



The transition from pandemic to endemic transmission

Kåre Mølbak, MD, DMSc

Professor, University of Copenhagen & Statens Serum Institut

Former vice-president at Statens Serum Institut



No conflicts of interest to declare



COVID-19 – an epic pandemic

Frodo:

I wish it need not have happened in my time.

Gandalf:

So do I, and so do all who live to see such times. But that is not for them to decide. All we have to decide is what to do with the time that is given us.



When is it "over" – what is "normal"

Definitions are evolving constructions

Pandemic epidemic, endemic, reproduction number, herd immunity

Created by epidemiologists to describe transmission scenarios

- being “undermined” by ongoing discussions among scientists and laypersons

- First known use of “pandemic” referred to “*a Pandemick, or Endemick, or rather a Vernacular Disease (a disease alwayes reigning in a Countrey)*” (G Harvey 1666)
 - PAN + DEMOS
- In the 1889 pandemic the word “pandemic” was rescued from near-obscurity and attached to the remarkable global emergence of influenza



Pandemic signatures

Pandemic: *“an epidemic occurring worldwide, or over a very wide area, crossing international boundaries and usually affecting a large number of people”*

- Wide geographic transmission
- Disease movements – following transport routes
- High attack rates
- Minimal immunity – unusual age distribution
- Transmission outside seasons
- Occurrence in several waves
 - For more than one reason
- Impact on society in terms of disease severity?

The transition from pandemic to endemicity:

When is it over?

Or when will it be over

- The disease has become eliminated/eradicated
 - SARS
- Or in control = endemic
 - Covid-19

Re = 1 ?

The transition: When is it over? Or when will it be over

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Re = 1 ?

Not sufficient to declare endemicity

When is it over?



- An **endemic** condition is present at a **fairly stable, predictable** rate—the observed number of cases are approximately the same as the number **expected**.

WHO position

- *On 5 May 2023, more than three years into the pandemic, the WHO Emergency Committee on COVID-19 recommended to the Director-General, who accepted the recommendation, that given the disease was by now **well established and ongoing**, it no longer fit the definition of a PHEIC. **This does not mean the pandemic itself is over, but the global emergency it caused is – for now.***
- The pandemic continues, but the emergency is over for now



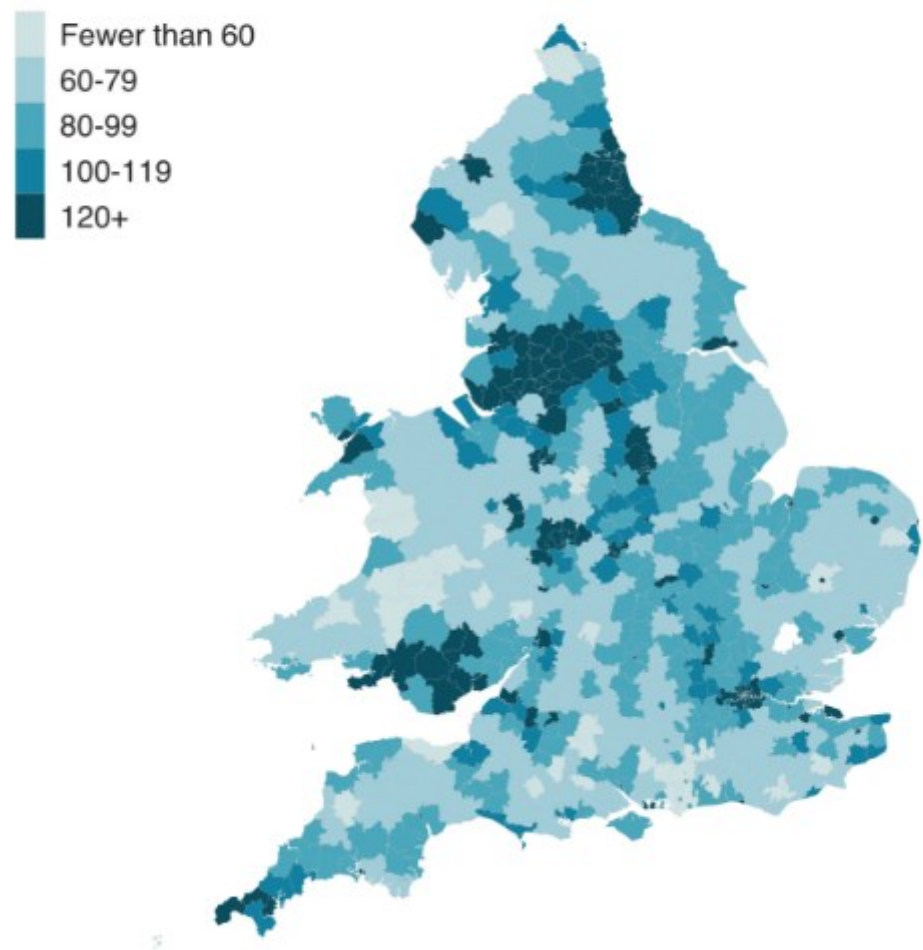
The pandemic is over when:

- The condition is present at a **fairly stable, predictable** rate
- We can somehow predict seasonal fluctuations and epidemiological patterns
 - Waste water surveillance
- The **burden for society** does not represent an emergency
 - But may still be a significant burden for society
- May not be equally distributed

Here is that map of child deaths in the middle of the 19th Century.

Child mortality in 1851, England & Wales

Number of children dying between ages 1 and 5, per 1,000 children in that age group



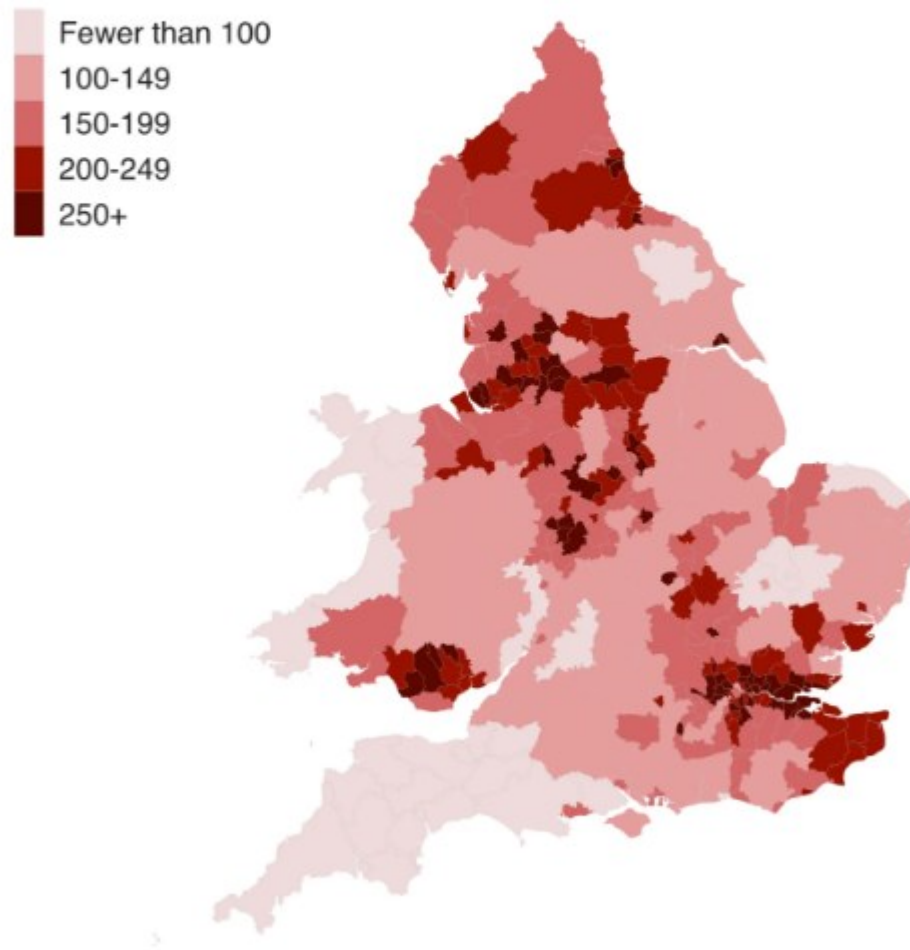
Source: University of Cambridge, www.PopulationsPast.org



And the Covid death rate from March 2020 to April this year.

