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Reimagining the 1918 Pandemic

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RMS LifeRisks

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Agenda

1. Influenza Characteristics
2. The 1918 Pandemic
3. Reimagining the 1918 Pandemic



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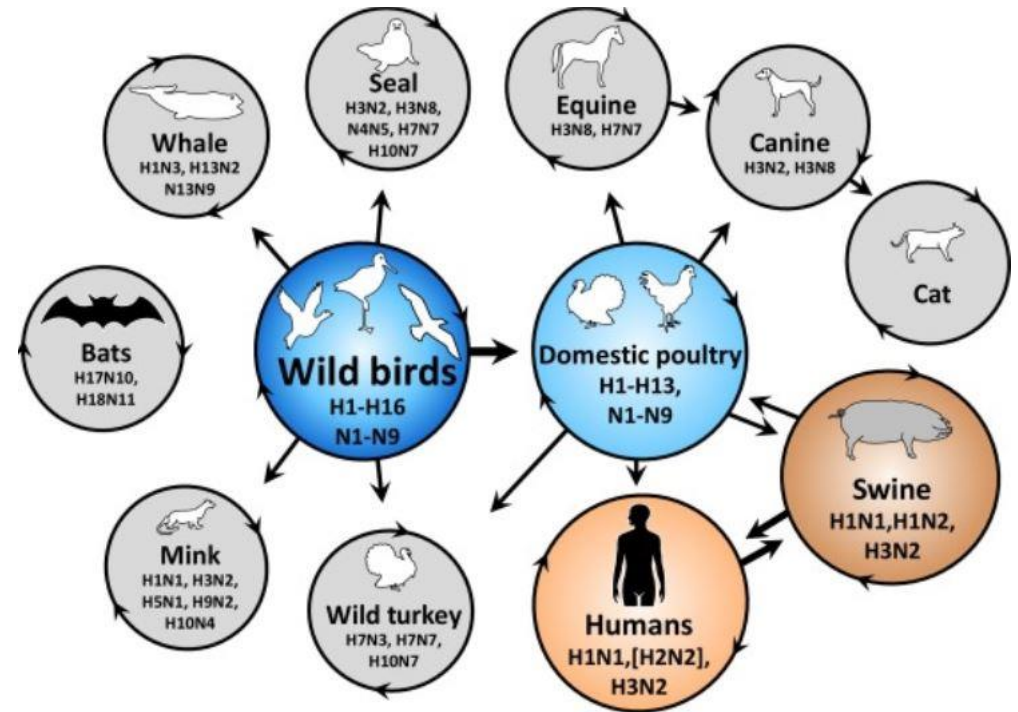
Influenza Characteristics

ertise
ponsorship
Thought leadership
Progress
Community
Sessional Meetings
Education
Working parties
Volunteering
Research
Shaping the future
Networking
Professional support
Enterprise and risk
Learned society
Opportunity
International profile
Journals
Support

Types of Influenza

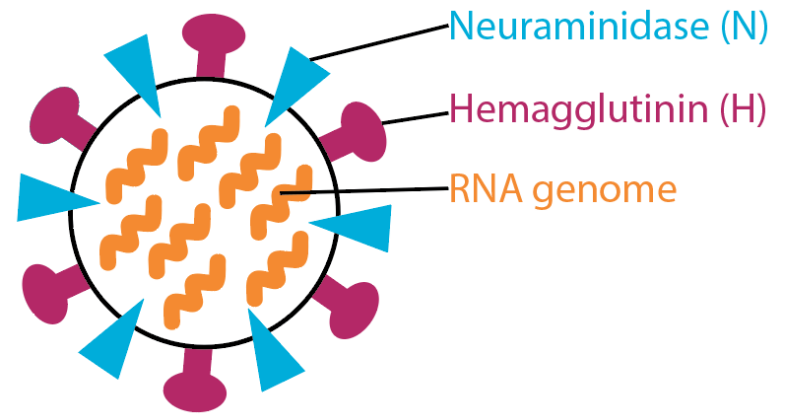
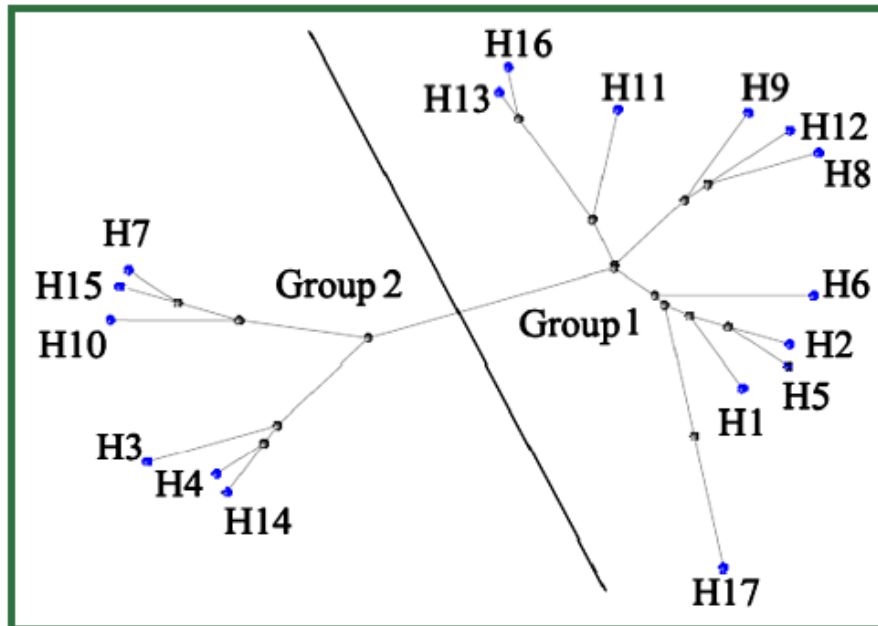
- **Type A**

- Zoonotic
- Drifts frequently
- Shifts cause pandemics
- Group 1 & Group 2 strains



- Type B – Human-to-Human & Seals; Not associated with pandemics
- Type C – Humans & Pigs; Not associated with pandemics

