

### *Lessons for Our Global Health Today*

#### Overview

In the summer of 1833 a devastating cholera epidemic broke out in Lexington, Kentucky, claiming 500 lives out of a population of 7000. The disease was wreaking havoc in several US cities along river and sea ports. Although the death toll was high in New Orleans and New York City, the time from infection to expiration was particularly swift in the Bluegrass.

When a town is built on limestone with sinkholes, underground caverns and springs, then what goes down must come up. Seeping of contaminated sewage into the city's drinking water was a major factor in the quick spread of contagion.

#### ***History in the World***

Cholera is an acute infection that attacks the small intestine. The disease is contracted by the ingestion of water that has been contaminated by human feces containing the *Vibrio Cholerea* microbe. The



*Turkish army defeated by cholera, not by enemy fire.*  
— *Le Petit Journal*, 1912

unsuspecting victim becomes stricken with voluminous diarrhea. This loss of great quantities of body fluids can result in rapid dehydration, circulatory collapse and death.

Per a number of accounts, the first Cholera Epidemic to reach the Western Hemisphere originated in India in 1817. The disease spread along trade routes and accompanied armies traveling across Eastern Europe. The staggering number of deaths in places such as St. Petersburg, Russia was perplexing to locals. Commonly referred to as “Asiatic Cholera”, the illness had been viewed as a disease of the Far

East. Those in the New World had not conceived of it attacking them, nor were their doctors experienced in treating it.

#### ***Epidemic in Lexington***

Lexington, a place of beauty, academia, high culture and healthful reputation, was known in the mid-1800's as “The Athens of the West”. When the Cholera Epidemic struck, its citizens were stunned by this unexpected vulnerability. Many fled to the countryside in hopes of avoidance.

The trend of deaths was soon evident. The concentration of the disease was in the center of the city, near the Town Branch Stream.

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Lexington’s first outbreak came at Captain John Postlewaite’s Tavern between Water and Main St. Heavy rains had caused the Town Branch to swell and overflow. Shallow privies, filling with water, spilled their contents onto the ground. Subterranean caverns swallowed the contaminated mixture which resurfaced at springs and other sources of drinking water. One bucket of water drawn at a well or a public pump could infect a household.

There was limited medical infrastructure in Lexington at the time. The only hospital was Eastern Kentucky Lunatic Asylum. Cholera patients were scattered all over town with no central place to obtain treatment or care. Lexington’s doctors were mostly faculty members at Transylvania’s Medical College.

**Cholera deaths in Kentucky and other cities in the USA, 1832-33**

City	Population	Number of Victims	% age of Population
Lexington	6,383	489	7.7
Flemingsburg	500	66	13.2
Paris	1,200	80	6.7
Cynthiana	700	25	3.6
Somerset	2,040	60	2.9
Maysville	1,200	34	2.8
Louisville	10,341	13.7	1.3
New Orleans, LA	50,000	5,000	10.0
New York, NY	220,000	3,500	1.6
Cincinnati, OH	52,320	300	.6
Philadelphia, PA	80,462	900	1.1

Three doctors succumbed to the disease in the first ten days; one was out of town and did not return during the epidemic. Another, struggling into his coat while rushing to see a patient; fell and suffered an incapacitating injury.

There was no Board of Health to keep track of cases, or to enforce sanitary measures. Physicians based treatment on their own experience versus empirical evidence. In the years before the

Pure Food and Drug Act of 1906 and the establishment of the FDA, treatment methods and medication doses were entirely unregulated. Patients were given high doses of calomel (mercury) as a purgative, which added to their dehydration.

The Lexington Observer and Reporter published the names of all who died in the 1833 epidemic, as well as a second outbreak in 1849. Lists were divided geographically along city wards, entitled as Whites, Negroes and the Lunatic Asylum (Eastern State Hospital). Under Whites, children were listed by their father’s name and Negroes by their owner. The Lunatic Asylum had residents from several counties and other states. The death rate there was high due to a communication between the water source and sewer under a main building. When this plumbing problem was repaired in the 1850’s, residents’ overall health improved.

