Quarantine and Isolation: From an Environmental Health Perspective

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Objectives

- Definitions of isolation and quarantine.
- The federal legal authority for quarantine
- Legal authority
- Pandemics
- History of maritime quarantine.
- History of quarantine in public health.
- Role of the local health department in isolation and quarantine.
Definitions: Process, Length of time, Location

**Isolation**
Used for People who are ill with contagious diseases.
- Receive care for the disease, with precautions put into place (such as protective clothing for care givers) to prevent the spread of the disease.
- Period of infectiousness for the disease.
- Hospital, care facility or patient’s home.

**Quarantine**
Used for people who have been exposed to a contagious disease, but are not sick.
- Individuals are separated from others who have not been exposed to the disease, and can receive vaccinations, antibiotics, early diagnostic testing and symptom monitoring.
- Incubation period of the disease.
- Home, designated emergency facility or a specialized hospital.
The very first pandemic in recorded history was described by Thucydides. In 430 BC, during the Peloponnesian war between Athens and Sparta, the Greek historian told of a great pestilence that wiped out over 30,000 of the citizens of Athens (roughly one to two thirds of all Athenians died).

Thucydides described the disease as such:

"People in good health were all of a sudden attacked by violent heats in the head, and redness and inflammation in the eyes, the inward parts, such as the throat or tongue, becoming bloody and emitting an unnatural and fetid breath."

Next came coughing, diarrhea, spasms, and skin ulcers. A handful survived, but often without their fingers, sights, and even genitals.

Until today, the disease that decimated ancient Athens has yet to be identified.
The Antonine Plague

In 165 AD, Greek physician Galen described an ancient pandemic, now thought to be smallpox, that was brought to Rome by soldiers returning from Mesopotamia.

The disease was named after Marcus Aurelius Antoninus, one of two Roman emperors who died from it.

At its height, the disease killed some 5,000 people a day in Rome. By the time the disease ran its course some 15 years later, a total of 5 million people were dead.
In 541-542 AD, there was an outbreak of a deadly disease in the Byzantine Empire. At the height of the infection, the disease, named the Plague of Justinian after the reigning emperor Justinian I, killed 10,000 people in Constantinople every day. With no room nor time to bury them, bodies were left stacked in the open.

By the end of the outbreak, nearly half of the inhabitants of the city were dead. Historians believe that this outbreak decimated up to a quarter of human population in the eastern Mediterranean.

It was the bubonic plague, caused by the bacterium *Yersinia pestis*.

This outbreak, the first known bubonic plague pandemic in recorded human history, marked the first of many outbreaks of plague - a disease that claimed as many as 200 million lives throughout history.
The Black Death was one of the most devastating pandemics, resulting in the deaths of an estimated 75 to 200 million people and peaking in Europe in the years 1346–1353. Analysis of DNA from victims in northern and southern Europe published in 2010 and 2011 indicates that the pathogen responsible was the Yersinia pestis bacterium, probably causing several forms of plague: Bubonic, Pneumonic and Septicemic plague.

The Black Death is thought to have originated in the arid plains of Central Asia, where it then travelled along the Silk Road, reaching Crimea 1343. From there, it was most likely carried by Oriental rat fleas living on the black rats that were regular passengers on merchant ships.

Spreading throughout the Mediterranean and Europe, the Black Death is estimated to have killed 30–60% of Europe's total population. In total, the plague reduced the world population from an estimated 450 million down to 350–375 million in the 14th century. The world population as a whole did not recover to pre-plague levels until the 17th century. The plague recurred occasionally in Europe until the 19th century.

In 1855, another bubonic plague epidemic (named the Third Epidemic) hit the world - this time, the initial outbreak was in Yunnan Province, China. Human migration, trade and wars helped the disease spread from China to India, Africa, and the Americas. All in all, this pandemic lasted about 100 years (it officially ended in 1959) and claimed over 12 million people in India and China alone.
The 1918 flu pandemic (January 1918 – December 1920) was an unusually deadly influenza pandemic, the first of the two pandemics involving H1N1 influenza virus. It infected about 1 billion people or half the world's population including remote Pacific islands and the Arctic. The disease killed 50 to 100 million; three to five percent of the world's population, making it one of the deadliest natural disasters in human history. Historical and epidemiological data are inadequate to identify the pandemic's geographic origin.