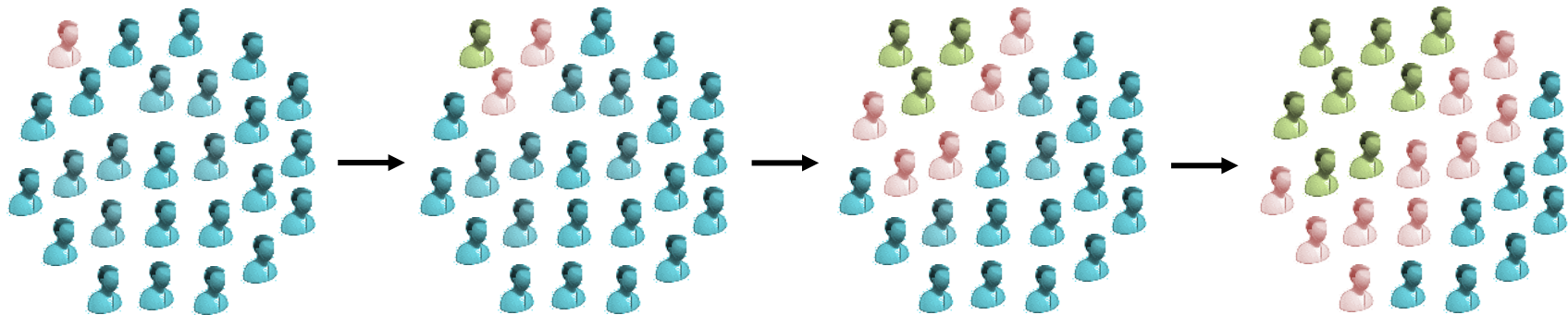
Two phylogenetic groups of influenza



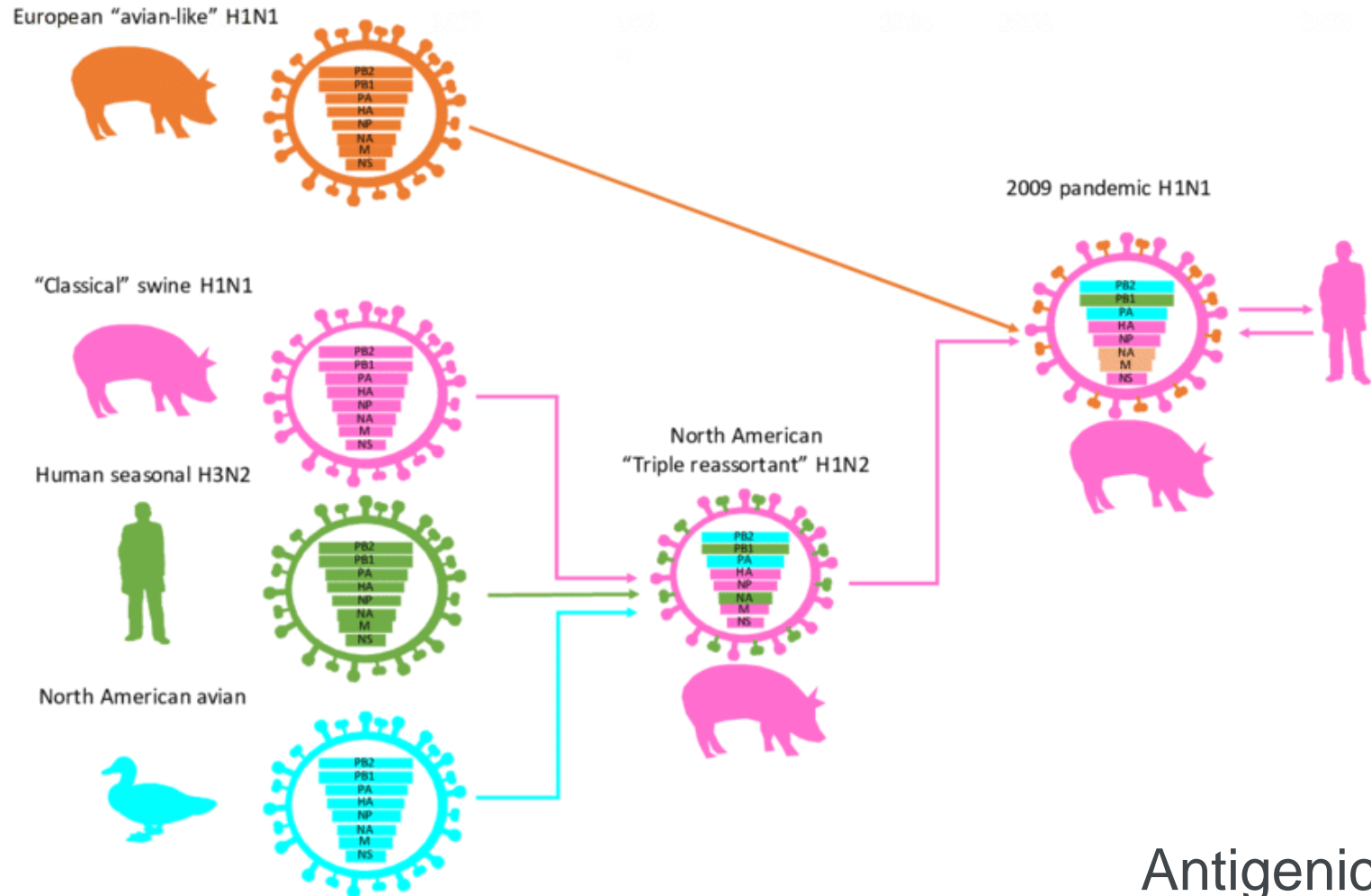
... e.g. H1N1

Contagion characteristics of an influenza virus

- Human-to-human contact
- Virus attaches to upper respiratory tract
- Social Network is crucial for determining contagion

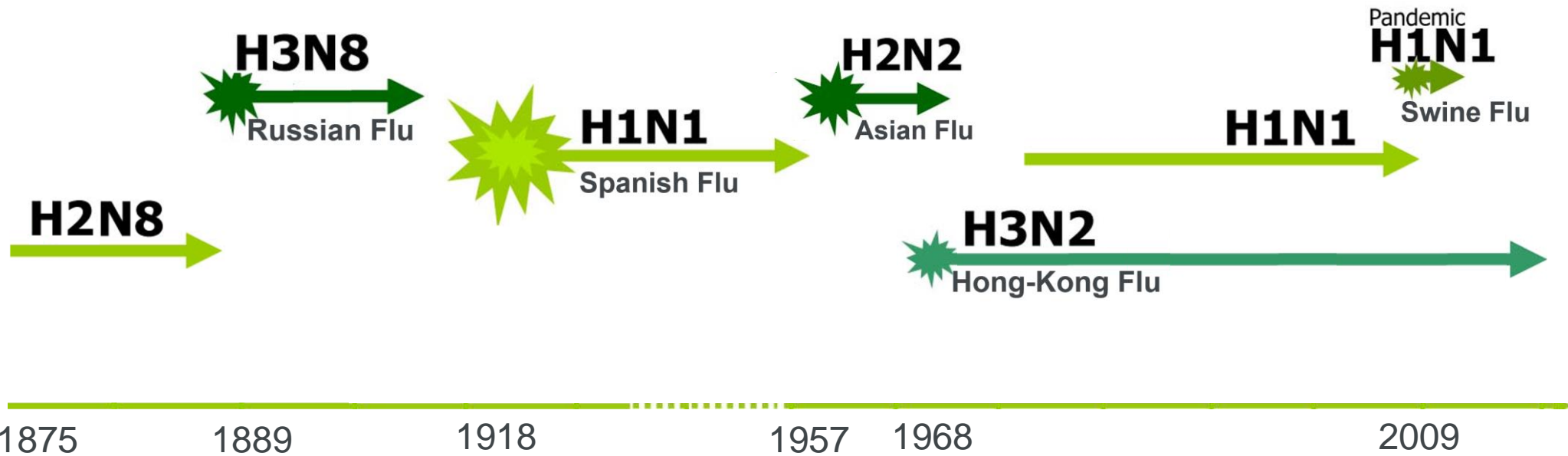
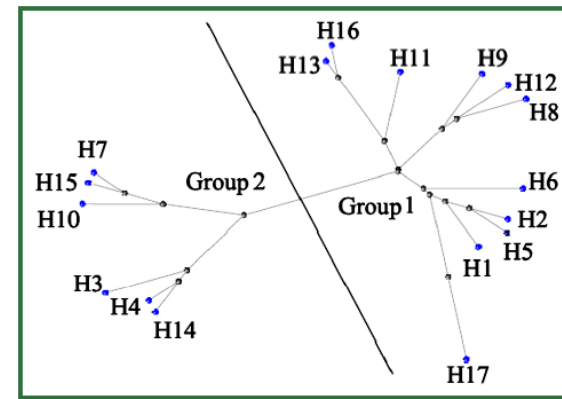