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After being struck by such a devastating disease, Lexington was no longer deemed immune. The deceased faculty members in the Medical School were not replaced. With the rise of medical schools in Cincinnati and Louisville, Transylvania Medical College dissolved before the Civil War.

Lexington prepared for a predicted 1849 cholera wave by enacting ordinances to clean up low-lying boggy places. Pigs were no longer allowed to roam free in the streets; although some residents argued that at least the pigs ate the offending garbage. A new privy ordinance decreed that said structures must be at least 2 to 4 feet deep with sides of wood or brick. Which raises the question: How deep and sturdy were the privies during the 1833 epidemic?!

#### ***Town Branch Stream***

The limestone karst underlying Lexington enabled water from overflowing privies to seep into sinkholes (ground openings) that lead to springs and wells. In 1833, the Town Branch stream flowed openly through the center of Lexington. During the 1800's, it was gradually covered over in the downtown area, with Vine and Water Streets realigned. Today, Town Branch surfaces in a corner of a parking lot on Cox Street/Newtown Pike, adjacent to Rupp Arena in the western part of town. It then flows along Old Frankfort Pike/Leestown Road, is joined by Wolf Run Creek and empties into Elkhorn Creek in Franklin County.



*In 1833, the Town Branch stream flowed openly through the center of Lexington.*

In the early part of the twentieth century, heavy rains brought flooding to downtown Lexington. In the 1930's, WPA money helped to alleviate this flooding with the laying of a storm sewer. However, 80 years later, too much volume in the storm sewer burdened the sanitary lines, causing backflow into basements, lifting manholes, and contaminating Town Branch which flowed openly through new subdivisions. This situation exemplifies the need for enlarging cities to plan for, and provide, clean water and sewage disposal within their environment.

#### ***Local Heroes and Emerging Advocacy***

William "King" Solomon, 1775-1854. People were dying so quickly and in such large numbers, that there was no one to bury them. Bodies were piled by the graveyard, wrapped in the bedclothes of their expiration. Solomon had been a strong excavator in his prime. In 1833, having fallen to drink, he was arrested for vagrancy and auctioned as an indentured servant. He was purchased by a freed Negro

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William "King" Solomon

woman, Aunt Charlotte, who supposedly had known him in his youth. Solomon worked day and night burying the cholera victims, thus becoming the "hero" of the epidemic. By purchasing, lodging and feeding him, Aunt Charlotte was the unheralded force behind the hero.

Maria Cecil Gist Gratz, 1797-1841. Disasters bring death and destruction, but they can also elicit benevolent change. Care for vulnerable populations of children and women resulted from community response to their plight. When five orphans were brought to Mrs. Gratz in the summer of 1833, she realized something substantial and permanent needed to be done. Gratz organized 24 women from different Protestant denominations into The Lexington Orphan Society. They obtained \$5,000 from subscriptions and purchased the Fishback home on Third Street. The Children were housed and a school teacher was hired. The plight of parentless children and disrupted homes brought about philanthropy and advocacy. The cholera epidemic sparked the beginning of organized altruism in Lexington. The Lexington Orphan Society, with a focus on community needs, still exists today.

After the 1849 cholera epidemic, a residential "Home of the Friendless" (mostly single women and widows) was opened at 525 West Short Street in Lexington. In 1925, the Appleton place was purchased and the renamed "Old Ladies Home" moved to High and Merino Street. In the 1960's, the establishment relocated to the Chevy Chase neighborhood, where it continues to house mature gentlewomen today as "Ashland Terrace."

#### ***World Disease Patterns: Cholera/ SARS***

In modern times, outbreaks of cholera wreak havoc for merchants and tourism. Governments tend to deny the disease or report it in sporadic or incomplete fashion.