Most influenza outbreaks disproportionately kill juvenile, elderly, or already weakened patients; in contrast the 1918 pandemic predominantly killed previously healthy young adults. Modern research, using virus taken from the bodies of frozen victims, has concluded that the virus kills through a cytokine storm (overreaction of the body's immune system). The strong immune reactions of young adults ravaged the body, whereas the weaker immune systems of children and middle-aged adults resulted in fewer deaths among those groups.

Recently, scientists were able to “resurrect” the virus from a well-preserved corpse buried in the permafrost of Alaska.
History of Quarantine

The Middle Ages
The practice of quarantine, as we know it, began during the 14th century in an effort to protect coastal cities from plague epidemics. Ships arriving in Venice from infected ports were required to sit at anchor for 40 days before landing. This practice, called quarantine, was derived from the Italian words *quaranta giorni* which mean 40 days.

Early American Quarantine
When the United States was first established, little was done to prevent the importation of infectious diseases. Protection against imported diseases fell under local and state jurisdiction. Individual municipalities enacted a variety of quarantine regulations for arriving vessels. State and local governments made sporadic attempts to impose quarantine requirements. Continued outbreaks of yellow fever finally prompted Congress to pass federal quarantine legislation in 1878. This legislation, while not conflicting with states' rights, paved the way for federal involvement in quarantine activities.
History of Quarantine

Late 19th Century

Outbreaks of cholera from passenger ships arriving from Europe prompted a reinterpretation of the law in 1892 to provide the federal government more authority in imposing quarantine requirements. The following year, Congress passed legislation that further clarified the federal role in quarantine activities. As local authorities came to realize the benefits of federal involvement, local quarantine stations were gradually turned over to the U.S. government. Additional federal facilities were built and the number of staff was increased to provide better coverage. The quarantine system was fully nationalized by 1921 when administration of the last quarantine station was transferred to the U.S. government.
AUTHORITY
The federal government derives its authority for isolation and quarantine from the Commerce Clause of the U.S. Constitution.

Federal isolation and quarantine are authorized by Executive Order of the President. The President can revise this list by Executive Order.

Under section 361 of the Public Health Service Act (42 U.S. Code § 264), the U.S. Secretary of Health and Human Services is authorized to take measures to prevent the entry and spread of communicable diseases from foreign countries into the United States and between states.

The authority for carrying out these functions on a daily basis has been delegated to the Centers for Disease Control and Prevention (CDC).
CDC’s Role

Under 42 Code of Federal Regulations parts 70 and 71, CDC is authorized to detain, medically examine, and release persons arriving into the United States and traveling between states who are suspected of carrying these communicable diseases.

As part of its federal authority, CDC routinely monitors persons arriving at U.S. land border crossings and passengers and crew arriving at U.S. ports of entry for signs or symptoms of communicable diseases.

When alerted about an ill passenger or crew member by the pilot of a plane or captain of a ship, CDC may detain passengers and crew as necessary to investigate whether the cause of the illness on board is a communicable disease.
Quarantinable Diseases
Executive Order of the President 13295

CHOLERA
DIPTHERIA
INFECTIOUS TUBERCULOSIS
PLAGUE
SMALLPOX
YELLOW FEVER
VIRAL HEMORRHAGIC FEVERS
SARS (Severe Acute Respiratory Syndrome)
NOVEL OR RE-EMERGENT INFLUENZA
Police Power of the States

Under the Tenth Amendment to the US Constitution, the powers not specifically delegated to the Federal Government are reserved to the states or to the people.

Police power the capacity of the states to regulate behavior and enforce order within their territory for the betterment of the health, safety, morals and general welfare of their inhabitants.
Police Power of the States

Police power is exercised by the legislative and executive branches of the various states through the enactment and enforcement of laws. States have the power to compel obedience to these laws through whatever measures they see fit, provided these measures do not infringe upon any of the rights protected by the US Constitution or in the various state constitutions, and are not unreasonably arbitrary or oppressive.

Methods of enforcement can include legal sanctions, physical means, and other forms of coercion and inducement.
TYPHOID FEVER

This Notice is Posted in Compliance with Law
“Every person who shall wilfully tear down, remove or deface any notice posted in compliance with law, shall be fined not more than seven dollars.”
--General Statutes of Connecticut, Revision of 1902, Section 1173.

Town Health Officer.

