recent epidemiological transition unfolding in Pune. The prevalence of non-communicable diseases (NCDs), especially cardiovascular and chronic respiratory

diseases, diabetes, and different forms of cancers, is increasing, while at the same time communicable diseases such as gastrointestinal disorders and tuberculosis are still ever present — or even increasing, as is the case for dengue fever (Kroll 2013). Susceptibility to communicable and non-communicable diseases varies between different socioeconomic groups. While the prevalence of NCDs such as diabetes is higher among the lower socioeconomic groups in Western societies (Kroll 2010), for a long time NCDs were mainly considered to be a problem of the affluent urban population in India because of the diseases' risk factors. Type 2 diabetes is often labeled a “lifestyle disease” due to its roots in behavioral risk factors such as an unhealthy diet and a sedentary existence (see Figure 1). Although diabetes is on the rise among the entire Indian population, studies show a higher prevalence of it within the urban population because of the wider distribution of risk factors such as obesity (Mohan et al. 2008; Ramachandran and Snehalatha 2009). In Pune, experts now also see a rising trend:

There is almost an explosion of diabetes in our society [...] especially in the last 10 years (Interview with a diabetologist in Pune).

However, data on the diabetes burden for the population of Pune or for different socioeconomic groups do not currently exist, due to the lack of routine surveillance of NCDs.

The age-standardized diabetes prevalence among all participants of the household survey over 20 years old (n=2,613) revealed a socioeconomic gradient ranging from 7.3 percent and 7.8 percent respectively in the two upper middle class areas, 5.4 percent in the middle class area, to 4.4 percent in the two registered slums and 1.8 percent in the temporary slums. Since the diabetes burden was self-reported, underreporting is very likely to have occurred in all six geographical areas. A study among industrial workers and their families in Pune, for example, found a diabetes prevalence of 8.4 percent based on blood sugar measurements (Ajay et al. 2008). Medical experts interviewed expected underreporting to be higher in the slum areas because of insufficient knowledge about health and nonexistent or late diagnosis due to greater barriers to healthcare access. A diabetologist from a government hospital, who mainly sees patients from the lower socioeconomic groups, stated that: “We also thought that it is a disease of the upper class, but it is no more. Any class can get affected.” Though diabetes is more prevalent among the higher socioeconomic groups, the gradient is not as steep as might be expected. This raises the question of how the increasing prevalence of diabetes among all socioeconomic strata is linked to exposure to certain risk factors.

Risk factors for diabetes

Diabetes is characterized by a complex disease aetiology, making it impossible to attribute its occurrence to a single causal factor. Its onset can instead be explained by a web of disease, placing the exposure to risks as well as protective factors in a probabilistic multidimensional matrix of interactions (Jenkins 2003). The assess-

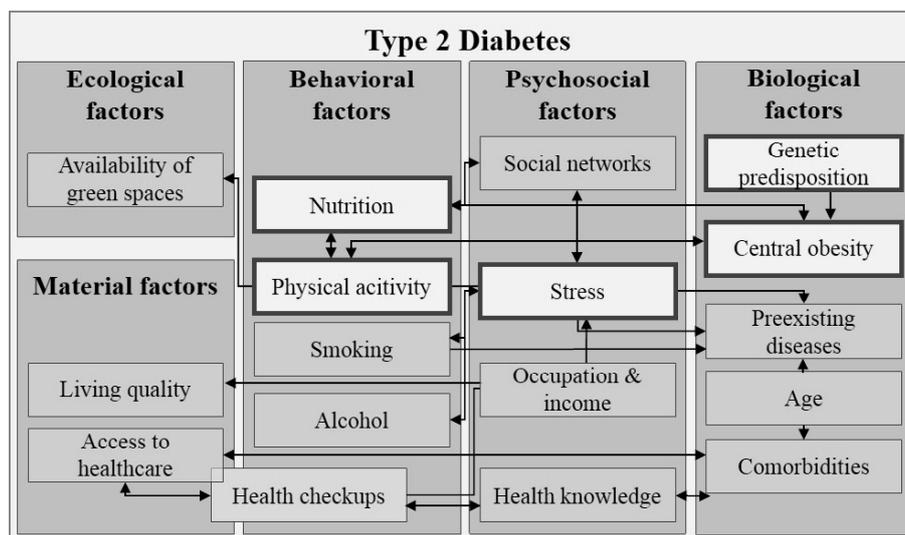
ment of health determinants is based on the three explanatory approaches to disparities therein identified by Bartley (2004): psychosocial, material, and behavioral factors. Bartley also makes reference to the “whole lifetime” perspective, as exposure to risk factors — for example in early childhood — can also affect health status at a later point in a person’s life. Furthermore, migration can cause temporary exposure to local risk factors. In addition, biological and ecological factors are also considered. Bartley includes the latter in the material dimension, since one’s available income usually defines the environmental quality of the residential area that a person chooses. This assumption does not, however, hold true for fast-growing cities in India, where environmental degradation affects every socioeconomic stratum.

