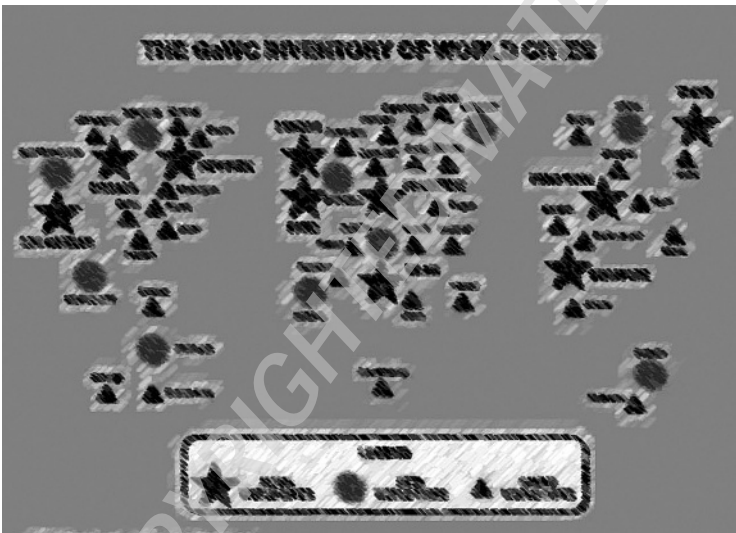


Toward a Dialectical Understanding of Networked Disease in the Global City: Vulnerability, Connectivity, Topologies

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Globalization means that if someone in China sneezes, someone in Toronto may one day catch a cold. Or something worse – if, in Guangdong province, 80 million people live cheek by jowl with chickens, pigs and ducks, so, in effect, do we all. Global village indeed.

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The rapid global spread of SARS between cities in Canada and Asia in 2003 exposed the unanticipated vulnerability of global urban centers, linked to each other through networked and complex flows of people, capital, and commodities across the globe, to the spread of emerging infectious diseases.¹ While SARS claimed lives and wreaked havoc on economies and health

systems globally, sites of contemporary globalization and urbanization were unexpectedly exposed as environments in which infectious diseases can thrive and prosper. Whether we consider the SARS case, the anticipated avian influenza pandemic, or the re-emergence of tuberculosis in recent years, the need to understand how and why infectious diseases are emerging (and re-emerging) and spreading is clear and increasingly urgent.

Assertions of a “human victory” over the forces of illness and disease, and notions of geographical containment, are being disproved with increasing frequency and force (Garrett 1996). After SARS, we are coming to terms with the realization that the networked relationships of cities in contemporary globalization are more than the pathways of global capital and human mobility – they are also the pathways of rapid and undetected viral transmission. While the emergence and spread of infectious diseases is more than an academic problem to which clever theoretical solutions can be applied, building a theoretical framework through which we can understand the relationship(s) between globalization, urbanization, and emerging infectious diseases is fundamental to the development of informed and ultimately successful practical responses to future, and potentially more devastating, outbreaks of infectious disease. The focus of this chapter is to explore how the evolving body of research known as the literature on “global cities” (Sassen 2000, 2002; Brenner and Keil 2006) or “world cities” (Friedmann and Wolff 1982; Friedmann 1986; Knox and Taylor 1995; Taylor 2004) can assist us in this project of simultaneously elucidating the fluid pathways of urban connectivity and analyzing the role of spatially fixed sites in contemporary globalization.

Global cities research offers important insights into the trajectory of SARS, which David Fidler has referred to as the “first post-Westphalian pathogen” (2003, p. 486). Building on Ali and Keil’s (2006) analysis of SARS, I propose that we must combine insights from both more traditional global cities perspective of relationships between nodes in a hierarchical network (Sassen 2000, 2002; Knox and Taylor 1995; Taylor 2004) as well recent topological approaches (Amin and Thrift 2002; Smith 2003b). While I contend that global cities research can make an important contribution to our understanding of emerging infectious disease in the global city, I also point to a number of ways in which approaches to understanding urbanization and contemporary globalization are challenged by the gaps, problems, and questions exposed by the experience of SARS.

