

Urbanization and human health in urban India: institutional analysis of water-borne diseases in Ahmedabad

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Abstract

Diseases are rapidly urbanizing. Ageing infrastructures, high levels of inequality, poor urban governance, rapidly growing economies and highly dense and mobile populations all create environments rife for water-borne diseases. This article analyzes the role of institutions as crosscutting entities among a myriad of factors that breed water-borne diseases in the city of Ahmedabad, India. It applies 'path dependency' and a 'rational choice' perspective to understand the factors facilitating the breeding of diseases. This study is based on household surveys of approximately 327 households in two case study wards and intermittent interviews with key informants over a period of 2 years. Principle component analysis is applied to reduce the data and convert a set of observations, which potentially correlate with each other, into components. Institutional analyses behind these components reveal the role of social actors in exploiting the deeply rooted inefficiencies affecting urban health. This has led to a vicious cycle; breaking this cycle requires understanding the political dynamics that underlie the exposure and prevalence of diseases to improve urban health.

Key words: Health policy, hygiene, India, new institutionalism, principal component analysis, urbanization

Key Messages

- The historical trajectories and rational interest actors in influencing WBDs are examined.
- Passive governance has created opportunities for social actors worsening urban health.
- The political dynamics that underlie the exposure of diseases are identified.

Introduction

Institutional analysis of health

Urban environments in developing worlds increasingly offer conditions that trigger water- and vector-borne diseases (Alirol *et al.*

2011). Given the close proximity of the human environment, existing diseases are reestablishing themselves, new diseases are emerging and diseases once considered as rural have now established themselves in urban areas. Rapid economic growth, exponential increase

in urban population and widening health inequalities have forced many rapidly growing economies, such as India, Brazil and China, to focus on urban health. After delaying its implementation for decades (Dasgupta and Bisht 2010), in 2012 India introduced the National Urban Health Mission along the lines of the 2005 National Rural Health Mission (GoI 2012). The mission aimed to provide free access to basic healthcare facilities to the urban poor. These health reforms include the significant reorganization and expansion of the urban healthcare system, public–private partnerships in the delivery of services and enhanced health system governance. This is supported by various initiatives to strengthen the monitoring of the people's health status, which is considered a vital investment for the changing burden of diseases (Ebrahim 2011). In spite of these efforts, universal health coverage, reducing health inequality and disease burden have continued to challenge India. This article applies institutional analysis to understand the health outcomes in the city of Ahmedabad in India. In this city, two case study wards were selected—one that is planned settlement and the other that is unplanned, to understand the role of diverse institutional factors shaping diseases. In specific, it offers institutionally-framed reasoning behind the growing health inequality, limited access of basic services and exposure to diseases in urban India. This offers a deeper understanding of the socio-political processes governing the people's exposure to diseases.

Myriad of factors influence the WBDs. Undernutrition (Thapar and Sanderson 2004; Bryce *et al.* 2005); social factors (Zodpey *et al.* 1998); socio-economic status (Wijk-Sijbesma 1998); demographic and location factors (Mukherjee 1990; Nanan *et al.* 2003); lack of awareness and education (GoI 2002) and individual and household hygiene practices (Oo *et al.* 2000; Jensen *et al.* 2004) are some of the few to point out. However, it is rare for any single factor to act in isolation or on a single scale, and consideration of these factors are insufficient for understanding the disease and its emergence. The myriad of factors are bound by diverse institutions and must be accounted. An institutional reasoning behind these factors offer insights on the historical trajectories and its turning points (Grundy *et al.* 2014) behind the spread of diseases for developing appropriate interventions. Institutions cut across the social and biophysical environment and between the proximal and distal determinants of health. Understanding how historical institutional arrangements are exploited by the contemporary social actors in creating and recreating health inequalities offers insights on the causes and political determinants of health outcomes.

New institutional literature has provided insight into the functioning of institutions and how they influence health systems. In new institutional literature, historical institutionalism and rational choice institutionalism have been applied to better understand healthcare reform. Having its roots in political science, historical institutionalism takes a path of dependency approach. From this school, Wilsford (1994) has examined health care reforms in select countries to argue for the historical embeddedness of these reforms. Similarly, Bloom and Wolcott (2013) have highlighted the dominant role of history and its legacy of institutions on contemporary health systems. In specific, Grundy *et al.* (2014) have argued that path dependency offers insight on the durability and continuity of institutions and their related behaviors. Rational choice institutionalism, with its roots in new institutional economics, argues that actors are rational, self-interested individuals attempting to maximize their benefits and minimize their costs in the given institutional arrangement (Bertone and Messen 2012). They do not disregard path dependency, but give primacy to the rational interests of individuals and communities. Therefore, health systems are seen as institutional

arrangements that, through adequate incentives, can coordinate rational agents for improved healthcare (Bertone and Messen 2012). The rational choice school understands health-seeking behavior and explains public policies as solutions for the collective actions of rational individuals (Ovseiko 2008). Scholars of path dependency and rational choice institutionalism have offered insights on healthcare systems' limited capacities and the failure and inadequacy of key healthcare reforms. The above literatures have mainly focused on health sector-specific and rarely on the historical and strategic reasoning behind the socio-political process governing access to basic services, growing health inequality and health burden on urban residents.