Shifts Cause Pandemics



Antigenic Shift

Most recent influenza pandemics



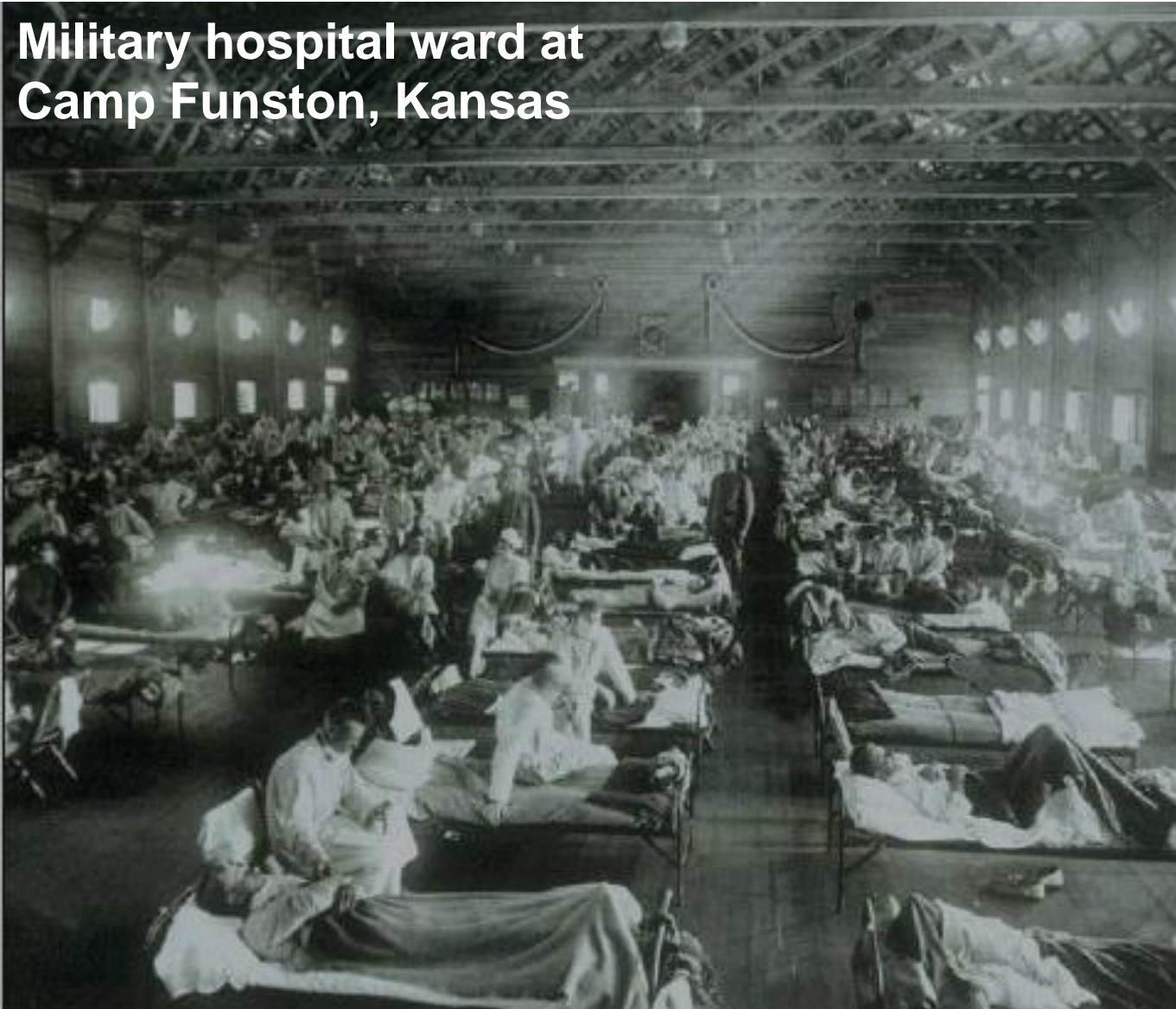


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The 1918 Spanish Influenza – What happened?

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Military hospital ward at Camp Funston, Kansas



The influenza pandemic of 1918 to 1919 is the deadliest in modern history.