Contemporary Globalization and Urbanization: The Renewed Potential for Disease

A deepening of global connectivity, in which aspects of our lives traditionally understood to occur primarily at the local or national level are increasingly embedded in broader global processes (Appadurai 1996; Hall 1991a,b), is

occurring simultaneously as more and more of us are living in cities. Already over 50 percent of the global population are urban dwellers, with UN projections showing that 67 percent of the world's population will be by 2030 (UN-HABITAT 2006). A number of significant features of both global cities and of contemporary neoliberal globalization indicate a renewed potential for the emergence and re-emergence of infectious diseases: the speed and ease of global travel; flows of international migration; rapid and uneven urbanization; increasing population density; ecological changes ranging from global climate change to dam building; war and displacement; poverty; malnutrition; inadequate access to basic infrastructure and services; and the breakdown of public health and medical systems and aging populations (Lines et al. 1994; Louria 2000).

As Jonathan Mayer (2000) suggests, truly understanding disease causality in an era of intensification of both urbanization and globalization requires moving beyond the biomedical model of causation. He calls on us to examine how relationships of political and economic power define all levels of human-environment interaction, shaping our social, physical, and spatial reality. The impact of human interactions with our environment and each other is clearly visible in the globalized urban environment as populations expand and migration to urban centers increasingly overwhelms infrastructure and services of cities, particularly those of the global South.

While cities have often been associated with the development of public health systems and advanced medical care, they have also been sites of some of the most devastating epidemics, due to poverty, inequality, and lack of infrastructure. The case of SARS and its rapid and undetected spread between global cities illustrates how the globalized urban environment may be a particularly hospitable environment for emerging infectious diseases. Recent outbreaks of emerging infectious disease appear to be strongly related to features of contemporary urbanization (Vlahov and Galea 2003), as a brief overview of the experience of Toronto in the 2003 SARS crisis will demonstrate.

Toronto and SARS: Global Citiness as Vulnerability

Toronto is Canada's global city, through which the national economy is articulated into the global economic system (Todd 1995; Sassen 2000; Kipfer and Keil 2002). Taking it as an example, it becomes clear that many of its global city qualities are the very relations that made it most vulnerable to the SARS outbreak. Toronto is home to the busiest airport in the country with 30,000–40,000 passengers taking off to international destinations every day (St. John et al. 2003). As no two airports in the world are more than 36 hours apart (Gould 1999, p. 203), airports become "interchanges" in disease transmission and spread (Ali and Keil 2006), with the time between Toronto and any other city likely much less than the incubation period of any emerging infectious disease. The time-space of air travel contrasts with

that of the body (Dodge and Kitchin 2004) and of viruses such as SARS, which has an incubation period of between two and ten days, during which a traveler could be across the world with no signs of illness (WHO 2003a).

A destination for large-scale international immigration and home to a number of different diasporic communities, Toronto is often called one of the most “multicultural” cities in the world (Driedger 2003; Ali and Keil 2006). This indicates a connectivity extending beyond economics to cultural and social links with global reach involving relationships across geographical distance facilitated by communication technologies, but also face-to-face contact and physical travel, which becomes critically important in understanding the spread of infectious disease (Urry 2004; Ali and Keil 2006).

Toronto’s vulnerability cannot be understood only in relation to the movement of the virus through individual people. There are a number of other subtle and long-term ways in which “global citizenship” shaped Toronto’s experience with SARS, particularly in regards to public health and health governance. While federal funding and legislation provides an overall framework for health care in Canada, provinces have authority in regards to where and how money is spent. However, despite this provincial jurisdiction, health care is administrated and experienced primarily at the local level. Hospitals are subject to standards set by the province that funds them, but they are locally controlled by community level boards that are only loosely coordinated and the approach to care is marked by discontinuity between institutions (Armstrong and Armstrong 2003). Also, arguably the most important branch of the health system for the prevention of infectious diseases, public health in Canada falls to the level of government with the least power, resources, and autonomy at its disposal. As a statutory ‘creature’ of the province, the municipal government of Toronto had very limited ability to deal with the SARS outbreak, given that the scale of prevention had as much to do with the global as it did with the local. As Warren Magnusson points out, for a local government to “... deal with questions of public health, it would have to project its authority far beyond its immediate boundaries. In a sense, it would have to follow its particular connections throughout the world” (1996, p. 291). During SARS, the problematic nature of an uncoordinated and geographically fixed approach to health governance and administration were made blatantly clear:

We were not prepared for SARS, nor did we have a system wide critical care communication strategy in place. From a critical care perspective, the most important limitation in the response to SARS was the absence of a coordinated leadership and communication infrastructure. (Booth and Stewart 2005, p. S58)

In recent decades, the drive to build globally “competitive” cities has become a dominant force in Toronto’s urban restructuring (Kipfer and Keil 2002). Pressure for Canadian cities to be efficient and management oriented has been

accompanied by the downloading of significant costs and responsibility from federal and provincial governments, who at the same time have decreased funding to municipalities. Shifts toward neoliberal public administration models such as New Public Management (NPM), coupled with the decreased capacity of the local government to satisfy the needs and desires of the public, has resulted in the increasing privatization and contracting out of public services. Guided by the imperative of attracting transnational business and elites, local governments are shifting their focus from redistribution to the creation of wealth (Porter 1995). As Rodwin and Gusmano's (2002) research on health governance and infrastructure has revealed, rising inequality between social groups and barriers in access to health care, particularly for the poor and ethnic minorities, are "onerous health risks" faced by global cities (2002, p. 449).

In Canadian cities these risks have been exacerbated by neoliberal restructuring that continues to dismantle Canada's universal public healthcare system and push social services into the private sector. Like entrepreneurial models of urban governance emerging in Canada, health reform has been driven by the private sector, emphasizing speed and efficiency (defined in market terms), leading to an increased reliance on outpatient services. This kind of assembly line medicine makes the diagnosis of a disease such as SARS, with subtle and non-specific symptoms, increasingly difficult and unlikely. As well, basic sanitation services have been drastically cut in recent years and hospitals increasingly rely on contracting-out for cleaning and laundry services, eliminating full-time and unionized staff as a way to cut costs. Hospital environments, and particularly emergency rooms, are increasingly dirty, making them highly vulnerable to the spread of infectious diseases such as SARS. Neoliberal discourses of efficiency minimize these aspects of health care, focusing on treatment instead of prevention (Armstrong and Armstrong 2003; Keil and Ali 2007).

Re-Reading Global Cities: "The Dialectic of Mobility and Fixity"

Understanding the complexity of emerging infectious diseases in the age of global cities calls for more than a straightforward collaboration between medical or epidemiological research and global cities perspectives. Building an appropriately complex and flexible theoretical framework requires more than adding a "health" or "disease" perspective to our understanding of global cities, or including an "urban" perspective in the study of health and disease. Rather, it calls for an innovative reading of global cities research; one that questions fundamental assumptions about how and why global city networks are formed and produced, and for what purposes we should attempt to understand them. We can, and should, simultaneously consider what the emergence and development of a "global cities network" means for

emerging infectious diseases, and what emerging infectious diseases mean for a global cities network.

The relationship between cities and infectious diseases challenges us to consider both the fixed nature of spaces in which diseases are experienced and health is governed *and* the fluid mobility of microbes that thrive in the connectivity of globalized urban environments. As Ali and Keil (2006) have noted, “[I]t is the dialectic of mobility and fixity that is truly characteristic of the urban condition under globalised circumstances.” Following from this, I suggest that an appropriate theoretical framework accounts for the ways in which cities are fixed nodes in networks bound by specific contexts – historical, social, and political developments within socio-spatial structures of local, national, and regional scales that are further embedded in the global economic system. At the same time, this context demands a conception of time and space through which we can see the city as fluid and hybrid, constantly in the process of change and transformation, populated by a multiplicity of actors, themselves constantly emergent.