Methods and analysis

Ahmedabad city has a population of approximately 5.6 million, which is projected to increase to approximately 7.5 million by 2021. In 2009–2010, the city was ranked 19th among other Indian cities for having improved water supply and sanitation services (UMC 2012). In spite of this, however, WBDs in Ahmedabad continue to reoccur and persist. The two case study administrative wards (the lowest administrative unit in the city) was selected from 57 in the city for the survey, Ward A and Ward B¹, reported the highest incidence of WBDs (Appendix 1). However, differences remained between the two wards (Appendix 2). Ward A had a dominant Muslim (74%) population, a low average monthly household income (3554 Indian Rupees [INR]) and the urban development authorities shelved the ward from any public infrastructure investments, as it was considered a 'slum' or a 'slum-like' settlement. In contrast, Ward B was dominated by Hindus (71%), had higher average monthly household income (9650 INR), and was one of the planned settlements for any major public investment projects. In these settings, this article examines the role of actors and the institutions they draw on for access to basic infrastructure (such as drinking water, sanitation, hygiene and health care), and their health outcomes. This helps to identify the actors involved and their ability to integrate diverse institutions in exposing people to WBDs. Here, actors are defined as individuals and organizations. Institutions are defined as 'systems of established and prevalent social rules that structure social interactions' (Hodgson 2006, p. 2). They may include statutory established rules and socially embedded norms. Statutory rules are openly shared, clearly structured and constitutionally and legally valid arrangements that are enforced by public and/or private actors. Socially embedded rules are practiced widely amongst individuals and groups, but are concealed, unwritten and enforced by castes, religions, village councils and so forth. These institutions integrate at different times and spatial scales in a strategic context (Saravanan *et al.* 2009). Such integrations are not always a place-based nexus of multiple actors; rather, they are evolved or created, formal or informal, location-specific or generic in strategic context. In these integration processes, different forms of governance arrangements (such as state-centered, private and community institutions) incrementally and cumulatively affect the health outcomes.

The analysis presented here is based on survey data from 150 households in Ward A and 177 households in Ward B carried out between January and July 2012, and interviews with key informants (namely political workers, elected councilors, land owners and junior engineers from the department of engineering) conducted in 2012 and 2013 during sporadic visits by the lead author (April to June 2012, September to October 2012; January 2013 and

Table 1 Stratification of households in case study wards (in brackets households sampled for survey)

	Poor	Medium	Rich
Ward A			
Hindus	965 (10)	1484 (14)	81 (2)
Muslims	2428 (24)	11 330 (112)	–
Christians	–	–	24 (0)
Total households	3393 (34)	12 814 (126)	105 (2)
Ward B			
Hindus	3969 (56)	12 739 (81)	821 (7)
Muslims	423 (4)	1895 (37)	–
Total households	4392 (60)	14 634 (118)	821 (7)
Total households	19 847 (185)		

September 2013). The households were stratified based on religion and economic status, through group discussions with ‘link workers’ and ‘multiple health workers’ in the ward. ‘Link workers’ are an army of health workers attached to the urban health centers in each ward. They regularly make door-to-door visits to about 1000 households in their jurisdiction to determine the residents’ health statuses. ‘Multiple health workers’ (MHWs) coordinated with about 5–6 link workers (LWs). The urban health centers (each in one ward) play a prominent role in the delivery of healthcare services and in the surveillance and monitoring of diseases. Two Group discussions were conducted with 4–5 LWs who had extensive experience in the ward to identify the households for the survey.

The households in the wards were stratified based on the group discussions with five LWs in Ward A and four in Ward B, supported by expert views from MHWs and key informants in both the Wards. About 162 and 185 households were stratified (Table 1). Out of the 162 households identified for sampling in Ward A, 155 household sample was considered for analysis, with one household unwilling to answer the questionnaire and four questionnaires rejected due to poor recording of information. In Ward B, out of the 185 households identified, 172 households could be considered; five household questionnaires were rejected for poor recording of information, two households were unwilling to answer, and one household could not be reached. Open-ended interviews were conducted with about six key informants (two from government agencies, three from ward and one from the non-governmental organizations) from ward A and ward B, respectively. These interviews were conducted over a period of time during the field visits with the permission and approval of the respondents for maintaining anonymity (all names cited in the article are anonymous and as much as possible their specific positions are not revealed). This was followed by our own observations in the field during visits to the wards.

To help frame the questionnaire for the survey, open-ended interviews were conducted with key informants in the ward to determine their history, their understanding of the diseases and the reasoning behind the occurrences of these diseases. Prior to conducting the interviews, the research team made two or three visits to the identified households to explain the study and to determine their willingness to be part of the study team. The study was conducted only after the head of the household or other adult member of the household approved and signed as to their willingness. This helped to build rapport and also helped the household members to think about their participation in the study. The investigators, along with LWs, were trained to conduct the survey and were supervised by

two of the study’s authors. Using the local language, information on hygiene practices; land tenure status; healthcare strategies; family migration history; basic facilities in the households; personal or family characteristics (social factors, education level, economic status and demographic factors) and health history (5 years for chronic and 6 months for water- and vector-borne diseases) were collected through structured interviews with the head of the household or a knowledgeable person in the household. Data from the questionnaires were double entered after the case was closed, and plausibility was checked before the database was locked. All information was treated as confidential.

