University of Zurich[UZH]

Institute of Evolutionary Medicine (IEM)

The Bern Lectures in Health Science, 26.1.2023

Learning from the past or forgetting the past? How better knowledge of scenarios from past pandemics could strengthen pandemic preparedness

PD Dr. Kaspar Staub **& Team / Collaborators**

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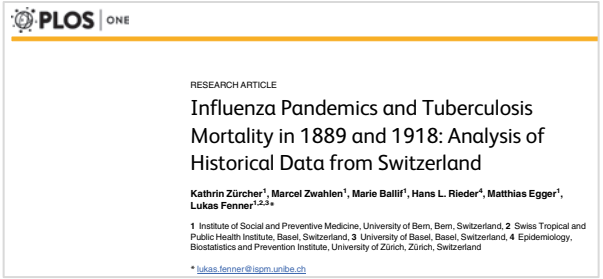
Preface

THANK YOU!

- For this opportunity (lecture)
- **For previous and ongoing collaborations (since 2011 !)**
- Your interest in history & the long-term perspective



PLOS | ONE

RESEARCH ARTICLE

Influenza Pandemics and Tuberculosis Mortality in 1889 and 1918: Analysis of Historical Data from Switzerland

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PLOS | ONE

RESEARCH ARTICLE

Tuberculosis Mortality and Living Conditions in Bern, Switzerland, 1856-1950

Kathrin Zürcher[1], Marie Ballif[1,2,3], Marcel Zwahlen[1], Hans L. Rieder[4], Matthias Egger[1], Lukas Fenner[1,2,3]*

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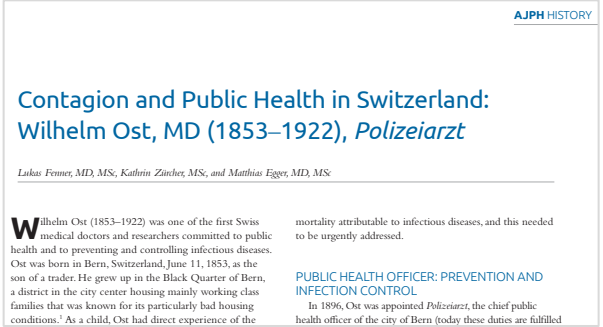

AJPH HISTORY

Contagion and Public Health in Switzerland: Wilhelm Ost, MD (1853–1922), *Polizeiarzt*

Lukas Fenner, MD, MSc, Kathrin Zürcher, MSc, and Matthias Egger, MD, MSc

Wilhelm Ost (1853–1922) was one of the first Swiss medical doctors and researchers committed to public health and to preventing and controlling infectious diseases. Ost was born in Bern, Switzerland, June 11, 1853, as the son of a trader. He grew up in the Black Quarter of Bern, a district in the city center housing mainly working class families that was known for its particularly bad housing conditions.[1] As a child, Ost had direct experience of the mortality attributable to infectious diseases, and this needed to be urgently addressed.

PUBLIC HEALTH OFFICER: PREVENTION AND INFECTION CONTROL

In 1896, Ost was appointed *Polizeiarzt*, the chief public health officer of the city of Bern (today these duties are fulfilled

1. The *Anthropometrics & Historical Epidemiology* research group @IEM

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+ 5 Dr. med. and 10 MSc/MMed students

Anthropometrics & Historical Epidemiology Group

- PI Kaspar Staub, 4 Postdocs, 2 PhD students, 5 Dr. med. Students, 10 MSc/MMed students

- **Focus:** Interactions between human health and the changing (health) environment during the last 200 years.

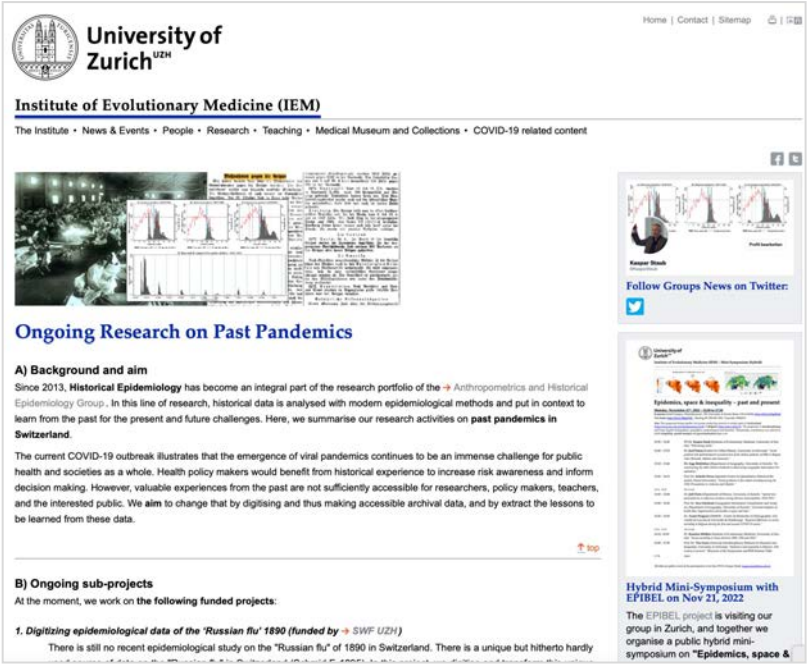
  - Anthropometry (phenotypic plasticity) – How has the size and shape of the body adapted to the changing environment (incl. most recent trends)?

  - Historical Epidemiology (disease environment) – How have morbidity/mortality changed? Since 10 years work on Influenza, Typhoid fever, Tb, Cholera, Diphtheria, Mortality in general, …)

- **Approach:** Quantitative, interdisciplinary, collaborative, connecting the past and the present, digitizing archival data, brining data sets together, int. network (PANSOC, EPIBEL, PandemiX Center, etc.).

Unexpected topicality in 2020

- COVID-19 has changed a lot, and intensified our pilot work on 1918 started in 2015.
- Interest in the historical perspective has exploded, but “active” experts and knowledge on past pandemics in Switzerland were few.
- So we invested a lot of time and resources here in the past 2-3 years.
  - 8 publications, 5 funded projects, countless media reports and interviews, 5 new student projects, new collaborations, etc.
  - **Aim: Start to fill the research gap, digitize and analyse historical data, make past pandemic experiences accessible.**

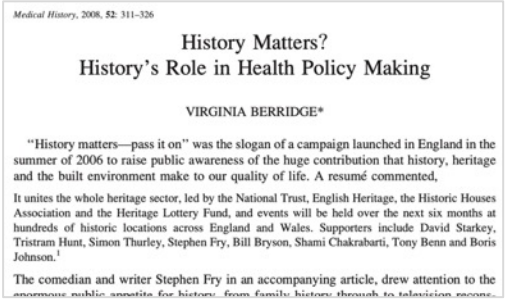


https://www.iem.uzh.ch/en/pastpandemics.html

2. Increased interest in the past

Historical Epidemiology – before COVID-19

- Historical experiences are valuable in the case of an outbreak of a novel pathogen, for which nonpharmaceutical countermeasures have to rely on past experiences.
- Health policy specialists benefit from integrating historical experience to avoid interventions failing.
- Historical epidemiology makes historical experience accessible.
- The literature on past influenza pandemics has shown how to integrate lessons from the past into pandemic planning.
- But: Not for Switzerland, there is a large research gap on past pandemics and epidemics since 1850.



Medical History, 2008, **52**: 311–326

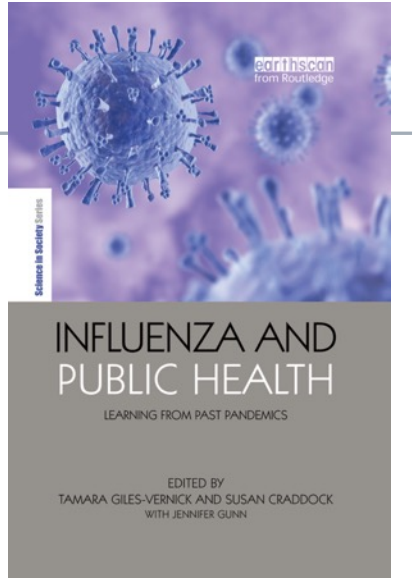
History Matters?
History's Role in Health Policy Making

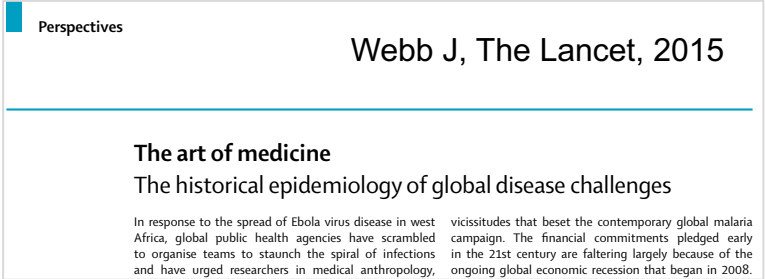
VIRGINIA BERRIDGE*

"History matters—pass it on" was the slogan of a campaign launched in England in the summer of 2006 to raise public awareness of the huge contribution that history, heritage and the built environment make to our quality of life. A resumé commented,

It unites the whole heritage sector, led by the National Trust, English Heritage, the Historic Houses Association and the Heritage Lottery Fund, and events will be held over the next six months at hundreds of historic locations across England and Wales. Supporters include David Starkey, Tristram Hunt, Simon Thurley, Stephen Fry, Bill Bryson, Shami Chakrabarti, Tony Benn and Boris Johnson.[1]

The comedian and writer Stephen Fry in an accompanying article, drew attention to the





Perspectives

Webb J, The Lancet, 2015

The art of medicine

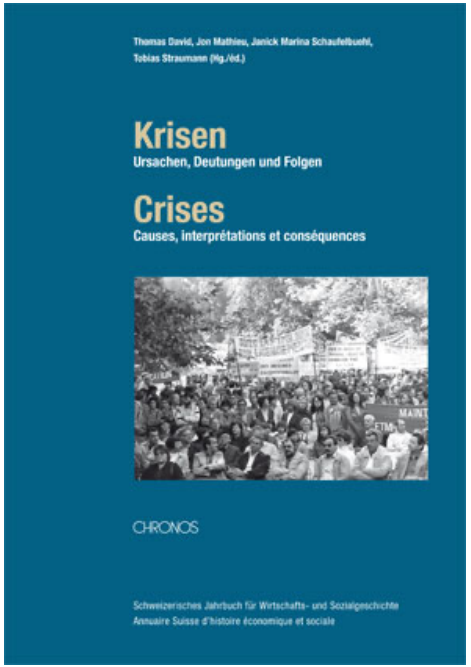
The historical epidemiology of global disease challenges

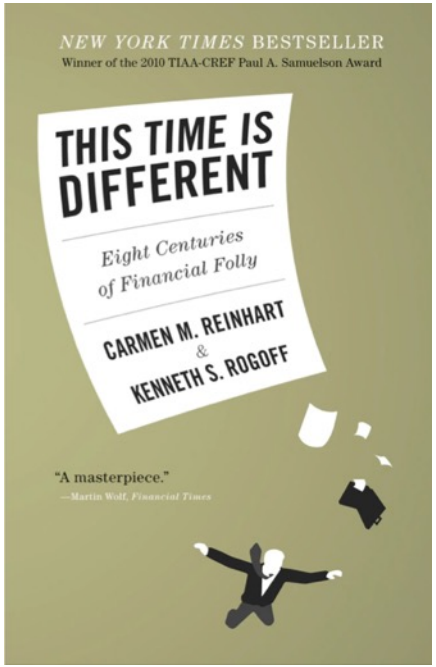
In response to the spread of Ebola virus disease in west Africa, global public health agencies have scrambled to organise teams to staunch the spiral of infections and have urged researchers in medical anthropology,

vicissitudes that beset the contemporary global malaria campaign. The financial commitments pledged early in the 21st century are faltering largely because of the ongoing global economic recession that began in 2008.