“Global Cities,” “World Cities”: Situating the Urban in Globalization

Since the early 1980s, scholars have linked their treatment of the urban to explorations of the relationship between global forces and cities (Brenner and Keil 2006). “Global cities” research has highlighted the role of the cities as critical sites in contemporary globalization, breaking with traditional approaches to economic and political analysis that have tended to ignore the local actors, emphasizing the role of the nation-state (Keil 1998a). Important contributions by scholars such as John Friedmann, Saskia Sassen, Michael Peter Smith, Michael Timberlake, and Manuel Castells have helped to define the relationship between globalization and urbanization as a critical agenda for urban scholars (Brenner and Keil 2006).

Global cities, hierarchy, and vulnerability

A significant amount of global cities research has focused on the way in which specific cities have emerged in the post-Fordist era as central nodes in a global urban network, functioning as the capitals of finance and advanced producer services, and as the headquarters of transnational corporations (TNCs), which produce the global economy (Friedmann and Wolff 1982; Zukin 1991; Friedmann 1986; Sassen 2002). Efforts to map the hierarchical organization of cities within contemporary global capitalism have tended to focus on a select group of “global” cities that act as “command and control” centers in the various geographical regions of the global economy (Friedmann 1986; Sassen 2000, 2002; Taylor 2004). In *The Global City* (2002), Saskia

Sassen used New York, London, and Tokyo to illustrate the emergence of a global urban system in which a few “core” cities, supported by a larger network of “peripheral” cities, articulate the global economy.

Work by Taylor (2004) and others as part of the GaWC (Globalization and World Cities) research at Loughborough University (see research bulletins at <http://www.lboro.ac.uk/gawc/>; Beaverstock et al. 2000) has attempted to show how global cities are organized hierarchically according to the importance and influence that they exert internationally. Although variations in the hierarchy do emerge, depending on exactly what kind of firm or service is being analyzed, generally similar configurations are found, with the same players emerging on the top: London, New York, Hong Kong, Paris, Los Angeles, Tokyo, and Singapore (Beaverstock et al. 2000). Efforts to map this hierarchical organization, such as those undertaken by the GaWC researchers in the “Inventory of World Cities” (2004), are important, as they reveal a “skeleton of the new world economy” (Ali and Keil 2006) that can help us to uncover aspects of vulnerability and resilience.

The hierarchical representations that global cities researchers have offered thus far are centered primarily on economic and political functions, but this concept of hierarchical configurations amongst cities could be extended to consider what alternative orderings might emerge when patterns of health and disease are considered: Are particular cities central nodes in the flows of health and disease? Do different patterns of hierarchical influence and importance emerge in respect to health governance and disease control? The notion that certain cities emerge as disproportionately influential and connected is important and should be expanded upon, to look at configurations that emerge in relation to these other aspects of contemporary globalization, particularly in relation to the increasing threat of emerging infectious diseases.

After SARS, it becomes impossible to think about infectious disease as a local or contained problem (Ali and Keil 2006), and the structures and patterns of hierarchical organization and influence depicted by global cities research can provide important clues as to the link between global citiness and vulnerability to infectious disease. Connection to the network of international travel and trade between these nodes is an essential aspect of what makes a particular city “global” – the more critical to the flows moving through the network, the more global the city is. Understanding precisely what kinds of flows and relationships makes a city “global” can help us to understand how patterns of disease are affected by the nature of these globalized and globalizing spaces (Ali and Keil 2006).

One of the most important lessons of SARS is that this prized status as a “global city” may facilitate the movement of microbes and disease as much as that of capital, commodities, or people. Changes in urban development and technology greatly enhance the ability of microbes to rapidly move from animal to human, rural to urban, and local to global. With effects on health systems, economies, political chains of command, and social perceptions of diversity

and multiculturalism, SARS became lethal not just to the individual human in the globalized urban environment, but to the status quo of the global city network of contemporary capitalist globalization. SARS unsettled the assumption that it was possible to guarantee safe travel, healthy environments, and access to medical treatment for the global elite, everywhere in the world.