For the analysis, households reporting incidences of WBDs during January to July 2012, and those not reporting diseases, were considered. The information was classified into the following categories: land tenure; economic status; environmental hygiene; social hygiene practices; socio-demographic status; health status of the household and access to water supply and sanitation. A list of 36 variables was selected (Appendix 3), which were converted to a dummy, scale and ordinal forms for the principle component analysis (PCA). Using STATA, the PCA was calculated and the role of potentially correlated variable was derived. The components were created by adding together scores of the observed variables that were optimally weighed in such a way that resultant component accounts for maximum variance in the data set. Reducing the data sets helps to explain the role of correlated variables in facilitating the water-borne diseases. Of these 36 variables, 22 variables correlated with each other as components and explained approximately 60% of the Eigen values that were used for a Poisson regression (Appendix 4). The institutional reasoning behind these variables were derived from the qualitative responses from the households interviewed, secondary documents, open-ended interviews with key informants and focus-group discussions with LWs on the institutions (norms, values and rules) and the social actors behind the variables. In specific, the questions were focused on legislations or norms or values and actors involved in drawing these to influence the socio-economic, education, hygiene and health care outcomes.

Results

Poisson regression was carried out to identify the significance of the components influencing WBDs in the wards. In both wards, the Poisson regression revealed that vulnerable households and good water quality had a significant association with WBDs (Table 2), while only in Ward A religion had a significant association with WBDs.

Households vulnerable to diseases

Vulnerable households had a lower income, a lower percentage of dependable members and a higher percentage of members employed as daily wage earners. They belonged to both Muslim and Hindu religions. A higher number of vulnerable households increased the incidence rate of WBDs by 26 and 50%, for Ward A and Ward B, respectively. In Ward A, vulnerable households reporting higher percentages of members employed as daily wage earners and lower percentages of dependable members had a 26% higher chance of having WBDs. Households with daily wage earners had lower incomes and typically lived in poor quality one-room housing.

The situation was not very different in Ward B, where vulnerable households reported a 50% higher chance of being infected with WBDs. These households were non-native of Gujarat, received poorer water quality, were from the Muslim community, used

unhygienic means to wash their hands, and reported water stagnation around their house. The households in this component consisted of young families (due to less dependable household members), and had poor housing and environmental conditions.

Urban rich reaping benefits

The availability of good water quality (WQ) reduced the incidence of WBDs by 24 and 32% for Ward A and Ward B, respectively. Households reporting good water quality were native to Gujarat, had good housing, higher incomes, their own water sources and fewer household members sharing one room. In Ward A, households reporting good water quality reported a decreased incidence of WBDs by 24%. Many of the housing societies were either independent bungalows or apartments, providing housing to those with higher incomes, in turn offering them good toilets inside. These household members were employed in white-collar jobs, hygienically washed their hands with soap and had a fewer number of families sharing one room in the house. Many of these households had their own water sources and in-house water treatment facilities.

Ward B households were native of Gujarat, Hindus, had higher percentages of dependable members in the household, reported no water stagnation around their houses and lived in rented or leased housing. Though planned settlements included apartments and societies, the latter were safer comparatively. These apartments were a low-cost housing source at a subsidized cost, promoted by the government in the 1970s for textile mill workers. The apartments were highly dense and could not accommodate higher numbers of families; additionally, the urban water services were highly polluted. Comparatively, 28% (51/177) of the households living in societies (e.g. independent bungalows) had a larger space for housing expansion and reported lower incidences of WBDs.

Table 2. PCA for ward A and ward B

S. No	Components	Ward A		Ward B	
		IRR	P >	IRR	P >
1	HEE	1.04	0.676	1.13	0.335
2	HAB	0.84	0.178	1.06	0.632
3	INH	0.91	0.436		
4	DW	–	–	0.54	0.019*
5	WQ	0.76	0.017*	0.677	0.001*
6	NH	1.3	0.026*		
7	NHH			1.21	0.139
8	VH	1.2	0.055*	1.49	0.001*
9	HC	1.03	0.777		
10	UH	–	–	0.77	0.055

*Reveals significant associations.

Table 3. Muslim households and water-borne diseases in Ward A

	Total households	Water-borne diseases				Total disease incidence	Water stagnation	
		No Cases	One case/ household	Two cases/ households	Three cases/ households		Reported stagnation	Reported no stagnation
Non-Muslim households	39	31	7	1	0	8	20	19
Muslim households	111	61	37	10	3	50	78	33
Total	150	92	44	11	3	58	98	52

Segmented settlements breeding disease

In addition to these common components, WBDs increased by 35% in non-Hindu households in Ward A. These households had rented accommodations, poor quality housing, did not have private toilets and reported that water stagnated around their houses. Many of these households seemed to be living in informal settlements. Non-Hindus constituted approximately 75% (113 of 150 households) of the Ward A population, a majority (111 out of 113 non-Hindu households) of them being Muslims. Higher the number of Muslim households (45%) correlated with higher numbers of reported incidences of WBDs between January and July of 2012 (Table 3). The Muslim households reporting incidences of WBDs lived in rented housing, did not have their own toilets and reported water stagnation around their houses, which increased WBD incidence by approximately 35% compared to Hindu households.

