



Dr. Gary Mumaugh

**Development of
Disease**

Disease Definitions

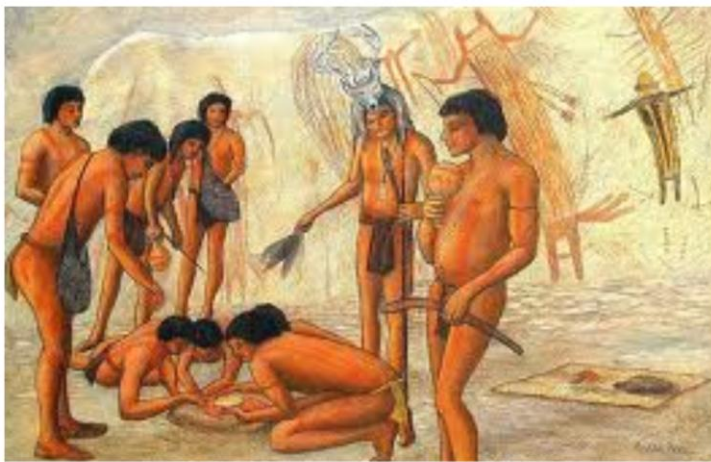
- A pathological condition affecting a part, organ or entire system of an organism and it is identified by a specific group of signs or symptoms
 - Could be several causes including infection, genetic defect, or environmental
- A secondary definition for disease states that it is a societal condition or tendency regarded as abnormal and harmful

- A disease then is recognized by its ability to damage aspects of (or in its entirety) an organism with which it comes into contact
- Though a disease's origins, nature and effects (based upon its subject and strength) may vary, the overriding similarity of all diseases is that they cause sickness to those organisms in which they infiltrate



Disease: History

- In prehistoric times, epidemics and infectious diseases were rare
 - Persons lived far away from one another (communities more spread apart)
 - Animals did not reside in the same confines as humans and could not serve as a conduit for transmitting pathogens



- As animals became more domesticated and humans began to cultivate plants for consumption and other purposes, a shift from hunter-gatherer, nomadic lifestyle to a steadfast, agricultural society began to occur



- The movement to become a more agricultural society affected the spread of infectious disease
- It necessitated the need for persons to live closer to one another so that they all needed to help with planting and harvesting
- Many families lived together with extended families and multiple generations also with pets
- And, though food was more readily available than it had been in the past, malnutrition still posed a major problem
 - Diet of the agrarian lifestyle (predominately carbohydrate based as opposed to hunter-gathers who consume larger amounts of meat)





- The different jobs of people invited additional exposure to new people and geographical areas
 - All of this, with bad hygiene, contributed to a more rapid spreading of disease
- Researchers have concluded that since the advent of agriculture, the level to which infectious diseases have plagued humans has only increased

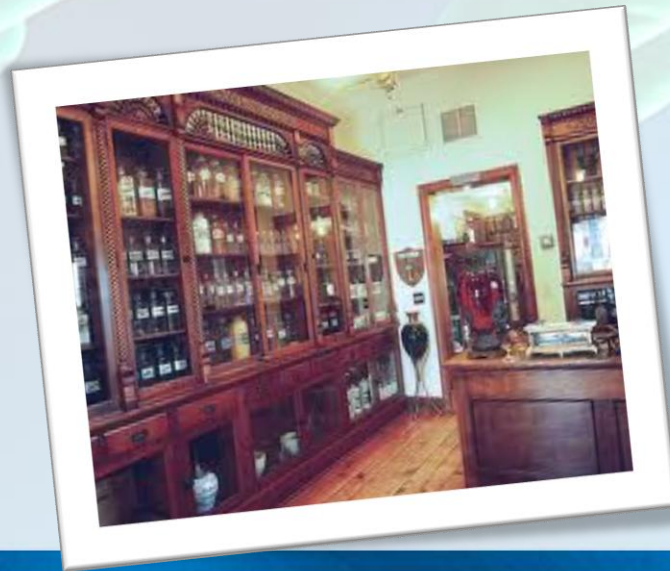


- When an outbreak occurred, the early settlers efforts were included:
 - herbal and animal medicines
 - sorcery and witchcraft-type elixirs
 - and then the beginnings of true medicinal treatments