The Global Cities Network: Articulating the Global Economy

Global cities are conceptualized as linked together through networks of flows of capital, people, information, and commodities, which have predominantly been analyzed in terms of the relationships of corporate firms spatially located in different cities (Friedmann 1986; Knox and Taylor 1995; Smith and Timberlake 2002; Taylor 2004). In this “network society” (Castells 2000), the increase in mobility for people and things, particularly through air travel between global cities, has made connections between cities more fluid than traditional links between port cities. This notion of a fluid network is one of the aspects of contemporary globalization that sets it apart from former stages of international travel, trade, and colonization (Ali and Keil 2006). While global cities are understood to be fundamentally shaped by these interconnections and the flows moving through them, they are also seen as having an active role in defining the global economy through particular historical and socio-political contexts (Keil 1998a). Through the organization and management of these flows, global cities provide spatial articulation to facilitate the processes of global capitalism.

Despite considerable interest in the networks of flows between cities, there is still relatively little known about precisely how cities are actually connected and what the consequences are for the everyday lives of people who live in them (Derudder 2003). While much of the case-study based work on individual cities has been rich and detailed (see Sassen 2000, 2002), Short et al. (1996) have pointed out the lack of empirical data detailing how the connectivity of global network of world cities is formed and maintained by the flows between and through them (for an example of wide-ranging empirical work, see Beaverstock et al. 2000; Taylor 2004).

The case of SARS exposes the difficulty of adequately understanding other kinds of connectivity, such as the flows of infectious disease between particular cities, through such an approach. The relationships illuminated by the path of the SARS virus between cities such as Toronto and Hong Kong or Singapore, which are otherwise seen as loosely connected, are not easily explained by data available through conventional global cities analysis. Much of the empirical basis for connectivity between global cities remains speculative, particularly for relationships involving “second-tier cities” such

as Toronto. Derudder et al. (2004) have stressed the many obstacles to the use of air travel data, noting that it is particularly problematic with respect to Canadian and Chinese cities due to the bias of airline data to direct connections, which are less likely between second-tier cities and are not clearly linked to origin and destination information. This gap in the data is surprising, considering Short's (2004) research placing Hong Kong, Toronto, and Singapore amongst the most globally connected cities. It is also particularly problematic in the context of the growing economic networks of trade between Canada and Asia and the large South Asian and Chinese diasporic communities in Toronto (Statistics Canada 2005b; Ali and Keil 2006).

*Cliques: The "Tangible Relational Patterns"
of the Global City Network*

Understanding the relationship between these SARS-affected cities means that we have to ask different questions about the relationships and connectivity between cities. As Smith points out: "... what is needed are new approaches that help us to go beyond counting; to go through those doors to find out precisely how networks work and are maintained over long-distances" (Smith 2003a, p. 31). While we must indeed find ways to go beyond counting, we must also critically consider what we are counting and why. What else we might we be counting in order to grapple with basic questions about how and why global city networks are formed? Emerging and spreading infectious disease can offer "a new entry point for the already lively debate on connectedness in the global city universe" (Ali and Keil 2006, p. 3).

Derudder and Taylor (2005) employ the concept of the clique to explore relationships within the global cities network with greater precision. They define a clique as "a maximal set of actors in which every actor is connected to every other actor" (ibid., p. 77). According to their research on "The Cliquishness of World Cities," membership in a clique indicates a cohesive relationship to other members and a weak relationship to those outside, helping us to break down the concept of the global city network into "tangible relational patterns" (ibid., p. 75). By looking at world cities on the basis of political economic data, such as the number of corporate headquarters, their research clusters global cities into smaller relational groups, giving us more specific information about how, where, and what kinds of flows are traveling between places. Clique analysis reveals sub-levels of network connectivity, which Derudder and Taylor argue represent "regional-global nexuses within contemporary globalization" (ibid., p. 85).