Discussion

Contested urban space breeds diseases

Ahmedabad, once known for its 'chimneys and pols', is now a vibrant city with grand riverside projects, a thriving informal sector and large patches of 'slums' (informal housing). The process of Ahmedabad's transformation has not only included physical changes, but also changes in the established configuration of land ownership and control, entitlements to basic services and the facilitation of urban citizens in reshaping urban space. In this transformation, the city's landscape has become an arena of contestation among diverse actors, local to global, who draw on both statutory rules and socially embedded norms. This discussion section highlights the contestation of actors in shaping the vulnerability of the urban poor, including their unequal access to basic services and in segregating the religious minority.

Statutory institutions have played a major role in creating space for diverse actors to contest. The Mughals who ruled from the 15th to the 17th centuries contributed in establishing the textile industry as the backbone of the city's economy. Textile producers were divided into many groups based on caste and religion, but were all connected through a sequence of well-established operations (Yagnik and Sheth 2011). In the 19th century, colonial rulers, in order to meet their revenue interests, transformed this decentralized caste-based system into centralized tasks, thus creating new power structures. This led to a division of the community into two groups: first, the skilled millworkers from higher caste Hindus and Muslims living within the walled city in 'pols' and 'mohallas'; and second, the labor intensive, low paid workers that were primarily Muslims and lower-peasant class Hindus living in the industrial area on the outskirts of the walled city. The second group primarily resided in chawls (currently these are in the city center, like Ward A), which consisted of one-room housing with common toilets and were considered hovels

of the worst quality, with no water supply and filthy toilets (Yagnik and Sheth 2011). This segmentation of settlements was reinforced under the colonial urban planning mechanism.

The colonial urban planning paradigm promoted safe (from any attacks on colonial regime), orderly and clean settlements and ‘must pay’ for services (Oldenberg 1985). It did not socio-culturally embrace an economically plural Indian society (Menon 1997, p. 2934), thereby ignoring and neglecting a large set of industrial areas and its residential chawls from the urban planning process. Independent India witnessed a continuation of the colonial legacy of urban planning. The urban planning process produced a number of master plans; however, many of the plans served only to create chaos in Indian cities (Bhan 2013) and were ‘fiercely challenged by social movements and forms of insurgence’ (Roy 2009, p. 76). Urban planning takes years to materialize and become fully implemented. The Ahmedabad Urban Development Authority announced the development plan in 1997. The plan was sent to the urban development department for approval in 2000, and was finally approved by the state government in 2002 (Daily News and Analysis, 21 January 2013). Though the town planning schemes were supposed to be finalized in 4 years, the process took decades (Sanyal and Deuskar 2012). During these times, diverse actors (politicians, real-estate agents and middle class and poor households) acted in coalition to manipulate various urban legislations to serve their interests for housing and real-estate business, marginalizing the urban poor from a decent livelihood (Mahadevia *et al.* 2009).

Contestation over ‘material poverty’ exposing diseases

In the mid-1990s, government and non-governmental organizations made efforts to arrange technical interventions to address the material poverty among the urban poor (Stephens 2014). The Self Employed Women’s Association of India (SEWA), a non-governmental organization based in Ahmedabad, initiated a program to provide drinking water and toilets for those living in chawls and informal settlements in Ward A, under basic human right logic. They² negotiated with the Ahmedabad Municipal Corporation to arrange for ward residences to gain access to drinking water and sanitation. A SEWA volunteer interviewed stated ‘each households (that) wanted drinking water connection and toilets was expected to pay INR 20 each month for about 10 months. Upon completion of this payment, the Corporation provided drinking water outside their houses and, if space was made available, constructed a toilet for these households (sic).’ Drinking water connections were made from nearby pipelines, largely outside the houses and shared among more than one household. The toilets were more often built farther away from the houses due to lack of space within and around the houses. These toilets were shared among other households and not always connected to sewage lines. Although these material interventions helped the households gain access to piped water and toilets, the homes were still not safe and lacked the basic requirements for a decent existence. ‘Pregnant women had to walk few meters during the late stage of pregnancy and many teenage girls face embarrassment from the youth and other neighbors (sic),’ explained the SEWA volunteer, whose daughter interjected that the women her mother described were also sometimes harassed. While physical distance remains, many of these toilet buildings were damaged or dilapidated and unfit for human use during the research team’s visits.

Although having indoor private water connections was a necessity for residents, they could not obtain the service due to their illegal hold on the land (or at least *de facto* documents to prove their legal status), which was also complicated by bureaucratic

procedures. Non-state actors³ (i.e. political workers and private plumbers) came in handy to offer this informal service for those who could afford the cost of approximately INR 3000 to INR 6000 per connection (as of 2013). In addition to these market strategies, residents, along with private plumbers, adopted other strategies (encroaching on public lands, getting illegally connected to drinking water, tampering with documentary evidence to gain legal access to water) to gain access to drinking water. Though these strategies made it possible for residents to obtain access to water, there was an inherent risk of the water being contaminated by rainwater, overflowing sewage and run-off water from roadsides, due to puncturing the pipelines (Saravanan *et al.* 2014). This informal means to gain access to water created an environment of cross-contamination with sewage waters and, thus, an environment perfect for breeding of diseases.