Interest in history during times of crisis

- In **normal times**, crises don't interest that much, not even in science («*Most scientists don't care a fig about history.*», Stephen Jay Gould 1996)
- But in times of crisis (or a centenary) this changes abruptly.
- This is very well known from **economic crises**, and there are numerous publications showing that short memories make it all too easy for crises to recur.





Increase of interest in past pandemics in 2020

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LETTER TO THE EDITOR

WILEY

Down memory lane: Unprecedented strong public and scientific interest in the "Spanish flu" 1918/1919 during the COVID-19 pandemic

To the Editor

Humans tend to place present events in the context of past experiences, especially during crises, when society's vulnerabilities become apparent. In these times, reflection on the learning processes from the past is initiated. All non-pharmaceutical public health countermeasures currently being taken against the COVID-19 outbreak are based on experience gained from past pandemics over the last several centuries,[1,2] which were mostly caused by influenza (1889/90, 1918/19, 1957-59, 1968-70, 1977/78, and 2009) and twice by coronaviruses (2003 and 2019/20). Among these pandemics, the 1918/1919 influenza outbreak (*Spanish flu*) remains the most devastating, as it caused an estimated 20-100 million deaths worldwide and continues to exemplify the worst-case scenario.[3]

Over the last few months, during the current worldwide COVID-19 outbreak, we have noted a unprecedented and sharp increase in the public and scientific interest toward the influenza outbreak of 1918/1919. A first look at the Google search trends since 2004 (https://trends.google.com) revealed marked increases in searches for *Spanish flu* on the web and on news pages in March and April 2020 (Figure 1A). Further, according to a non-systematic PubMed search using the tool *PubMed by Year* (https://esperr.github.io/pubmed-by-year/), the number of listed scientific studies per 100,000 citations using the search terms *Spanish flu* or *influenza 1918* in their abstract/title reached an all-time high in 2020 (Figure 1B). Of the 31 studies that were published in 2020, some can still be attributed to the centenary of the Spanish flu. However, the number of studies explicitly

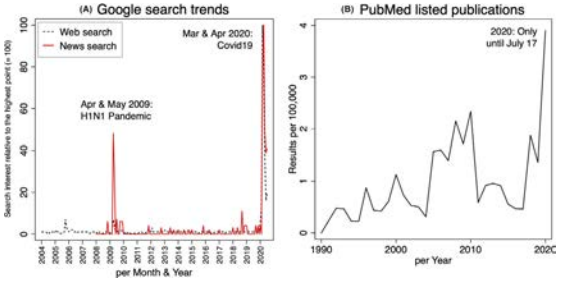
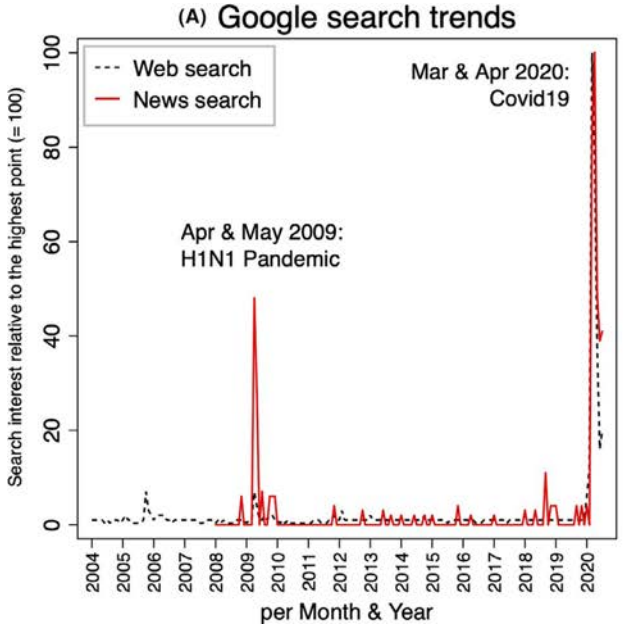


FIGURE 1 A, Results from the worldwide Google trends search per month and year using the term *Spanish flu* (black dashed line = web search; red line = news search). B, Yearly number of PubMed listed publications with the terms *Spanish flu* or *influenza 1918* in the title/abstract as a proportion of 100,000 listed items per year. (Date of searches: 17 July 2020)



Staub/Floris, Influenza Other Resp Viruses, *2020*

3. Vulnerable socities & “Learning from the past”

The “Disaster gap” in Switzerland

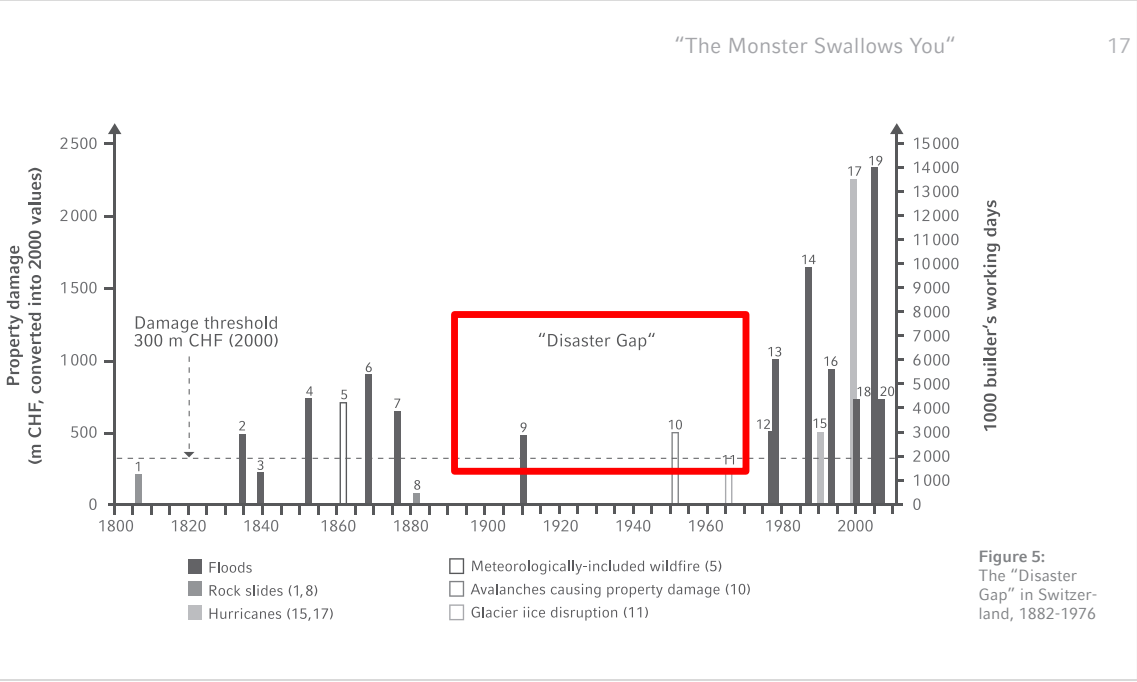


Figure 5:
The “Disaster Gap” in Switzerland, 1882-1976

Switzerland was spared by major natural disasters between the 1880s and the 1970s. This could have led to a loss of disaster memory, and an underestimation of natural risks by the end of the 20th century (Pfister 2011, 2014)


REIHE: NATURGEFAHREN 239

Die „Katastrophenlücke“ des 20. Jahrhunderts und der Verlust traditionalen Risikobewusstseins

Von 1882 bis 1976 blieb die Schweiz von Naturkatastrophen weitgehend verschont. Diese „Katastrophenlücke“ trug dazu bei, dass Naturrisiken unterschätzt wurden. Nach der jüngsten Häufung von Naturkatastrophen ist eine neue, professionelle Risikokultur entstanden, die auch auf Wissen früherer Generationen zurückgreift.

Christian Pfister

The “Disaster Gap” of the 20th Century and the Loss of Traditional Disaster Memory

GAIA 18/3 (2009): 239 – 246

Erinnerungskultur und historisches Handlungswissen

The “Pandemic Gap” in Switzerland

- In Switzerland (and other European countries), none of the global pandemics after 1920 have reached the severity of the Russian flu in 1889, or the “Spanish” flu in 1918.
- Absence of pandemics led to a loss of ‘pandemic disaster memory’ and increased disregard of immediate pandemic risks in the population and among policymakers.
- Way out: Making past pandemic experiences accessible and increase science communication

https://smw.ch/op-eds/post/the-pandemic-gap

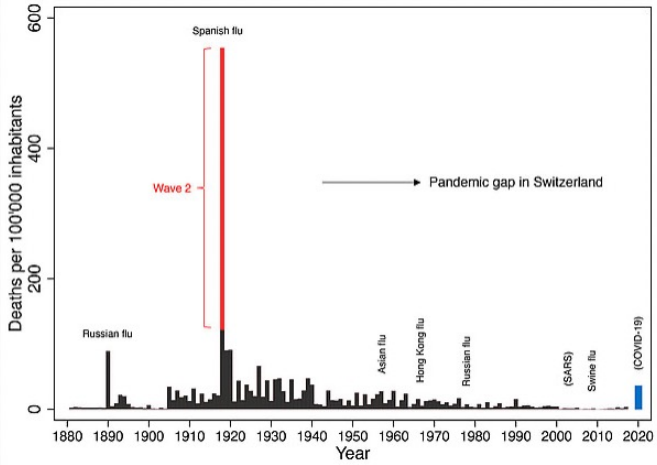


Figure 1: The “pandemic gap” (absence of pandemics) in Switzerland. The development of deaths from influenza per 100,000 inhabitants (as reported by official Swiss federal statistics [7–9]) shows the catastrophic extent of the Spanis flu of 1918/1919 (especially the second wave) and the pandemic disaster gap across the 20th century (when Switzerland was largely spared from pandemics did not develop a corresponding culture of memory and coping). The two pandemics not caused by influenza (SARS and COVID-19) are shown in brackets (the number of deaths for COVID-19 was estimated at 3000 by November 2020)