The occurrence of Type 2 diabetes is influenced by various behavioral (such as dietary patterns, lack of physical exercise), psychosocial (for example stress), and biological factors (like age, weight, genetic predisposition, or preexisting conditions such as hypertension or pancreatitis), acting cumulatively and interactively (see Figure 1). Therefore, the onset of the disease cannot be linked to one specific risk factor alone. The Indian population, for example, seems to have a stronger genetic predisposition to diabetes (Ramachandran and Snehalatha 2009). Material and ecological factors have an indirect effect on the disease’s prevalence: the availability of green spaces and the quality of the daily living environment have an impact on the amount of physical activity, meaning on the walkability of a given residential area. Income determines housing quality, the affordability of certain foods, healthcare access, and the ability to meet other basic needs. Information on risk and protective factors for different socioeconomic groups was collected during the survey, through in-depth interviews with both laypeople and medical experts. The most important such factors will be discussed in the following.

Diet can constitute both a major risk factor (for example through the intake of excessive saturated fats by eating fast food) as well as a protective one (such as the consumption of unsaturated fats through fruit, vegetables, and dietary fiber) — thus capable of altering the risk of Type 2 diabetes onset in either direction (Park 2007). The intake of fruit and vegetables was due to financial constraints very low in most households in the three slum areas surveyed: for example, 60 percent of all households in the temporary slums could not afford any fruit at all. However, their being affordable to the higher socioeconomic strata does not always lead to a higher consumption of these foodstuffs within these groups: only 16 to 20 percent of all households in the upper middle class areas examined consumed the five servings of fruit and vegetables per day (in total 400g) recommended by the WHO (Agudo 2005). Another risk factor related to diet patterns is increased caloric intake, leading to obesity, which results in a decrease in insulin sensitivity (Ramachandran and Snehalatha 2009). The risk of obesity is also linked to the amount of physical exercise undertaken. While work for members of the higher socioeconomic strata is often deskbound, awareness of the necessity of regular physical exercise is increasing. Forty-seven percent of the population above the age of 14 in the two upper

middle class areas declared that they regularly participate in sports activities. Nevertheless, 24 percent of the interviewees in these two areas were either overweight (13 percent) or obese (11 percent) (note that there are different body mass index (BMI) thresholds in India for overweight (>23) and obesity (>25), Indian National Institute of Nutrition 2010: 53). Among the lower socioeconomic strata, occupations and daily work routines often require extensive physical activity — although changing living conditions can also now put some of these people at risk of obesity. Furthermore, the consumption of cheap, high in fat, unhealthy foods poses an increasing risk, as reported by practitioners and laypeople alike. In the two registered slum areas, 1 and 4 percent of the respondents were overweight respectively, while 1 percent in both areas were obese. Though these numbers are overall still very low, obesity among the lower socioeconomic groups could become a problem in the future in light of changing diet patterns and declining physical activity levels. Additionally being underweight also constitutes a risk factor for diabetes, remaining — according to general practitioners and NGO experts — a problem primarily found in slum areas: according to the “thrifty phenotype” hypothesis, foetal under-nutrition increases the risk of developing coronary heart disease and diabetes later in life (Yajnik et al. 2003). Though obesity and unhealthy diets are still more prevalent among the affluent strata of Indian society, health awareness and preventive measures are increasing in this group — while in slum areas the risk for diabetes is on the rise due to recent behavioral changes. Material factors — that is, the affordability of nutritious food — do however still also play an important role.