The Babur Nagar settlement is a case in point—it has about 300–350 households in Ward B with residents who settled in this location mostly in the 1990s. The households are Muslim families displaced due to the closing of textile mills. Currently, they make their living by supplying plastic waste to their landlord, who owns a small-scale industry to recycle the waste. They also make and sell incense sticks and embroidery for extra income. The residences are accommodated bordering the lake that was reserved by the municipal corporation for a sports stadium. They settled in this land by paying a meagre sum of 1450 INR for a 10 square meter parcel of land.⁴ They do not have any legal document to prove their ownership, but pay monthly rental to their landlord. In turn, their landlord Allah Sheikh offers access to electricity, community toilets (though they are unused) and public drinking water connections. More importantly, he has rescued the village residents from eviction on three occasions (in 1998, 2005 and 2009), due to close association with the Bharatiya Janata Party (BJP). The houses in Babur Nagar are located on the banks of a lake, and use the lake as an open-defecation center, illegally tamper with public water pipes to gain private access to drinking water, and discharge wastewater outside their home; all of which lead to water logging around their homes.

Mr. Sheikh⁵ highlighted the need to provide basic human resources to his households. The Ahmedabad Municipal Corporation (AMC) under the Basic Urban Services for the Poor have been providing electricity, water and public sanitation to these households. While all citizens should have access to these services as basic human rights, landlords and politicians convert these needs into an opportunity to demand regularization of these settlements. Sheikh claimed, ‘These households have records of paying electricity and water bills for more than 5 years, if government wanted to evict them they should not be accepting these payments and should stop the services.’ With the proposed plan to convert the lake into a sports stadium still awaiting clearance, it is a double-edged sword for the government. ‘On one hand, [plumbing and sanitation] are supposed to be provided as basic services for the poor; on the other hand, if the household[s] are able to prove their residence by showing payment of electricity bills, a letter approved by the Ward Councilor and other supporting documents, the government is obliged to regularize these settlements’ claimed a junior engineer⁶ with the department of engineering.

Politicians, non-governmental organizations and land-grabbers in conjunction proliferate rapid urbanization and inefficient urban planning, which leads to human rights concerns and poor urban regulation. This creates an environment of ‘material poverty’ in informal settlements, and thus, an unhygienic environment that incites the breeding of diseases.

Elite transformation at the cost of the urban poor's health

On one hand, neoliberal policies increased informal settlements; on the other, they facilitated the growth of middle-class households. Planned and unplanned housing developments largely benefited these elites, who could afford better housing, their own drinking water sources and toilets and hygienic environments (at least within their homes).

The Akbar housing society with about 200 residences in Ward B is one of the societies developed in unplanned land area. The society has one- and two-bedroom apartments built in on unapproved land. However, one of the residents claims⁷, 'their builder has close link with the ruling BJP and after some years will get the land approved.' The builder obtained the land from one of the BJP leaders in the city (also his uncle) who had reserved his excess landholding under the Urban Land (Ceiling and Regulation) Act (ULCRA)-1976. The builder provided the households with piped water sourcing water from the ground aquifer, and at the same time acquired public water supply for the society in 2011. The society wastewater is discharged into the open gutter a few meters away from the outside of the housing society. The residents enjoy regular water supply (as the public water is stored in large tanks within the society for supply) and are able to treat the water using reverse osmosis or other filtering mechanisms or buy treated canned water. The president of the housing society stated⁸, 'almost all the residents in the society treat their drinking water before use'—this leads to fewer cases of water-borne diseases.

The rich and middle class manipulate the urban planning paradigm by networking with political actors and real estate agents to lobby government agencies to regularize their housing at the cost of neighborhood residents' health.

Urban politics ghettoizing diseases

The neoliberal policies of the 1980s and the new economic policy in 1991 led to the closing of textile mills, resulting in 'slums' or 'slum-like' settlements, similar to the 'de-industrialization' experienced in North American and European cities (UN-Habitat 2003). This shaped the socio-economics of the current settlement pattern, including housing, healthcare and the informalization of the work force. Segregation of settlements, manipulation of urban planning processes and growing Hindu-Muslim differences accelerated the process of ghettoization, whereby certain population groups are restricted or confined to particular areas in the city. Such segmentation of settlements along religion and economic status was exacerbated by Hindu-Muslim clashes, which accelerated even more in the years after the 2002 clashes (Bremner 2004). The impact of ghettoization was felt among the non-Hindu households living in Ward A.

