Isolation, Quarantine, Social Distancing: What Does It All Mean?

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None
Agenda

• Chain of Infection
• Background on COVID-19
• Quarantine and Isolation
• Application to COVID-19
• Contact Tracing
• Social Distancing
• Coronavirus on a College Campus
• Conclusions
Chain of Infection
Chain of Infection
Flattening the Curve

Without Protective Measures

Healthcare system capacity

With Protective Measures

Time since first case

(adapted from CDC / The Economist)
Background on COVID-19
How COVID-19 Spreads

• Close contact between people
  • Respiratory droplets that are produced when an infected person coughs or sneezes

• Possibly by touching a surface or object that has the virus on it and then touching the mouth, nose, or eyes
Early Timeline of COVID-19

• Dec 26, 2019: 4 unusual cases of pneumonia noticed in one hospital
• Dec 31, 2019: Chinese officials in Wuhan in China's central Hubei province confirmed dozens of cases of pneumonia from an unknown cause.
• Jan 7, 2020: Outbreak identified as a novel coronavirus (2019-nCoV)
• Jan 11, 2020: China reported its first known death from an illness caused by the coronavirus
• Jan 20, 2020: WHO situation report detailed the first confirmed cases outside China in Thailand, Japan and South Korea.
Early Timeline (continued)

• Jan 21, 2020: USA announced its first confirmed coronavirus case — a man in his 30s in Washington state.

• Jan 23, 2020: China placed Wuhan, a city of 11 million people, under quarantine orders. All flights and trains departing from the city were canceled, and buses, subways and ferries within the city were suspended.

• Jan 24, 2020: Another 15 Chinese cities shut down

• Jan 30, 2020: WHO declared the outbreak a global public health emergency as more than 9,000 cases were reported worldwide, including in 18 countries beyond China.
COVID-19 Cases

Coronavirus COVID-19 Global Cases by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University

Total Confirmed: 885,687

Confirmed Cases by Country/Region/Sovereignty:
- US: 190,089
- Italy: 105,792
- Spain: 102,136
- China: 82,361
- Germany: 74,508
- France: 52,896
- Iran: 47,593
- United Kingdom: 29,842
- Switzerland: 17,137
- Belgium: 13,964
- Netherlands: 13,696
- Turkey: 13,551

Total Deaths: 44,216

- Italy: 12,428 deaths
- Spain: 9,053 deaths
- France: 3,523 deaths
- Hubei, China: 3,193 deaths
- Iran: 3,036 deaths
- United Kingdom: 2,352 deaths
- China: 2,247 deaths
- Germany: 1,610 deaths
- Italy: 1,579 deaths
- Iran: 1,5473 deaths
- France: 1,573 deaths

Total Recovered: 185,477

- China: 78,485 recovered
- Spain: 22,647 recovered
- Germany: 16,180 recovered
- Italy: 15,729 recovered
- Iran: 15,473 recovered
- France: 9,527 recovered


Data sources: WHO, CDC, EPIC, NHC, PCDC, Tyndall Center, Worldometers.info, SNOW, state and national public health departments, and local media reports. Read more in the FAQ.

 Courtesy of Johns Hopkins University: https://systems.jhu.edu/research/public-health/ncov/
Quarantine and Isolation
Quarantine vs. Isolation

Quarantine
• To separate and restrict the movement of well persons who may have been exposed to a communicable disease
• Monitor to see if they become ill
• These people may have been exposed to a disease and do not know it, or they may have the disease but do not show symptoms
• Quarantine can also help limit the spread of communicable disease.

Isolation
• To separate ill persons who have a communicable disease from those who do not have that disease
• Restricts the movement of ill persons to help stop the spread of certain diseases
• Example: Isolation for patients with infectious tuberculosis
Quarantine
Ethical Considerations with Quarantine

- Quarantine more ethically problematic than isolation
  - Confinement of “healthy” individuals
  - May increase chances of infection
- Quarantine induces physical, cognitive, emotional and spiritual isolation
- Considerations of coercion
- Protections of human and national security
- Moral obligations of individuals
History of Quarantine

• Old Testament:
  • Lepers

• The Middle Ages:
  • Plague epidemics

• Early American Quarantine:
  • Yellow fever outbreaks

• Late 19th Century:
  • Cholera outbreaks

• Public Health Service Act:
  • Established federal government's quarantine authority

• Center for Disease Control and Prevention
Spanish Flu Pandemic 1918-19

- Inconsistent measures:
  - Mass graves
  - Suspension and closure of public gathering places
  - Prohibitions on public gatherings
  - Ordinances
  - Quarantines and isolations
21st Century Quarantine Measures

• SARS:
  • Timely quarantine and isolation practices reduced spread
  • Travel restrictions
  • Contact Tracing

• Ebola in West Africa:
  • Sella Kafta in Sierra Leone:
    • Village of 1000 inhabitants placed under quarantine for 3 weeks after death of one villager from Ebola
    • Curfew in place
    • No movement between houses
    • Enforced by soldiers and police
Legal Authorities for Quarantine in the US

