

## From SARS to strategic actions reframing systems

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### From SARS to strategic actions reframing systems

**Background.** The developed world responds to new and re-emerging diseases through the discovery of medications. Disease can be transmitted around the world in a day, but the development of medications does not occur at this rate. The world has one environment and the focus in health care must be on identifying factors in this environment that coalesce to produce disease.

**Aim.** The aim of this paper is to introduce the integrative model of environmental health and explore its potential to illuminate the Toronto SARS experience.

**Discussion.** SARS affected people on three continents in a matter of days. Response to this new disease varied from one area to another and was dependent upon the level of integration of health services and communication across services. The present focus of the health care system is on treating the results of disease rather than the causative factors. Reacting to a new disease had grave social and economic consequences. The time for a new global environmental approach to health is now. The Toronto SARS experience was examined using the integrative model of environmental health and the upstream perspective as exemplars to interrupt the traditional approach to disease. All health care providers share the responsibility to learn about and to understand how our environment creates disease. This knowledge comes through research on topics such as; chemicals, pesticides, soil erosion, killing of forests, contamination of water, destabilization of climate, and social disruption from wars.

**Conclusions.** Health care systems in the developed world continue to focus on the treatment of disease. A global ecological initiative for an integrated disease prevention system must be negotiated among nations.

**Keywords:** environment, model, nursing, severe acute respiratory syndrome, strategic, Toronto

### Introduction

The arrival of severe acute respiratory syndrome (SARS) in North America and in particular Toronto is a classic example of the result of 'downstream' approaches to economic political and environmental factors. Butterfield (2002) described downstream thinking in the nursing literature more than a decade ago when she adapted the river analogy of McKinlay (1979) to thinking in nursing. This analogy depicts

the current focus of health care as downstream on the consequences of disease rather than upstream to determine where disease is coming from.

The SARS is viral in origin and is characterized by 'influenza like symptoms such as fever, myalgias, headache, sore throat, dry cough, shortness of breath, or difficulty breathing. The symptoms may be followed by hypoxia and pneumonia, and occasionally acute respiratory distress (requiring mechanical ventilation) and even death' [Center

for Disease Control (CDC) 2003, paras 2–4]. To date there have been 8439 confirmed cases of SARS and 812 deaths worldwide [World Health Organization (WHO) 2003].

The SARS attracted world attention and rapid efforts took place to isolate the suspected corona virus and to develop a vaccine to treat SARS. Unique to this new disease was the worldwide effort and collaboration among countries to identify the causative agent. Why is this? To date, the exact mode of transmission is uncertain but it appears that human beings are vulnerable no matter their socio-economic status, race, gender, age and geographic location. We can only imagine the state of AIDS care or malaria care if these diseases had had the same status and level of collaboration that SARS has had. There is, however, some reason to be optimistic on this front. Mitka (2001) described a report issued by the Council on Foreign Relations and Milbank Memorial Fund arguing that United States of America (USA) foreign policy must consider the health of the people of the world for the following reasons. The USA is at increased risk from infectious diseases that know no borders, developing countries receive 42% of USA exports and poor health is known to create 'political instability, disenfranchises people with inadequate social capital, limits economic growth and exacerbates the human damage caused by social and economic dislocation' (p. 1165).

Taking the present worldwide collaborative effort that has occurred downstream from a new disease and harnessing this collaboration upstream could prove more effective. The purpose of this paper is to examine a classical result of downstream approaches in health care in order to offer a way forward for nursing and others to reframe thinking about disease so that actions may begin upstream to prevent disease. Such actions could be referred to as 'strategic actions reframing systems' (SARS). The following strategies will be used in order to promote an upstream health care discourse: (a) The Dixon and Dixon (2002) integrative model of environmental health is presented as an organizing framework and contrasted with the public health model; (b) SARS and the Toronto experience in particular are examined using the Dixon and Dixon model, as well as other readings; (c) the results of the Toronto experience are interpreted in relation to the model and to upstream thinking and finally; (d) nursing research strategies that can reframe existing disease control discourses are presented.

### Integrative model of environmental health

Why this model? SARS is a new disease that affected people on three continents in a matter of days (CDC 2003, para 1).