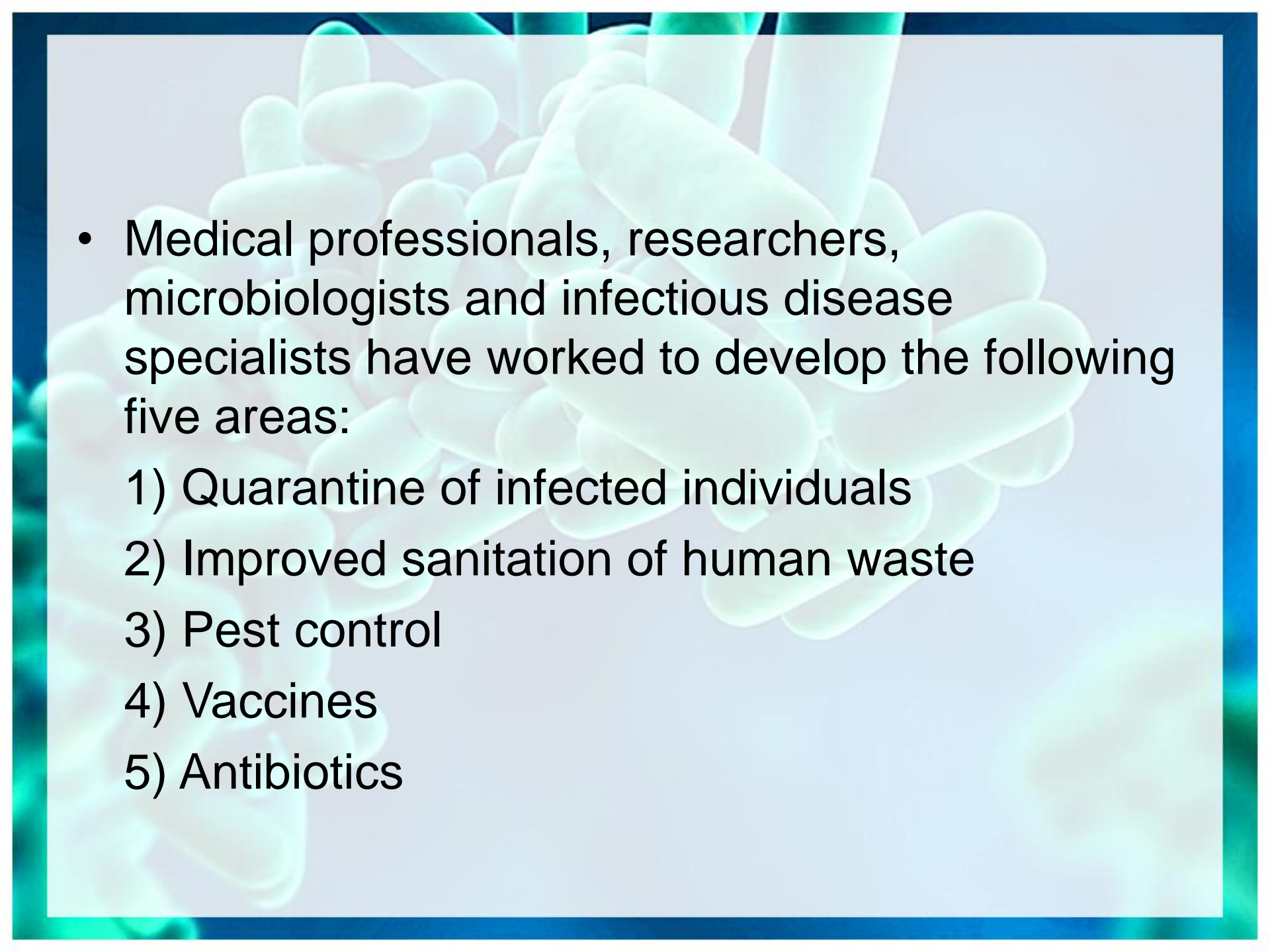


- Within the past century, major strides in the battle to find treatments and preventative measures to fight infectious diseases
- This is evident by the decline in deaths attributed to such epidemic-incited illnesses such as: pneumonia, influenza, tuberculosis and diarrhea