Political workers are active in exploiting the democratic political process, working in close coalition with government bureaucrats and intermediaries to serve the interest of the urban poor and middle class households to meet the housing needs. The two dominant political parties—the Indian National Congress (INC) and the Bharatiya Janata Party (BJP)—campaign in these wards to gain residents' votes. Ward A is known for its Muslim asylum seekers, especially after the 2002 city clashes. The ward has been ruled by the INC for more than a decade. The party claims to have secular values, in contrast to the BJP, which is considered pro-Hindutva, and has been a ruling party in the state of Gujarat since 2001. Ward A has a number of unused textile lands; land reserved for the department of forests and vacant public lands (such as land surrounding lakes, river banks and space under the bridges). Such land provides a

good opportunity to accommodate migrants and provide housing for middle class households. Being a stronghold of INC, the ward offered refuge to many of the Muslim families displaced from development projects during a series of riots. 'A number of settlements sprang-up after the 2002 clashes,' stated Fakir⁹, one of the youth committee leaders in the ward. Some of the settlements included the Bharat Nagar, the Vallabh Nagar (a Muslim settlement with approximately 8000 individuals) and informal settlements around Chandola lake. All of these settlements are situated closer to the solid waste management site, which is land owned by the Department of Forests. Congress political worker¹⁰ Ahmed Shah prepared a rough layout and offered the plots to the people for a paltry sum of 500 INR for a family for a space of 10 square meters. The rate varies depending on the ability of the family to negotiate with Mr. Shah. Residents do not become legal owners, but are allowed to stay if they continue to pay the monthly rental fee. In turn, Ahmed Shah provides them with electricity, and drinking water through tankers. A party worker claims all these settlements boosts INC by about 20 000 votes.

The Ulhas Nagar settlement exemplifies the attempts of residents who sought refuge in the Ward A to gain access to various services that shape their everyday livelihood. The settlement has about 700 households in the land owned by the Department of Forest, adjoining one of the solid waste dumping facilities in the city. Though the land was reserved under the department's 1997 development plan, the plan did not come into force until 2002, and was not put into use by the department (due to lack of funds) until 2013. The vacant land became an opportunity for the local councilor from the INC,¹¹ who provided refuge for the Muslim population displaced from the 2002 riots. He claims that any unused land (by the forest department), will be legalized in due course, as in 1976 when some of the informal settlements were legalized. Local politicians and government officials have struck deals to allow residents access to the electricity connections in their homes. In 2012, local NGOs demanded access to piped drinking water for residences.

Vacant land spaces are used by the politicians, government officials and the urban migrants to meet the electoral demands of the politicians, exploit the inefficiency of the government bureaucrats and promote housing for the urban poor. In a way, there is a win-win situation for all, but at a cost on the urban health for the households.

Conclusion

A vicious cycle of urban health

This paper demonstrates the deeply rooted structural inefficiencies of urban inequalities that have created opportunities for exploitation by contemporary actors, which in turn leads to environments conducive for breeding water-borne diseases (Stephens 2011). Applying historical and rational choice institutionalism, the article identifies three turning points that governments failed to effectively capitalize. The first was during the colonial era that set the foundation for the contemporary urban health crisis. Transformation of decentralized caste-based household activity into centralized tasks in the textile mills created a hierarchy-based employment. This was followed with 'clean, orderly and safe' zoning for colonial residents, which ignored the infrastructure and amenities for the native population and segregated the settlements. The second was at the time of independence, when the country failed to capitalize on their newfound freedom to contextualize their urban policies and programs. They merely mimicked and inherited the reforms of their colonial

counterparts. The inheritance of ineffective urban planning mechanisms continued to segment the urban population as legal and illegal, all while ignoring the socio-economically and culturally plural Indian society. The post-colonial reforms followed rigid land-use planning, dichotomous land tenure systems and other policies that turned a blind eye to the urban poor. This compounded with the failure of the state to contain the Hindu–Muslim clashes that led to the ghettoization of settlements. The final turning point was at the time of implementing the neo-liberal reforms, which failed to protect the interests of retrenched textile mill workers, thus impacting their housing, health and their livelihood. The passivity of the government remains a major hurdle, as urban health seems to have never been a major priority.

The study in Ahmedabad reveals that health care is about focusing on the political dynamics that underlie the exposure and prevalence of health outcomes. In specific, it calls for the active and adaptive role of the government in reducing the power disparities among social actors by improving the housing, environmental and personal hygiene and basic infrastructures, in addition to improving coverage and expansion of health services. The case study in two wards reveals social actors such as non-governmental organizations, political workers and land-grabbers exploiting the passivity of the government to provide ad hoc material services, creating opportunities for elites to manipulate inefficient governance arrangements and facilitate coalition politics to provide basic services to the needy population. In the process, they integrate diverse statutory (existing legislation, inadequate institutional arrangements and human rights logic) and socially embedded institutions (social networks, secular logic, social norms) with intentions to overcome the deeply rooted structural inefficiencies. The case study in a ‘slum-like’ Ward A demonstrates the neglect of the urban governance facilitating the social actors to enter into coalition with government bureaucrats to provide ad hoc measures. While in a planned settlement like Ward B, poor governance and aging infrastructure is facilitating the same process. These ad hoc interventions have resulted in the growth of numerous illegal water connections, the mixing of drinking and sewage water, land- and water-grabbing by urban residents, and water logging around these houses—all of which offer a perfect breeding ground for water- and vector-borne pathogens. The government’s response (or reforms) has been health care reforms focused on delivery of health care services, and in adopting ‘fire-fighting’ approaches to manage the crisis, such as by relaying pipelines, regularizing the informal settlements, providing drinking water and toilets without sewerage disposal system, and distributing drugs to combat infectious diseases. These ad hoc arrangements, meant to offer relief, are not safe, secure or sustainable, as they derail the policies and programs meant for the urban poor, thereby resulting in a vicious cycle of poor urban health.