SCARLET FEVER

THESE PREMISES ARE UNDER STATE QUARANTINE
No person shall be permitted to enter, leave or take any articles from this house without written permission from a legally authorized agent of the Board of Health, excepting physicians and trained nurses in charge of the sick.

Animals must not be permitted to leave these premises.

No person other than those authorized by the Board of Health shall remove this placard. Any person or persons defacing, covering up, or destroying this placard render themselves liable to the penalties of the law.

Act of the General Assembly approved June 28, 1913, provides that anyone violating the provisions of this Act, upon conviction thereof, may be sentenced to pay a fine of not more than $200.00, to be paid to the use of said county, and costs of prosecution, or to be imprisoned in the county jail for a period of not less than ten days or more than thirty days, or both, at the discretion of the court.

By order of the Board of Health

Health Officer

Address

MEASLES

CHILDREN—EXCEPT THOSE OF THIS HOUSEHOLD WITH THE HEALTH OFFICER'S PERMIT—MUST NOT ENTER OR LEAVE THESE PREMISES

No person other than those authorized by the Board of Health shall remove this placard. Any person or persons defacing, covering up, or destroying this placard render themselves liable to the penalties of the law.

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By Order of The Board of Health

Health Officer

Address

ANTERIOR POLIOMYELITIS!

INFANTILE PARALYSIS

“Act of Assembly approved May 14, 1909, provides that anyone violating the provisions of this Act, upon conviction thereof, may be sentenced to pay a fine of not less than $10.00 or more than $100.00, to be paid to the use of said county, or to be imprisoned in the county jail for a period of not less than ten days or more than thirty days, or both, at the discretion of the court.”

BY ORDER OF THE BOARD OF HEALTH

Health Officer

Address
REFUSES TO DON
INFLUENZA MASK;
SHOT BY OFFICER

SAN FRANCISCO, Oct. 28.—While scores of passersby scurried for cover, H. D. Miller, a deputy health officer, shot and severely wounded James Wisser, a horseshoer, in front of a downtown drug store early today, following Wisser's refusal to don an influenza mask.

According to the police, Miller shot in the air when Wisser first refused his request. Wisser closed in on him and in the succeeding affray was shot in the arm and the leg.

Wisser was taken to the central emergency hospital, where he was placed under arrest for failure to comply with Miller's order.
Maritime Quarantine
Maritime Quarantine Signal Flag

The present flag used for to indicate quarantine is the "Lima" (L) flag. It signals to stop vessel immediately. Also called the “Yellow Jack” when flown in the harbor.
Maritime and Quarantine Station History

U.S. Public Health Service Officers circa 1912, wore uniforms while performing quarantine station duties beginning in the late 19th Century.

This PHS cutter ship was used to transport quarantine inspectors to board ships flying the yellow quarantine flag.
QUARANTINE HOSPITALS
THE KIND OF "ASSISTED EMIGRANT" WE CAN NOT AFFORD TO ADMIT.
Immigration

Ellis Island Quarantine Station  c.1930
Brother Island, New York City, NY

The island was uninhabited until 1885, when Riverside Hospital moved there from Blackwell's Island. Riverside Hospital was founded in the 1850s as the Smallpox Hospital to treat and isolate victims of that disease. Its mission eventually expanded to other quarantinable diseases. Mary Mallon, also known as “Typhoid Mary”, was confined to the island for over two decades until she died there in 1938.
Indian Camp Plantation, Carville, Louisiana

The Plantation home, built in the 1850’s, became the site of the Louisiana State Leprosarium in 1894. The U. S. Public Health Service acquired it in 1921. It is now known as the National Hansen’s Disease Center.

In 1999, the federal government relocated its HD program headquarters from Carville to the Summit Hospital in Baton Rouge.
The U.S. Animal Quarantine Station, Clifton, NJ

The buildings were built in 1900 and were added to the National Register of Historic Places on October 9, 1981. The site is now the Clifton Municipal Complex.
The Sanitarians’ and Public Health Nurses’ Role
The Sanitarian’s Role

We provide consultation and support to other first response, medical and other support activities on matters of environmental and public health, including the protection from further harm.

We advise and direct quarantine and decontamination strategies and ensure the safety of vital services necessary for the health and well being of the population.

We oversee continuing public health services, and, assist in ensuring a rapid recovery and restoration of all vital services at the end of the crisis.

