Implications of SARS: Medical Geography and Surveillance in Disease Detection

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OBJECTIVE: To expose pharmacy educators and practitioners to concepts of medical geography and medical surveillance. Severe acute respiratory syndrome (SARS) is used as a case example because it is an emerging infection and a prime example of the type of disease that pharmacists may encounter in daily practice (e.g., easily transmitted, resembles the common cold).

DATA SOURCES: We retrieved data from publications related to medical geography, medical surveillance, and SARS. Data on current SARS cases in Hong Kong were obtained from the Hong Kong Department of Health Web site.

STUDY SELECTION AND DATA EXTRACTION: Variables regarding new cases and deaths due to SARS were evaluated.

DATA SYNTHESIS: Background information on medical geography and medical surveillance was reviewed. Descriptive statistics were calculated for incidence, prevalence, and the number of deaths due to SARS in Hong Kong from March 14 to May 31, 2003.

CONCLUSIONS: Emerging infections are a serious concern for both the public and healthcare practitioners. The recent global diffusion of SARS highlights the ease in which diseases can diffuse from place to place. Understanding concepts related to medical geography and medical surveillance can help pharmacists be better prepared to anticipate disease diffusion and to evaluate signs of emerging infections. In turn, this can help pharmacists be better prepared to provide information and care to their patients. The long-term benefit of understanding how diseases spread and the specific activities related to disease detection is an opportunity for expanding the scope of pharmacy practice.

KEY WORDS: medical geography, medical surveillance, SARS.

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Throughout history, diseases and pathogens have diffused across vast geographic areas, causing considerable morbidity and mortality. The plague, which the Germans referred to as the Black Death, is probably one of the best known and earliest occurrences of global disease diffusion. This disease, which occurred in the mid-1350s, killed approximately one quarter of the European population.[1] In more modern times, influenza has been a particularly deadly disease. For example, the influenza pandemic of 1918–1919 was extraordinarily virulent, killing at least 20 million people worldwide.[2] Since that pandemic, epidemics of influenza A have occurred with regularity at approximately 10-year intervals in 1928–1929, 1936–1937, 1946–1947, 1957–1958, 1968–1969, and 1977–1978.[3] The 1957–1958 flu pandemic, which was also extraordinarily virulent, moved from its origins in southern China in February 1957 and traveled the entire globe in only 4 months.[4] Since 1981, AIDS has increased from only a small number of cases in Africa to a full-blown pandemic, with 40 million adults and children currently living with HIV infection worldwide.[5]

Within the 6-month period between December 2002 and May 2003, a new, highly infectious disease was identified in Guangdong Province in the People's Republic of China (PRC). This disease, which was aptly named severe acute respiratory syndrome (SARS) because of its life-threatening attack on an individual's respiratory system, has been responsible for thousands of infections, hundreds of deaths, disruptions to global economic trade and com-

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merce, and the release of the first-ever global health alert by the World Health Organization.[6] Undoubtedly, SARS is a new disease, with researchers identifying a new member of the coronavirus family as the suspected causative microorganism and the civet cat as one suspected animal-to-human (i.e., zoonotic) vector.[7] This new infection followed many of the traditional patterns of disease diffusion.

When disease outbreaks occur, fears created by their uncertainty often lead individuals to search for remedies or strategies to ward off causative agents. This phenomenon of panic buying was evident in China when SARS was first suspected.[8] People rushed to pharmacies to purchase items, including herbal remedies, to protect themselves against infection. The fear of bioterrorism also has the potential to lead to panic buying of pharmaceutical products. For instance, prescriptions for ciprofloxacin began to increase dramatically after the first reported case of anthrax in early October 2001.[9]

The types of events associated with both natural and bioterror disease outbreaks have compelled federal and state agencies to initiate medical surveillance programs. For medical surveillance to work properly, healthcare professionals with experience and training in disease detection are especially valuable. Pharmacists, because of their professional training and role within the community, are in a position to contribute to medical surveillance efforts.

The purpose of this article is to expose pharmacy educators and practitioners to concepts of medical geography and medical surveillance in order to (1) increase their understanding of how diseases spread, (2) inform them of medication surveillance programs, and (3) identify their role in future outbreaks and how to increase their vigilance during outbreaks. Basic medical geography concepts are discussed and disease diffusion is emphasized. In addition, the relevance of medical geography to pharmacy practice is reviewed. The concept of medical surveillance is discussed and current initiatives to incorporate pharmacists as key players in medical surveillance activities are explored. Throughout this article, SARS is used as a case example for several reasons: (1) it provides an excellent opportunity to study known geographic methodologies as they relate to disease diffusion, (2) it is an emerging public health problem, and (3) it is a prime example of the type of disease that pharmacists are likely to encounter in practice (e.g., highly contagious, resembles the common cold, patients are likely to seek over-the-counter [OTC] medications and pharmacist advice in the first instance).