Recent interest on urban health has mainly focused on improving coverage and expanding service delivery. An assessment of the healthcare reforms across the rapidly-growing economies reinforces these and call for improving the quality dimensions by taking a comprehensive approach to urban health (GoI 2014), increasing public spending, stewarding mixed public–private systems, ensuring equity, meeting the growing human resources and addressing the social determinants of health (Gragmolati *et al.* 2013; Marten *et al.* 2014). However, these measures are focused on health as a sector in facilitating preventive and curative care, rather than an overarching theme of governing urban health. In the urban governance of cities with rapidly growing economies, health remains a tail-ender. Health department officials are only called when there is an outbreak of diseases. Rarely is health and environmental hygiene on the agenda of

other departments involved in planning, housing and water infrastructure. Strategically focusing on environmental hygiene (better housing, integrated water supply and sanitation, food quality regulation and solid waste management) may be more effective, than with the contemporary approach of health care delivery and towards addressing material poverty.

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Conflict of interest statement. None declared.

Notes

1. Pseudonyms have been used to conceal the identity of all the places and persons mentioned in this paper.
2. Interview with SEWA volunteer 5 September 2013.
3. Interview with BJP party worker on 4 October 2012.
4. Interview with Begum, a resident and volunteer for an NGO on 12 August 2012.
5. Interview with Sheikh on 23 September 2012.
6. Interview on 15 October 2012.
7. Interview on 13 October 2012.
8. Interview on 20 October 2012.
9. Interview on 20 May 2012.
10. Interview on 5 May 2012.
11. Interview on 31 October 2012.

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Appendix 1. Total incidence rate (rate per 100 000) of water- and vector-borne diseases (2010–2013) in Ward a and Ward B and the City Average (City)

Year	Gastroenteritis			Jaundice (out-Patient)			Jaundice (in-Patient)			Typhoid			Malaria (includes PV and PF)		
	Ward A	Ward B	City	Ward A	Ward B	City	Ward A	Ward B	City	Ward A	Ward B	City	Ward A	Ward B	City
2010	359	628	144	244	17	35	69	58	23	24	100	15	19	8	75
2011	198	400	80	57	748	64	265	254	58	55	130	24	369	112	129
2012	379	571	100	322	43	32	116	295	43	42	118	22	479	264	204

Source: Department of Health Statistics, AMC, Ahmedabad.

Appendix 2. Profile of the Wards

Indicators	Ward A	Ward B
Total population (as of 2011)	91 404	86 346
Total households sampled (N)	150	177
Total population covered through sample survey	999	1089
Percentage of dependable members in the household (i.e., members below age 12 years and above age 60)	19	35
Religion		
Hindu	37	126
Muslim	111	29
Sikh	0	9
Christian	1	6
Others	1	7
Settlement type		
Societies and Independent bungalows	62	51
Gujarat Housing Board	–	49
Chawls	31	19
Flats	–	34
Informal settlements	57	24
Quality of housing		
Pucca ^a	80	139
Semi-Pucca ^b	51	32
Katchcha ^c	19	6
Ownership of housing		
Own house	123	164
Rented	24	11
Leased	3	2
Source of water		
Piped water inside the house	122	117
Public taps/stand pipes	4	7
Other	24	2
Access to toilets		
Owns a toilet within or outside the house	138	168
Other types (Open defecation and public toilets)	12	9
Number of households reporting water stagnation around the house (due to rain, water leakage, or poor drainage)	98	118
Average percentage of household members educated beyond a secondary school education	17	35
Monthly average income (in Indian Rupees) of the household ^d	3,554.00	9,650.00
Average percentage of the household working as laborers	12	10
Average number of members sharing one room	4	4

^aPucca households: Houses made with high quality materials throughout, including the floor, roof and exterior walls.

^bHouses that have solid walls constructed with high quality material, but the roofs are thatched with grass or asbestos or tiles.

^cHouses made from mud, thatch, or other low-quality materials.

^dThe exchange rate as on 1 USD = 57.90 Indian Rupees as on 15 October 2014.

