

# COVID-19 (2019 nCoV)

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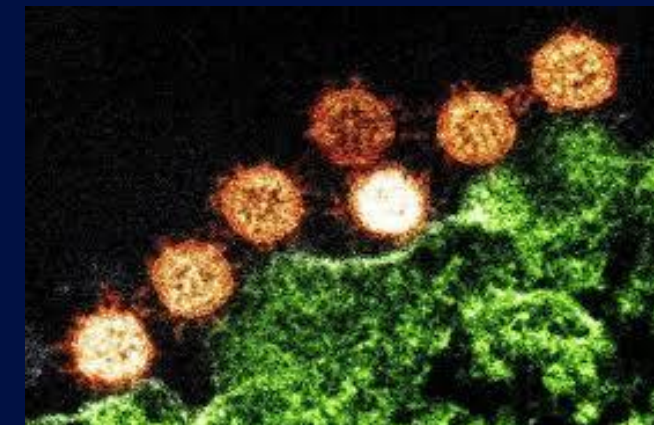
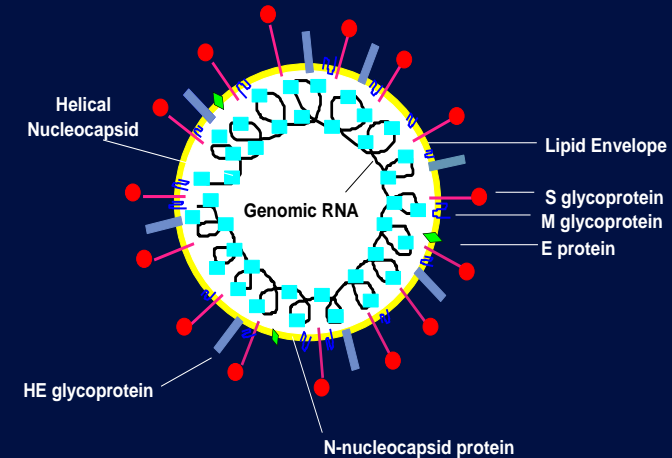
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Disclosures: Consultant to PDI, Germitec, Lumagenics, Pfizer; Past Consultant, Merck

# CORONAVIRUSES

- Single-stranded, linear, positive-sense RNA, enveloped virus, 120-160 nm
- Reservoirs: Humans, multiple animal species, bats
- Epidemiology: Worldwide; winter and spring in temperate climate
- Syndromes
  - Common colds: **Common** cause of upper respiratory tract infections
  - Lower tract infections (pneumonia) in immunocompromised individuals and older adults
  - Gastroenteritis
  - Endemic coronaviruses: 229E, HKU1, NL63, OC43
  - Epidemic coronaviruses: SARS, MERS, COVID-19 (nCoV-19)