Globalization is a reality, but it will not be sustainable without environmental preservation (Friedman 1999). In the recently released Institute of Medicine report on *Emerging Infections: Microbial Threats to Health in the United States* (Smolinski *et al.* 2003), the impact of infectious diseases on the USA is described as steadily increasing. The report identifies 13 factors that contribute to new and re-emerging diseases. All of these factors have either a direct link to the environment or an indirect link through human actions. The environment has been a consistent domain in nursing theory, and nursing theorists' definitions of the environment are the subject of an important critique.

Kleffel (1994) identified that nursing's present understanding of the environment is inadequate and set out to explicate an expanded nursing and environmental domain. Kleffel challenged nursing theorists to develop the knowledge base to create this expanded environmental domain. This yet to be developed knowledge could contribute to a better understanding by nurses of the context of care. The rather narrow view of the environment and the patient that nurses and other health care professionals have learned may perhaps be serving to drive health care professionals to consider only the immediate environment of the patient. Kleffel (1991) introduced Butterfield's ideas on upstream nursing approaches, urging nurses to work on modifying economic, political and environmental factors that coalesce and result in health problems. Traditional approaches locate the problem within the individual and keep strategies downstream.

Dixon and Dixon (2002) proposed the integrated model of environmental health. The focus of the model was to move thinking from the agent and the individual to an examination of the environmental context in which humans live. Such a proposition creates the possibility for upstream thinking that connects us with what is happening in the environment. This connectedness creates awareness of the fact that infectious diseases kill twice as many people as cancer. These diseases kill 14.4 million people each year (Worldwatch Institute 2003a, 2003b). Dixon and Dixon saw 'factors in the environment as major determinants of health for individuals and populations' (p. 43) and therefore the model supports upstream thinking.

### Domains of the model

Dixon and Dixon (2002) developed this model after years of attending conferences on environmental health where only the physiological domain of the problem was discussed, leaving so many unanswered questions. The model has four domains:

The physiological domain concerns chemical and physiological processes...The vulnerability domain concerns the broad array of individual and community characteristics that may alter pathways of the physiological domain...The epistemological domain concerns processes of personal thought and social knowledge...The health protection domain concerns engagement in environmental health. (p. 44)

The four domains deal with the following questions respectively: 'What is the problem' (p. 45)? 'Who is affected' (p. 47)? 'How does everyone know about this' (p. 49)? and 'What do people do about it' (p. 51)? These authors also believe that the existing public health epidemiological model falls short in getting thinking upstream.

The public health model deals with disease prevention and the health of populations. According to Mann *et al.* (1999), it fails in its persistent focus on individual risk behaviours, and its dismissal of hazards that lie beyond personal choice, leading to failure to examine public health problems from the wider perspective of the global environment and the societies in which risk behaviours take place. Once risks are identified, public health departments have a good record on preventing and reducing risk through education. Public health departments control health problems using the results of epidemiological studies. For example, following discovery of the relationship between cigarette smoking and coronary heart disease and between injuries and automobile seatbelts, public health departments were instrumental in developing educational programmes on smoking cessation and the use of seatbelts (Mann *et al.* 1999). This work, although valuable, is still a response to what has already happened and brings us to where Dixon and Dixon (2002) want to go: what combination of factors has the potential to lead to a problem, and what can be done upstream so the world is not dealing with emerging diseases like SARS?

### SARS the Toronto experience

In late February 2003, two Canadians stayed in the Metropole hotel in Hong Kong, where they contracted the SARS virus. In early March, they returned to Canada. Traveller X, a 55-year-old male landed in Vancouver. He had flu-like symptoms and on 7 March 2003 went to a Vancouver emergency department. At triage, he was asked to put on a mask and from there was isolated. Traveller Y, a 78-year-old female diabetic, was ill on her return to Canada and died at home. Her son became infected, went to an emergency department in Toronto and was admitted to hospital on 7 March. He was isolated on 8 March. On

12 March the WHO issued a global alert about the worldwide spread of an atypical pneumonia (McIlroy 2003).

### The physiological domain

At the outset of the Toronto experience the answer to the question, 'What is this?' had not been decided. The corona virus has since been identified as the causative agent. The exact mode of transmission has not been decided, but is considered to be by droplet or contact with an infected person. When SARS arrived in Toronto, physicians, nurses and health care institutions were described as unaware of any new disease emergence (McIlroy 2003).