Covid-19 mortality rate 2020-21

Age standardised deaths due to Covid-19, March 20 - April 21 per 100,000 people, by local authority in England & Wales



Source: ONS, Deaths due to COVID-19 by local area and deprivation



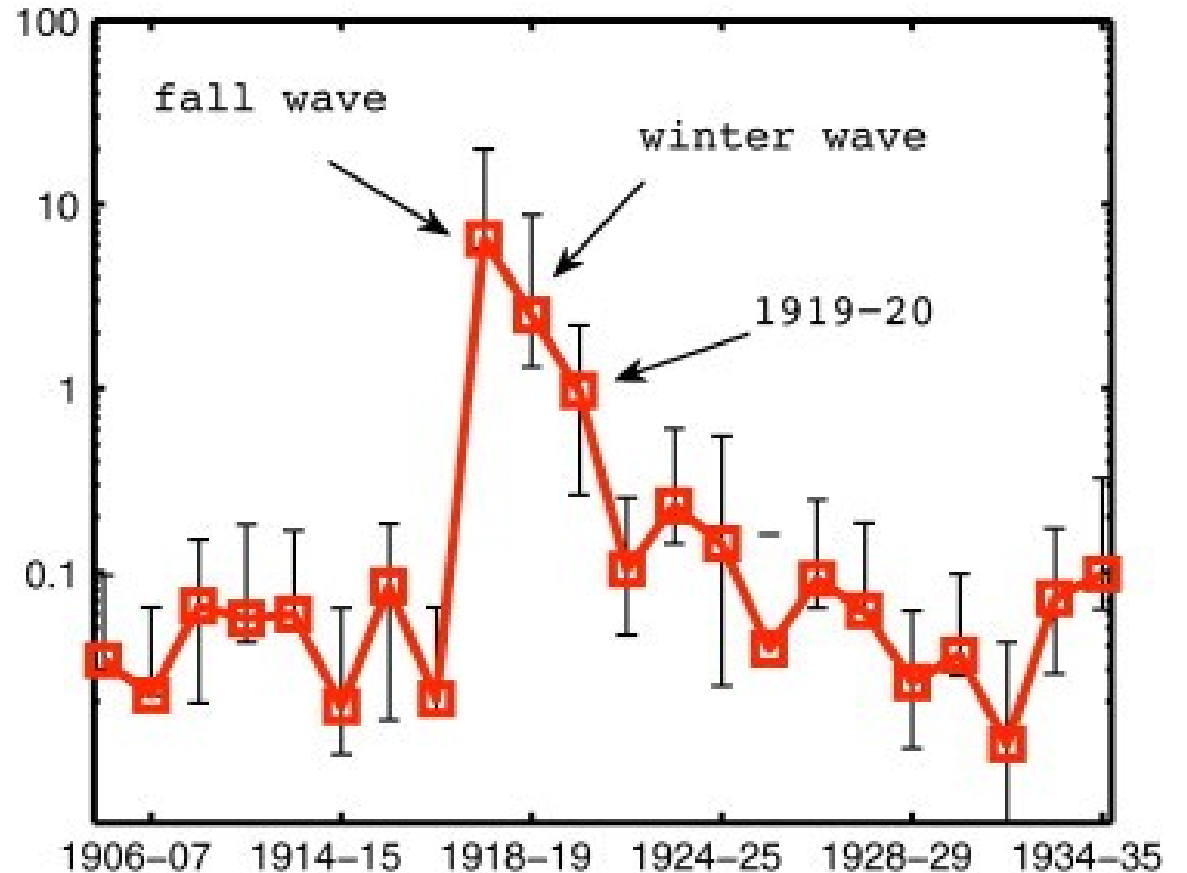


The timeline for the transition

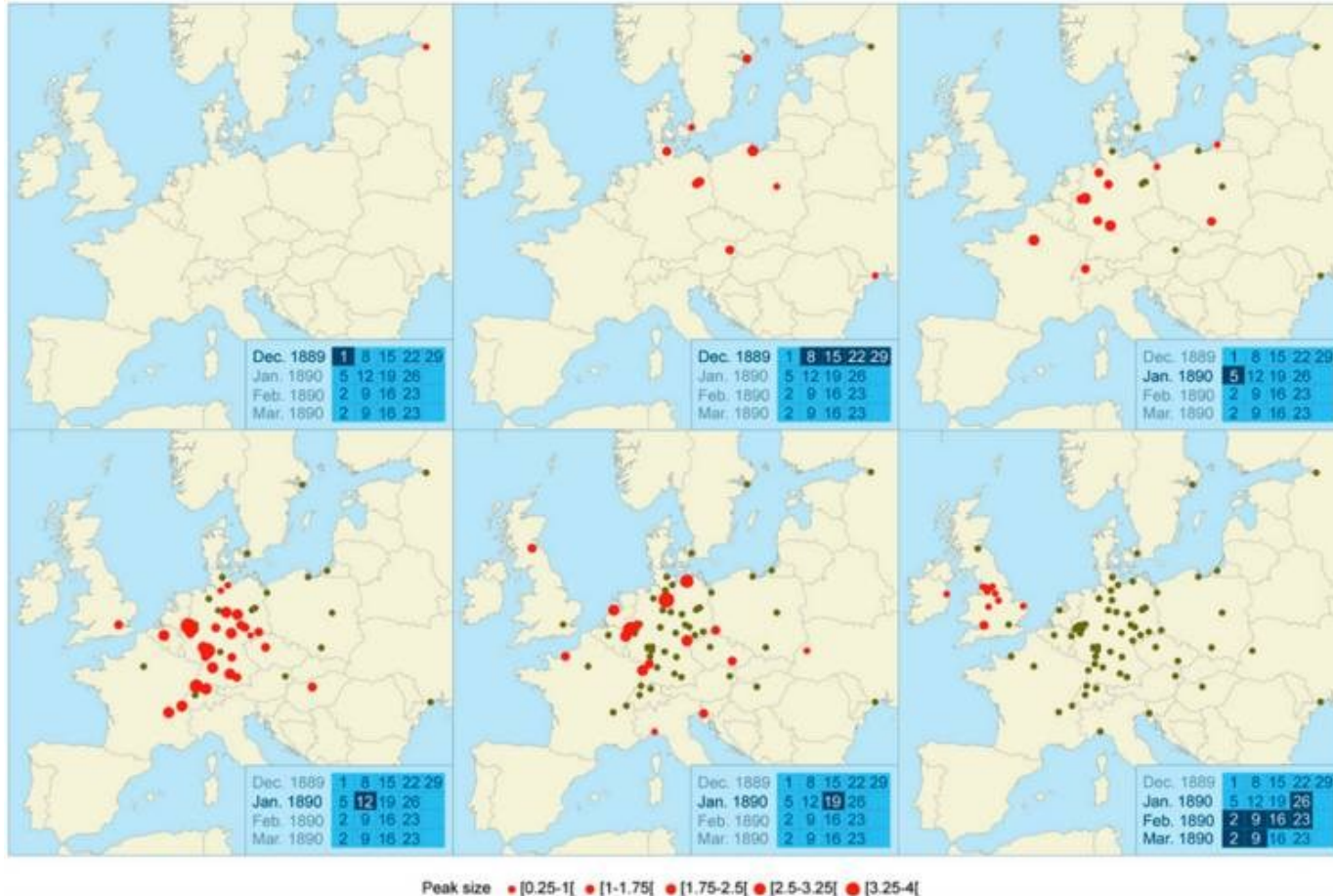
Learning from the past: Deaths in < 65 years, Spanish flu

Age patterns of influenza-related mortality rates by season, Copenhagen, 1904–1937, based on the rate ratio measure.

By 1925–1926, **seven years** after the emergence of the pandemic H1N1 virus, the $RR_{<65}$ was back to its pre-pandemic level at 0.1 or below,



Was there a coronavirus pandemic before Covid-19 ?