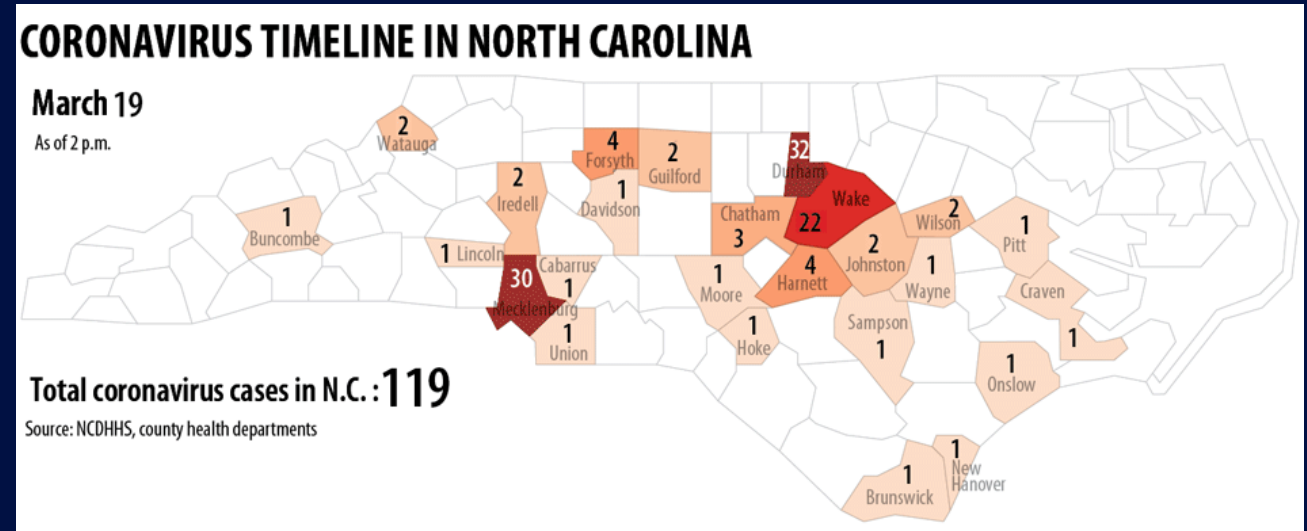
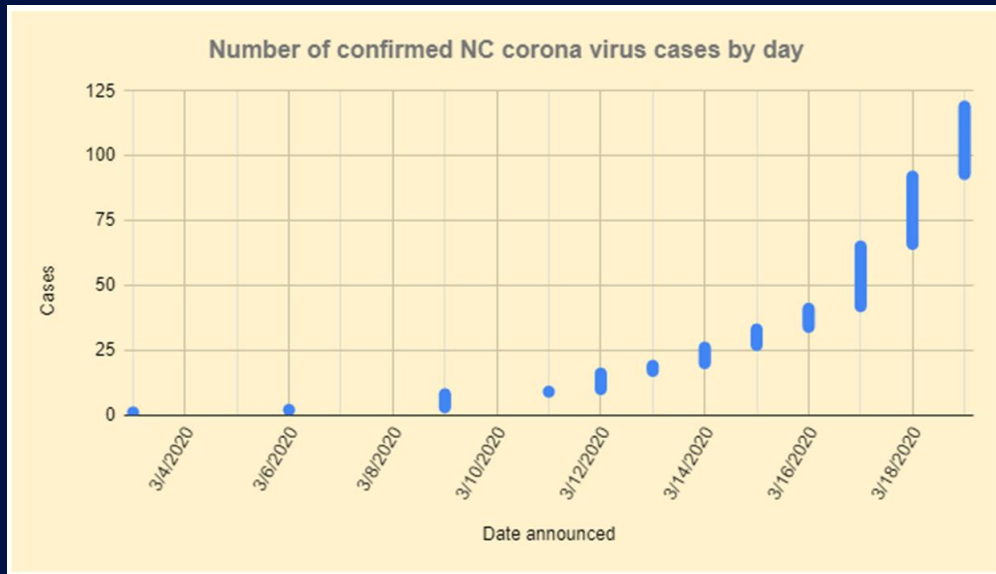


# UPDATE: COVID-19 INFECTION

- Transmission: Droplet/contact; also likely, indirect contact
- Incubation period: Median, 5 days; mean, 7 days; range, 2-14 days (possible outliers up to 27 days)
- Experience in China
  - Majority of cases arise from close contacts of symptomatic cases; 1-5% of 38,000 close contacts developed COVID-19
  - Transmission is driven by family-clusters (i.e. 75-85% of clusters)
- At diagnosis: ~80% are mild/moderate; ~15% severe; ~5% critical
- Progression: ~10-15% of mild/moderate cases become severe, and ~15-20% of severe become critical
- Mortality: 1%-3%; case fatality rate (if hospitalized, ~15%)
  - Risk of dying related to age: 0-39, 0.2%; 40-49, 0; 50-59, 1.3%; 60-69, 3.7%; 70-79, 8.3%; ≥80, 16.7%
  - Higher risk of dying in persons with underlying diseases
- Treatment: Supportive (no vaccine and no specific drug therapy available)