- In 1900, 33 percent of all deaths were the result of pneumonia, influenza, tuberculosis and diarrhea
- In 1990, the leading causes of death to man were found to be heart disease, cancer and stroke.
 - In 1990, infectious diseases were the cause of less than four percent of all deaths



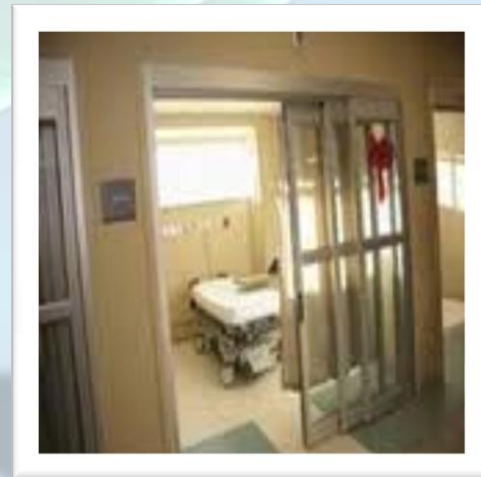
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- Medical professionals, researchers, microbiologists and infectious disease specialists have worked to develop the following five areas:
 - 1) Quarantine of infected individuals
 - 2) Improved sanitation of human waste
 - 3) Pest control
 - 4) Vaccines
 - 5) Antibiotics

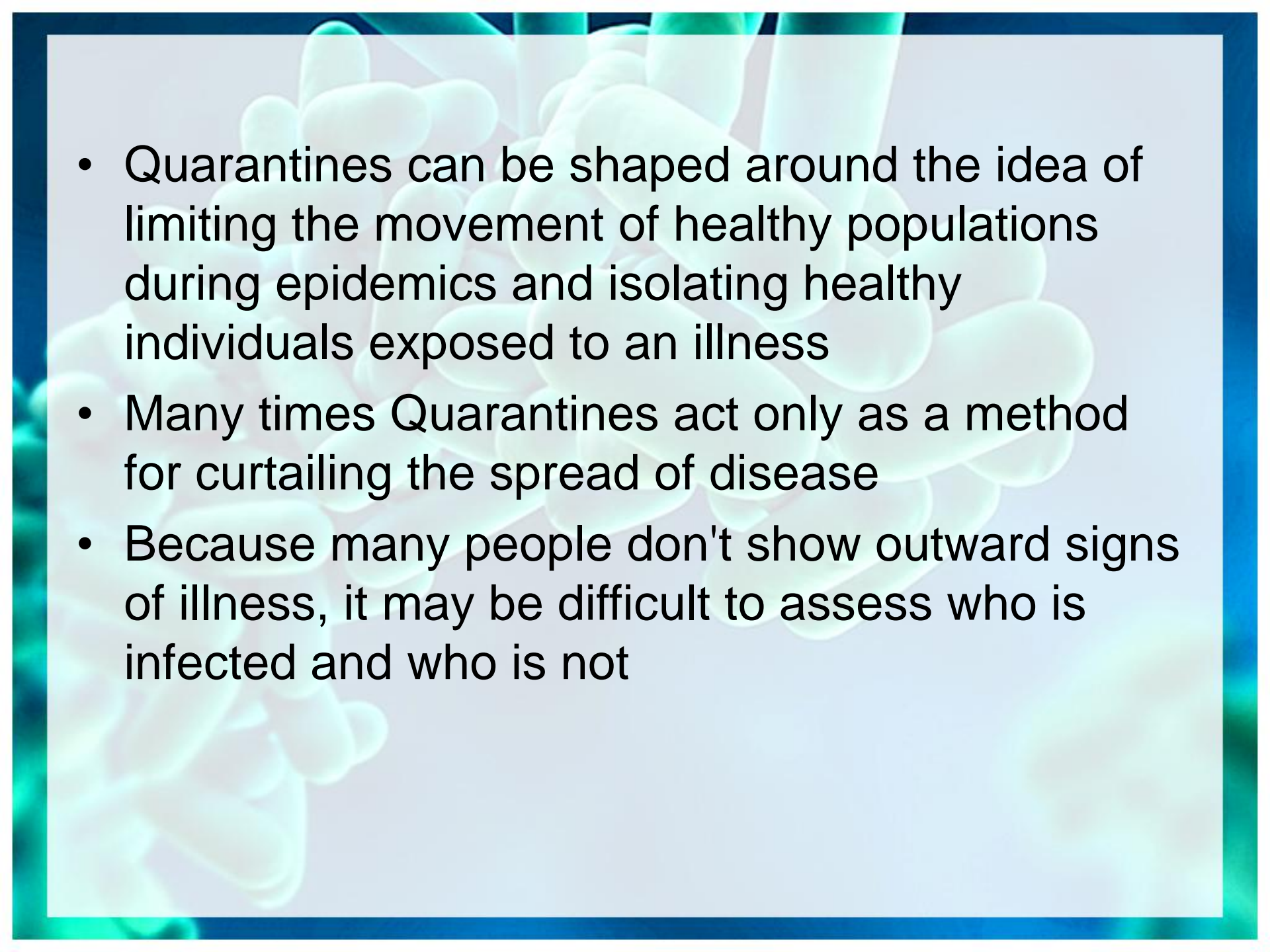
Disease: Treatment & Preventative Protocols