~1/3 of world infected
~50 million deaths

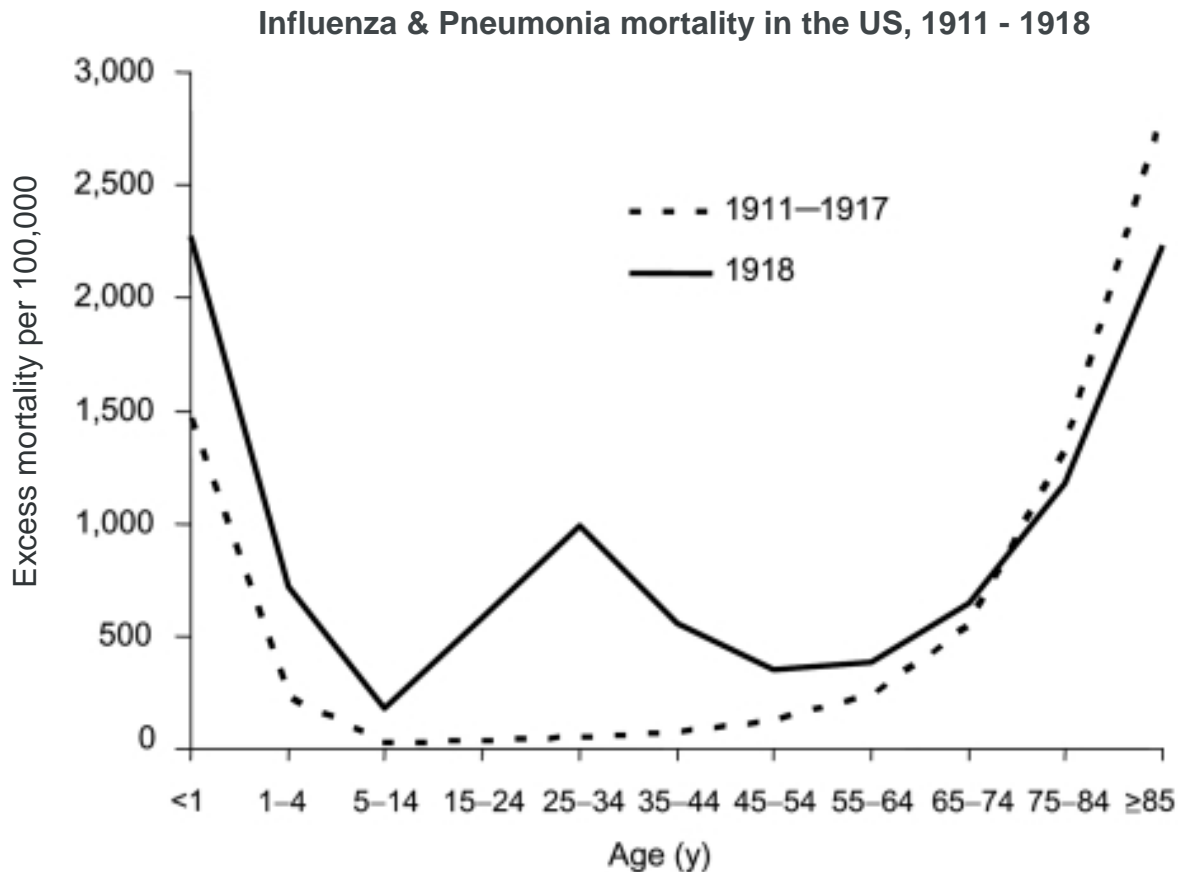
High excess mortality in young people

Origin

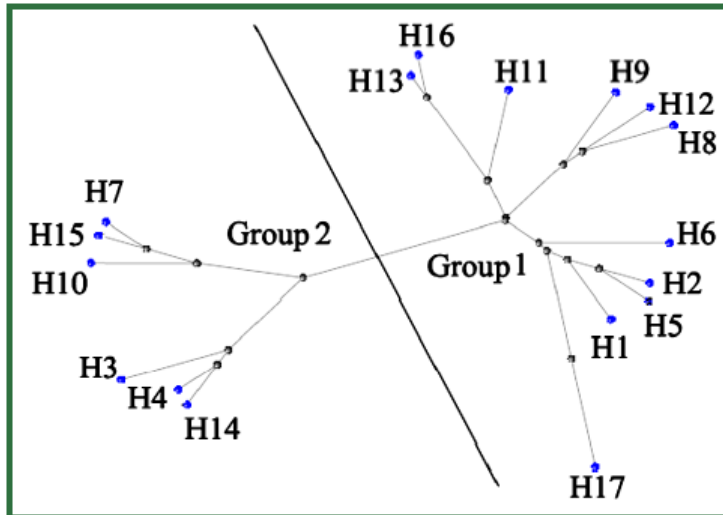
- The 1918 influenza pandemic is mistakenly called ‘The Spanish Flu’
- In late 1917, a virulent respiratory disease of unknown origins erupted in the interior of northern China
- China mobilized 95,000 labourers to support the war effort