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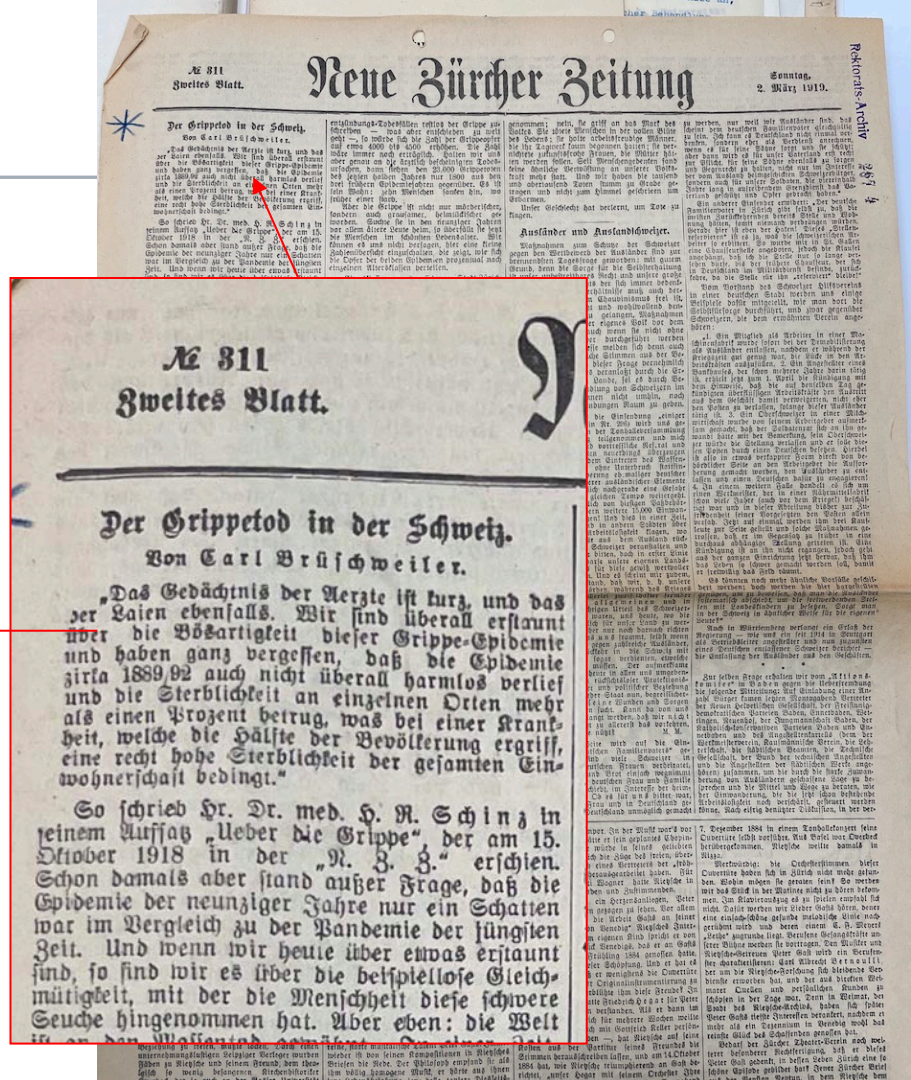
Pandemic gap is nothing new, also 1890 -> 1918

"The memory of doctors is short, and that of lay people too. Everywhere we are amazed at the viciousness of this flu epidemic and have completely forgotten that the epidemic around 1890 was not harmless everywhere either ..."

(NZZ, 15. October 1918, at the beginning of the fatal second wave in fall/winter 1918)



Neue Zürcher Zeitung

Sonntag, 2. März 1919.

Æ 311 Zweites Blatt.

Der Grippetod in der Schweiz.

Von Carl Brüschweiler.

„Das Gedächtnis der Aerzte ist kurz, und das der Laien ebenfalls. Wir sind überall erstaunt über die Bösartigkeit dieser Grippe-Epidemie und haben ganz vergessen, daß die Epidemie zirka 1889/92 auch nicht überall harmlos verlief und die Sterblichkeit an einzelnen Orten mehr als einen Prozent betrug, was bei einer Krankheit, welche die Hälfte der Bevölkerung ergriff, eine recht hohe Sterblichkeit der gesamten Einwohnerschaft bedingt."

So schrieb Hr. Dr. med. H. R. Schinz in seinem Aufsatz „Ueber die Grippe", der am 15. Oktober 1918 in der „N. Z. Z." erschien. Schon damals aber stand außer Frage, daß die Epidemie der neunziger Jahre nur ein Schatten war im Vergleich zu der Pandemie der jüngsten Zeit. Und wenn wir heute über etwas erstaunt sind, so sind wir es über die beispiellose Gleichmütigkeit, mit der die Menschheit diese schwere Seuche hingenommen hat. Aber eben: die Welt

Covid-19 exemplification, May 2022

BAG – OFSP – UFSP
@BAG_OFSP_UFSP

Gastkommentar in der heutigen NZZ: «Wir haben vieles zum ersten Mal gemacht» – Pandemiebewältigung aus Sicht der BAG-Direktorin» nzz.ch/meinung/die-pa...

10:32 · 03.05.22 · Sprout Social

- This might be true for today's generation, but it is only partly true if you go back a few generations only…

Vulnerable societies

- Past and present pandemics can be contextualised with the **concept of vulnerability** (widely discussed in crisis research for a long time, e.g. Füssel 2007, Krämer 2016).
- A system (=society at a certain time and place) is threatened by a triggering event. What disturbances the system is exposed to, how they affect it, and how does the system react to the disturbances?
- The following **structural categories** (Krämer 2016) are important:
  - Within the **"exposure" category**, it is important to investigate how exactly a society is exposed to the threat.
  - Within the **"coping/resilience" category**, the different ways a society can cope with the disruption or learn from its consequences are central. The aim here is to **minimise the present/future risks**, to adjust and ultimately to increase resilience to future comparable disturbances.

“Learning from the past” – That is not so simple…

- “Learning from the past” must not be oversimplified, as history does not provide universal rules that remain the same across time (Condrau 2020).
- History-as-lessons approach: Assumption that epidemics are structurally comparable events, wherever and whenever they take place (Peckham 2020).
- Although history will likely not repeat itself exactly, clues to the urgent questions (or possible scenarios) nevertheless might be found in research on previous pandemics (Mamelund 2020).
- For this learning from the past to work at all…
  - … the past must be known
  - … there must be a transfer from historians to policy makers.
- History as a discipline should be at the policy table, and public health policy is one of the areas where historical input is valuable to strengthen evidence-based policy making (Berridge 2008).

A debate takes place…

COVID-19 & HISTORY AJPH

COVID-19: The Power of Historical Lessons

Svenn-Erik Mamelund, PhD

ABOUT THE AUTHOR

Svenn-Erik Mamelund is with The Work Research Institute, Oslo Metropolitan University, Oslo, Norway.

See also Chandra et al., p. 430, and the COVID-19 & History section, pp. 402–445.

Eighty-nine million cases and 1.9 million deaths from coronavirus disease 2019 (COVID-19) have been reported up to January 8, 2021 (but these estimates are unfortunately going to in-

different from the COVID-19 pandemic in many ways—for example, it happened in the context of World War I more than 100 years ago, was caused by influenza and not coronavirus, and killed young adults

influenza pandemic. They found that Michigan had "up to four waves of excess mortality over a span of two years, including a severe one in early 1920. Some counties experienced two waves in late 1918, whereas others had only one." They also document that the two waves in late 1918 were likely related to the timing of the statewide imposition of a three-week social distancing order. Once this measure was lifted, infections and deaths started to increase again. Other research has shown similar effects in 1918,[5] and we also have seen this outcome during the COVID-19 pandemic.

This research on the epidemiology of the 1920 wave and the demonstration of the value of public health in control-

Mamelund, AJPH, 2020

A PIECE OF MY MIND

Preventing a Pandemic's Toll—We've Been Here Before

Abigail Zuger, MD
New York, New York.

No 2 epidemics are alike; those who practiced medicine in the early days of HIV/AIDS can attest to that. AIDS back then was an ultramarathon; COVID is more a series of exhausting sprints. Even so, history is repeating itself in an uncanny fashion as clinicians struggle once again to convince patients to save their own lives.

Widespread rejection of COVID vaccination has been ascribed to specific contemporary problems: the fraught political climate, an established "anti-vaxx" movement, these vaccines' novel mechanisms, and their unusually rapid path to market. In the late '90s, though, the first effective HIV treatments sometimes were met with a very similar reception.

No older HIV doctor will ever forget the watershed year of 1996, when the lifesaving power of specific antiretroviral combinations became clear. With those daily

Surely one of these is the happy fiction we promote, that modern medical interventions are safe and effective. We routinely forget that the truth there is relative, not absolute, that every treatment of choice is simply better than the alternatives of untreated disease or lesser treatments. If physicians do not emphasize to patients at every possible opportunity that we always deal in flawed commodities, we inevitably establish hugely inflated expectations of our powers. Rare adverse effects then explode into catastrophe, and our advice founders at the worst possible times.

A second problem is the substantial difficulty of making an invisible and inconceivable future real, a necessity for effective preventive care. Novelists and cinematographers are far better at this art than are clinicians. Perhaps we should learn from their example. Instead of dealing in principles, lecturing patients on the data and the num-

Zuger, JAMA, 2021

EDITORIAL

Annals of Internal Medicine

The Dangers of Ignoring History Lessons During a Pandemic

The global ravages of coronavirus disease 2019 (COVID-19) have directed attention to historical analyses of previous respiratory airborne pandemics, particularly the catastrophic influenza of 1918–1919 (1). Similarities in the epidemiologic characteristics of the 2 diseases left

This unique collection of spatially organized influenza morbidity data allows us to observe the impact of the pandemic using a much wider epidemiologic lens than historians are usually able to do. As the COVID-19 pandemic illustrates, shocking though the mortality numbers

Mooney, Annals of Internal Medicine, 2021

Perspectives

The art of medicine

Revisiting the 1957 and 1968 influenza pandemics

Published Online
May 25, 2020
https://doi.org/10.1016/S0140-6736(20)31201-0

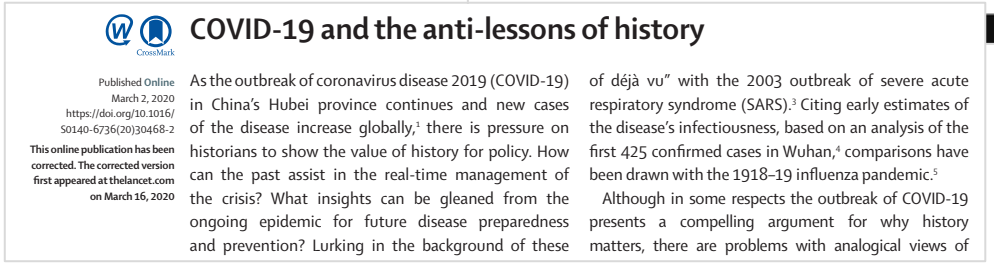
The virus emerged in China in the winter of 1957 and spread rapidly worldwide via ships, aeroplanes, and trains. In April, it sparked a major epidemic in Hong Kong, where about 250 000 people were infected, and by June India had seen over a million cases. Shortly afterwards, it made landfall in the UK, and by September outbreaks were being reported in England, Wales, and Scotland. General practitioners were

Oct 17, 1957, there were few hysterical tabloid newspaper headlines and no calls for social distancing. Instead, the news cycle was dominated by the Soviet Union's launch of Sputnik and the aftermath of the fire at the Windscale nuclear reactor in the UK.