Medical Geography

Medical geography is a discipline within geography that uses spatial analytic techniques (i.e., techniques that analyze changes occurring over geographic space) to identify relationships between geographic variables (e.g., location, space, time, movement, climate, economic activity) and illness. Medical geographers are interested in how geographic processes such as climate, movement of people, and spatio-temporal changes (i.e., changes in geographic space over time) affect illness and disease diffusion. Medical geographers have studied spatial aspects of influenza, measles, cholera, and hepatitis B, as well as the accessibility and utilization of healthcare resources.[10,11] An early role of geography and its relationship to illness was described by the philosopher Hippocrates[12] in the 4th century BC:

> He who wishes to study the art of healing must first and foremost observe the seasons and the influence each and every one of them exercises … and further he shall take note of the warm and cold winds … so should he also consider the properties of the water …. The healer shall thoroughly take the situation into consideration and also the soil, whether it is without trees and lacks water, or is well wooded and abundant with water, whether the place lies in a suffocatingly hot valley or is high and cool. Also the way of life which most pleases the inhabitants; whether they are given to wine, good living and effeminacy, or are lovers of bodily exercises, industrious, have good appetites and are sober.

Medical geography thus encompasses ideas ranging from landscape epidemiology and physical geography to healthcare utilization and resource accessibility. For the purpose of this article, disease diffusion is discussed in detail. This topic is important for pharmacists who want to know more about medical surveillance. It will help them become better prepared to anticipate future emerging infections and assist them with disease surveillance activities.

DISEASE DIFFUSION

Diseases can occur in a specific geographic location by originating there or by being transported there.[13] Diseases originate in a particular place because certain precipitating ecologic factors favor that location as the locus of initiation. For example, Southern China is the usual locus of initiation for newly emerging strains of influenza virus. Likewise, SARS originated in restaurant workers in Guangdong, presumably because of poor sanitary conditions and contact between humans and the zoonotic vector.[14] If a disease does not originate in a specific location, it is transported from place to place by spatially contagious diffusion (SCD), hierarchical diffusion (HD), or a combination of both.

Spatially Contagious Diffusion

SCD, also known as contact diffusion, involves diseases spreading from person to person via close contact. This is analogous to the way spilled wine spreads across a tablecloth. The extent to which wine travels (or extent of diffusion) is related to the initial volume spilled (or intensity of infection) and the absorbing action of adjacent fibers in the tablecloth (or the ability of people to become infected).[15] With any disease, particularly highly infectious ones like SARS, SCD is responsible for transmission within a particular geographic location. For example, in Hong Kong, the number of infected individuals increased daily because of direct contact between infected individuals and others within the community. Figures 1A, 1B, and 1C show the number of incident cases, cumulative cases, and deaths due to SARS in Hong Kong from March 14 to May 31, 2003.

Not surprisingly, the ability of a disease (or any other entity) to undergo SCD is directly related to distance. Those closer to the source of infection are more likely to become infected than those who are farther away. This concept, known as distance decay, shows that the intensity of an entity under observation (e.g., incident cases of disease) is inversely proportional to its distance from its point of origin. Figure 2 presents a classic example of distance decay, showing a decrease in the rate of AIDS infection from the point of origin in Manhattan to surrounding areas.[15] As distance from the point of origin increases, the number of cases of AIDS decreases.