We provide public health information to the public.
The Sanitarian’s Role

Therefore:

We make it possible for all responders, medical and other essential personnel to do their jobs safely and with minimal risk to themselves and the community.
Epidemiology

- Provide demographic and other essential community data to response team.
- Inform team of any environmental health and safety concerns and issues unique to the situation and community.
- Provide assistance in information and data collection and any other support activities available.
- Assist in the collection of environmental and clinical samples and specimens.
- Assist in providing information and education to the public.
Quarantine

- Develop a quarantine and embargo strategy to prevent the further spread of illness or injury.
- Oversee the implementation and enforcement of all necessary quarantine activities.
- Assess risk of disease propagation in the community.
- Advise medical, first responders and other support personnel on limiting movement and safe movement of people and materials.
Quarantine

• Advise and direct quarantine strategy for individuals and groups.
• Ensure continued vital services to quarantined individuals and groups.
• Assist in corpse control and death registry.
• End quarantine as soon as safe and practical.
Decontamination

• Provide information on decontamination of people, necessary services and materials.
• Assist in decontamination activities to ensure the protection of the public health and environment.
• Identify decontamination resources including chemicals and facilities.
Decontamination

• Develop decontamination strategies and implementation including terminal disinfection.
• Monitor decontamination activities.
• Ensure the safe use of decontaminant chemicals and methods.
• Ensure proper neutralization and/or safe disposal of decontaminants.
Water

- Assure the availability of safe drinking water.
- Contact water purveyor for status and check supplies as necessary.
- Arrange for emergency, backup and alternate water supply.
Food

• Provide information regarding delivery and protection of perishable foods if necessary, and advice on sorting and disposal of contaminated food.

• Act in consultative capacity to assure proper food handling practices.

• Assist in the accounting of condemned or potentially contaminated food stuffs.
Liquid Waste / Sewage

• Ensure proper handling and disposal of human liquid waste; prevent contamination of domestic water supplies and prevent degradation of surface and groundwater quality.

• Secure commercial chemical toilets if necessary and arrange for servicing. If commercial toilets are not available, provide information on alternative safe disposal methods.
Solid Waste Disposal

• Check status of disposal and transfer sites.
• Issue instructions on how refuse must be prepared for disposal.
• Arrange for safe temporary storage if necessary.
• Coordinate safe removal and disposal.
• Provide guidance for hazardous and medical waste storage and disposal.
Vector Control

- Coordinate emergency corrective measures against those vectors that can cause problems.
- Assess vector populations: flies, mosquitoes and rodents.
- Assess vector control capabilities and operations.
Vector Control

- Assess conditions that may promote the proliferation or incursion of vectors.
- Supervise application of vector control measures.
- Implement preventive measures and activities.
Shelter Management

- Ensure safe and healthful conditions at clinics and emergency gathering places.
- Contact, inspect and advise each domicile and emergency facility on matters concerning environmental and public health.
- Apply environmental health and safety principles of housing to all domiciles and shelters.
Shelter Management

• Contact, inspect and advise each domicile and emergency facility on matters concerning environmental and public health.

• Apply environmental health and safety principles of housing to emergency, isolation and quarantine shelter management.
Pet Shelter Management

- Ensure safe and healthful conditions for pets and farm animals at quarantined home, emergency pens and other holding facilities.
Medical Waste

- Identify locations where medical wastes are generated.
- Verify facilities’ ability to collect, store and treat waste.
- Determine accumulation beyond storage capacity.
- Ensure that wastes that require strict handling under normal circumstances are disposed of safely.
- Prevent access to medical wastes by vertebrate or invertebrate vectors.
Medical Waste

- Advise and assist in the proper disposal of medical waste including: collection, storage, transportation, treatment and disposal systems.
- Oversee the segregation of sharps and other medical wastes.
- Recommend emergency containment.
- Arrange for safe removal and transport.
Housekeeping

• Advise on housekeeping techniques, unique to the situation and hazard.
• Coordinate removal of contaminated materials.
• Develop a manual bed availability matrix for facilitating bed relocations.
• Develop protocols for the safe transport and laundering of potentially contaminated clothing and bedding.
Information

• Provide information relative to public health, environmental health and safety issues.
• Provide consultation to public information personnel on matter relating to public and environmental health.
• Inform and educate the public on preventive measures, quarantine, decontamination procedures and other public health issues as necessary.
• Share information with other agencies.

• **Document all activities.**
Questions, Comments, Brickbats?