Like the tools used by researchers in hierarchical mapping, clique analysis has focused largely on *economic* relationships between global cities; however, as Derudder and Taylor themselves propose, clique analysis is a tool that can be extended to consider other kinds of relationships in the global city

network (*ibid.*, p. 85). Therefore while current clique analysis, focused largely on corporate headquarters and business elites, reveals little about the kinds of relationships that exist between the SARS-affected cities, looking at relationships between the specific subgroup of the SARS cities within the global city network, may yield important lessons. A clique analysis informed by some of the critiques discussed below and recent topological perspectives on cities and networks may provide unique insight into why SARS was able to emerge in particular places and not others.

Expanding the Global City Network: Which Cities Count, Which Flows Matter?

While the work of global cities research, which has centered on a small group of elite cities, has revealed central aspects of contemporary urbanization and economic globalization, critiques of this narrow focus and of the emphasis of global cities research on quantitative analysis have led to a number of innovative attempts to broaden fundamental understandings of how “global citiness” can, and should, be understood and measured. A number of authors have attempted to counter the exclusion of major portions of the globe from global city analysis, particularly the global South, as well as de-industrializing cities in Europe and North America, (Simon 1995; Shatkin 1998; Robinson 2002; Ley 2004). This extension of global cities perspectives to reflect “the experiences of a much wider range of cities” (Robinson 2002, p. 532) has resulted not just in the inclusion of locations previously “off the map” (*ibid.*), but has also informed new understandings of what globalization is and how it interacts with particular historical, social, political, and economic contexts in different places (Shatkin 1998; Marcuse and van Kempen 2000). SARS showed us that the connectivity that matters in relation to the global spread of disease does not necessarily parallel the relationships that are most obvious from global cities maps.

As well, important interventions have pointed to the wide range of actors and practices that are part of global city formation on the ground, actively resisting and shaping dynamics of globalization (Keil 1998b; Abu-Lughod 1999; Smith 2001). Recent work linking urban studies and questions of scale has revealed how static conceptions of the global cities network fail to account for the constantly changing and emergent nature of cities (Thrift 1996, 2000b; Brenner 2000). These approaches suggest that the messiness of urban life, populated by a multiplicity of actors operating in various scaled and networked relationships, requires a more complex understanding of time and place through which the fluidity and hybridity of global cities can be conceptualized, acknowledging that “space is also rather messy, complex, juxtaposed, or perhaps that there are many kinds of space” (Smith 2003b).

The introduction of insights from post-structuralist and actor-network theory (ANT) (see Ali, Chapter 14) into the field of urban studies is a critical

development in efforts to expand the focus of global cities research beyond the confines of a strict political economy approach limited by a spatial and temporal fixity (Smith 2003b). Topological approaches, such as the work of R.G. Smith (2003a,b), introduce a more complex picture of everyday life in the city, populated by intricate networks of humans and non-humans to produce “a liquid theatre alive with the unruly times of urban practices.” Smith pushes our understanding of the city beyond rigid portrayals of cities as discrete units and their relationships as fixed and linear, by emphasizing the ways in which they are “in constant movement, undergoing a series of transformations, translations and traductions” (Smith 2003b, p. 575).

The example of SARS calls on us to question assumptions in global cities research about what is meaningful about connectivity, and how we conceptualize it. The speed at which this newly emerged disease was able to spread indicates that there are significant human and non-human aspects of connectivity that are not adequately confronted by our images of network connectivity. Understanding infectious diseases in the global city network demands not only that we acknowledge overlooked flows, but also work toward understanding how these relate to and transform/are transformed by the more traditionally understood flows, such as capital and information. As Smith argues, “globalization and world cities are too intermingled through scattered lines of humans and non-humans to be delimited in any meaningful sense” (2003, p. 570). The limitations of a fixed notion of geographical scale are exposed in the face of emerging infectious diseases such as SARS, which “jump-scales” (Brenner 2000) easily, operating simultaneously at purportedly distinct local and global levels (see Ali and Keil 2007). The need to expand our understanding of the urban beyond the activities of transnational corporations and the movements of a small transnational elite is made urgent in the face of undetected actors with lethal potential to travel in the global city network. The case of SARS suggests that the network linkages detected by economically focused analysis create a limited picture of the global cities network that is not adequate for an analysis of emerging infectious diseases. As Danny Dorling (2004) suggests, we must turn our attention to the pathways and flows that determine the production of health and disease in particular places.