Demographic response – Excess Mortality

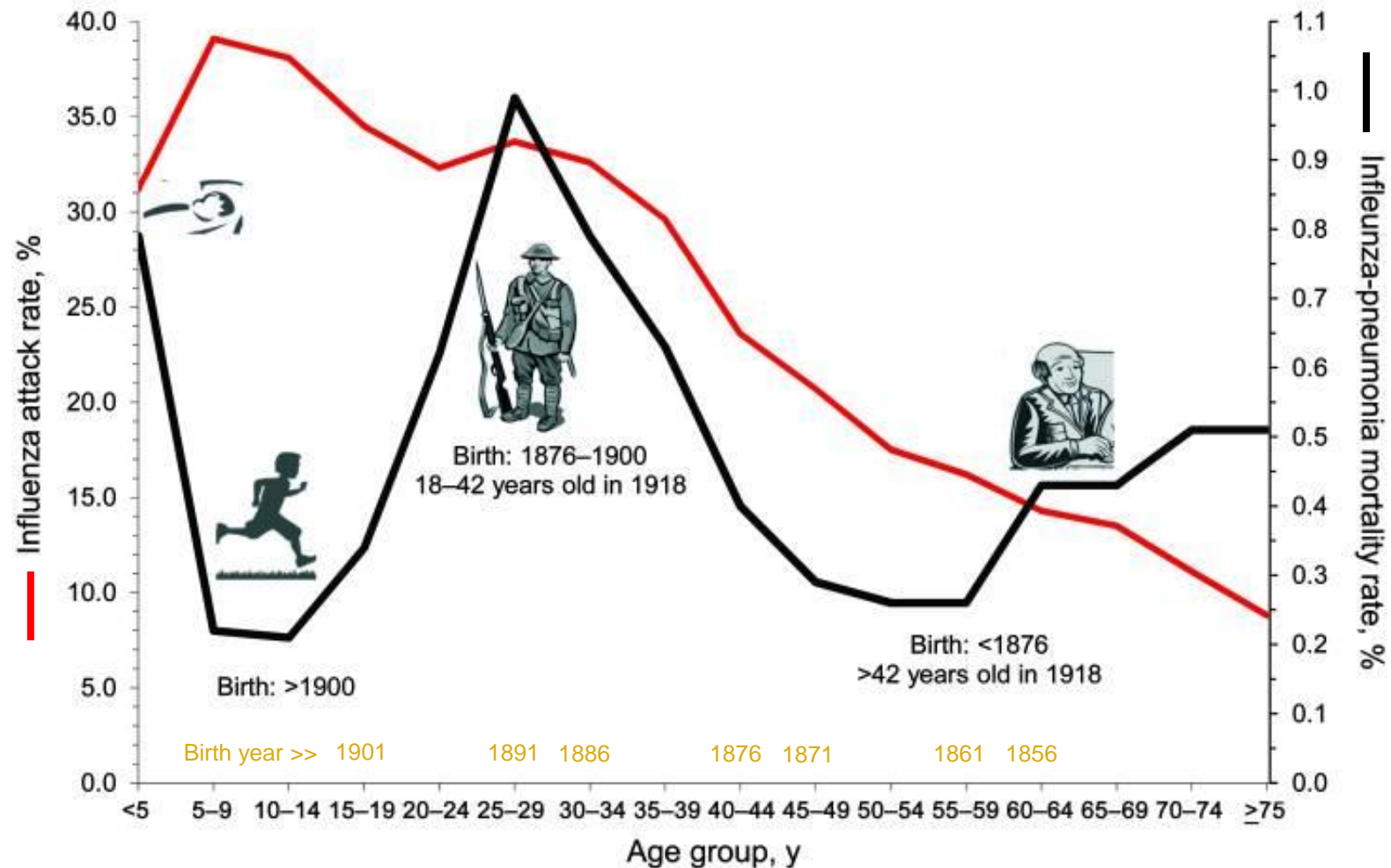


Antigenic imprinting

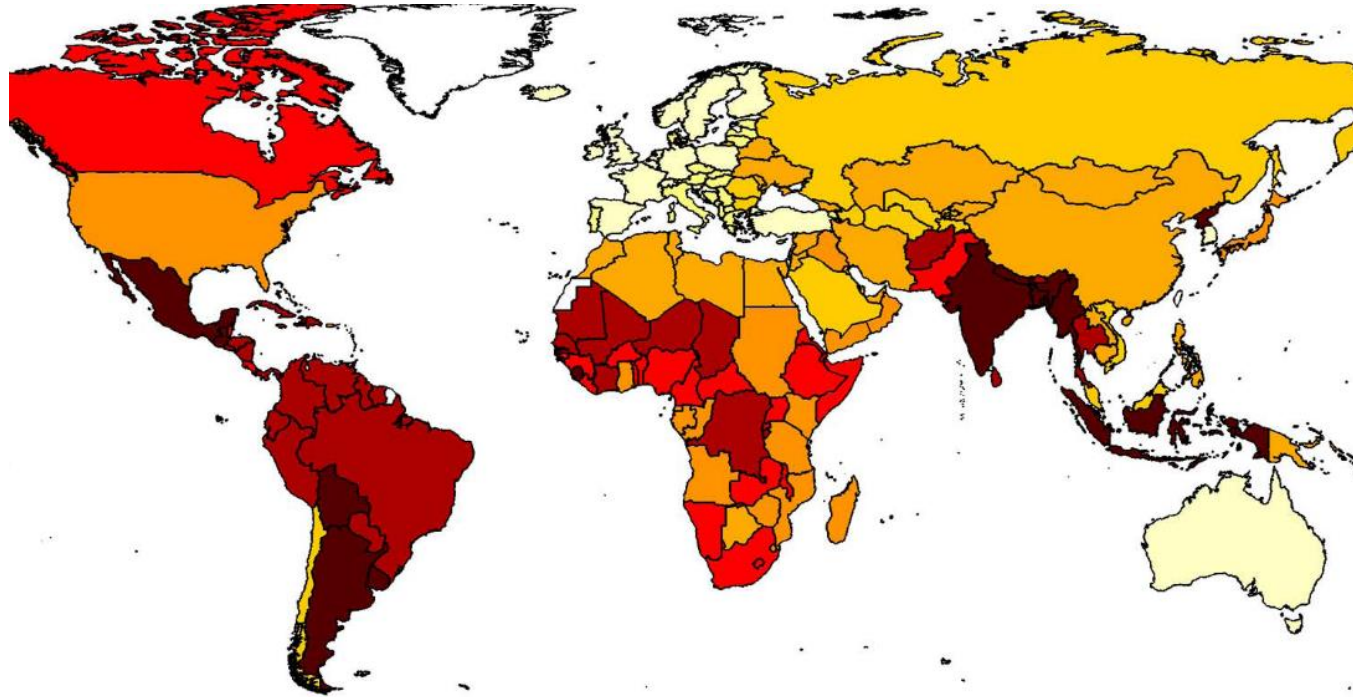


- Child imprints on the HA group of their first flu exposure
- Reduced risk of severe disease from flu strains within that same phylogenetic group
- More vulnerable to other HA group strains

Antigenic imprinting: 1918 Pandemic

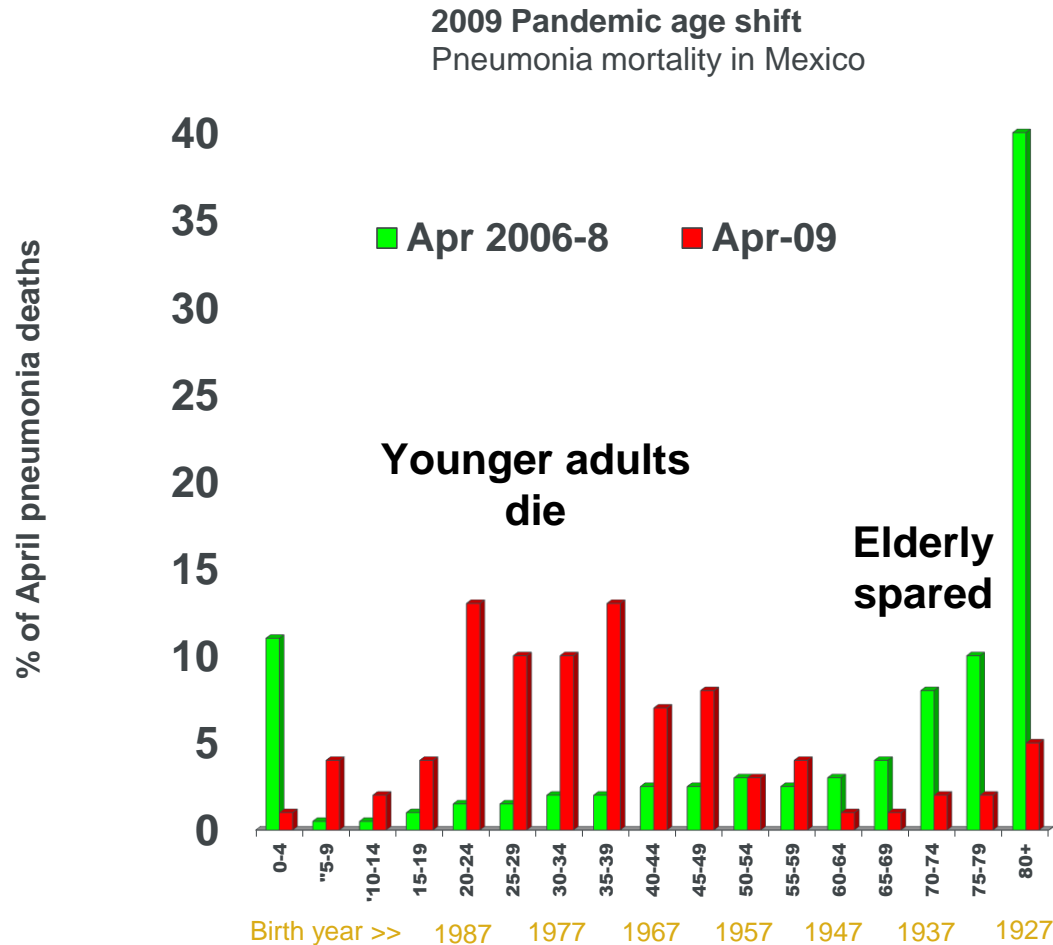


Antigenic Imprinting: 2009 “Swine-Flu”