Vancouver, Canada's second-largest city, on the other hand, had issued alerts on 20th and 24th February to physicians and hospitals 'to be on the lookout for patients meeting certain criteria' (McIlroy 2003, p. A4), notably, recent travel to Hong Kong and presenting with influenza like symptoms and atypical pneumonia. Although a viral agent had not been identified, health officials in the province of British Columbia followed the precautionary principle that 'indication of harm, rather than proof of harm, should be the trigger for action' (Steingraber 1998, p. 270). Despite the fact that the WHO did not issue a global health alert to watch for cases of atypical pneumonia until 12th March centres such as Vancouver had already acted and as a result experienced no major outbreak of disease.

In Toronto, at the start of the outbreak the causative agent for SARS was unconfirmed. It is, nevertheless, reasonable to believe that the disease could have been contained if the province of Ontario response had been the same as that of British Columbia. However, a fully integrated approach to the problem did not occur. The epistemological domain of the model will serve to illuminate further the Province of Ontario response to SARS.

### The epistemological domain

The epistemological domain answers the question, 'How does everyone know about this?' One of the first thoughts in answer to this question is the Internet. This, however, is but one of many sources of information. Toronto is certainly electronically connected and, according to Friedman (1999), 'the result is that never before in the history of the world have so many people been able to learn about so many other people's lives, products and ideas' (p. 67). This same author goes on to say that, despite the global capability to acquire information, there are barriers to this happening. One

important barrier is lack of transparency surrounding a nation's economy and how it does business.

China demonstrated a lack of transparency in its failure to alert the WHO when SARS first appeared in Foshan, Guangdong province, in November 2002. This failure led to exportation of the disease in February 2003 to Hong Kong, Canada, Ireland, Vietnam, Singapore and the USA (Hawaleshka 2003). It is clear that China's lack of transparency was an important factor in the spread of SARS. One country's failure, however, need not be the excuse that another country uses. The province of British Columbia in Canada has a provincial CDC and staff there clearly understood an important reality of our world, namely the trend to new and re-emerging diseases. The province of Ontario completed the dismantling of its provincial microbiology laboratory in 2001 with the statement that 'It would be highly unlikely that we would find a new organism in Ontario' (Abraham & Priest 2003b, p. A1).

The epistemological domain requires that the members of a community collaborate with experts in taking responsibility for how to act in particular situations. Experts and the general public in Toronto were doubly handicapped in the SARS outbreak. First, China failed to alert the world and, second, the province of Ontario had short-sightedly dismantled its provincial microbiology laboratory that could have acted as did the CDC in British Columbia to alert health care professionals about an unusual flu-like illness. The weaknesses in the Toronto response that have been highlighted by the physiological and epistemological domain of the integrative model of environmental health are further explored through the vulnerability and health protection domains.

### Vulnerability domain

Vulnerability addresses the question, 'Who is affected?' According to Dixon and Dixon (2002), health risks often vary significantly based on extent of exposure and susceptibility. Individual and community characteristics need to be considered. At present, the SARS epidemic is waning and the statistics in this domain are not complete. The public health department for the Toronto area has reported that older people and those with co-morbid conditions are at greater risk of poor outcome from SARS. There have, however, been a number of deaths in young adults with no existing disease (Galloway 2003b, p. A6). Booth *et al.* (2003), in a study of 144 Toronto patients with SARS, found that '51% were healthcare workers' (p. 2803), 'the majority of cases were related to hospital exposure, there was a significant

association with morbidity and mortality  $P = 0.03$  and the vast majority (93.5%) of patients survived' (p. 2801).

The greater Toronto community found itself at a loss to respond to SARS. The experts did not know the exact causative agent. The public health department and province lacked effective coordinated communication about the situation, and directives for health care workers and the public changed daily. The apparent lack of coordination and communication surrounding SARS in Toronto, as well as the belief that Toronto was exporting the disease, led to a travel alert for Toronto being issued by the WHO.

Toronto and Canada became vulnerable at this moment from every point of view. People stopped travelling there and so airlines, hotels, restaurants and theatres had no business. The Canadian dollar dropped in value and economic growth decreased. Every sector of the population became an indirect victim. When this happens what do people do? This is the question addressed by the fourth domain of the model: health protection.