By the time this influenza pandemic—known colloquially at the time as "Asian flu"—had concluded the following

Honigsbaum, Lancet, 2020

More critical voices…



COVID-19 and the anti-lessons of history

Published Online
March 2, 2020
https://doi.org/10.1016/S0140-6736(20)30468-2

This online publication has been corrected. The corrected version first appeared at thelancet.com on March 16, 2020

As the outbreak of coronavirus disease 2019 (COVID-19) in China's Hubei province continues and new cases of the disease increase globally,[1] there is pressure on historians to show the value of history for policy. How can the past assist in the real-time management of the crisis? What insights can be gleaned from the ongoing epidemic for future disease preparedness and prevention? Lurking in the background of these of déjà vu" with the 2003 outbreak of severe acute respiratory syndrome (SARS).[3] Citing early estimates of the disease's infectiousness, based on an analysis of the first 425 confirmed cases in Wuhan,[4] comparisons have been drawn with the 1918–19 influenza pandemic.[5]

Although in some respects the outbreak of COVID-19 presents a compelling argument for why history matters, there are problems with analogical views of

- Oversimplified looking at the present through the lenses of the past will not work.
- Danger: Historians can also mislead policy, not only inform…
- Analogical view: Constrains our ability to grasp the complex place-and-time-specific variables in the present.
- There is no precedent for some aspects: E.g., the challenges of a vaccination as the exit strategy from a pandemic, etc.
- When the present is viewed through the lens of the past, we typically overlook differences.

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Highlighting similarities and differences!

AJPH RESEARCH AND ANALYSIS

A Centenary Tale of Two Pandemics: The 1918 Influenza Pandemic and COVID-19, Part I

David M. Morens, MD, Jeffery K. Taubenberger, MD, PhD, and Anthony S. Fauci, MD

See also Leavitt, p. 996.

Separated by a century, the influenza pandemic of 1918 and the COVID-19 pandemic of 2019–2021 are among the most disastrous infectious disease emergences of modern times. Although caused by unrelated viruses, the two pandemics are nevertheless similar in their clinical, pathological, and epidemiological features, and in the civic, public health, and medical responses to combat them. Comparing and contrasting the two pandemics, we consider what lessons we have learned over the span of a century and how we are applying those lessons to the challenges of COVID-19. (*Am J Public Health.* 2021;111:1086–1094. https://doi.org/10.2105/AJPH.2021.306310)

Morens/Taubenberger/Fauci, AJPH, 2021

Comparing pandemics: 1918 influenza and 2019 COVID-19

Variable	1918 Influenza	2019 COVID-19
Infectious Agent	Novel respiratory virus	Novel respiratory virus
Mechanism of emergence	Host switching	Host switching
Source of emergence	Wild waterfowl (*Anseriformes*)	**Wild *Rhinolophus* bat**
Cell receptor	**Sialic acids on respiratory epithelia**	**ACE2 receptor on multiple cells, multiple organs**
Viral preadaptation	Virus preadapted or quickly adapted to human spread	Virus preadapted or quickly adapted to human spread
Clinical & Pathological Disease		
Clinical	Upper respiratory disease, pneumonia	Upper respiratory disease, pneumonia
	No viremia, no systemic disease	**Viremia with systemic disease, vascular damage**
Complications	Secondary bacterial pneumonia, empyema	**Secondary bacterial pneumonia less frequent; Multisystem disease**
Pulmonary pathology	Viral pneumonia, DAD, edema	Viral pneumonia, DAD, edema
	Microthrombi, variable hemorrhage in some	Microthrombi, variable hemorrhage in some
	Aberrant immune response	Aberrant immune response
	Massive neutrophilic infiltrates in some	Neutrophilic infiltrate **less frequent**
Epidemiology		
Preexisting immunity	Possible immunity in older persons	**Prior immunity status not yet certain**
Mortality	Case–fatality ratio about 1% in United States	Case–fatality ratio estimated around 1% in United States
	Higher mortality in infants, elderly, chronically ill	**Children and young adults: lower incidence & severity**
	Pregnant women/fetuses	**No extreme mortality in pregnant women/fetuses?**
	Mortality peak in adults aged 20–40 years	**No mortality peak in adults aged 20–40 years**
Morbidity	Morbidity peak in school-aged children	**Low morbidity in children & young adults**
Origin & spread	Spread by travel, from big cities, spread outward	Spread by travel, from big cities, spread outward
	R_0 estimated to be about 1–2	R_0 about 1–2, but varies greatly
	Spread by droplet, aerosol, hands and fomites	Spread by droplet, aerosol, hands, and fomites
	Asymptomatic carriers	Asymptomatic carriers
	Super spreaders probable	Super spreaders
	Induces full or partial protective immunity	Induction of full or partial protective immunity not established
	Persisted by means of viral evolution	Persistence potential not yet established
Public Health Responses	Closures, isolation, social distancing, masks	Closures, isolation, social distancing, masks
	Bacterial vaccines	Bacterial vaccines, SARS-CoV-2 **viral vaccines**
Treatment	Supportive care, plasma therapy, no ICUs	Supportive care, plasma therapy, **ICUs**
	No antibiotics or antivirals	**Antibiotic, antivirals, glucocorticoids**
	Quack and untried remedies	Quack and untried remedies
Psychosocial Reactions	Widespread disease fear	Widespread disease fear
	Common defiance of public health recommendations	Common defiance of public health recommendations
	Altruism and helping others was common	Altruism and helping others was common

Our perspective: A careful middle way…

- One can and should “learn” from both **similarities & differences** with past epidemics.
- Every pandemic takes place again in a **new context** and is a **mix of old/new things**, past experiences have to be **adapted**.
- History offers **scenarios and warnings** that should at least be considered in pandemic planning (alternative: ignoring the past)
- Not only 1918 is relevant, other past pandemics and epidemics also contain relevant aspects.
- Past pandemic experiences **must be researched** evidence/source-based (-> research gap in Switzerland)
- Research is only the first step, the **transfer** of this knowledge is at least as important.

Blick, January 2021

4. Selected snapshots from the past with relevance for the present (& the future?)

NPIs: Tempo matters!

- 3 similar articles in JAMA and PNAS 2007-2009
- NPIs: School closures, quarantine, ban of gatherings, etc.
- Strong association between early, sustained, and layered application of NPIs and mitigating the consequences of the 1918 pandemic in US cities.

ORIGINAL CONTRIBUTION

Nonpharmaceutical Interventions Implemented by US Cities During the 1918-1919 Influenza Pandemic

Howard Markel, MD, PhD
Harvey B. Lipman, PhD
J. Alexander Navarro, PhD
Alexandra Sloan, AB
Joseph R. Michalsen, BS
Alexandra Minna Stern, PhD
Martin S. Cetron, MD

Context A critical question in pandemic influenza planning is the role nonpharmaceutical interventions might play in delaying the temporal effects of a pandemic, reducing the overall and peak attack rate, and reducing the number of cumulative deaths. Such measures could potentially provide valuable time for pandemic-strain vaccine and antiviral medication production and distribution. Optimally, appropriate implementation of nonpharmaceutical interventions would decrease the burden on health care services and critical infrastructure.

Objectives To examine the implementation of nonpharmaceutical interventions for epidemic mitigation in 43 cities in the continental United States from September 8, 1918, through February 22, 1919, and to determine whether city-to-city variation in mortality was associated with the timing, duration, and combination of nonpharmaceutical interventions; altered population susceptibility associated with prior pandemic waves; age and sex distribution; and population size and density.

THE INFLUENZA PANDEMIC OF 1918-1919 was the most deadly contagious calamity in human history. Approximately 40

Table 4. Implementation Strategy of Nonpharmaceutical Interventions for 21 Cities Between September 8, 1918, and February 22, 1919

	Public Health Response Time, d						
	Early (<7 d)			Late (≥7 d)			
Outcome Variable	25th Percentile	50th Percentile	75th Percentile	25th Percentile	50th Percentile	75th Percentile	*P* Value
Time to peak, d	13	18	22	9	11	13	<.001
Magnitude of first peak (weekly EDR)	54.7	67.6	84.8	101.5	125.8	145.4	.001
Excess pneumonia and influenza mortality rate (total EDR)	359.1	451.2	505.2	529.5	580.3	654.7	<.001
	Total Days of Nonpharmaceutical Interventions						
	Most (≥65 d)			Least (<65 d)			
Excess pneumonia and influenza mortality rate (total EDR)	358.0	451.2	505.2	529.5	559.3	610.4	<.001

Abbreviation: EDR, excess death rate.