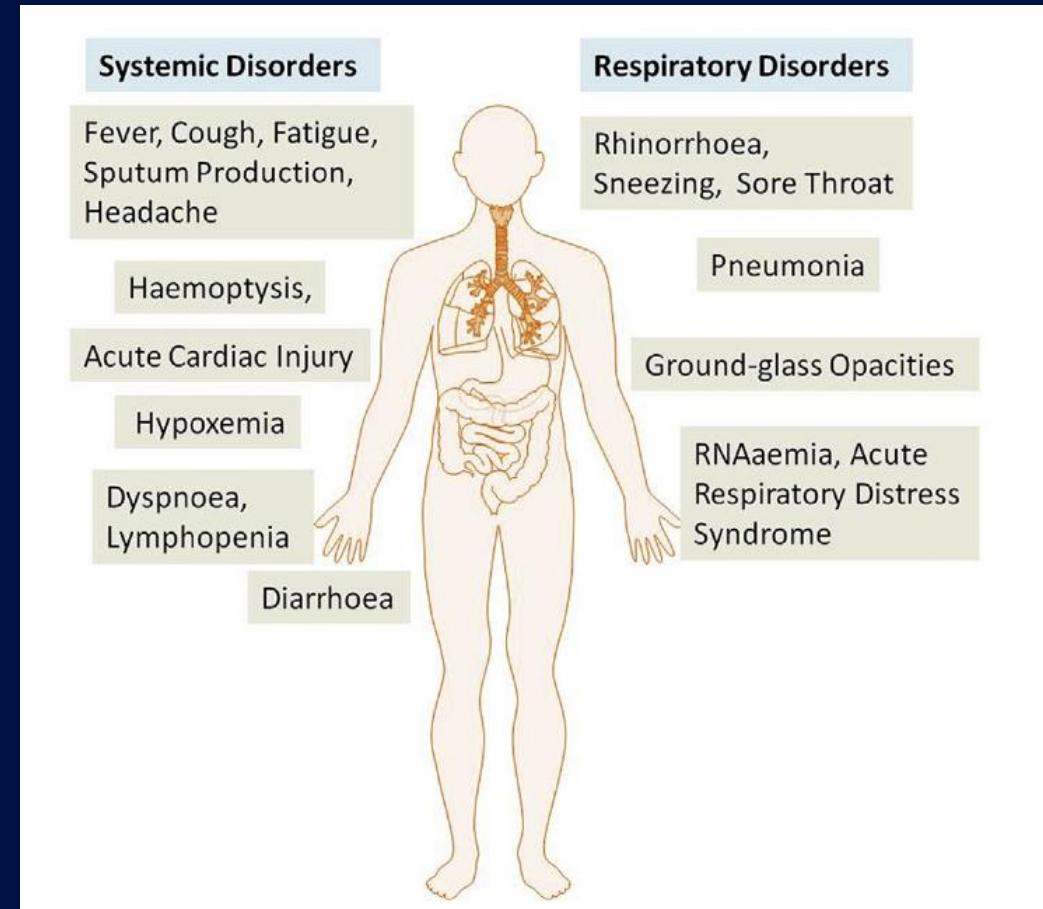
# COVID-19: EPIDEMIOLOGY, COMMENTS

- Cases: Global: >215,500 (~9,000 deaths), >140 countries with cases
  - China has gone 24 hours without community transmission; Outside China: Italy, >35,000 (~3,000 deaths); Spain, >13,500 (~600), France, >9,000
  - US: >8,300 (~150 deaths); NC, 97 cases (0 deaths) - 23 counties reporting cases; doubling time every 2-3 days
- Comments
  - NC now has community transmission
  - Major limitations on our COVID-19 response: Critically shortages of PPE and limitations on COVID-19 test material



# SYMPTOMS of nCoV

- Uncomplicated upper respiratory infection
  - Fever, cough, sore throat, nasal congestion
  - Malaise, headache, muscle aches
  - Shortness of breath
- Most patients have reportedly had mild to moderate respiratory illness
- Older and immunocompromised patients may present with atypical symptoms (e.g., no fever)
- Complications for infection
  - Mild to severe pneumonia
  - Acute Respiratory Distress Syndrome
  - Sepsis
  - Septic shock