### Health protection domain

Ideally, in an integrative model of the environment, individuals and communities want to reduce risks and prevent problems from occurring. Toronto suddenly found itself with many sick people; therefore, physicians and nurses and other health care providers took care of the sick. Hospitals closed their doors to visitors and stopped elective surgery in order to prevent disease transmission. Thousands of people were quarantined to prevent community transmission. Scientists were busy working on a vaccine. Politicians were busy doing damage control and defending public policy. As soon as the first wave of SARS appeared to be contained, Toronto infectious disease specialists began travelling internationally to describe their treatment and containment of SARS. Meanwhile, the disease continued to simmer at home (Abraham & Priest 2003a). Following the immediate reactions, criticism of provincial public health policy and hospital policy began to appear. Physicians criticized the lack of a provincial microbiology laboratory and a communication system (Abraham & Priest 2003b). Nurses criticized the reduced employment of full-time nurses (Grinspun 2003), and the fact that they were not being listened to when they knew the second wave of SARS was breaking out (Galloway 2003a). Every sector of the population is now attempting to recover in some way from SARS. Overall, the Toronto response was downstream all the way and the SARS acronym serves to sum it up: S – shortsighted, A – arrogant, R – recurring, S – stressed.

## Interpretation

This review of the Toronto experience using the Dixon and Dixon (2002) model has exposed strengths and weaknesses in both the model and the Toronto response. The primary strengths in the Toronto response were the care of patients and the relative disease containment. The weaknesses have already been highlighted in the previous section. In terms of the model, the strengths are that the four domains act as a guide to factors to consider. The physiological domain directs us to the causative agents, and this is very much in keeping with the traditional scientific process. These are very important to know in order to be able to treat patients appropriately. The weakness of this domain is that the greater question should be: 'What global environmental factors are coalescing that have the potential to produce new disease?'

The epistemological domain was the most helpful in gaining greater understanding of the Toronto experience. In exploring the question, 'How does everyone know?', weaknesses in provincial microbiology laboratory resources were revealed, as well as poor communication links between provincial public health units and between the public health department and hospitals. One particularly salient point is that everyone can get connected to the Internet, but systems such as health care need formalized coordinated communication patterns so that all who need information, no matter where they are located – will receive it in a timely manner.

To lend credence to this interpretation of the Toronto experience, some additional jurisdictional comparisons were sought. Singapore, a city-state with a population similar to that of greater Toronto experienced a SARS outbreak roughly equivalent to that of Toronto. The minister of health was in charge and one hospital was declared the SARS hospital. The public health department liaised directly with the hospital (Health Canada 2003). The USA and United Kingdom (UK) did not experience the outbreaks as did Toronto, and may therefore have lessons for other areas.

In the USA, the responsibility for public health rests at three levels: local, state and federal. The creation of the Centers for Disease Control (CDC), with a central location as well as employees in most states, has proved a cornerstone in research and responses regarding disease prevention and control. The CDC rapidly responds, no matter where threats or disease outbreaks arise (Health Canada 2003).

The UK has three separate health systems, each fully integrated: 'The basic organizational unit of the National Health Service is the Primary Care Trust. The trusts are accountable to 28 health authorities, each with a director of public health' (Health Canada 2003, p. 62). Directors are

accountable for health protection. One commonality in these comparisons is the existence of an identified point of accountability and communication in the event of disease outbreak.

The vulnerability domain addresses the question, 'Who is affected?', and directs attention to individual and community characteristics. This domain was helpful in revealing that there is much yet to learn from SARS in order clearly to list the individual and community characteristics of those most likely to be affected. Looking at individual and community characteristics is a traditional public health approach to an existing problem and does not take us upstream of the problem.

The health protection domain is intended to direct attention to risk prevention as well as caring for those affected, but it gives the sense that this is a matter of prevention of known diseases. It was easy to identify what everyone in Toronto and the world was doing after the fact. Once again the focus must become the reduction of the emergence and re-emergence of disease.

The model advanced by Dixon and Dixon (2002) is a clear evolution from the traditional public health model. The four domains are a good start in pushing thinking upstream. The model, however, does seem at times downstream. This observation comes from the sense that in the physiological domain there is an assumption that new disease is taken for granted. To be all the way upstream, the model needs to have an ecological domain that necessitates professionals and the public knowing the current status of the world's environment so that all communities are acting locally and putting systems in place to prevent or minimize exposure to emerging disease. There is always a risk in the unilateral application of any single theory to phenomena. In order to minimize this risk and do justice to this new disease, and to the model, the perspective of upstream thinking is now considered in relation to SARS.