- Cities that intervened early and sustained had longer time to the peak, lower magnitude of the peak, lower excess deaths.
- Just one of many examples: **NPIs work, and tempo matters.**

University of Zurich[UZH]

Institute of Evolutionary Medicine (IEM)

NPIs: Hesitation and decentralisation are risky

Annals of Internal Medicine

HISTORY OF MEDICINE

Public Health Interventions, Epidemic Growth, and Regional Variation of the 1918 Influenza Pandemic Outbreak in a Swiss Canton and Its Greater Regions

Kaspar Staub, PhD*; Peter Jüni, MD*; Martin Urner, MD; Katarina L. Matthes, PhD; Corina Leuch, BSc; Gina Gemperle, MDentMed; Nicole Bender, MD, PhD; Sara I. Fabrikant, PhD; Milo Puhan, MD, PhD; Frank Rühli, MD, PhD; Oliver Gruebner, PhD†; and Joël Floris, PhD†

Public health interventions implemented during the coronavirus disease 2019 (COVID-19) pandemic are based on ex-

the second wave, in autumn 1918, cantonal authorities initially reacted hesitantly and delegated the responsibility to enact

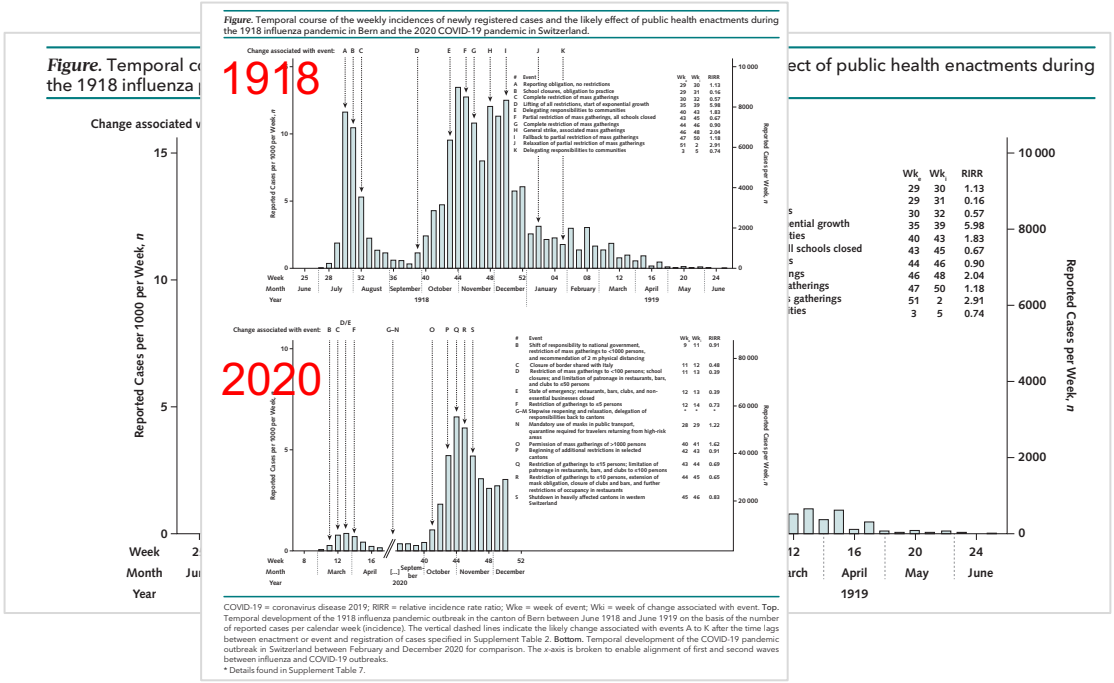

Figure. Temporal course of the weekly incidences of newly registered cases and the likely effect of public health enactments during the 1918 influenza pandemic in Bern and the 2020 COVID-19 pandemic in Switzerland.

COVID-19 = coronavirus disease 2019; RIRR = relative incidence rate ratio; Wke = week of event; Wki = week of change associated with event. **Top.** Temporal development of the 1918 influenza pandemic outbreak in the canton of Bern between June 1918 and June 1919 on the basis of the number of reported cases per calendar week (incidence). The vertical dashed lines indicate the likely change associated with events A to K after the time lags between enactment or event and registration of cases specified in Supplement Table 2. **Bottom.** Temporal development of the COVID-19 pandemic outbreak in Switzerland between February and December 2020 for comparison. The *x*-axis is broken to enable alignment of first and second waves between influenza and COVID-19 outbreaks.

* Details found in Supplement Table 7.

- Reported ILI cases, canton of Bern 1918/19.
- In the 1st wave, school closures & restrictions of mass gatherings were associated with a deceleration of epidemic growth.
- In the **2nd wave, cantonal authorities initially reacted hesitantly and delegated the responsibility to enact interventions to municipal authorities,** which was associated with a lack of containment of the second wave.
- Similar patterns were found in the management of the COVID-19 outbreak.

Excursus: Warnings at the eve of the fatal second wave 1918

14. Jahrgang. Nr. 278. 2. Blatt. Neue Zürcher Nachrichten Dienstag, 8. Oktober 1918.

Schweizerische Volksabstimmung über den Nationalratsproporz.

(13. Oktober.)

Abstimmungstage im Kreise Freiburg.

(A. H.-Corr.) Der Kreis Freiburg hat am Sonntag bezogen zur Proporzinitiative. Nach

ten Phrasenschwall.

Und unterdessen verblutet das arme Volk.

Der Zürcher Stadtarzt zur Grippeepidemie.

In der Berichtswoche vom 22. bis und mit 28. September sind ärztlicherseits 955 Fälle von Grippe (gegenüber 743 in der Vorwoche) unter der Wohnbevölkerung gemeldet worden, wovon 529 Neuerkrankungen betreffen. Bei den übrigen Fällen handelt es sich um nachträgliche Meldungen von Erkrankungen aus der Zeit vor der Berichtswoche. Die Zahl der gemeldeten Todesfälle infolge von Grippe beträgt in der Berichtswoche 15, wovon 2 Todesfälle noch der vorhergehenden Woche angehören. Damit steigt die Gesamtzahl der seit Beginn der Epidemie ärztlicherseits gemeldeten Erkrankungen von 8849 auf

October 8, 1918: The delegated doctor of the city of Zurich in a major newspaper (**beginning 2nd fatal wave):**

- *"The flare-up of the epidemic is primarily favoured by the carelessness of the public, bordering on recklessness, who, having barely escaped the danger, throw all well-meant advice to the wind, whether out of comfort or out of selfishness and pleasure-seeking."*
- *"A new wave of the flu epidemic is coming ... hundreds of people may have to pay for their carelessness with their lives tomorrow."*
- *"It must therefore be called the duty of every individual to contribute to the containment of the epidemic in his own place, putting aside his own self-interest, and by conscientiously following all that is required."*

A big constant: Individuals of low SEP & minorities are at higher risk

- Individuals of low SES, less affluent neighbourhoods, and racial/ethnic minorities had worse outcomes in the 1918, 1957, and 2009 influenza pandemics.
- Social inequality was already a forgotten factor in pandemic preparedness plans before COVID-19.

Social inequality – a forgotten factor in pandemic influen preparedness

GLOBAL HELSE

SVENN-ERIK MAMELUND
E-post: Svenn-Erik.Mamelund@afi.hioa.no
Svenn-Erik Mamelund (born 1969), PhD and research professor at the Work Research Institute, Oslo and Akershus University College of Applied Sciences. previously employed at the Norwegian Institute of Public Health, and has conducted research on historical influenza pandemics, with a particular focus Spanish influenza.
The author has complete the ICMJE form and reports no conflicts of interest.

Reducing social inequality in health is at the core of international health work, but does not form part of the discussion on international preparedness plans for pandemic influenza. Th surprising given that influenza pandemic mortality rates are highest among those with the lowest socioeconomic status. This is not conducive to achieving the international goals of reducing social inequality in health and ensuring good health for all by 2030.

Mamelund SE, Norwegian Medical Journal, 2017

- **Example of Norway:** It took four months during the COVID-19 pandemic before the risk-management plans mentioned social vulnerability in addition to medical vulnerability.

Scandinavian Journal of Public Health, 1–6

COMMENTARY

Social inequalities in infectious diseases

SVENN-ERIK MAMELUND & JESSICA DIMKA

Centre for Research on Pandemics & Society, Oslo Metropolitan University, Norway

Mamelund/Dimka, Scand J of Pub Health, 2021

University of Zurich[UZH]

Institute of Evolutionary Medicine (IEM)

Later waves can be very strong…

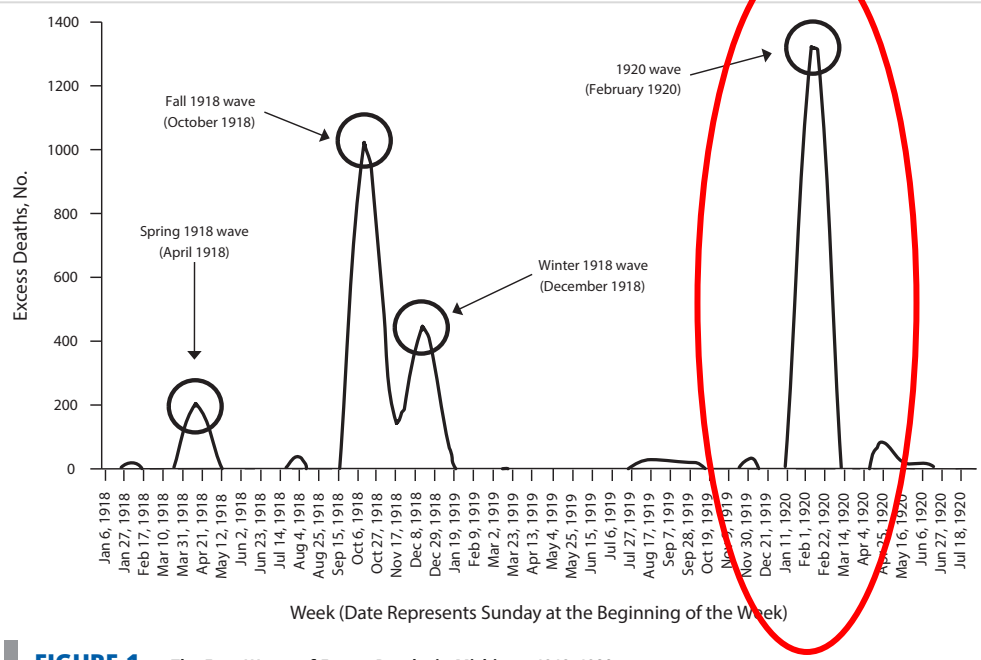

FIGURE 1— The Four Waves of Excess Deaths in Michigan: 1918–1920

AJPH COVID-19 & HISTORY

Pandemic Reemergence and Four Waves of Excess Mortality Coinciding With the 1918 Influenza Pandemic in Michigan: Insights for COVID-19

Siddharth Chandra, PhD, Julia Christensen, BA, Madhur Chandra, MPA, PhD, and Nigel Paneth, MD, MPH

See also the COVID-19 & History section, pp. 402–445.

- There is a lot of evidence that later waves can be very strong a few years after the actual pandemic year.
- This happened in many countries after 1890, or in 1920.
- Extreme example: Michigan, Jan-Mar 1920 (excess deaths).
- Reasons: Incomplete immunisation? Virus mutations?