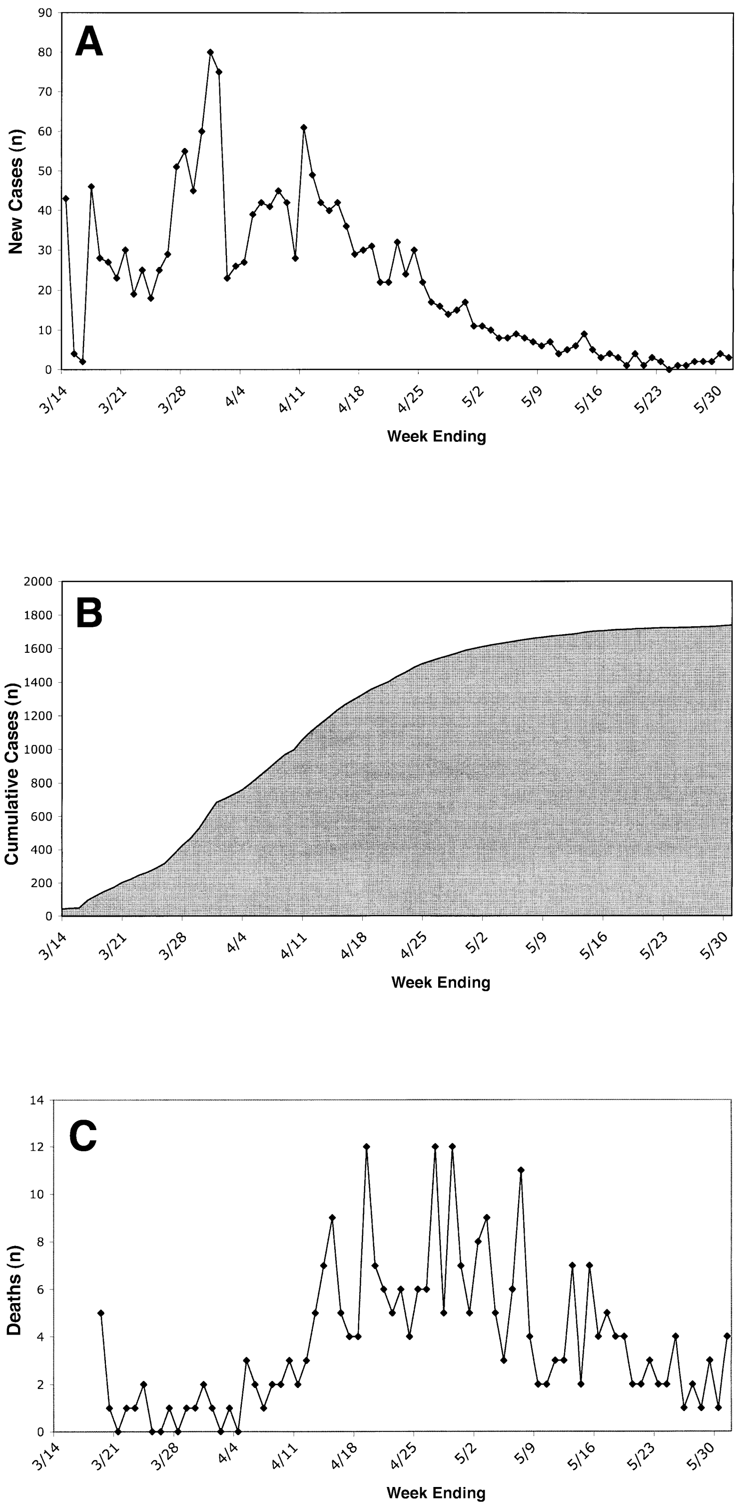

Figure 1. Number of new cases (A), cumulative cases (B), and deaths (C) associated with SARS in Hong Kong from March 14 to May 31, 2003. SARS = severe acute respiratory syndrome.[18]

Hierarchical Diffusion

HD (i.e., from 1 city to another) is another method of disease diffusion. With SARS, SCD was responsible for diffusion within Hong Kong, while HD was responsible for its spread to other major cities around the world. Indeed, SARS appeared to have jumped from one major city to another without affecting smaller cities in between (e.g., from Hong Kong to Singapore). It should be noted, however, that while HD and SCD are different, they often occur concurrently. For example, a disease may spread from one major urban area to another by HD, but will diffuse within an urban area by SCD.

Central Place Theory

Understanding central place theory is essential to understanding HD. Central place theory categorizes cities and towns on an urban hierarchy based on factors such as population size, services available in that city, and interconnectedness with other cities (e.g., distance, transportation links, cultural ties, historical ties, economic ties).[16] In turn, cities are ranked as first, second, third, fourth order, and so on (Figure 3). First-order cities are highly developed service centers; lower-order towns are relatively simple in nature and usually rural. Hong Kong and New York are examples of first-order cities. Both are large, urban, global economic centers with highly developed infrastructure and transportation networks. They also have major research universities and a whole array of goods and services available (e.g., global headquarters, luxury car dealers, 5-star restaurants, major banks, specialty grocery stores, pharmacies). A second-order city has fewer services, but would still be considered a major city. As one moves down the urban hierarchy, fewer goods and services are available and the population becomes smaller. When one arrives at the lowest-order center, only essential goods and services, such as a post office, gas station, and neighborhood grocery store, are available. Higher-order cities contain all of the goods and services of their respective lower-order cities.