The first cases of severe acute respiratory syndrome (SARS) occurred in the Guangdong Province of China in mid-November, 2002. The outbreak was reported to the World Health Organization (WHO) on February 11, after 5 deaths had occurred. The WHO team was allowed into the province on April 2, 2003. Patterns similar to the cholera epidemics included denial of a problem by the government and international spread (from Hong Kong to Toronto), enhanced by travel and commerce. Comprehensive, multinational WHO response and strict preventative measures (including quarantine) reduced the threat by 2004. The WHO website lists the total cases at around 8,400 with over 900 deaths.

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#### ***World Response to Cholera***

International organizations emerged to gain control of threats to global health through cooperative efforts. The Sanitary Council, Paris, 1851 evolved into the World Health Organization, Geneva, 1948. Cholera epidemics instigated the first structures of modern Public Health.

The secrets to cholera treatment were gradually uncovered by international researchers in Dacca, East Pakistan and Bangladesh. The Southeast Asia Treaty Organization (SEATO) supplied funds and support to military doctors looking for a way to secure a safe environment for deployed troops. Methods tested and refined over time eventually led to the correct formula for intravenous and oral rehydration.

Researchers such as Drs. David and Brad Sack of Johns Hopkins University, indicate new strains, as well as *Cholera vibrio* residing in sea water between epidemics. Hope for control in the future may lie in a combination of oral rehydration solutions, antibiotics to shorten duration of symptoms and vaccines to reduce the total case numbers in outbreaks.

#### ***Global Health Today: Environment/Politics***

It has been almost 200 years since cholera epidemics traversed major trade routes, killing thousands along the way. Municipalities have made great strides in providing tap water and sewer lines. One would think the threat of cholera would be gone. But for many, prevention and treatment still remain a challenge.



*In 2009, over 98,000 cases of cholera were reported in Zimbabwe.*

The 21<sup>st</sup> century has seen a dramatic rise in cholera, especially in Africa. WHO estimates that approximately 120,000 people die from cholera each year. Even with the work of SEATO in the 1980s to discover and refine a treatment, remote areas may not receive the treatment kits nor have clean water available to reconstitute the kit and rehydrate the patient.

Shifting water levels in delta regions and areas that have been deforested can bring almost chronically repetitive disease outbreaks. War can cause destruction of water and sanitary infrastructures. Fleeing populations in war-torn countries form huge refugee camps with limited facilities for clean water and sanitation.

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Outbreaks of deadly cholera occurred in Iraq in 2007. U.S. bombs destroyed or disrupted municipal water and sewer lines. Money and equipment needed for pipeline repairs went instead to war efforts. Basic human needs were affected by a political/military change resulting in flare-ups of the ancient scourge.

In 2009, cholera struck with a vengeance in Zimbabwe, Africa where 98,000 cases were reported. The crumbling medical facilities, economic deprivation, and persistent denial by the governmental authority severely jeopardized the health of citizens. Despite yeoman efforts to literally drag and carry the sick to make-shift medical outposts, 4,276 lives were lost to the cholera reaper.

Patterns of global disease reflect the status of populations. Any change in environment, the outbreak of war, or modifications of government systems can affect disease incidence. Countries must be quick and forthright in reporting outbreaks. The international authority of WHO and cooperation of local communities are paramount for global disease prevention, outbreak surveillance and patient treatment.

We are cognizant that increasing world mobility with travel, trade and tourism can bring disease from remote places to our doorstep. Clean water is the basic necessity for all of us. It connects our neighborhoods, communities and countries. Its purity is essential for healthy existence. We must heed what we know about disease and environment. We all share the measures and consequences of our communal global health. No one is completely immune. "It can happen here. It can happen to me."

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**Image Credits:** Grim Reaper -- Illustration from Le Petite Journal, 1912; Town Branch Steam - Richie Wireman Photo; William "King" Solomon -- Photograph from portrait. Courtesy Lexington Junior League; Cholera patient in Budiro -- Associated Press.