- Police Power
- US: Federal Law
- CDC’s Role
- State and Local Law
- Enforcement
- Federal Quarantine rarely used
Quarantinable Diseases

- Determined by Executive Order
- List of diseases:
  - Cholera
  - Diphtheria
  - Infectious Tuberculosis
  - Plague
  - Smallpox
  - Yellow Fever
  - Viral Hemorrhagic Fevers
  - Severe acute respiratory syndromes
    - Influenza caused by novel or re-emergent influenza viruses that are causing, or have the potential to cause, a pandemic
Legal Rights under Quarantine

• **Right of Habeas**
  • Determines whether there is sufficient cause to justify detention
  • Constitutional right, cannot be infringed by federal or state entities

• **Right to Counsel**
  • Federal – right to counsel at medical review
  • State – varies, only 23 states explicitly allow for the right to counsel in the state regulations

• **Right to Food, Medicine, and Other Necessities**
  • Federal – Provides adequate food and water, appropriate accommodation, appropriate medical treatment, and means of necessary communication
  • State – Varies, some states require individuals to pay for their own needs

• **Right to Lost Compensation**
  • Federal – no provision
  • State – Varies, 20% of states provide employment protection for quarantined individuals
Model Public Health Act

- Least restrictive means necessary to prevent the spread of a contagious or possibly contagious disease to others
- Isolated individuals must be confined separately from quarantined individuals
- The health status must be monitored regularly
- How to move from quarantine to isolation
- How to terminate isolation or quarantine
- Addressing needs of those in isolation or quarantine
- Safe and hygienic maintenance of facilities
- Respect for cultural and religious beliefs
Range of Quarantine Strategies

- Short-term, voluntary home curfew
- Restrictions on the assembly of groups of people
- Cancellation of public events
- Suspension of public gatherings
- Closings of public places
- Restrictions on travel
- Closure of mass transit systems
- Restrictions on passage into and out of an area

Combine with other public health tools, and does not have to be absolute to be effective
Isolation
Different Types of Isolation

- Varies with the mode of spread and severity of the disease
- Hospital isolation
  - Standard isolation
  - Strict isolation
  - Contact isolation
  - Protective isolation
  - High security isolation
- Home isolation
Home Isolation Criteria

• Primary caregiver is available to provide necessary care that the patient is unable to provide for their self as well as help monitor the person’s condition.

• Household members not providing care can be re-located. If relocation of household members is not possible, their contact with the patient should be minimized. Persons at risk of serious complications should not have contact with the patient.

• Telephone is available.

• A separate bedroom is available.
Support Needed for Home Isolation

• Surgical masks for the patient to wear (if possible) when caregiver is present
• Food and water
• Daily cleaning of patient’s room and bathroom, as well as any bodily fluids spilled during the day
• Medicines and medical consultations
• Mental health and psychological support services
• Other supportive services, i.e. day care, etc.
• Transportation to medical treatment, if required
Application of Isolation and Quarantine Policies to COVID-19 in the US
Quarantine for Returning Travelers

- Jan 31, 2020: The White House announced that it would ban entry for most foreign nationals who had traveled to China within the last 14 days.
- Also impose quarantine to US citizens returning from impacted areas.
- Repatriation of US citizens and mandatory quarantine
- Repercussions for breach of quarantine
How did it work?

• 195 people evacuated from Wuhan under federal order
• At that time, only 6 infections known in US
• Held at Californian Airforce Base
• Tested for virus
• Twice daily temperature checks
• Prevents transmission should they develop symptoms
• Allows rapid identification of early symptoms
• Initiated given concerns for asymptomatic transmission
Cruise Ships

- Coronavirus appears to spread more easily between people in close quarters aboard ships and boats
- Cruise ships house many travelers from many countries
- Often have travelers >65 years of age
- >800 cases of COVID-19 on 3 cruise ships; 10 deaths
- Social distancing and quarantine difficult to maintain on cruise ships
- CDC and US government recommend avoiding cruise travel
Person to Person Transmission

- January 30, 2020: CDC announces limited person to person spread in the US
- Guidelines developed to reduce transmission
- Quarantine for known close contacts
Quarantine “Rules”

• Stay home until 14 days after arrival and maintain a distance of at least 6 feet (2 meters) from others
• Self-monitor for symptoms
  • Check temperature twice a day
  • Watch for fever, cough, shortness of breath
• Avoid contact with people at higher risk for severe illness (unless they live in the same home and had same exposure)
• Follow CDC guidance if symptoms develop
Isolation Practices for COVID-19

• Identify patients with symptoms of respiratory illness as soon as possible and place in mask

• If patient has traveled to areas of interest or has been in contact with a confirmed case or another PUI
  • Isolate patient as safely possible without causing alarm or disruption to clinical areas
  • Maintain adherence to hand hygiene (both HCWs and patient)
  • Provided appropriate PPE to HCWs
Discontinuation of Isolation