“Unexpected, Disproportionate, and Emergent Effects”

With globalization, any event can have unexpected, disproportionate and emergent effects that are often distant in time and space from when and where they occurred.

R.G. Smith (2003b, p. 569)

Emerging infectious diseases complicate the relationship between globalization and urbanization, with unpredictable and unexpected consequences, of which the emergence and spread SARS is a perfect example. Such “unexpected,

disproportionate and emergent effects” (Smith 2003b, p. 566) challenge the ways in which global cities have traditionally been understood, and how the global city network has been conceptualized (Ali and Keil 2006). Infectious diseases appear as one of the first agents with material potential to unravel the global city network – in both theory *and* practice. SARS has made it impossible to guarantee that the borderless enclave of the identical hotels, condos, office buildings, and convention centers that facilitate the mobility of the transnational elite is disease free. In the face of a possible avian influenza outbreak, which is predicted to be much worse in scale than SARS, and is likely to appear suddenly without effective vaccines or treatments prepared, the presumption that our governance and health infrastructure have either the knowledge or the power to control infectious diseases is no longer tenable and appears dangerously arrogant.

While I have noted the importance of locating urban development within a broader context of the global economy, emerging infectious diseases indicate the need for a more messy and complex picture of the urban, one that sees “life in all of its sticky and slack human/nonhuman, inorganic/incorporeal, phenomenal/epiphenomenal, and banal/intense everydayness” (Seigworth 2000, p. 246, quoted in Amin and Thrift 2002, p. 9).

The work of R.G. Smith (2003b), Amin and Thrift (2002), and Thrift (1996, 2000b) builds on post-structural and actor-network theories (ANT) to construct a non-scalar, non-linear representation of space and time in the global city. This multidimensional and “messy” perspective, accounting for the multiplicity of actors and the constant of change, points to alternative explanatory possibilities for how cities and their relationships work. Rejecting the limitations of dominant quantitative approaches and modern assumptions of linear space and time, and the human/nature dualism, these approaches see cities as more than platforms for economic and structural forces. Instead, globalization is produced in the everyday of the streets and neighborhoods of the global city (Keil 1998a; Flusty 2003; Smith 2003b). Rather than conceiving cities as “command and control” centers (Sassen 2000, 2002), Smith complicates network connectivity and the role of global cities, describing them as “‘switches’, ‘intermediaries’, ‘middles’, in a continuum,” who exercise their power through “their ability to enroll and mobilize others to perform in ‘their’ network” (2003b, p. 576).

The appearance of SARS in a wealthy city, in a developed Northern nation, contests Dorling’s (2004) assertions that the cities populated by the wealthy transnational elite will be the healthiest; and, debunks notions that vulnerability to infectious disease is a problem of a distant “other” on the side of the world. Such a view relies on the fixed and rigid depictions of the global city network and its portrayal as a seamlessly integrated web of built environments and transport systems operating a non-stop, 24-hour network of capital that transcends nature, moving “with ease from space to space and

time to time” (Smith 2003b, p. 576). In contrast, Amin and Thrift (2002) depict the city as a porous space; even those parts that have attempted to shut themselves off are vulnerable to flows and movements. Fixed notions of the polarization of the city into a “core” and “periphery,” “human” and “natural,” hides the “trails of mobility” that connect spaces within and between cities (2002, p. 22). Just as elites cannot ever really seal themselves from the complexity of urban life, those on the margins are not immune to unintended effects of the transnational mobility of a select group of elites. Infectious diseases are not contained by office buildings or gated communities; they coexist with their human and animal host – as of yet undetected by the architects and analysts of the global cities network.