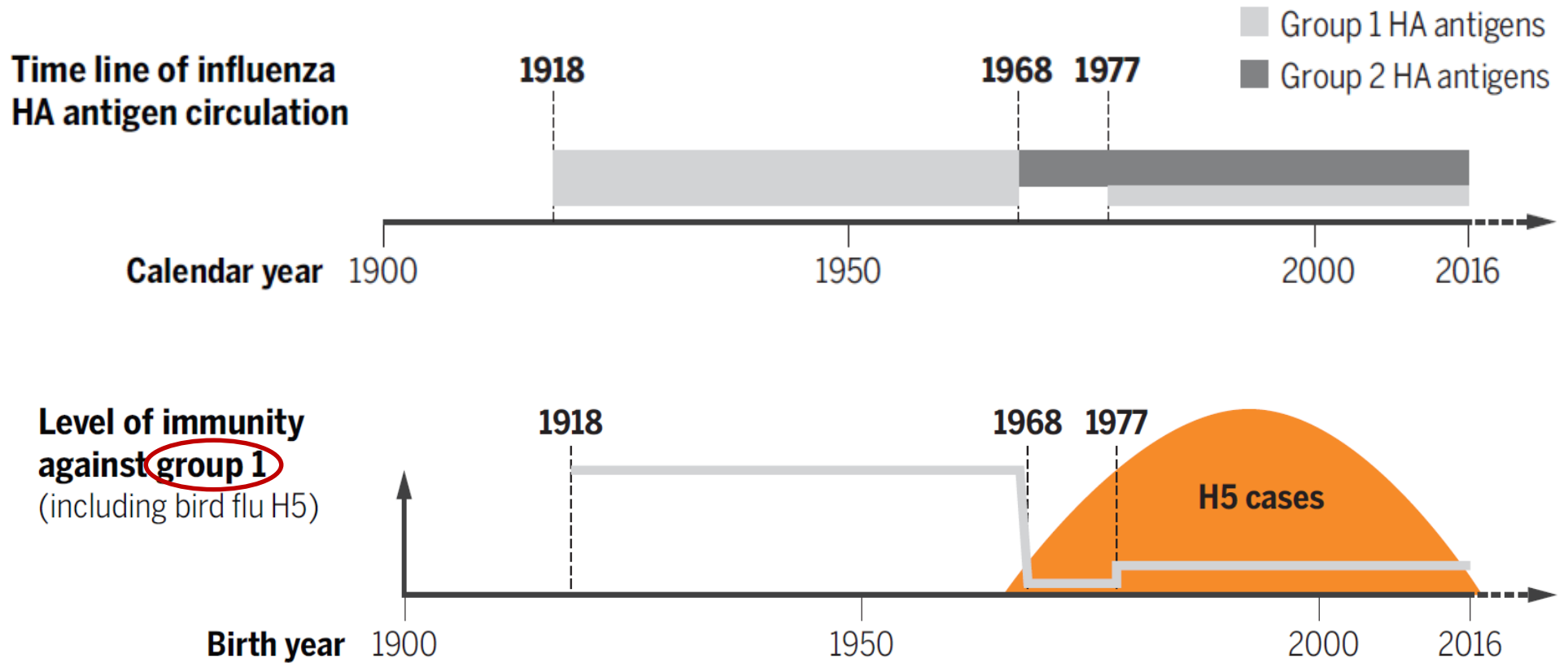


- 151,700 – 575,400 respiratory pandemic deaths Globally

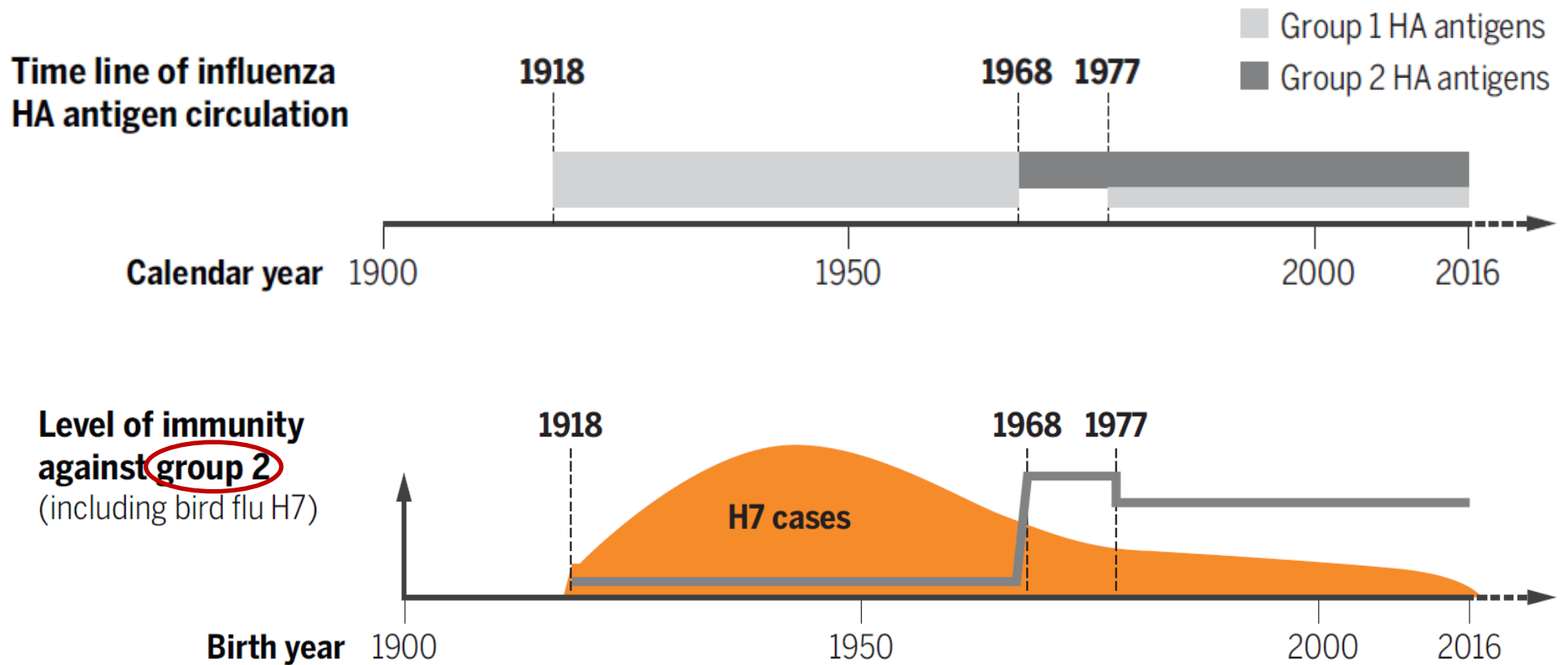
Antigenic Imprinting: 2009 “Swine-Flu”



Antigenic imprinting: “Bird-Flu” Epidemic



Antigenic imprinting: “Bird-Flu” Epidemic





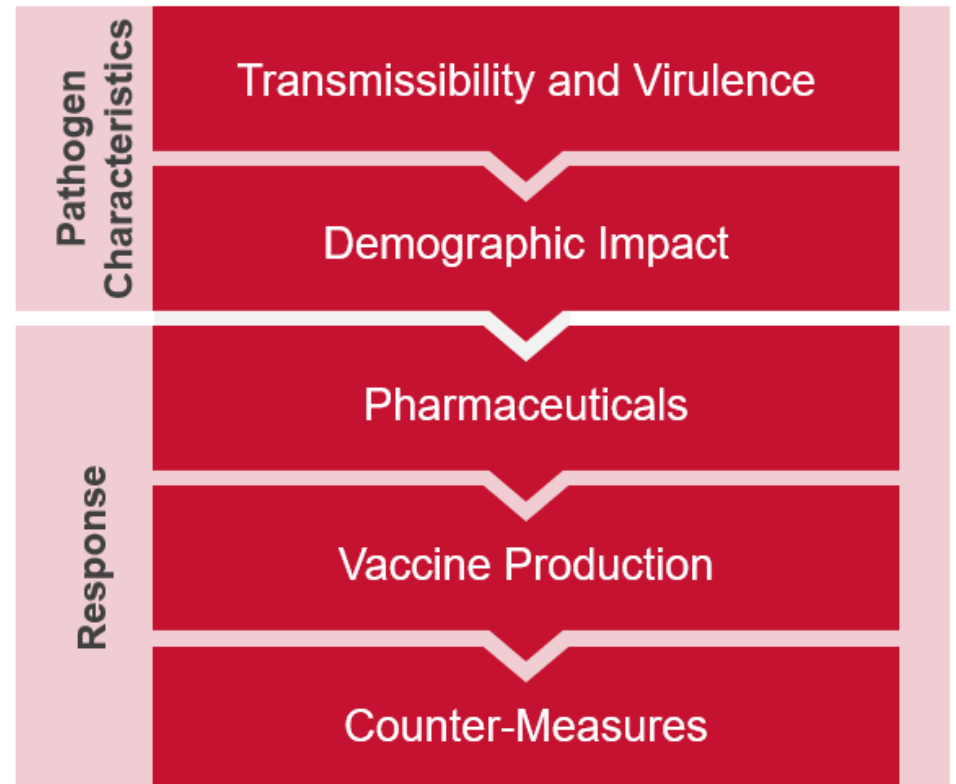
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Reimagining the 1918 pandemic