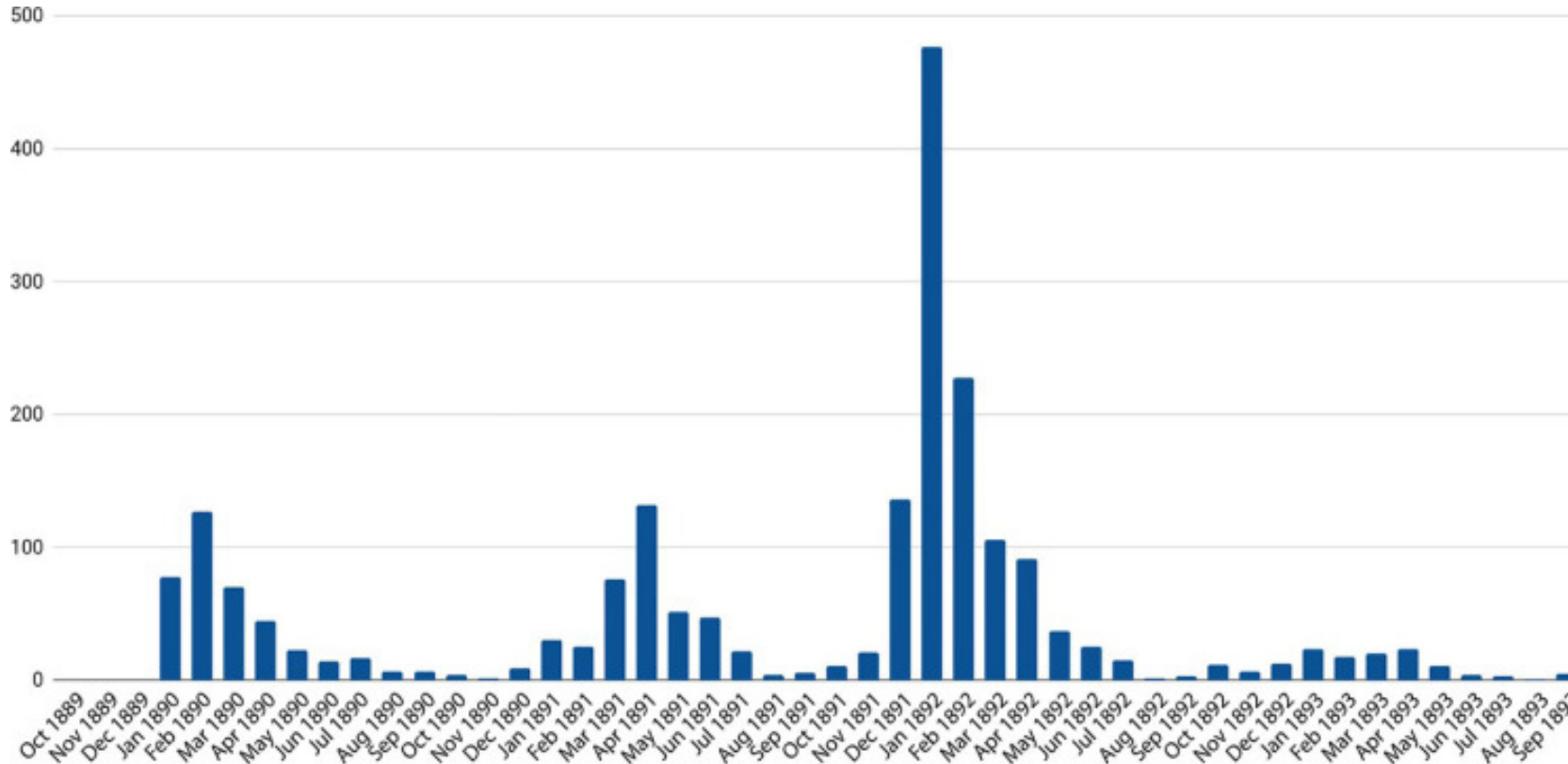


The Russian flu of 1889

Started in Turkestan
May 1889 and
spread to St
Petersborg Nov 1889

Spread from December 1889 to March 1890

Several waves of Russian influenza



Mortality statistics during the Russian influenza in 1890 in Indiana (USA), showing a third wave associated with higher mortality



What was the cause of Russian flu ?

- **Influenza virus ?**
 - H2N2 (like 1957 Asian flu) ?
 - H3N8 from horses
- **Coronavirus HCoV-OC43 hypothesis ?**
 - Phylogenetically related to bovine coronavirus BCoV
 - Common ancestor around 1890
 - 1870 to 1890 a panzootic of contagious peripneumonia attributed to *Mycoplasma mycoides*
 - Clinical picture – systemic disease, relapses, complications
 - Reinfections
 - HCoV-OC43 has retained some neurotropism
 - Seasonality not similar to flu pandemics of 1918, 1957 and 1968

Conclusions

Epidemiological definitions are social constructs

The transition from pandemic to endemic is ill-defined and non-linear

Endemicity requires predictability

Lessons from past epidemics show that the transition takes several years

The burden of disease under the transition is not equally distributed

It is likely that COVID-19 will be an additional burden on top of other virus infections
1889 “flu” and HCoV OC43 as an example?

Whereas an influenza pandemic will replace seasonal influenza – and become seasonal



Thank you for
your attention