The vulnerability of global cities is usually depicted in relation to things humanly created and controlled in economic or technological terms, such as stock market crashes and technological failures. SARS demonstrated that the vulnerability of the global cities network might lie outside all of these modern constructions, in the non-human realm rarely considered by global cities research. Assumed to be subdued and controlled by the human built and controlled urban environment, socio-nature relationships are invisible in boosterist discourses of the global city – neither a threat nor a benefit to the elite spaces of the global city (Kaika and Swyngedouw 2000). The notion of the global city network as a space of flows of capital, people, and commodities appears to assume that viruses (nature) can be killed or controlled to maintain the functioning of global capitalism; and that cities and their human residents exist above, or outside, of “nature.” Accounts centered on the de-territorialized spaces of airports, chains of identical hotels, and convention centers worldwide not only leave out vital spaces and human actors that make these places function, from streetscapes to markets to taxi drivers and janitorial staff, but also the non-humans that inhabit urban spaces, from animals to machines to microbes.

From a topological perspective, the study of the flows within and between global cities becomes much more complex (Smith 2003b) through conceptual tools by means of which we can move our analysis beyond connectivity as defined exclusively in terms of human environments and human actions. Cities as particular nodes are made from the “traffic” that moves through them, and this “traffic” is understood to be made from multiple and interconnected entities. The “human/nonhuman, inorganic/incorporeal, phenomenal/epiphenomenal” are constantly encountering each other in new and different ways, to produce unexpected and unpredictable effects (Seigworth 2000, p. 246, quoted in Amin and Thrift 2002, p. 9).

Drawing on Latour’s actor-network theory (ANT) (see Ali, Chapter 14), Smith calls on “world cities researchers to consider networks as being constantly made by *both human and nonhuman actors*” (Smith 2003b, p. 36). Diseases have to be understood not as alien visitors to otherwise safe and

sanitized global cities; they are both products and producers of the city themselves, often fundamentally shaped by their urban existence: “in the process of ‘adapting’ nonhumans to contemporary social settings, management policies and practices often transform the object of concern into a distinct and different entity” (Lulka 2004, p. 443). In many ways, emerging infectious disease are what they are *because* of cities, not despite them.

Infectious Disease and Global Cities: Building a Theoretical Framework

The (re-)emergence of infectious disease in the context of contemporary globalization challenges scholars and practitioners alike to consider the complexity of globalized urban spaces, and to turn our attention to the multiplicity of flows and pathways of connectivity in which they are embedded. Rather than treating emerging infectious disease as an isolated matter of biology and epidemiology contained by the modern city in which nature is killed or controlled, SARS forces us to consider the “[a]ntagonistic relations that emerge from this juxtaposition of trenchant modern social structures and transient actors [which] have yet to be resolved in any satisfactory fashion” (Lulka 2004, p. 443). As I have demonstrated above, an approach to understanding global cities that more adequately considers the role of emerging infectious diseases requires both the insight of global cities research into processes of urban (re)development in contemporary globalization and the innovative and “messy” understanding of urban life that topological approaches provide. The experience of SARS made clear the limitations of our modern understandings of the relationship between cities and disease. I suggest that a creative reading of global cities research reveals concepts and tools with which we can begin to build a new and innovative “dialectical” (Ali and Keil 2006) approach to understanding the relationship between infectious diseases and the global city network, one which can better equip us to face the challenges of vulnerability and the threat of infection that lies ahead.

NOTE

- 1 For the purposes of this chapter, we have adopted Feldmann et al.’s (2002) definition of emerging infectious diseases: “those in which incidences have increased in the past decade as a result of the introduction of a new agent, recognition of an existing disease that has previously gone undetected, a reappearance (re-emergence) of a known disease after a decline in incidences or an extension of the geographic range of a disease.”