The interconnectedness between geographic locations determines the flow of people and diseases between them. A higher degree of interconnectedness results in increased disease diffusion. Determining where a city falls on the urban hierarchy is a complex task beyond the scope of this article. However, a general rule of thumb is that the larger a city's population, the more interconnected it is, and the greater its transportation links are, the more likely it is to be a higher-order city.

There are multiple first-order cities around the world (e.g., New York, London, Hong Kong). Each is associated with its own lower-order cities. Generally, a disease originating in a lower-order city (e.g., SARS) will ascend (and descend) its particular urban hierarchy. SARS, for example, ascended the urban hierarchy from rural Guangdong Province to Shenzhen to Hong Kong. From there, SARS diffused to other first-order cities around the world. Once SARS was established in another urban hierarchy, it began to descend to lower-order cities (Figure 3).

Combination Diffusion — the SARS Example

In reality, disease diffusion is a combination of both HD and SCD. In such cases, a major urban center would expect SCD within its geographic boundaries while, at the same time, the disease would move to other cities on the urban hierarchy. This pattern was seen with SARS in Hong Kong. SARS was transmitted to family members and healthcare workers in Hong Kong by SCD and was transported to Toronto, Singapore, and Hanoi by HD. In turn, Toronto, Singapore, and Hanoi demonstrated SCD within

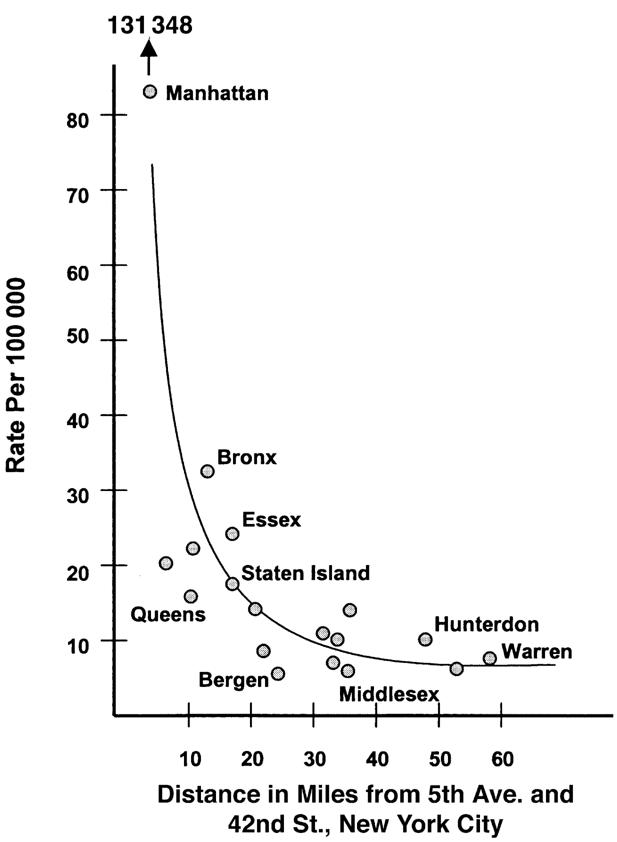

Figure 2. Rate of AIDS diffusion in 1982, with Manhattan as the epicenter.[15]

their respective cities and also were the source for transmission to other cities and towns down their urban hierarchy.

Based on documented accounts of the initial index patient in Hong Kong and his or her contact with others in Hong Kong, it is evident that HD was responsible for the spread of disease from Hong Kong to other cities in Asia and around the world.[17] On February 21, 2003, the index patient (patient A) stayed at the Metropole Hotel in Hong Kong (Kowloon). He died 2 days later, but not before infecting other guests. One infected guest, patient B, traveled to Hanoi (a lower-order city), became ill on February 23, 2003, and infected 59 healthcare workers in Hanoi.[17] Patient B spread SARS within Hanoi by SCD. Three other guests at the hotel (patients C, D, E) carried the disease to Singapore and in turn infected dozens of healthcare workers and family members.[17] One of the infected Singaporean healthcare workers, a physician, traveled to Germany and is linked to several cases there.

Diffusion from one first-order center to other first-order centers also occurred. Patient F, also a guest at the Metropole Hotel in Hong Kong, was linked to the diffusion of SARS to family members, healthcare workers, and other patients in a Toronto hospital before the disease spread to the community by SCD (Figure 4).[17] It should be noted, however, that SARS could have traveled from Hong Kong to Vancouver in the first instance due to Vancouver's ties with South East Asia. However, Toronto is a more likely place of initial diffusion since it is the financial capital of Canada, it has a large Chinese population, and there are many direct flights from South East Asia to Toronto.