WHO. [https://www.who.int/internal-publications-detail/clinical-management-of-severe-acute-respiratory-infection-when-novel-coronavirus-\(ncov\)-infection-is-suspected](https://www.who.int/internal-publications-detail/clinical-management-of-severe-acute-respiratory-infection-when-novel-coronavirus-(ncov)-infection-is-suspected). 24 January; Rothan HA, Byraredy SN. J Autoimmunity (In press)

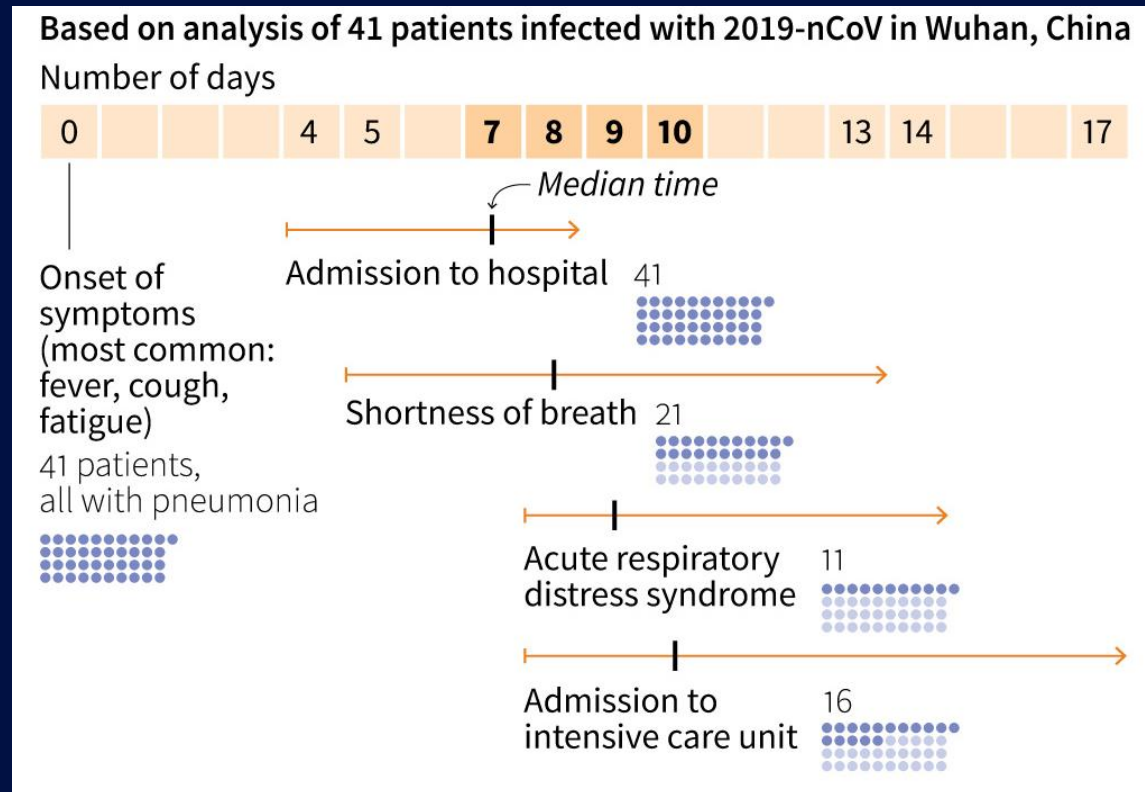
# COVID-19, TIME LINE OF INFECTION COURSE