General practitioners and diabetologists also linked the growing prevalence of diabetes in Pune to increasing stress levels, arising due to social transformation processes unfolding across all socioeconomic strata. However, the factors causing stress differ from group to group: “In the slum areas it may be more of means of subsistence, because of larger number of people under one roof, clashes between them. And in the upper socioeconomic strata it is more related to job, the lifestyle, lack of sleep, habits.” (general practitioner). Though husband and wife in slum areas often both pursue an economic activity, many households are not able to improve their economic situation significantly due to low wage levels in the unskilled sector. Around 60 percent of the interviewees in the three slum areas indicated their despair about the future because of financial problems and difficult living conditions, as compared to 20 to 30 percent in the middle class areas. In the upper middle class work-related stress was mentioned, as was increasing levels of psychological insecurity (for example about losing one’s job) in a highly complex urban environment. Although the reasons for increased stress levels seem to vary between households with different socioeconomic statuses, stress increasingly now constitutes a risk factor for developing diabetes and cardiovascular diseases for all of Pune’s socioeconomic strata.

Figure 1: Risk and Protective Factors for Diabetes

Source: translated from Kroll (2013: 215).

The increasing complexity of everyday life inter alia resulting in an increasing consumption of alcohol and tobacco as coping strategies, thereby constituting modern risk factors — ones found especially among the lower socioeconomic groups. Twelve percent of all males above the age of 20 in the temporary slum reported to consume alcohol on a daily basis, compared to equivalent figures of 6 percent and 9 percent respectively in the two registered slum areas. However it was reported in in-depth interviews with both survey participants and with NGO experts that the actual consumption rates are much higher. “Alcohol and drug abuse is a big challenge. It is because of the frustration [...] and the earning capacities are less and then when they see the lifestyles of others.” (NGO expert, Interview). Tobacco consumption was also especially high among males in the three slum areas. Results from the survey show that spending by those from lower socioeconomic groups — not only on alcohol, but also on tobacco or fast food — was often done at the expense of meeting basic needs. In the upper middle class areas the irregular consumption of alcohol among women and men increases, for example on social occasions or after work as a stress buster (for example 42 percent of all men and 14 percent of all women from the upper middle class living in the recently developed area occasionally consumed alcohol). Overall, modern risk factors such as stress, alcohol intake, and tobacco consumption are on the rise within each and every socioeconomic stratum. However, the impact thereof on those from the lower socioeconomic groups tends to be more severe, due to their financial constraints, difficult living conditions, and lack of health knowledge.

Disparities in the course of the disease

Although the higher socioeconomic strata at present still have a greater tendency to contract diabetes, a risk transition in the future could lead to the higher incidence of the disease among the lower socioeconomic groups — as observed in Western societies. Furthermore, it was discovered in our survey that the course of the disease varies between different socioeconomic groups, with diabetes being a chronic, long-term disease with variable clinical progression. Pune's lower socioeconomic strata are at a higher risk of a severe and even fatal course of the disease as, according to medical specialists there, it is usually only diagnosed at a later stage for members of this group. It is more difficult for the poor to regulate their sugar levels, either due to a lack of health knowledge or to financial constraints. Therefore, they are more likely to develop health complications. A diabetologist from a government hospital mostly attended by poor patients commented that:

Our patients are mostly illiterate, so unless we tell them (about the disease), they won't know. And [...] diabetes is a silent disease. So often they come to us when the complications have already occurred. [...] 40 percent (of our patients come) when they actually have complications. [...] and the compliance in around 20 percent patients is very poor.

Therefore those from the lower socioeconomic groups are more likely to suffer from irreversible comorbidities such as non-healing wounds, diabetic foot, and kidney or cardiovascular problems. Furthermore, the inadequate control of diabetes weakens the immune system and increases susceptibility to infectious diseases such as tuberculosis. These risks naturally also exist for members of the higher socioeconomic strata, but increasing awareness and medical checkups often allow for early diagnosis and successful intervention in their case. The number of healthy years lost due to diabetes and other NCDs is much higher within the lower socioeconomic groups.