- **Quarantine**--An important component of fighting infectious disease was to isolate (and separate) the contagion from the rest of the organism
- Because the nature of a disease is to spread and take over, it is paramount to limit their exposure and access as best one can



- During the 14th century, as an outgrowth of an attempt to set-up a quarantine-like environment to deter plagues of epidemic proportions , ships coming to port were required to sit at anchor for 40 days before entering port
- Most common quarantines
 - Most common isolation of sick individuals. Obviously this then helps prevent the disease from spreading to massive groups of people

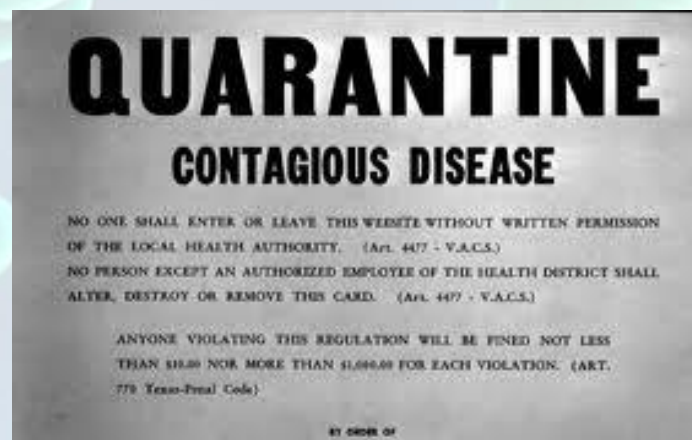


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- The background of the slide features a close-up photograph of hands being washed with white, bubbly soap suds. The hands are positioned in the center, with fingers slightly spread. The lighting is bright, highlighting the texture of the soap. The entire image is framed by a thick, dark blue border.
- Quarantines can be shaped around the idea of limiting the movement of healthy populations during epidemics and isolating healthy individuals exposed to an illness
 - Many times Quarantines act only as a method for curtailing the spread of disease
 - Because many people don't show outward signs of illness, it may be difficult to assess who is infected and who is not