Symptoms  
begin

4-5  
days

after exposure

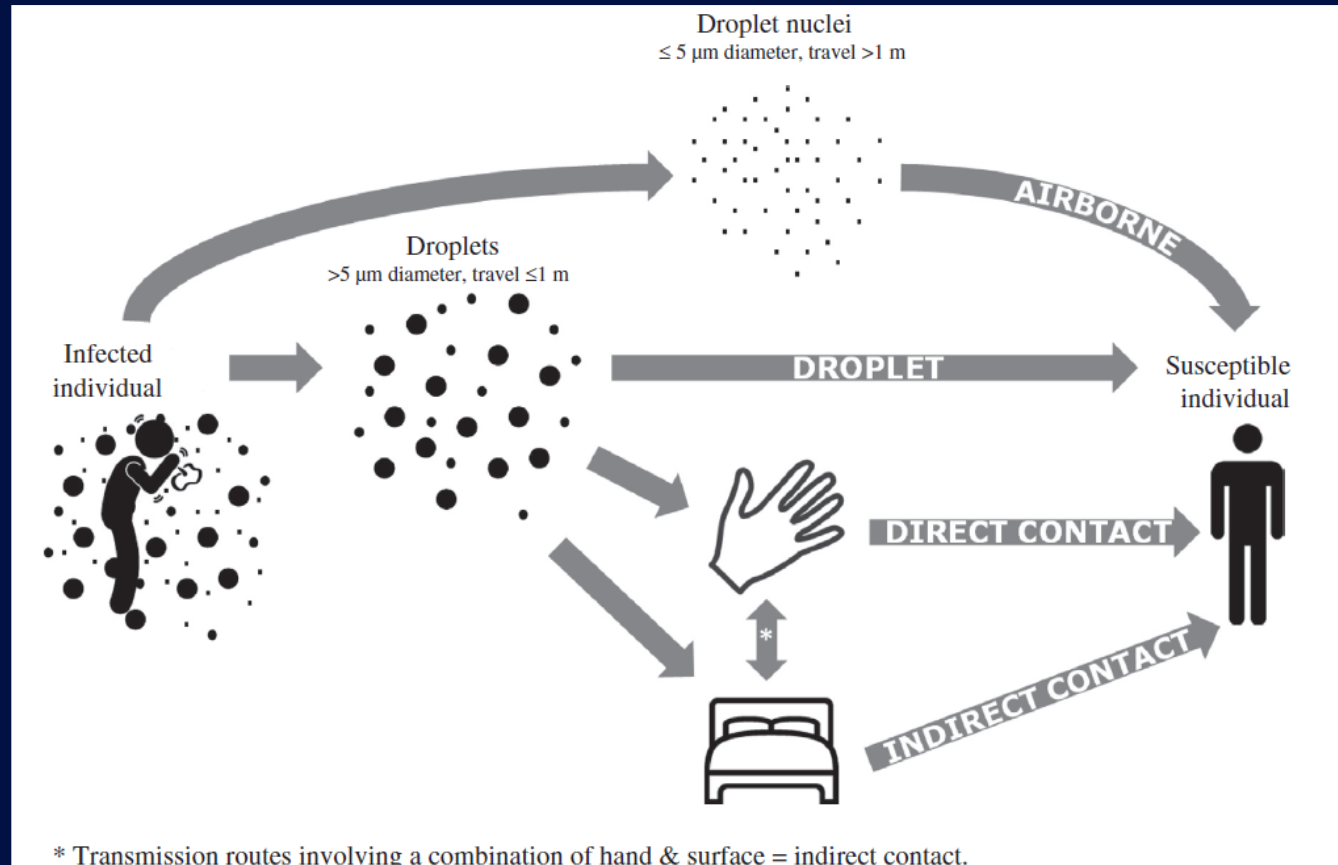
(range 2-14)



Li Q, et al. N Engl J Med. 2020 Jan 29. doi: 10.1056/NEJMoa2001316 Chan JF, et al. Lancet. 2020 Feb 15;395(10223):514-523

Guan WJ, et al. N Engl J Med. 2020 Feb 28. doi: 10.1056/NEJMoa2002032 Huang C, et al. Lancet. 2020 Feb 15;395(10223):497-506