Healthcare system perspective: access

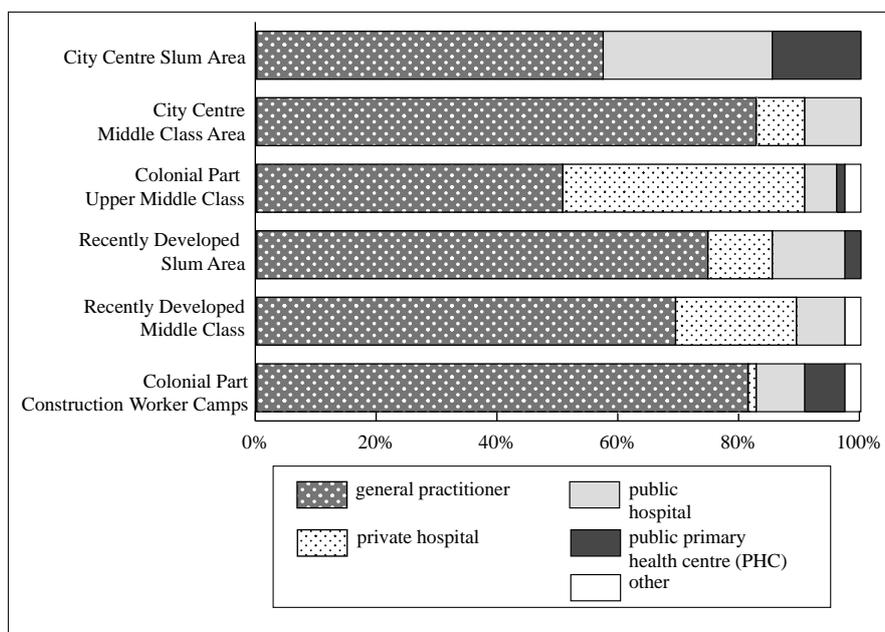
Different schools of thought each offer their own specific analytical perspective on access to healthcare services (for an overview, cf. Ricketts and Goldsmith 2005). One strand of research has developed on the basis of Penchansky's and Thomas (1981) seminal concept, which describes access to healthcare as the fit between system and patient in the five dimensions of acceptability, accessibility, accommodation, affordability and availability. For the analysis of access to healthcare services in Pune, an enhanced framework based on this concept was developed (cf. Butsch 2011). As an important improvement to the model, awareness was added as a sixth dimension — since a lack of orientation within the healthcare system (on the part of patients) and a lack of information on the health status of the population (on the part of the healthcare system) were identified in a pre-study as major factors influencing access to health care. The application of this enhanced six-dimensional framework revealed that obstacles to and facilitators of access to healthcare differ strongly according to: (1) the patient's socioeconomic status and (2) whether one

seeks care in the private or the public sector. In the two dimensions of affordability and awareness, the degree of fit between patients' needs and the healthcare system's structures is currently extremely unfavorable in Pune (as will be revealed in due course). Before facilitators and obstacles are described for each of the six dimensions, the results of a healthcare facility survey and the findings on general behavior when seeking treatment (from the household survey) will be briefly outlined.

The survey of the healthcare infrastructure in and around the six geographical research areas revealed that a high density and a great diversity of medical facilities exists in Pune. Especially at the primary care level, practitioners are trained in different systems of medicine — mainly allopathy (or “Western medicine”), homeopathy, and ayurveda. According to our expert interviews, many of the practitioners trained in alternative forms of medicine provide allopathic treatment in their day-to-day practice without actually being adequately trained to do so. By way of justification, the practitioners said that they are the most important point of contact for the poor and therefore have to use allopathy to help their patients — since some diseases cannot be treated through alternative systems of medicine. Some added that most patients expect quick results and therefore they had to administer antibiotics, for example. Under these circumstances, treating patients in a manner that is effective in the short-term is also an important economic motivator for practitioners.

Practitioners practicing allopathy without adequate training were mostly found working in or around slum areas. Other discernable patterns in the distribution of healthcare facilities were: (1) a high density of tertiary care facilities and public facilities in the city center and (2) variations in the type of specialization, the system of medicine practiced, and practitioners' qualifications according to the socioeconomic status of the neighborhood. As such postgraduate and foreign degrees as well as a higher degree of specialization were abundant among practitioners working in economically better-off neighborhoods.

The availability of practitioners at the microlevel is reflected in the treatment seeking behavior of the population, as the household survey revealed (Figure 2). Private practitioners at the primary care level are the predominant caregivers in all of the six neighborhoods, while the public primary care facilities that should (theoretically) provide holistic care for the majority of the population only in practice reach those living in the city center slum areas. Especially the upper middle class populace living in the colonial city extension uses the outpatient departments of reputed private hospitals as their main source of primary care.