SCD was responsible for SARS diffusion within Hong Kong. From March 14 to May 31, 2003, there were 1739 cases of SARS, 278 deaths, and, at the peak, 127 patients in intensive care.[18] In Hong Kong alone, the number of cases of SARS went from 1 in early February to 1739 four months later.

Medical Geography and Pharmacy Practice

Medical geography is relevant to pharmacy practice for 2 reasons. First, it provides pharmacists with an understanding of how diseases move from place to place. By understanding disease diffusion, a pharmacist can have advance warning of emerging infections in a particular geographic location. For example, even though SARS originated in East Asia, by knowing basic concepts of disease diffusion, a pharmacist in rural Texas could anticipate the arrival of SARS in the US and the cities it would initially infect, and learn more about the disease, its etiology, pathology, and treatments before the disease becomes entrenched in the local community. By knowing the geographic basis of disease diffusion, pharmacists can become key players in medical surveillance and disease detection activities. Medical surveillance involves identifying changing patterns of health within the community as a proxy for emerging diseases, while disease detection recognizes disease occurrence. Pharmacists can increase their capacity to recognize emerging diseases by paying attention to unusual buying patterns or disease symptoms and by disseminating this information to public health officials.

Medical Surveillance

Medical surveillance involves the collection, analysis, and interpretation of health-related data for the purpose of planning treatment interventions and preventing further complications from an emerging disease. The emergence of SARS in February 2003 emphasized the need for enhanced medical surveillance activities. Surveillance activities depend on an interdisciplinary team of individuals with a suitable background in geography, epidemiology, clinical medicine, pharmacy, nursing, and other disciplines. Indeed, pharmacists are in an excellent position to be an integral part of this infrastructure because they are well-trained, have extensive professional and community contact, and are trusted healthcare providers.[19] Yet, until recently, there has been little sustained effort to formally utilize pharmacists as part of medical surveillance activities.

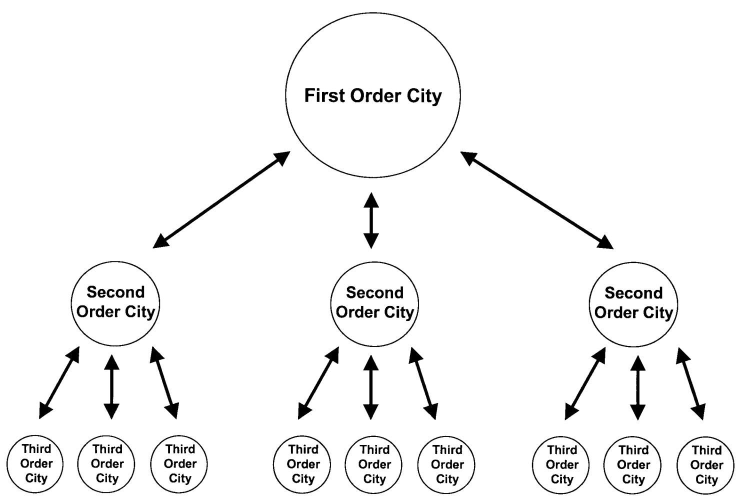

Figure 3. Geographic representation of an urban hierarchy. In the relationship between the first- and second-order city, there is a strong interconnectedness. The arrow shows that this relationship goes both ways. There is no well-defined relationship between 1 second-order city and another second-order city. If a disease originated in a second-order city, it would likely have to travel to the first-order city first and then descend back down the urban hierarchy to another second-order city.

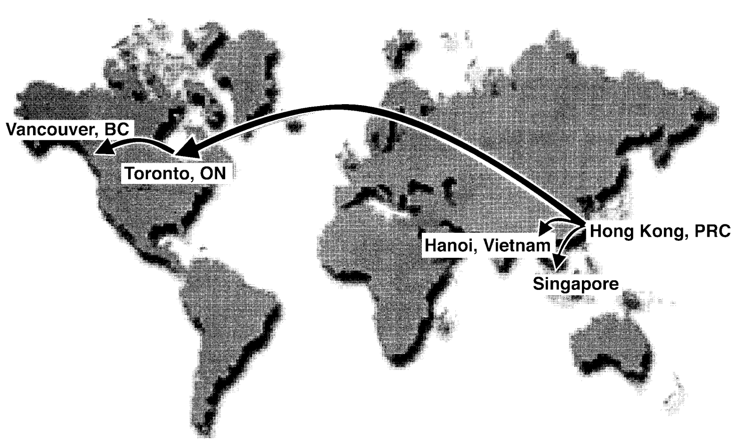

Figure 4. The diffusion of SARS from Hong Kong to select cities. SARS = severe acute respiratory syndrome.