# LIKELY TRANSMISSION ROUTES FOR nCoV

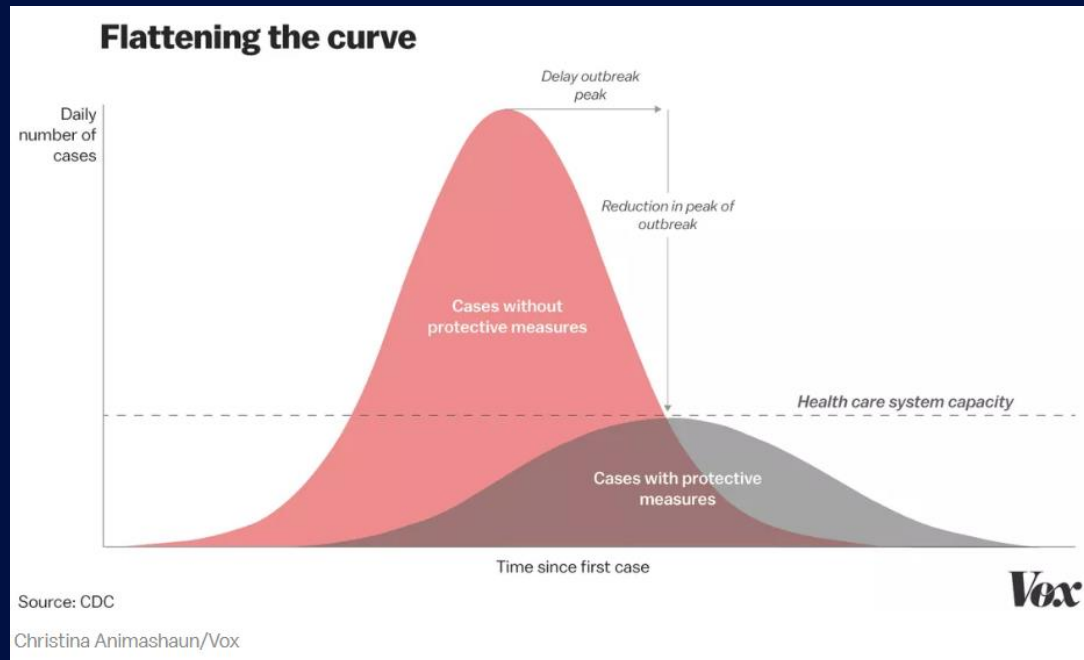


Understanding the epidemiology of COVID-19 allows one to safely manage patients and informs public health on necessary control measures



# KEYS TO COVID-19 MITIGATION: SOCIAL DISTANCING AND DIAGNOSTIC TESTING

## SOCIAL DISTANCING FLATTENS THE CURVE!!



## MITIGATION STRATEGIES

- Public health interventions
  - Quarantine: Separates and restricts persons exposed to an infectious disease
  - Isolation: Separates and restricts persons who have an infectious disease
  - Case finding: Used by Public Health Departments to locate persons exposed to a known case
  - All of above are dependent on have availability of access to a rapid, sensitive and specific diagnosis test
- Social distancing
  - Must be maintained for 2-3 incubation periods after community acquisition has ceased

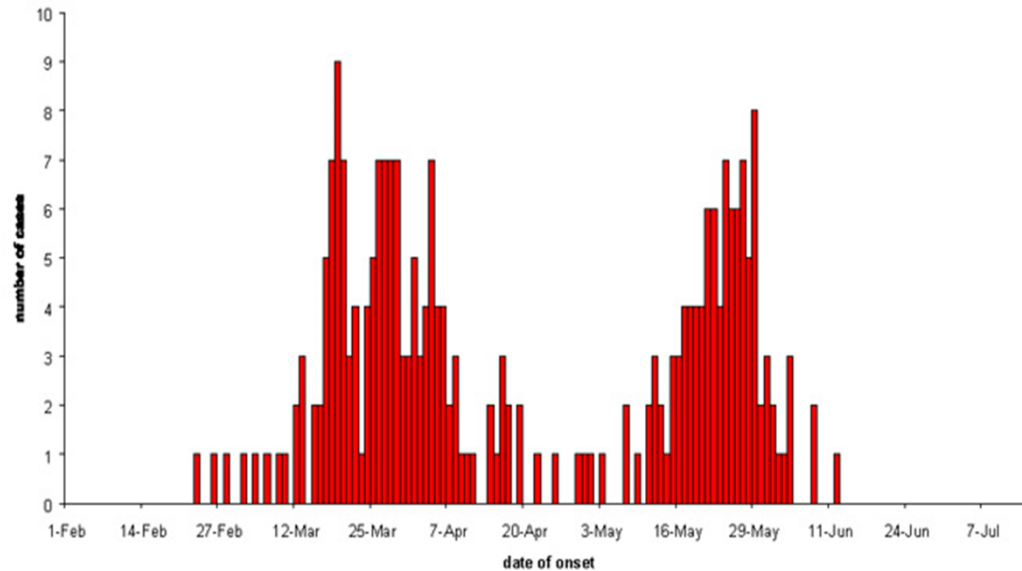


## Effects of social distancing on 1918 flu deaths



# PROJECTING THE FUTURE OF THE COVID PANDEMIC

Probable cases of SARS by date of onset  
Canada, 1 February - 4 July 2003 (n=250\*)