Figure 2: Treatment-seeking behavior in the six geographical research areas

Source: translated from Butsch (2011); database: in author's survey n=450 (6 x 75) households.

These patterns of healthcare utilization are also one outcome of the barriers and facilitators existing in the first dimension “accessibility,” which was found not to be an obstacle to healthcare access in Pune. Especially at the primary care level, affordable practitioners — though not necessarily providing adequate treatment — are usually available (second dimension) within walking distance — even in slums. In the recently developed area of the city, experts and laypeople alike identified the issue of accessibility of specialty and emergency care as an access barrier. Also, subsidized treatment within the public sector is scarcely available in newly developed areas of the city.

The accommodation (third dimension) of the needs of patients was identified as a core problem in the public sector. Due to a lack of resources, overcrowding, and restricted consultation hours, public healthcare services are less readily accessible as compared to private ones. Interestingly, though, it is usually not the skills of the staff that are questioned, as the following quotation illustrates:

I will go to these guys in the private hospital but I will not go to the public hospital. If the same doctors at the public hospital had their own practicing clinics I would go to them there. You know it's a question of time lack [...] the waiting period [...] the crowds [...] the clipping of treatment quality [...] That would be reasons which keep me away from there (Interview with a layperson from the upper middle class).

Barriers to and facilitators of access, which are related to the personal relationship between patient and practitioner (acceptability, fourth dimension), revealed a different pattern than that which was initially expected. Experts and laypeople rarely reported negative discrimination, which was originally assumed to play a role because of the Indian caste system. Negative discrimination was mainly mentioned in connection with the public sector's poor reputation, resulting in a strong preference for tertiary care private hospitals. The government sector's poor reputation especially prevents the poor — who could potentially benefit from the subsidized treatment offered — from seeking treatment there. Instead, they first spend their savings in corporate hospitals. Interestingly, positive discrimination was found to be an important factor influencing patients' preference for practitioners from the same religious background as themselves and, if they are migrants, those having the same geographical origins (for example as a result of them sharing the same native language).

One major barrier to accessing healthcare services in Pune is the issue of their affordability (fifth dimension). This financial impediment arises from the fact that the provision of subsidized services by the Indian government (the original idea behind a so-called “state system”) is far from adequate, while private facilities are often extremely costly. Health insurance — which would enable policyholders to utilize private services without fear of the economic consequences thereof — is not yet widespread. Civil servants and the employees of large companies do have state health insurance policies that offer extensive coverage; the rest of the population, however, is left only with the option of taking out private insurance. This is pricey, and policies generally do not cover the whole range of medical services one might need. The newly created “Rashtriya Swasthya Bia Yojna” (Das and Leino 2011) insurance scheme for the poor aims to close this gap, but with its relatively low service coverage it is not a sufficient countermeasure.

In this situation, financial barriers are not pivotally important when it comes to primary care (even if they do pose a burden for the urban poor); the cost of secondary and tertiary care can, however, be ruinous, even for middle class families. The long-term treatment of chronic diseases is a continuous burden on poor households, and therefore such conditions are often not treated adequately — if, indeed, they are treated at all. In the public sector, infrastructure capacities are insufficient to deal with the increasing burden being levied by chronic conditions. For example one expert reported that during the weekly cardiac consultation hour in the district hospital, which is scheduled to last for two hours, between them six practitioners treat on average 600 patients. Naturally, he said, these practitioners have to compromise on the quality of the treatment that they give. Additionally, even if the consultation is cheaper or even free in the public sector in most cases any medicine that is prescribed has to be bought from private pharmacies. As such, medicines account for a substantial proportion of treatment costs; the savings from going to a public doctor compared to treatment in the private sector are, therefore, ultimately negligible.

Another serious problem related to the financial dimension, one mentioned by both experts and laypeople, is overtreatment. The financial incentives for performing unnecessary investigations or treatments result in inadequate treatment of a different kind. This is in part directly linked to patients' own awareness (sixth dimension). For example, patients actively demand the receiving of certain unethical procedures, such as being given "bottles" (meaning the intravenous injection of a saline solution, which usually has a positive short-term effect on overall wellbeing). Patients with a limited educational background see only the immediate effects of this treatment without understanding the wider long-term consequences of it. As a result, experts identified insufficient health knowledge as a severe problem among large sections of the population. Particularly those persons with less education are ill-equipped to self-identify critical conditions and seek early advice in the case of chronic diseases.