- There are persons who act as carriers (asymptomatic person who can have the disease, remain unaffected yet carry it to others)
- These persons are perhaps the most dangerous for they are difficult to diagnosis and, thus, remain at-large capable of carrying and spreading the disease



- With modern came new methods for curtailing and curing select diseases
- The reliance upon quarantines for treating infectious diseases has been severely cut-back
- Yet there still remain a handful of diseases: cholera, diphtheria, tuberculosis, plagues, yellow fever and other severe viruses that remain best served by quarantines



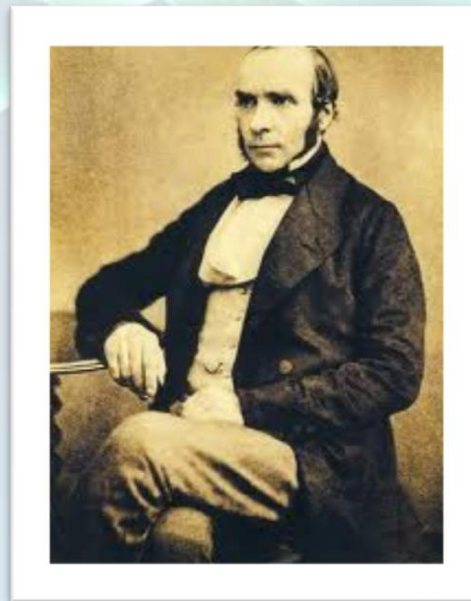
Sanitation

- Dating as far back as 800 B.C., sanitation is another method that has long been used to deter the spread of disease
- Archeological evidence points out the importance of clean water and that the quick and efficient disposal of waste played a significant role in maintaining civilizations

- The Romans and Greeks relied upon sanitation because they believed in the benefits of healthy living
- They built latrines and sewer systems as a means for isolating and removing waste from living areas



- Through the work of John Snow in London, the connection between poor sanitation and the spread of disease became most evident
- It was at this time that an outbreak of cholera in the city of London was taking out the entire population



- Meticulously plotting the residence of each patient, Snow discovered there to be a cluster of cholera patients around a particular water pump
- A simple removal of the pump handle proved sufficient enough to stop the epidemic
- Snow astutely surmised that germs in the water were causing the back-up of cholera and that polluted water was acting to transmit the disease throughout the city