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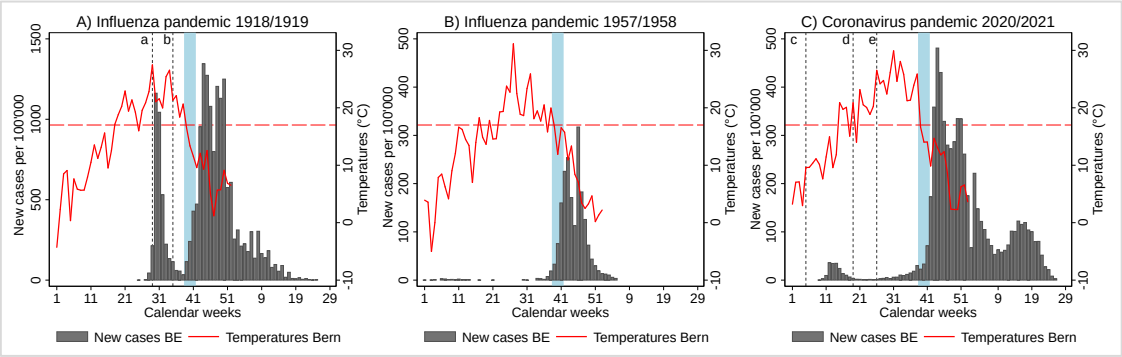
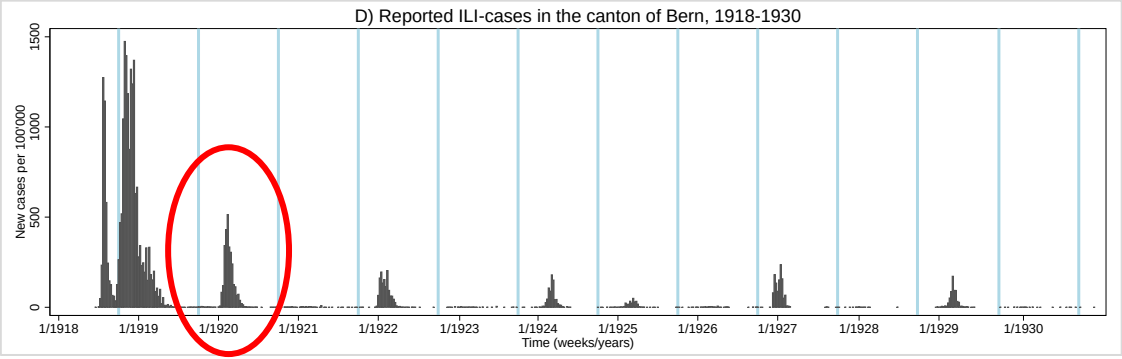
Other possible scenarios from the past





Swiss Medical Weekly

Formerly: Schweizerische Medizinische Wochenschrift

An open access, online journal • www.smw.ch

Viewpoint | Published 18 August 2021 | doi:10.4414/SMW.2021.w30014

Cite this as: Swiss Med Wkly. 2021;151:w30014

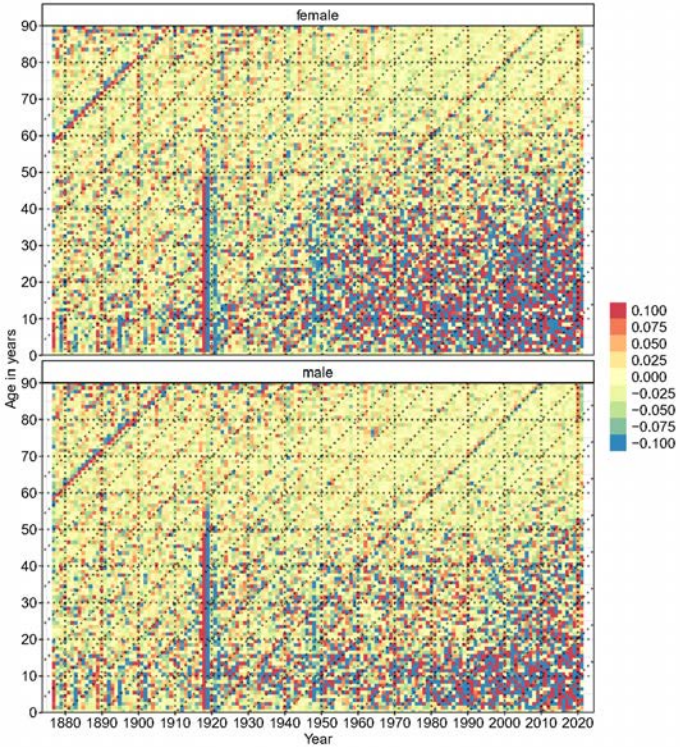
If immunisation is too low, dropping temperatures in fall 2021 may lead to epidemic resurgence – as in 1918, 1957 and 2020

Staub Kaspar [a b c]

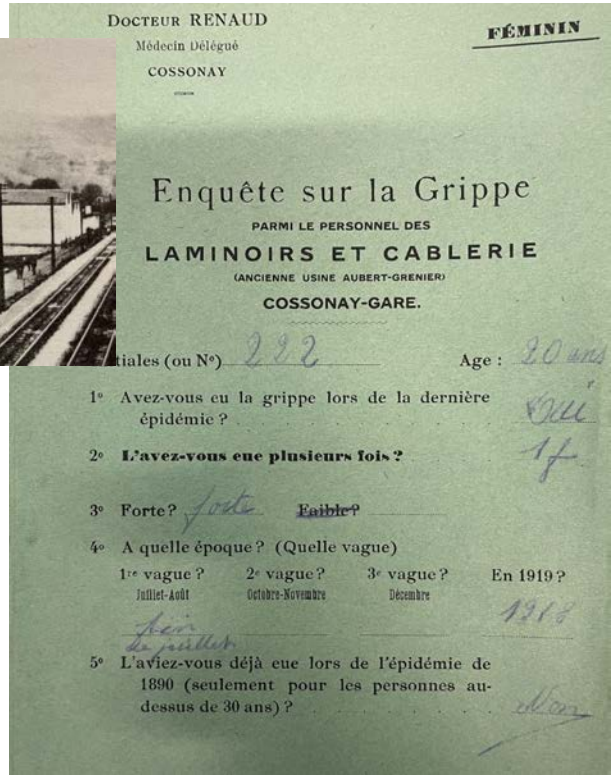
- Newly reported cases of ILI and SARS-CoV-2 in the Canton of Bern.
- Scenario 1: In 1918, 1957, and 2020, the onset of the **fall waves occurred 0-2 weeks after the first drop in temperatures** at the end of September (calendar week 39).
- Scenario 2: Strong later wave in winter 1920, and thereafter milder seasonal waves every 1-2 years.

In utero exposure 1918: A warning from the past?

- Katarina Matthes: Viewpoint accepted in SMW
- Lexis surface plot for annual change in age-specific mortality in Switzerland based on HMD data (adapted from *Jones et al. Qual. Quant. 2022*)
- Visualisation of **period and cohort mortality** effects (orange/red=increase, blue/green=decrease)
- Diagonal lines represent cohort effects: Birth cohort **1919** (in-utero exposure during the “Spanish flu”) had a higher mortality, esp. from the 1970s (age 50+).
- But also **1818** cohort! Last hunger crisis 1816-1817
- Current work: Look at short- and long-term mortality effects of in utero exposure 1918 in more details.



Work in review: (Cross-)Immunity and reinfections



DOCTEUR RENAUD
Médecin Délégué
COSSONAY

FÉMININ

Enquête sur la Grippe
PARMI LE PERSONNEL DES
LAMINOIRS ET CABLERIE
(ANCIENNE USINE AUBERT-GRENIER)
COSSONAY-GARE.

tiales (ou N°) 222 Age : 30 ans

1° Avez-vous eu la grippe lors de la dernière épidémie ? Oui

2° L'avez-vous eue plusieurs fois ? 1f

3° Forte ? forte ~~Faible ?~~

4° A quelle époque ? (Quelle vague)

1re vague ?	2e vague ?	3e vague ?	En 1919 ?
Juillet-Août	Octobre-Novembre	Décembre	
fin de juillet			1918

5° L'aviez-vous déjà eue lors de l'épidémie de 1890 (seulement pour les personnes au-dessus de 30 ans) ? Non

- Key topic in multi-wave pandemics: Immunity and reinfections
- Unnoticed archival source revisted
- Individual responses to medical survey among entire factory workforce in Cossonay (VD) in 1919
- n=820 factory workers, 50.2% reported ILI (majority severe illness)
- **15.3% of ill persons reported reinfections** (increasing rate across waves)
- The majority of subsequent infections were reported to be **as severe as the first infection**, if not more.
- Illness during the first wave, in the summer of 1918, was associated with a **35.9% (95% CI, 15.7-51.1) protective effect** against infection during later waves.

University of Zurich[UZH]

Institute of Evolutionary Medicine (IEM)

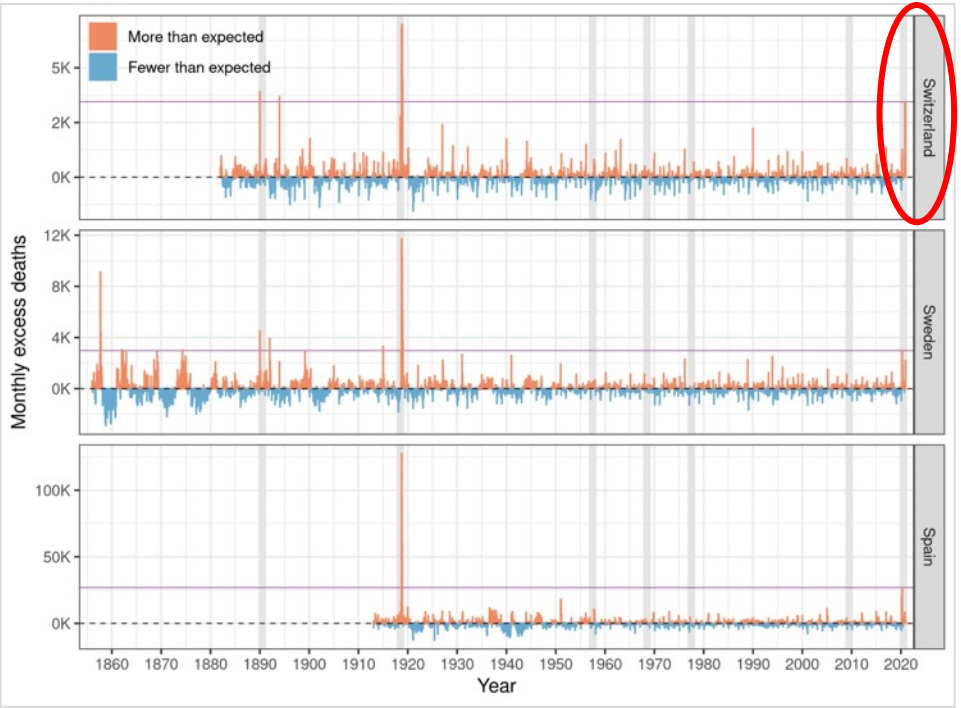
Annals of Internal Medicine

ORIGINAL RESEARCH

Historically High Excess Mortality During the COVID-19 Pandemic in Switzerland, Sweden, and Spain

Kaspar Staub, PhD*; Radoslaw Panczak, PhD*; Katarina L. Matthes, PhD; Joël Floris, PhD; Claudia Berlin, PhD; Christoph Junker, MD; Rolf Weitkunat, PhD; Svenn-Erik Mamelund, PhD; Marcel Zwahlen, PhD†; and Julien Riou, PhD†

Is COVID-19 the largest demographic disaster since 1918 in CHE, SWE, ESP?