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Scenario Structure

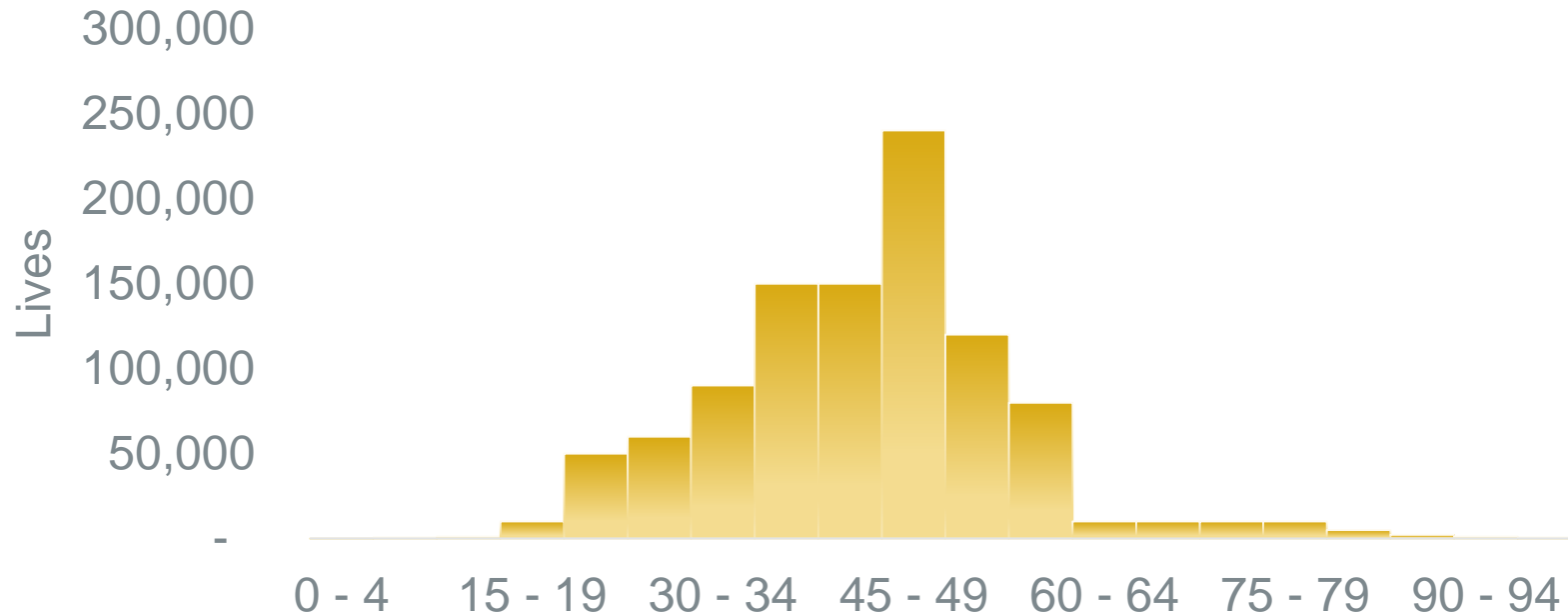
- **Transmissibility** = 2
- **Lethality** = 2.5%
- Assume vaccine available after 6 months
- Assume ineffective Pharmaceuticals



RMS Infectious Disease Model Structure

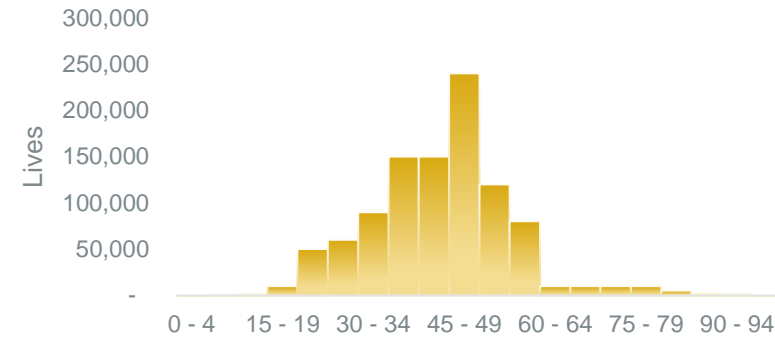
Demographic profile

Example Life Insurance Portfolio
(1 million lives)

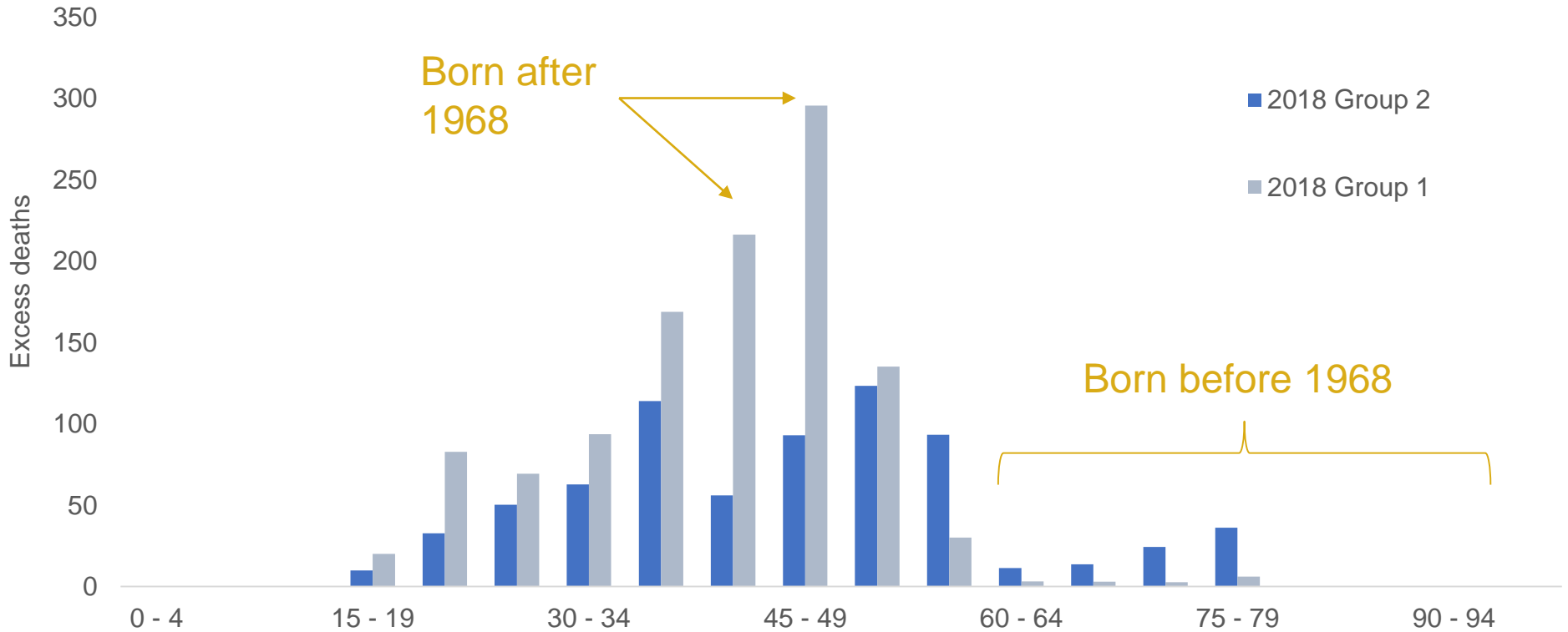


Results

Example Life Insurance Portfolio
(1million lives)