On top of these problems, some patients also have an inability to orient themselves in the complex urban healthcare system. Consequently, they often consult the wrong practitioners, who sometimes treat them anyway out of considerations of economic gain. Poor patients are often not aware of the availability of subsidized treatment options, not only in the public sector but also in some of the tertiary care hospitals — which run as trusts. As a result patients spend more than they need to on medical care, while several laypeople reported in interviews that treatment had to be stopped halfway through because they had by then run out of money. The most severe manifestation of awareness as a barrier to accessing healthcare services was reported by one temporary migrant interviewed, who said that he would go to his rural village if he became seriously ill because he did not know where to go for treatment in Pune. In spite of him having the most advanced facilities available to him within walking distance, this person would choose to travel several hours when in poor health because of deficits in the dimension of awareness.

Overall, the unregulated structure of the private sector and the overburdened public sector are the key reasons for the current inadequate access to urban healthcare that exists in Pune. A lack of regulation and supervision in the private sector (practitioners employing systems of medicine other than the one in which they are actually trained) and a lack of awareness on the part of the local population are the main problems here. The public sector, which could provide subsidized services for the poor, is heavily under-funded relative to the new realities that have been precipitated by Pune's rapid growth in recent decades. The city's sparse resources are also allocated in a suboptimal way, for example, primary health centers are sometimes to be found stationed in affluent neighborhoods. Furthermore public facilities are still mainly geared toward the treatment of infectious diseases; there are at present few structures in place for supplying care for chronic diseases, which is also due to a lack of systematic information gathering taking place as regards the needs of the population being served (this is also a barrier in the dimension of awareness).

Challenges for public health

In urban health research often models are applied to explain people's health status and their utilization of healthcare services, which have been developed in Western societies. A reflection on the research process shows that these models often cannot be directly transferred to the context of the fast-growing agglomerations of the Global South. As such, the conceptual and methodological toolkits used in urban health research need several updates to be made to them if they are to provide relevant knowledge for improving public health in such settings.

The findings of the case study that has been presented here show that in Pune the transition in urban health that is currently taking place is unfolding at different paces for different socioeconomic groups. Social disparities in Pune are therefore reflected in epidemiological diversification. Communicable diseases such as gastrointestinal afflictions, malaria, or tuberculosis are still present, although their severity is declining — especially among the upper socioeconomic strata. At the same time, NCDs are proliferating across all strata of local society — although their burden in terms of healthy life years lost is relatively higher for the poor, who suffer more frequently from comorbidities. This higher burden of disease is closely related to differences in access to healthcare services, which is mainly determined by a patient's ability to pay and by their knowledge about health and healthcare — factors that vary according to socioeconomic status. Both exposure to health threats and the ability to cope with disease are therefore strongly influenced by what one's socioeconomic standing is.

Given the epidemiological transition now occurring and the ongoing development of urban healthcare systems, Indian intra-urban health disparities are likely to increase in future. The Indian government has recently come to recognize its past neglect of urban health and thus has now launched the National Urban Health Mission, which is currently implemented at the state level (as of January 2014). The target of this program is to improve the health status of the country's entire urban population through a number of different strategies. These aim to enhance the public health capacity of local bodies in cities (for example the minimization of environmental health risks through infrastructure improvements, health promotion, and disease prevention), to improve the efficiency of the urban public healthcare system so as to facilitate adequate and equitable access to it (one focus herein is on the provision of screening and treatment facilities for chronic, non-communicable diseases), and to strengthen disease surveillance systems by integrating data from private healthcare providers into data collection routines (Ministry of Health and Family Welfare 2013). The measures being planned under the National Urban Health Mission are extremely comprehensive. Time will tell whether this federal program will indeed have the strength to address the existing shortfalls at various levels that contribute to the so-called "urban penalty." Beyond this, any further improvement of human health in India's cities will not only require a reform of the public healthcare sector

but also a mainstreaming of health-related issues in all local planning processes. This transition from the retroactive provision of infrastructure to actual foresighted planning, with health henceforth being treated as a cross-sectoral issue, will be essential to the future improvement of living conditions in all Indian cities.

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