- History is necessary to contextualise current events
- Only a few countries have **continuous monthly mortality data** available for longer periods.
- Spain, Sweden, and Switzerland were militarily neutral and not involved in combat during both world wars.
- We show that in 2020, these countries recorded the highest aggregated monthly all-cause excess mortality since the 1918 influenza pandemic.
- For Sweden and Switzerland, the highest monthly spikes in 2020 almost reached those of January 1890.
- These findings emphasize the historical dimensions of the ongoing pandemic.

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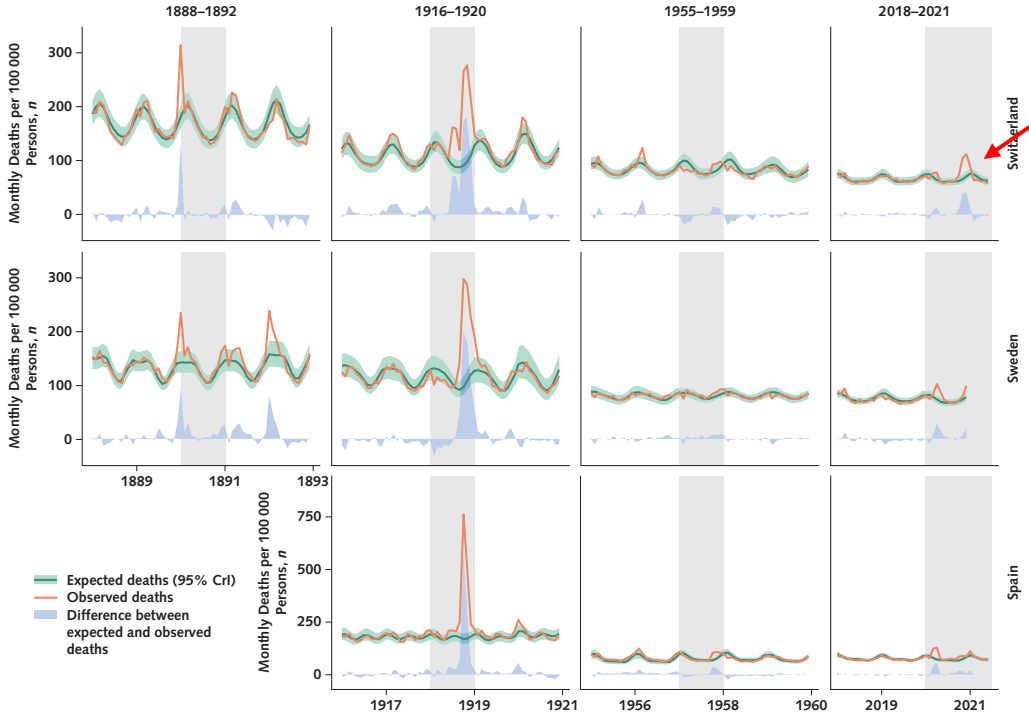
Figure 2. Detailed analysis of the deadliest pandemic years (1890, 1918, 1957, and 2020–2021) in Switzerland, Sweden, and Spain.

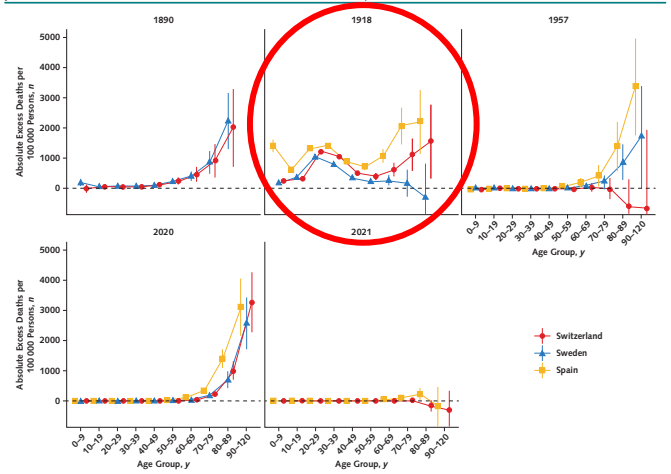


Data from Sweden were not yet available for 2021. The dark green lines and light green shading indicate expected monthly deaths from all causes with 95% CrIs based on the previous 5 years (excluding pandemic years themselves), the orange lines indicate the observed monthly deaths, and the blue shading shows the difference between the two (corresponding to monthly excess deaths). All numbers are scaled by population. The gray shading indicates pandemic years. The *y*-axes have different scales for each country. CrI = credible interval.

⬅️ Fall 2021: Strongest excess mortality in Switzerland since 1918. Historic event!

⬇️ But: 1918 is still a different dimension, also because of the age groups affected.

Figure 3. Excess deaths from all causes per 100 000 persons, with 95% credible intervals, by age group for the deadliest pandemic years (1890, 1918, 1957, and 2020–2021) in Switzerland, Sweden, and Spain.



The 90-to-120-year age group is not shown before 1957 because of the very low number of events. Data from Sweden were not yet available for 2021.

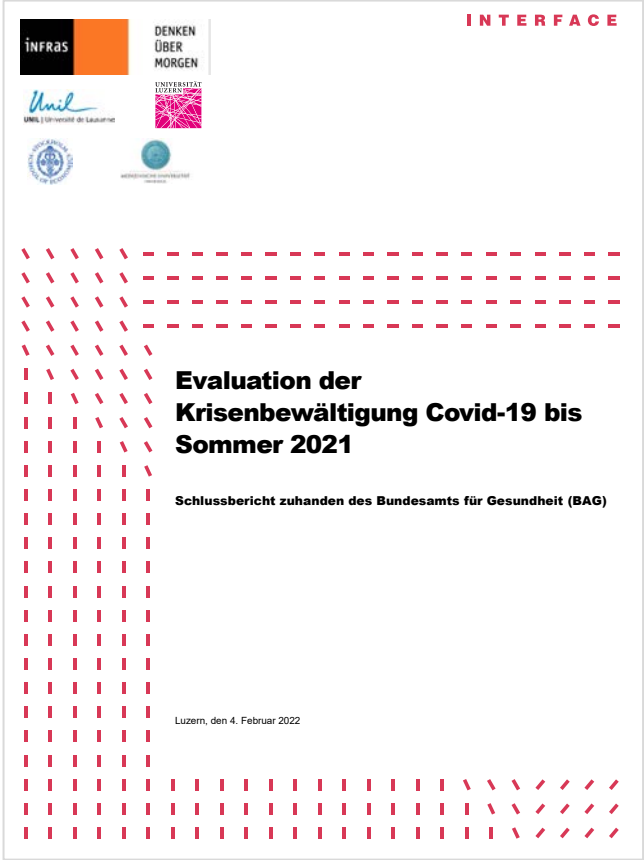
Transfer to the policy makers:
Historical dimension seems to be recognised…

17.9.2021

Federal Councillor Ignazio Cassis, 17.2.2022: *"So the history of epidemics repeats itself. I read recently about the Spanish flu, what happened in our country, it's incredibly topical."*

But then again...

26.4.2022



Pandemic preparedness and planning prior to COVID-19

- The challenges of subsequent waves are not well elaborated in the Epidemic Act (2016) and Swiss Influenza Pandemic Plan (2018).
- The pandemic plan is outlined for a single-wave influenza pandemic, and the historical horizon reaches back to 2009…

818.101

Bundesgesetz
über die Bekämpfung übertragbarer Krankheiten des Menschen
(Epidemiengesetz, EpG)

vom 28. September 2012 (Stand am 1. Januar 2017)

Die Bundesversammlung der Schweizerischen Eidgenossenschaft,
gestützt auf die Artikel 40 Absatz 2, 118 Absatz 2 Buchstabe b, 119 Absatz 2 und 120 Absatz 2 der Bundesverfassung[1],
nach Einsicht in die Botschaft des Bundesrates vom 3. Dezember 2010[2],
beschliesst:

Swiss Influenza Pandemic Plan

Strategies and measures to prepare for an influenza pandemic

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Confederation

Federal Department of Home Affairs FDHA
Federal Office of Public Health FOPH

5th edition 2018

And now: Interest in past pandemics is decreasing again

Received: 25 August 2020 | Accepted: 30 August 2020

DOI: 10.1111/irv.12806

LETTER TO THE EDITOR

WILEY

Down memory lane: Unprecedented strong public and scientific interest in the "Spanish flu" 1918/1919 during the COVID-19 pandemic

To the Editor

Humans tend to place present events in the context of past experiences, especially during crises, when society's vulnerabilities become apparent. In these times, reflection on the learning processes from the past is initiated. All non-pharmaceutical public health countermeasures currently being taken against the COVID-19 outbreak are based on experience gained from past pandemics over the last several centuries,[1,2] which were mostly caused by influenza (1889/90, 1918/19, 1957-59, 1968-70, 1977/78, and 2009) and twice by coronaviruses (2003 and 2019/20). Among these pandemics, the 1918/1919 influenza outbreak (*Spanish flu*) remains the most devastating, as it caused an estimated 20-100 million deaths worldwide and continues to exemplify the worst-case scenario.[3]

Over the last few months, during the current worldwide COVID-19 outbreak, we have noted a unprecedented and sharp increase in the public and scientific interest toward the influenza outbreak of 1918/1919. A first look at the Google search trends since 2004 (https://trends.google.com) revealed marked increases in searches for *Spanish flu* on the web and on news pages in March and April 2020 (Figure 1A). Further, according to a non-systematic PubMed search using the tool *PubMed by Year* (https://esperr.github.io/pubmed-by-year/), the number of listed scientific studies per 100,000 citations using the search terms *Spanish flu* or *influenza 1918* in their abstract/title reached an all-time high in 2020 (Figure 1B). Of the 31 studies that were published in 2020, some can still be attributed to the centenary of the Spanish flu. However, the number of studies explicitly