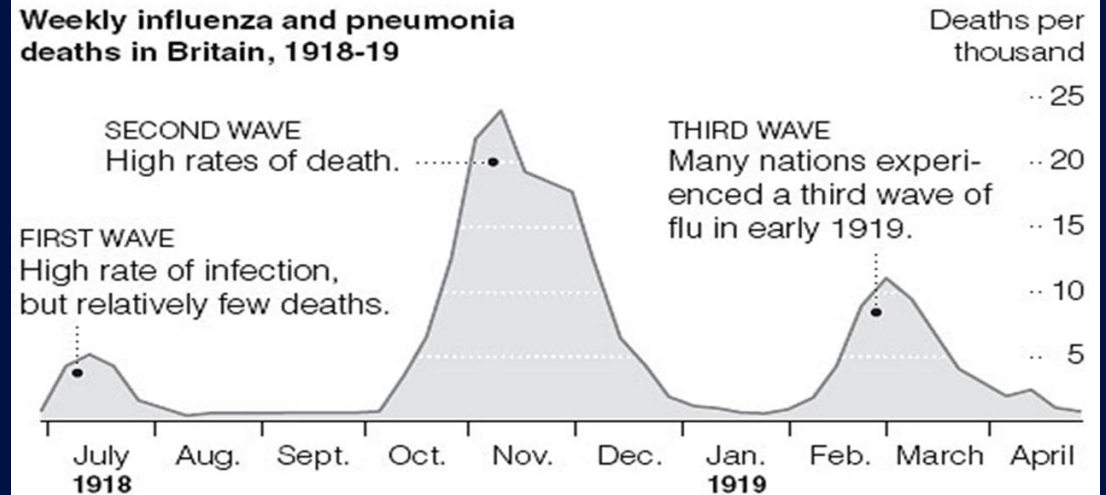


\* As of 4 July 2003, 251 probable cases of SARS were reported from Canada. This graph does not include one additional case of SARS for whom no date of onset was available. Between 4 and 10 July 2003, 2 probable cases were discarded and one additional probable case was reported. As of 10 July 2003, a total of 250 probable cases of SARS were reported.  
Source: Health Canada

## The 1918 Pandemic

The influenza pandemic of 1918 spread across Europe, Asia and North America in three distinct but uneven waves, and was fatal for about 2 percent of those who caught it. Global data is incomplete, but death rates in Britain hint at the severity of the three waves.

Weekly influenza and pneumonia deaths in Britain, 1918-19



Sources: *Emerging Infectious Diseases*; Jeffery K. Taubenberger and David M. Morens

THE NEW YORK TIMES

# HOPE FOR THE BEST, BUT PREPARE FOR THE WORST (Benjamin Disraeli)

APPENDIX A

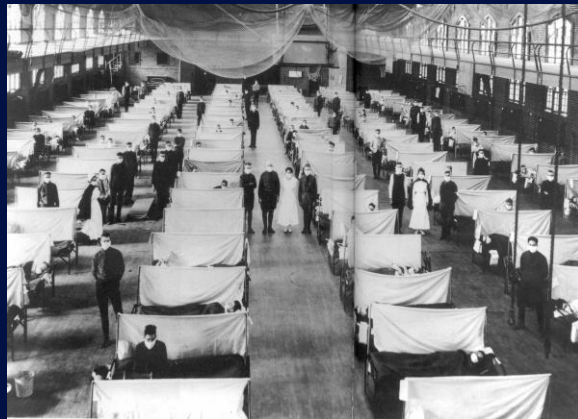
Wuhan



Social distancing,  
Italy



US,  
1918



Italian hospital