MEDICAL SURVEILLANCE AND PHARMACY PRACTICE

Recent examples suggest that pharmacists can play a key role in detecting emerging diseases. In 2003, for example, an epidemic of viral conjunctivitis occurred in São Paulo, Brazil.[20] Two remarkable features of this epidemic were the quantities of medications sold and the increased number of cases of conjunctivitis seen at the hospital. Indeed, during a 2-month period, >200 000 units of eye drops were sold. Hospital visits for viral conjunctivitis increased from a norm of 50 cases per day to a peak of 35% of all hospital cases on March 6, 2003.[20] The outbreak was officially recognized by the hospital ophthalmology department after recording a large increase in cases.

For pharmacists, the opportunity to incorporate medical surveillance and to identify markers of emerging infections occurred during the 2-month period of increased eye drop sales. Selling such a large quantity of an OTC product in such a short time was a marker of an emerging medical problem, although unidentified at the time. Pharmacists trained in medical surveillance could have been in the position to recognize the seriousness of these increased sales and reported this information to public health officials.

The emergence of SARS also presented an opportunity for pharmacists to incorporate medical surveillance into their daily routine. In China, for instance, the emergence of a new disease, later known to be SARS, led to panic buying of various herbal remedies rumored to be able to cure the disease.[8] In the US, pharmacies reported increased OTC sales of antibacterial liquid soap and regular soap in attempts to kill the SARS virus.[21] These panic buying trends support the pharmacist's role in collaborating with local and federal public health officials to educate customers and patients about emerging diseases. The role of pharmacists in medical surveillance efforts may be particularly important if recent testimony before the US Senate Permanent Subcommittee on Investigations regarding a likely winter outbreak of SARS is realized.[22,23]

Given recent concerns about bioterrorism and emerging diseases, federal and state authorities have implemented guidelines to increase medical surveillance activities. They have also sought to utilize pharmacists as key players in detection activities because of their accessibility and training. Preparation for potential bioterrorism attacks includes monitoring patterns of pharmacy use, emergency department visits, laboratory data, and school absenteeism, so that changes in resource utilization could facilitate the recognition of disease trends and determination of disease origin, as well as assist in prevention of further exposure.[24]

Federal and State Medical Surveillance Initiatives

Recent surveillance initiatives by the federal government include action by the Centers for Disease Control and Prevention (CDC) to establish guidelines on improved surveillance and epidemiologic capacity. These guidelines mandate that state authorities should "rapidly detect and obtain additional information about bioterrorism, other infectious disease outbreaks, and other public health threats and emergency surveillance systems."[25] Over time, the CDC also wants to identify preexisting health-related data sets or create new ones to recognize "active or sentinel surveillance activities."[25] Several states already use pharmacy activity and pharmaceutical data sets to recognize newly emerging diseases. These data sets include the National Electronic Disease Surveillance System (NEDSS), the Real-time Outbreak and Disease Surveillance (RODS), the National Retail Data Monitor (NRDM), and the Syndromic Surveillance system. The NEDSS, RODS, and Syndromic Surveillance are separate systems, while the NRDM is a demonstration project of RODS.

In 1999, Nebraska implemented the NEDSS to link "real time reporting of information for public health action" for the purpose of creating an integrated, standardized disease surveillance system.[26] It was envisioned to recognize emerging infectious diseases due to bioterrorism or naturally occurring infections (e.g., SARS) by monitoring OTC purchases.[27]

Pennsylvania sponsored the NRDM to examine OTC sales as a proxy for disease activity. The NRDM was launched in December 2002 to use OTC sales information to detect disease outbreaks.[28] Data are collected by use of universal product codes from large retail pharmacy chains, mass market stores, and grocery chains representing over 13 000 pharmacies in the US. "Coverage represents approximately 20% of overall national sales volume," but there is much higher coverage in some urban areas.[28] Many health departments, as well as the CDC, use results from the NRDM.