## Upstream perspective

Butterfield (2002) noticed that 'the origins of disease are reinterpreted to emphasize individual behavioural factors (e.g. exercise, diet, stress) rather than the socially constructed conditions that promote those behaviours (e.g. lack of safe places to walk, easy access to high carbohydrate snacks, mundane and repetitive work tasks)' (p. 37). In order to interrupt the disease discourse that focuses on the individual and to open a discourse that makes visible the social constructedness of disease, Butterfield proposes for nurses an upstream perspective that elaborates nursing actions that are distributive and strategic. Distributive actions are those

### What is already known about this topic

- Infectious diseases are emerging and re-emerging.
- Health care systems in the developed world focus on treatment of disease.
- Epidemiological approaches focus on individual risk behaviours and dismiss hazards that lie beyond personal choice.

### What this paper adds

- A call to focus thinking and resources on identifying environmental factors that are coalescing to produce disease.
- Application of the integrative model of environmental health and the upstream perspective to SARS as exemplars to interrupt the traditional approach to disease.
- A plea that a global ecological initiative for an integrated disease prevention system be negotiated among nations.

activities that nurses carry out on a day-to-day basis to incorporate environmental thinking into their work. They could include asking questions about the environment when interviewing clients, and working to alter the ways in which we carry out daily activities to include an environmental perspective. Distributive actions amount to vigilance toward ongoing threats in the environment. Nurses and physicians who specialize in infectious disease treatment have a unique opportunity to be upstream, and to scan the macro environment for precursors of disease and advocate societal strategies to reduce them.

Strategic actions, on the other hand, concern discovery and new knowledge. They come through research and making a conscious effort to know and understand as much as possible about chemicals, pesticides, population growth, soil erosion, disappearance of birds and languages, killing forests, water contamination, climate destabilization, increasing urban populations, global tourism, migration, social disruption from wars and disease emergence (Worldwatch Institute 2001, 2003a, 2003b). This new knowledge will enable for nurses and others to develop upstream discourses, although they are often caught downstream caring for the victims of diseases like SARS. Toronto, Canada and the world now have an opportunity to move their actions upstream, but first they need to see how they contribute to the social construction of phenomena in particular diseases. The social construction of phenomena referred to by Butterfield is a common thread in the work of several contemporary authors

from different disciplines. For example, Kleinman *et al.* (1997), Mann *et al.* (1999) and Friedman (1999) clearly saw the social connectedness from the perspectives of suffering, human rights and economics, respectively. The WHO operates within a public health model and therefore continues to focus on individual risk behaviours. It represents the public health voices of many countries and needs to examine public health problems from the wider perspective of the global environment in which risk behaviours happen. Upstream voices are needed in places like WHO that can alter discourses. Two such voices are those of nurses and nursing research that is strategic.

### Conclusions

Nursing research that moves thinking about disease upstream is essential. Butterfield (2002) suggested that nurses should get involved in research to examine 'proposed etiologic links between environmental agents and the development of diseases such as Parkinson's and asthma' (p. 44). In addition, nurses need to demonstrate how poverty, disease and violence are linked to environmental devastation. They need to know how the public views the environment in which they live, to find out what environmental concerns citizens have and to initiate needed research or implement existing research. Engagement of participants locally ensures that what is needed is addressed, and local success can be projected nationally and internationally (Kleinman *et al.* 1997, Friedman 1999). Through local connectedness nurses will know what illnesses are prevalent in their communities, and with comprehensive environmental knowledge can develop strong hunches about links between the two. They can be vital in reporting diseases with known and/or suspected environmental links. Tracking these diseases will lead to research confirming environmental links. Knowledge of these links is necessary in working to modify economic and political policy that induces and perpetuates environmental destruction resulting in poor health. Preservation of the environment has the potential to interrupt the development of further diseases. Nurses can play all of the roles from principal investigator in nationally funded studies, to instrument developer, to data collector, to organizing collaborative efforts for multi-site studies and identifying to researchers studies that need to be done.

Additional upstream approaches for nursing research include 'descriptive epidemiological studies to reveal which populations develop a particular pathology, and how this pathology varies over time can be useful for identifying risk factors for ethnic conflict' (Mann *et al.* 1999, p. 98). Global, national and institutional ethnographies in situations of

economic collapse, where poverty, inequality and violation of human rights are the norm, would be instructional in identifying how ethnic conflict comes to be. The testing of existing and emerging models associated with the environment, such as the ecological model and the integrative model of environmental health, will also serve to move thinking upstream.

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