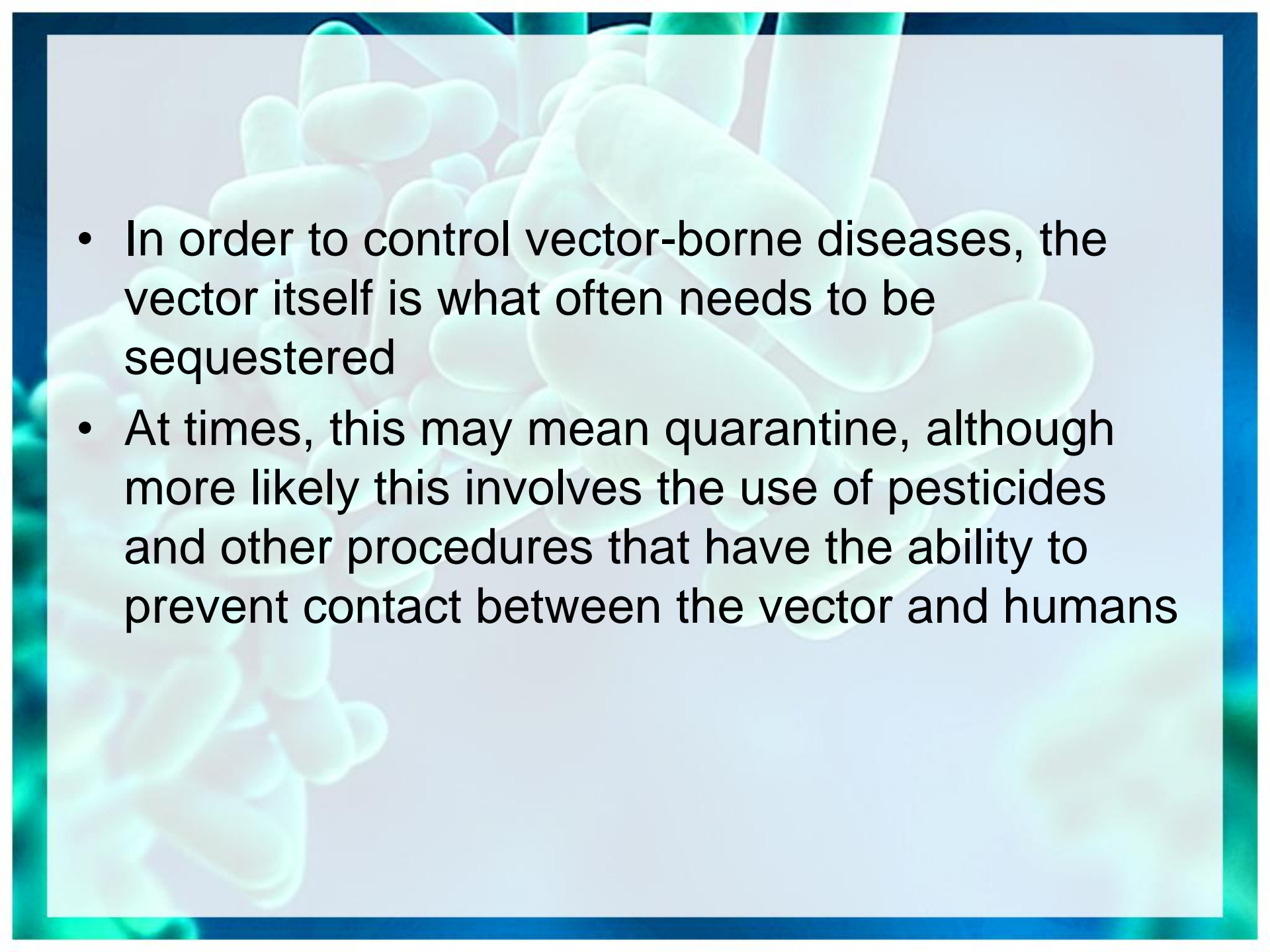
- Based upon Snow's findings and subsequent studies, by the late 19th century, English laws regulating sanitation were implemented
- Later in time, these laws proved to significantly increase life expectancy of the area's residents
- Today, public water supplies are, by law, regularly treated to remove pathogenic organisms
- Referred to as a 'purification process', these activities can take the form of settling tanks, filtration and chlorine treatments

Pest Control

- Toward the end of the 19th century, it was detected that vectors of insects were spreading diseases
- The major epidemic known as 'Yellow Fever' was one of the first diseases this was noted
 - During the Spanish-American War, the United States Army lost 958 soldiers in battle, and they lost more than 5,000 to yellow fever

- In order for the U.S. to occupy Cuba so that a stable government could be formed, they realized they would need to protect the troops from yellow fever
- A commission studied the cause and transmission of the disease, after tireless efforts they eventually found the Cuban mosquito, to be the vector spreading yellow fever
 - Further experiments, later demonstrated that the causative agent was a virus that was carried by the mosquito

- Present day, vectors are known to be the causal agent of many human diseases
- For example, Lyme disease, though transmitted from an infected deer to human by the deer tick, is caused by *Borrelia burgdorferi*
- Mosquitoes are known to spread West Nile Virus
- Insects are not alone in their ability to spread and/or transmit to humans
- Rodents have the ability to transmit disease
 - The contraction of the some diseases is almost always associated with contact between the patient and rodents or rodent litter

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- In order to control vector-borne diseases, the vector itself is what often needs to be sequestered
 - At times, this may mean quarantine, although more likely this involves the use of pesticides and other procedures that have the ability to prevent contact between the vector and humans