In 2002, the New York City Department of Public Health created a medical surveillance database system called Syndromic Surveillance. Syndromic surveillance encompasses "a spectrum of activities that includes monitoring illness syndromes or events, such as medication purchases, that reflect the prodromes of bioterrorism-related diseases."[29] Its goal is to detect infectious disease outbreaks early and to recognize specific disease characteristics such as diffusion patterns and speed of transmission.[9] However, unlike traditional surveillance methods that rely on etiologic diagnosis, this system relies on nontraditional data to produce real-time detection of emerging diseases. For example, the New York City Syndromic Surveillance system monitors the sale of specific drug classes and uses geographic surveillance to track disease diffusion by postal code analysis. Within 12 hours of being filed, data from pharmacy sales, emergency department visits, and ambulance dispatch logs are made available for analysis.[30] A fundamental aspect of this system is the extent to which pharmacists and pharmacy sales data are incorporated in the medical surveillance process. Pharmacists are recognized as being at the forefront of disease detection because of their direct contact with the public and their ability to detect emerging disease trends up to 2 days before patients are seen in physician offices or in emergency departments. However, pharmacists may not come into contact with patients purchasing OTC medications unless the patients actually consult a pharmacist. Real-time data on OTC purchases could also be captured by inventory control methods.

Future Direction for Pharmacists

For pharmacists who are interested in incorporating disease detection activities into daily practice, the Internet is a key source of information. Appendix I presents a brief description of reputable Internet sources that provide descriptions of newly emerging infections, geographic occurrences of these infections, information on their pathology, and information on other health issues. In addition, these Web sites are good sources of patient information. Table 1 provides examples of questions that patients may ask their pharmacist about emerging infections.

Practitioners may also want to know more about how to detect emerging diseases. To do this, they should be familiar with general signs and symptoms of emerging infections. Some of these signs and symptoms, albeit subtle, might be the first indicator that a new or recurrent infection has emerged and that further investigation is warranted by public health officials. Table 2 provides some examples of signs and symptoms that may indicate a change in the overall health status of the local community.

The information presented in this article can serve as a starting point for practitioners interested in teaching and learning about the spread of diseases, medical surveillance

Table 1. Potential Questions from Patients about Emerging Infections

How is a person infected with the disease?
How does the disease spread?
What are typical symptoms of infection?
What is the incubation period?
Is the disease serious?
Do people die from this disease?
Is there a test I can take to see if I am infected?
How do I keep from getting it?
Is there a vaccine to prevent me from getting infected?
How do I know when the symptoms are serious enough to see a physician?
Whom should I contact for more information?
What treatments are available?
Should I go to the hospital emergency department if I believe I am infected?

activities, and the potential role pharmacists can play in surveillance and detection efforts. To introduce this topic to undergraduate pharmacy students, instructors can include lectures on medical geography, epidemiology, and medical surveillance. For pharmacy graduate programs, elective courses, such as medical geography, epidemiology, and pharmacoepidemiology, may be beneficial. Most geography departments teach an undergraduate medical geography course, and interested students are encouraged to enroll in such a course.

Summary

The long-term benefit of understanding how diseases are spread and the specific activities related to disease detection is an opportunity for expanding the scope of pharmacy practice. Through active participation in disease detection, pharmacists can help ensure the availability of quality medical surveillance data, especially in the context of bioterrorism and naturally emerging diseases, as well as be at the forefront of catching the disease before it spreads too far. The ability of pharmacists to provide quality medical surveillance data, however, is limited to the internal capacity and infrastructure available to formally track this information. Currently, only a few states have developed programs that report real-time data to detect outbreaks and provide early preventive measures. In these and other proposed programs, pharmacy data are often included as a core surveillance tool for detecting disease occurrences through unusual patterns of drug purchasing behaviors. However, these efforts have not specified or mandated pharmacist participation. As healthcare professionals who are often the first point of contact with infections in the community, pharmacists are encouraged to become active participants in medical surveillance initiatives. The ideas and information presented in this article can serve as catalysts for future pharmacist involvement.

Table 2. Potential Indicators of an Emerging Infection

Patients presenting with unusual symptoms
Patients presenting with typical symptoms for a particular disease, but in large numbers
Patients presenting with symptoms for a particular disease, but atypical for that season
Unusual physician prescribing patterns:
type or quantity of medications normally prescribed
drug is prescribed off-season (e.g., an influenza antiviral is prescribed in large quantities in the summer absent any indication that it is being prescribed off-label or for an isolated case)
Customer buying patterns are different from usual
Specific medicines are quickly sold out (e.g., individuals who are unaware that they may be infected with an emerging infection who seek medicines for symptomatic treatment)
Customers panic buy certain medications (e.g., individuals who may or may not have symptoms but are aware of an emerging infection and want to purchase drugs to treat the infection should it reach their geographic area)
Pharmacies have difficulty obtaining products from their distributor or supplier