Appendix 3. List of variables selected for Poisson regression

S. No	Name variable	Type	Codes
Socio-demographic variables			
1	Household size ^a	Scale	
2	No of households members sharing one room	Scale	
3	Total adult members studied more than 10 grade	Scale	
4	Is the household a native of Gujarat?	Dummy variable	1 = yes; 0 = no
5	Is the Household a Hindu?	Dummy variable	1 = yes; 0 = no
6	% of vulnerable members in household	Scale	
Economic variables			
7	Annual income of household	Scale	
8	% of households employed as labourers	Scale	
9	Household categorised as poor (identified through BPL identity card) ^a	Dummy variable	1 = yes; 0 = no
10	Does the household have any health insurance	Dummy variable	1 = yes; 0 = no
Exposure variables			
11	What is the source of drinking water in the house?	Ordinal (by assumption that 1 is the best and 3 the worst)	1 = piped into dwelling
12			2 = public taps/standpipe
13			3 = others
14	Is the water supplied by government suitable for cooking?	Dummy variable	1 = yes; 0 = no
15	Is the water supplied by government suitable for drinking?	Dummy variable	1 = yes; 0 = no
16	Does the household have their own toilet at home?	Dummy variable	1 = yes; 0 = no
Social hygiene			
17	There is no water stagnation reported around the house.	Dummy variable	1 = yes; 0 = no
18	Does the household head eat full meals outside home	Dummy variable	1 = yes; 0 = no
19	Households reporting consuming fast foods in road side restaurants ^a	Dummy variable	1 = yes; 0 = no
20	Does any of the household member drink soda outside the house?	Dummy variable	1 = yes; 0 = no
21	Does any of the household eat ice golas outside the house?	Dummy variable	1 = yes; 0 = no
22	Does any of the household eat panipuri outside the house?	Dummy variable	1 = yes; 0 = no
23	Does any of the household drink fruit juices golas outside the house?	Dummy variable	1 = yes; 0 = no
24	How do household members wash their hands after daily chorus activities	Ordinal (by assumption that 1 is the best and 3 the worst)	1 = under tap using soap
25			2 = water from bucket with soap
26			3 = under tap/water from bucket without using soap
27	Households reporting different methods for treating water ^a	Ordinal (by assumption that 1 is the best and 3 the worst)	1 = Boiling water 2 = Adding chlorine tablets 3 = strain through cloth
Land tenure			
28	Is this house your own?	Ordinal (by assumption that 1 is the best and 3 the worst)	1 = your own
29			2 = rented
30			3 = leased
31	Quality of the house ^b where the households live.	Ordinal (by assumption that 1 is the best and 3 the worst)	1 = Pucca
32			2 = Semi Pucca
33			3 = Kachcha
Health status and health care practices			
34	Households reporting any chronic diseases ^a	Dummy variable	1 = yes; 0 = no
35	Households visiting clinics in the last 6 months ^a	Ordinal (by assumption that 1 is the best and 3 the worst)	1 = Government clinics 2 = Private clinics 3 = NGOs clinics 4 = Home remedies
36	Do any member in your households have any habits of consuming alcohol, smoking or consuming drugs?	Dummy variable	1 = yes; 0 = no

^avariables marked did not.^bPucca housing are those with concrete walls and concrete roofs; semi-pucca houses are those which have a combination of concrete walls and thatched or temporary roofs; kachcha house are those with temporary walls and roofs.

Appendix 4. List of Components that explains 60% of the Eigen value

Component 1

Higher economic and educational standards (HEE): This component includes income, higher educational status of the household members (adults who studied beyond the tenth grade), and a lower percentage of members employed as daily wage earners. This distal determinant aids the household members' ability to have a secure house, nutritious food, sanitation facilities, improved drinking water, improved hygiene and also appropriate health care.

Component 2

Street food habits (HAB): Consuming street foods (at least once a day) is common in urban regions, as the food is low in cost and easily accessible for a highly mobile urban population. However, they come at a health cost, due to unhygienic environments, the unregulated nature of the street food industry and the presence of contaminated water. Consumption of street foods, such as ice candy (ice golas), panipuri, fruit juice and carbonated drinks, acts as proximal determinants of health that influences WBDs.

Component 3

Insecure housing and hygiene (INHH) in Ward A: This component includes hand washing practices, private access to toilets at home, the type of housing (pucca, semi-pucca and kutchcha), and unhealthy habits among household members (like consuming alcohol, smoking cigarettes and doing drugs). Secure housing is a distal determinant on the water quality and the level of sanitation. It is presumed that a pucca house will have piped water on the premises and will have a private toilet that is hygienic, as compared to using a public or community toilet or engaging in open defecation. These indicators are complemented by proximal determinants of health, the habits (such as consuming alcohol, smoking cigarettes, and doing drugs) and hand washing practices within the household.

Component 4

Drinking water (DW) from other sources in Ward B: This component includes those households that receive water from public taps, standby pipes, wells that have been dug, and other sources that are proximal causes of the WBDs.

Component 5

Good water quality (WQ): The quality of water supplied at home dominates as one of the proximal determinants in addressing water- and vector-borne diseases. Water quality was assessed based on the household members' perceptions (smell, color, and taste) of the water quality and whether it was suitable for drinking and/or cooking.

Component 6

Non-Hindu (NH) households in Ward A: Religion plays a significant distal role in accessing housing, education and health care in the city as well as determining individuals' legitimacy in society.

Component 7

Native Hindu households (NHH) in Ward B: Nativity plays a significant distal role in accessing good housing, education and health care in the city as well as determining individuals' legitimacy in society.

Component 8

Vulnerable households (VH): This component is assessed based on a percentage of dependable members (dependable access to enough food for active living) in the household (< 5 and > 60 years of age), the number of household members working as daily wage earners and the nativity of the household members. Vulnerable members in the households and higher percentage of household members working as daily wage earners are distal causes for a higher risk of infectious diseases. Nativity of the household members provides access to secure housing, land tenure, and health care facilities.

Component 9

Health care and hygiene (HC) in Ward A: Insurance plays a significant proximal role in enhancing household members' access to health care and determines the environmental hygiene around the house.

Component 10

Unhealthy habits and hygiene (UH) in Ward B: Unhealthy habits (i.e. such as consuming alcohol, smoking cigarettes and doing drugs) and a higher number of household members sharing one room, are conducive proximal causes to the spread of infection.