- **Persons with COVID-19 diagnosed clinically:**
  - At least 3 days (72 hours) have passed since recovery defined as resolution of fever without the use of fever-reducing medications and improvement in respiratory symptoms (e.g., cough, shortness of breath); and,
  - At least 7 days have passed since symptoms first appeared

- **Persons who have COVID-19 where testing is available:**
  - Resolution of fever without the use of fever-reducing medications and
  - Improvement in respiratory symptoms (e.g., cough, shortness of breath) and
  - Negative results of two COVID-19 tests collected ≥24 hours apart
# Isolation and Quarantine Scenarios

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Plan for Care</th>
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</thead>
<tbody>
<tr>
<td>Contact with known patient</td>
<td>Quarantine for 14 days</td>
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<tr>
<td>Recent travel to high risk area</td>
<td>Quarantine for 14 days</td>
</tr>
<tr>
<td>Symptoms, not yet diagnosed</td>
<td>Isolate in clinical setting</td>
</tr>
<tr>
<td>Symptomatic, mild symptoms not requiring inpatient care</td>
<td>Isolate at home</td>
</tr>
<tr>
<td>Symptomatic, severe disease/critically ill</td>
<td>Hospital isolation</td>
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Contact Tracing
What is Contact Tracing?

- Part of the epidemiological investigation
- Identifies source of infection
- Identifies factors influencing spread
  - Geographical situation
  - Climatic conditions
  - Social, cultural and behavioral patterns
  - Character of agent
  - Reservoirs for vectors
  - Susceptible host populations
Close Contact

- Being within approximately 6 feet (2 meters) of someone with COVID-19 for a prolonged period of time.
- Living with, visiting or sharing a healthcare waiting area or room with someone with COVID-19.
- Coughed on by someone with the disease.

Contact tracing done by health departments
Social Distancing
What is Social Distancing?

Deliberately increasing the physical space between people to avoid spreading illness

- Avoidance of large gatherings
- Keep 6 feet (2 meters) between people
- Avoid shopping centers, movie theaters, stadiums
- Work from home
- Close schools or switch to online classes
- Visit loved ones by electronic devices instead of in person
- Cancel conferences and large meetings
How Do We Know If It Is Working?

- Timing
- Case Reports
- Hospitalizations
- Impacts on healthcare system
- Traffic
- Transit
- Telecommuting
Social Distancing for COVID-19 - China

Timing is imperative

• Wuhan shut down the city when they had 500 cases for a population of 10 million
• Shutdown occurred 4 weeks before predicted peak of ICU need
• Likely resulted in a lower peak of cases given time for implementation and length of shutdown
• No new cases for 5 consecutive days
• Question of resurgence: Gradually relax restrictions
USA: 15 Days to Slow the Spread

- Work or school from home
- Avoid social gatherings of more than 10 people
- Use drive-thru, pick up or delivery food options
- Avoid discretionary travel
- Do not visit nursing homes
- Practice good hygiene
Travel Restrictions

- International restrictions
- Domestic Restrictions
Social Distancing in the US - Seattle

Change in travel over time

- King County
- Washington
School Closures

- Issues of school closures
- Decontamination and contact tracing
- Absenteeism due to illness
- Community mitigation strategy
- ? Effectiveness
Coronavirus in Africa
Efforts to Slow the Spread in Africa

- Travel restrictions:
  - Incoming and outgoing
- Border closures
- Bans on entry
- Lockdowns
- Africa CDC has pandemic plans in place to guide response
Coronavirus on a College Campus
Key Considerations at Columbia University

• Communication:
  • Health advisories to community starting January 23, 2020
  • Preparedness website and FAQs
  • COVID-19 helpline

• Planning:
  • Infectious Disease Working Group
  • COVID-19 Task Force
Campus Operations

• Travel restrictions
• Quarantine for returning travelers
• Study abroad recall
• Class suspension
• Event policy
• Case notifications
• Online instruction
• Undergraduate move out
• Spring semester and campus operations
Conclusions
Modeling

• Estimate number of infections occurring at 80 days after the first 100 cases of community:
  • In a scenario when the virus was least infectious (assuming each case infects another 1.5 people), a median 279,000 infections would occur by day 80.
  • Decreases to 1800 with mitigation measures, when all of the following were enacted: isolation of infected individuals plus family quarantine, workplace distancing, and school closures.
• Of note, assuming a more infectious virus (one case infects another 2.5 people), there would be over 1.2 million infections at day 80 with no social distancing measures — and 258,000 with all measures in place.

The Lancet: Interventions to mitigate early spread of SARS-CoV-2 in Singapore: a modeling study
Final Thoughts

• In order to be successful, any of these strategies need to be implemented:
  • At the right time
  • For the right period of time
  • Thoroughly and completely

• Weigh the economic, political, and social costs against the severity of circulating virus.