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Appendix I. Internet Sources for Information on Emerging Infections

Organization	Internet Site	Comments
ProMED	www.promedmail.org	Maintained by the International Society for Infectious Diseases, this site is a global electronic reporting system for outbreaks of emerging infectious diseases and toxins. It has extensive information and immediate reporting. It is moderated by leading infectious disease specialists from around the world and is an excellent resource for timely information about emerging infectious diseases. ProMED provides updates on emerging infectious diseases by e-mail.
CDC	www.cdc.gov	The CDC is the leading US federal agency charged with protecting the health of the public. Information available on this site is extensive and freely available for public use. Current information on important public health topics is usually placed on the home page.
WHO	www.who.int	The WHO is a United Nations agency. It is a valuable source of health information on both clinical and nonclinical issues. The site is updated often and maintains information on disease outbreaks on the right-hand column of the home page.
Health Canada	www.hc-sc.gc.ca	Health Canada is a federal agency responsible for helping Canadians maintain good health. Like the CDC site, the Health Canada site is informative and extensive. The latest headlines, warnings, and advisories are posted on the home page.

CDC = Centers for Disease Control and Prevention; WHO = World Health Organization.

EXTRACTO

OBJETIVO: Exponer a los educadores y practicantes de farmacia a los conceptos de la geografía médica y vigilancia médica. Se utiliza SARS como ejemplo del caso porque es una infección que está emergiendo y porque es un ejemplo típico del tipo de enfermedad que los farmacéuticos pueden encontrar en práctica diaria (e.g., transmitido fácilmente y se asemeja al resfriado común).

FUENTES DE INFORMACIÓN: Se extrajo datos de las publicaciones relacionadas con la geografía médica, la vigilancia médica, y el SARS. Se obtuvo datos sobre casos actuales de SARS en Hong Kong de la red electrónica del departamento de salud de Hong Kong.

SELECCIÓN DE ESTUDIOS: Se evaluó las variables con respecto a casos nuevos y las muertes debido a SARS.

SÍNTESIS DE DATOS: Se repasó la información de trasfondo sobre la geografía médica y la vigilancia médica. Se utilizó estadística descriptiva para calcular la incidencia, prevalencia, y el número de muertes debido al SARS en Hong Kong desde 14 de marzo hasta el 31 de mayo del 2003.

CONCLUSIONES: Las infecciones emergentes son una preocupación seria para el público al igual que los médicos. La difusión global reciente del SARS destaca la facilidad en la cual las enfermedades pueden difundir de lugar al lugar. Entender los conceptos relacionados con la geografía médica y de la vigilancia médica pueden ayudar a los farmacéuticos estar mejor preparados para anticipar la difusión de la enfermedad y evaluar los signos de infecciones emergentes. Alternadamente, esto puede ayudar a los farmacéuticos estar mejor preparados para proveer información y cuidado a sus pacientes. La ventaja a largo plazo de entender cómo las enfermedades se propagan junto con las actividades específicas relacionadas con la detección de la enfermedad resultará en oportunidades para ampliar el alcance de la práctica de farmacia.

Carlos da Camara

RÉSUMÉ

OBJECTIF: Le but de cet article est d'introduire aux pharmaciens les concepts de géographie médicale et de surveillance médicale. Le SRAS est utilisé comme exemple car il est une maladie infectieuse émergente et qu'il est une pathologie que les pharmaciens risquent de rencontrer dans leur pratique a cause de sa similarité avec le rhume.

SOURCE DES DONNÉES: Les auteurs ont cherchés des publications portant sur la géographie médicale, la surveillance médicale, et le SRAS.

SÉLECTION DES ÉTUDES ET EXTRACTION DES DONNÉES: Les cas des SRAS ont été évalués selon des variables épidémiologiques.

SYNTHÈSE DES DONNÉES: L'information sur les concepts de géographie médicale et de surveillance médicale a été analysé. Les statistiques descriptives ont été calculées pour l'incidence, la prévalence, et le nombre de décès attribués au SRAS à Hong Kong entre le 14 mars et le 31 mai 2003.

CONCLUSIONS: Les maladies infectieuses émergentes nous concernent tous. La récente épidémie de SRAS souligne la facilité qu'ont maintenant les pathogènes pour se propager à travers le monde. Comprendre et appliquer les concepts de géographie médicale et de surveillance devient donc de toute première importance pour les pharmaciens. La position de première ligne du pharmacien lui permet d'informer les patients et de détecter les signes avant-coureurs de ces maladies infectieuses.

Jean Longtin