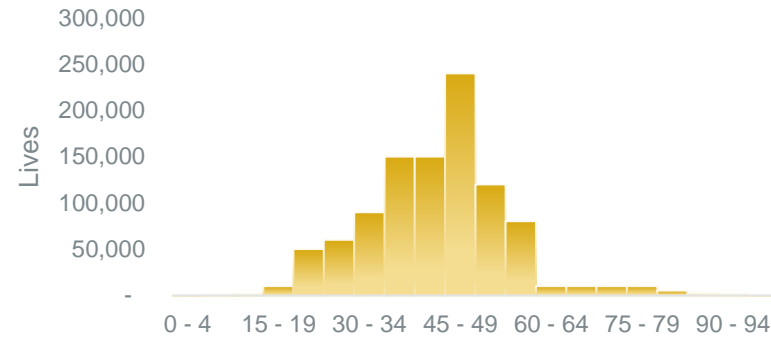


1918 Pandemic Scenario in 2018

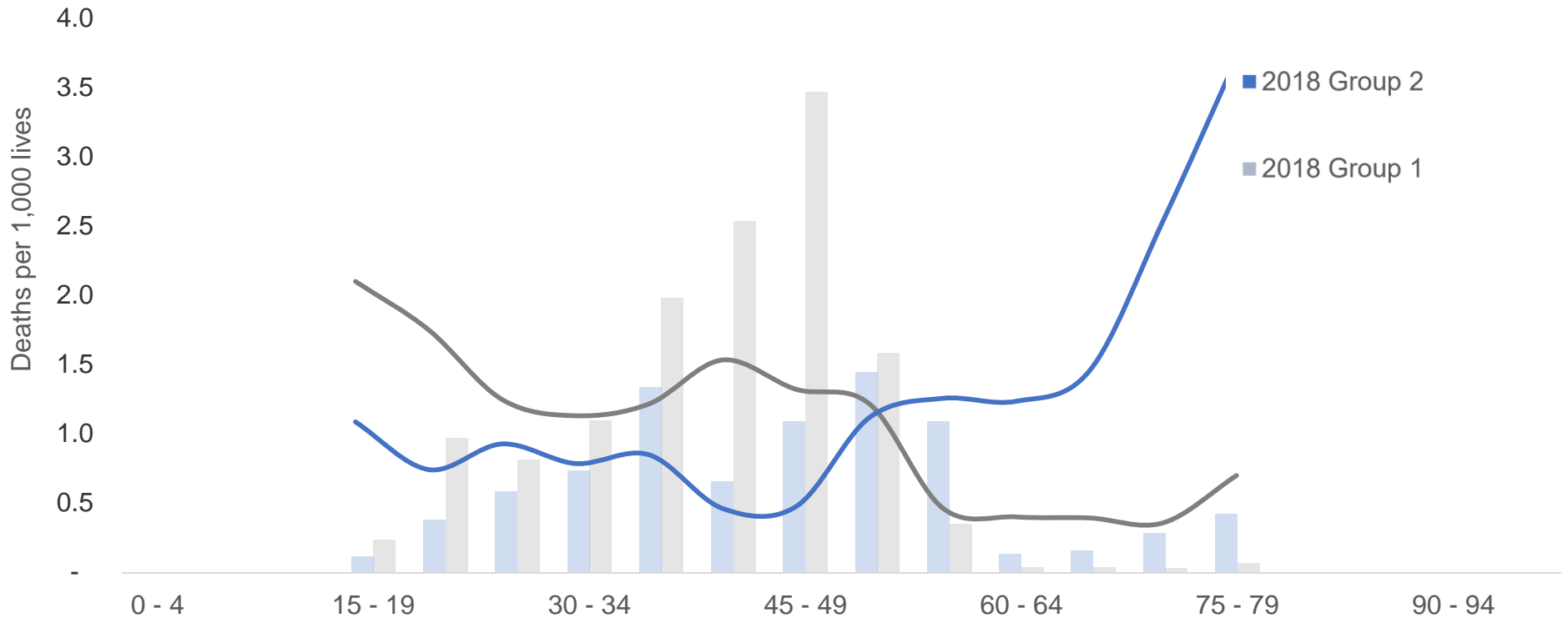


Results

Example Life Insurance Portfolio
(1 million lives)



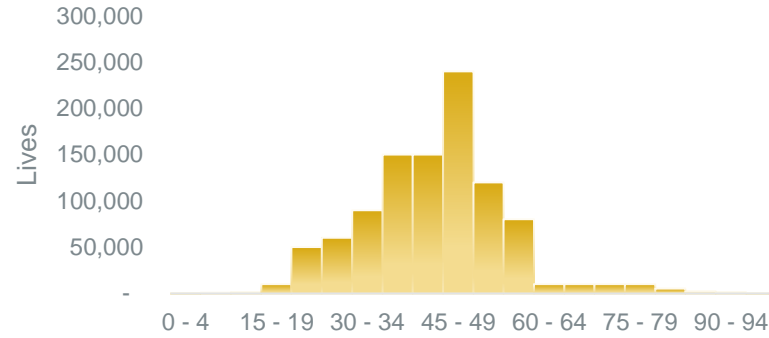
1918 Pandemic Scenario in 2018



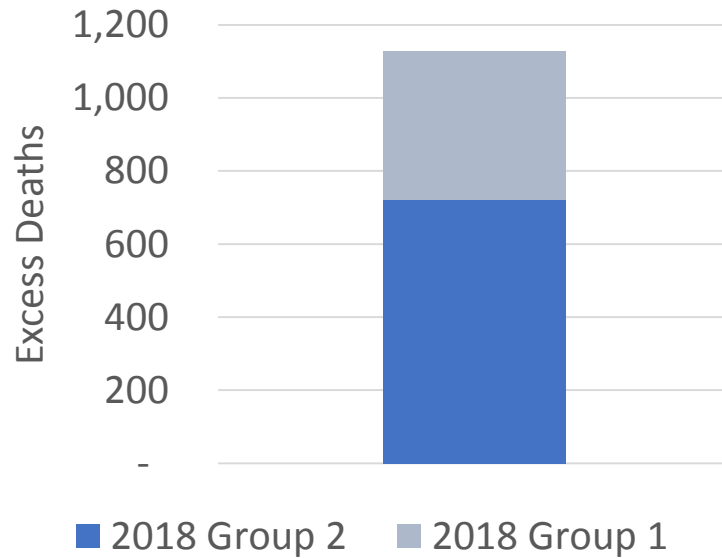
Results

- Most exposures were born after 1968. Vulnerable to group 1

Example Life Insurance Portfolio
(1million lives)



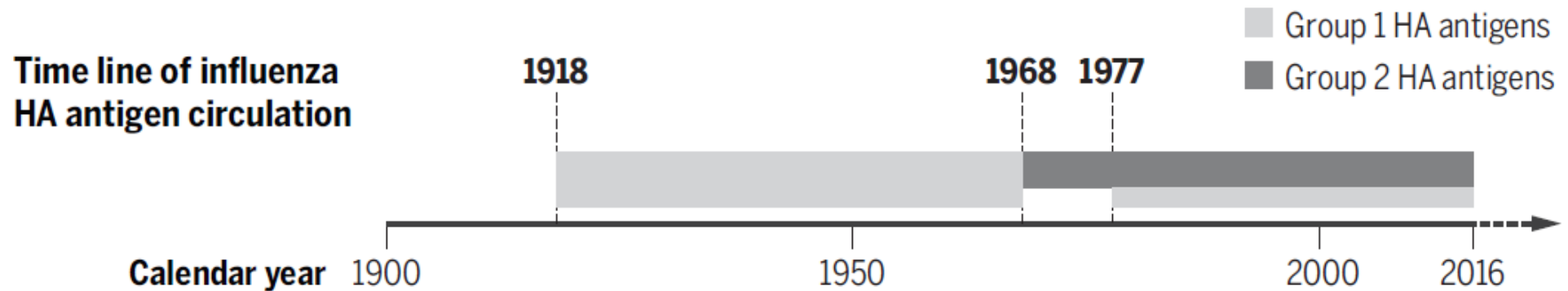
Variability of Experience due
to Influenza group



**+50%
more
deaths**

Conclusions

- Cohort effects exist and can change over time depending on circulating flu strains at birth



- Most life insurers will be more vulnerable to Group 1, e.g. H1, H2, H5, H6



Questions



Comments

Expressions of individual views by members of the Institute and Faculty of Actuaries and its staff are encouraged.

The views expressed in this presentation are those of the presenter.