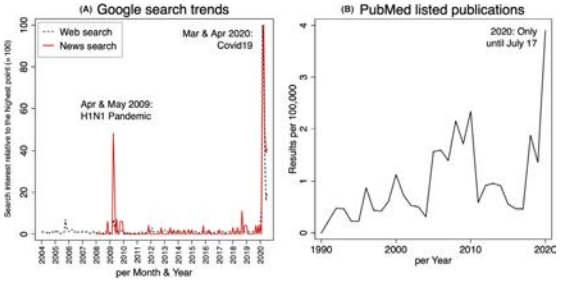
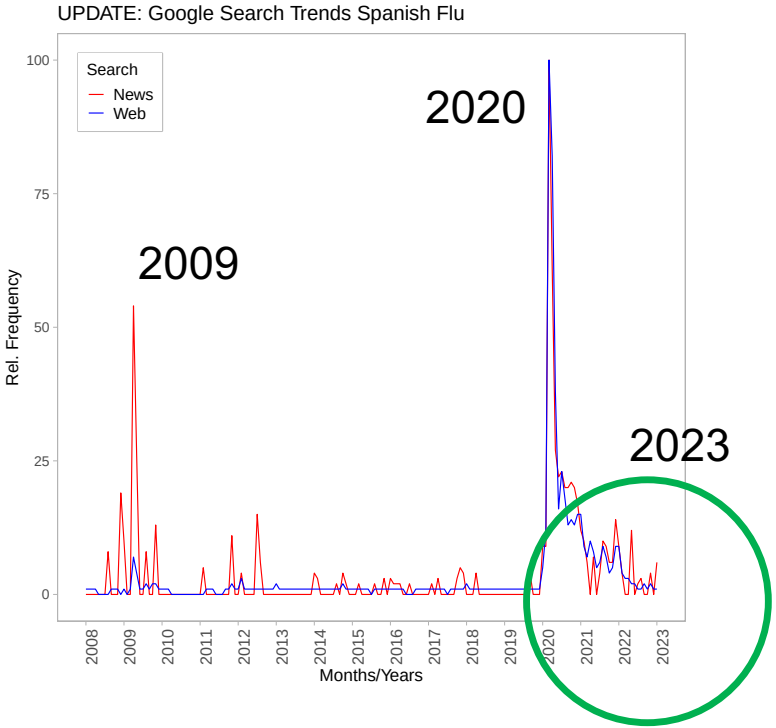


FIGURE 1 A, Results from the worldwide Google trends search per month and year using the term *Spanish flu* (black dashed line = web search; red line = news search). B, Yearly number of PubMed listed publications with the terms *Spanish flu* or *influenza 1918* in the title/abstract as a proportion of 100,000 listed items per year. (Date of searches: 17 July 2020)

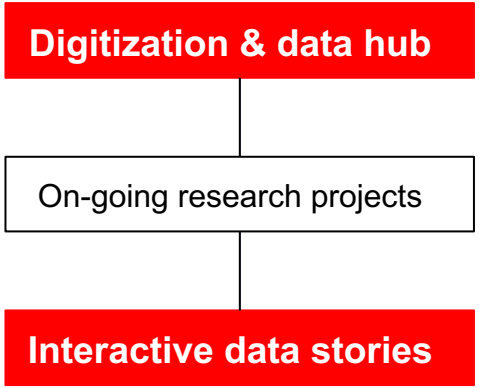


5. Looking ahead to the next pandemic: How can these past pandemic experiences and scenarios be made more present?

Target groups (identified using personas)

- **Scientists & students:** Access to data and background information
- **Data journalists:** Access to data and background information

- **Authorities & politicians:** More information about past experiences
- **The public:** More information about past experiences



Inspiration: Project Tycho

The NEW ENGLAND JOURNAL of MEDICINE

MEDICINE AND SOCIETY

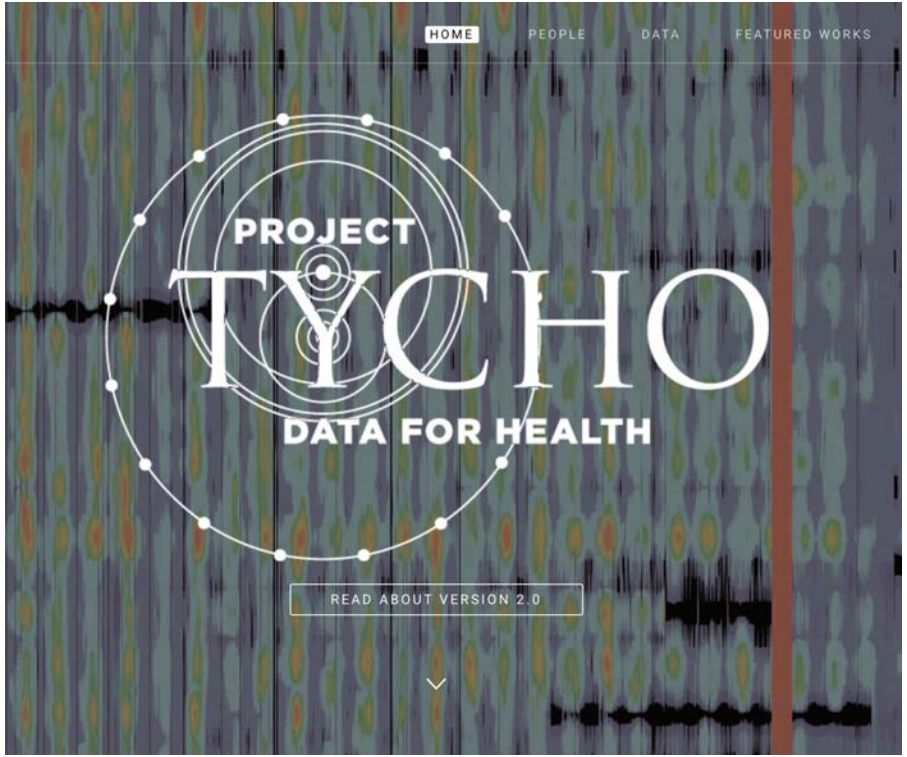
Contagious Diseases in the United States from 1888 to the Present

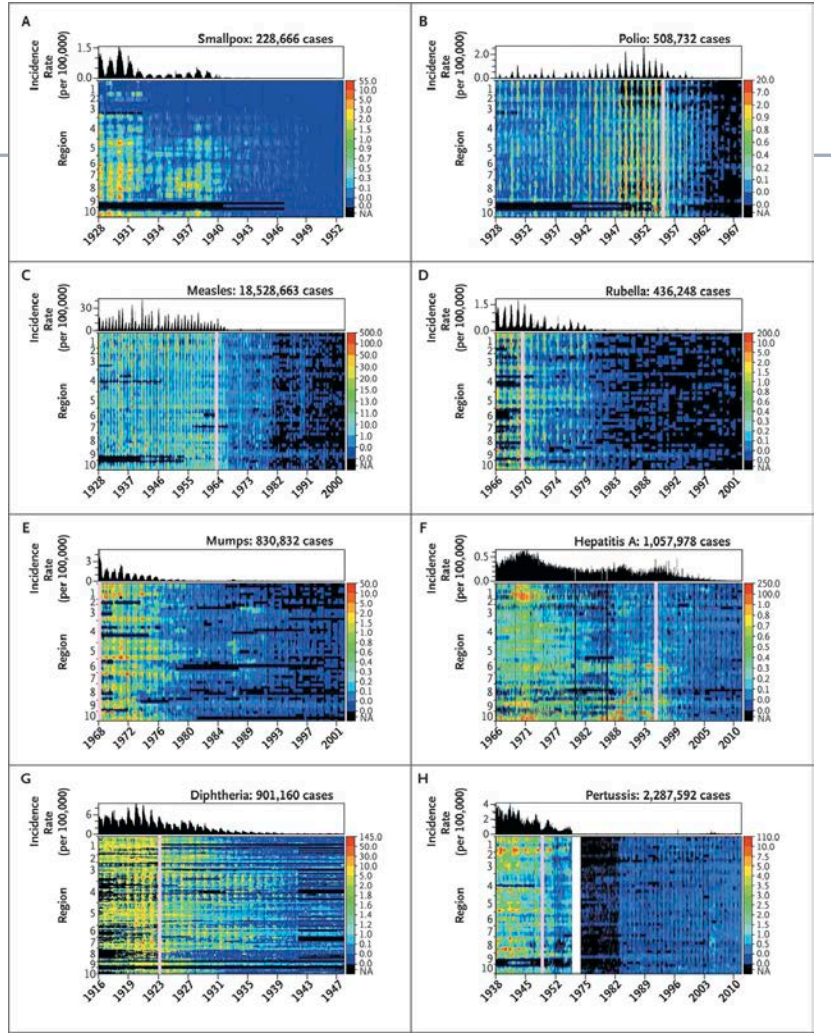
Willem G. van Panhuis, M.D., Ph.D., John Grefenstette, Ph.D., Su Yon Jung, Ph.D., Nian Shong Chok, M.Sc., Anne Cross, M.L.I.S., Heather Eng, B.A., Bruce Y. Lee, M.D., Vladimir Zadorozhny, Ph.D., Shawn Brown, Ph.D., Derek Cummings, Ph.D., M.P.H., and Donald S. Burke, M.D.

"Lack of access to historical epidemiologic data constrains scientific understanding of the dynamics of disease transmission, hampers disease-control programs, and limits public health education programs. We believe that open access to large disease surveillance data sets in computable form should become a worldwide norm."

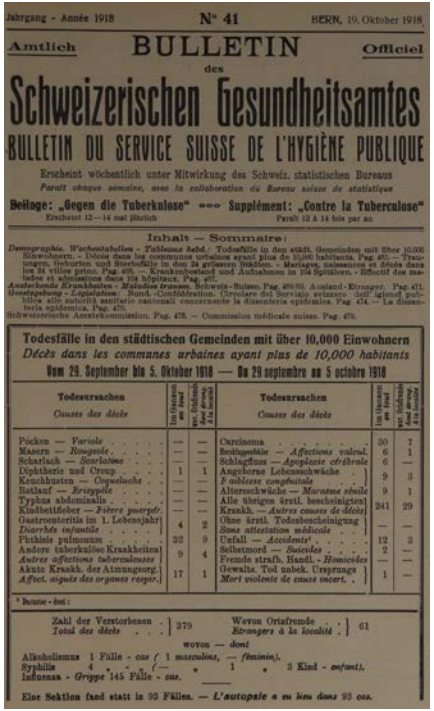
(van Panhuis et al., NEJM, 2013)

https://www.tycho.pitt.edu





Digitizing large amount of historical data



Jahrgang - Année 1918 | N° 41 | BERN, 19. Oktober 1918

Amtlich — BULLETIN des Schweizerischen Gesundheitsamtes — Officiel

BULLETIN DU SERVICE SUISSE DE L'HYGIÈNE PUBLIQUE

Erscheint wöchentlich unter Mitwirkung des Schweiz. statistischen Bureaus
Paraît chaque semaine, avec la collaboration du Bureau suisse de statistique

Beilage: „Gegen die Tuberkulose" ooo **Supplément: „Contre la Tuberculose"**
Erscheint 12—14 mal jährlich — Paraît 12 à 14 fois par an

Inhalt — Sommaire:

Demographie. Wochentabellen - Tableaux hebd.: Todesfälle in den städt. Gemeinden mit über 10,000 Einwohnern. - Décès dans les communes urbaines ayant plus de 10,000 habitants. Pag. 467. — Trauungen, Geburten und Sterbefälle in den 24 grössern Städten. - Mariages, naissances et décès dans les 24 villes princ. Pag. 468. — Krankenbestand und Aufnahmen in 104 Spitälern. - Effectif des malades et admissions dans 104 hôpitaux. Pag. 469.
Ansteckende Krankheiten - Maladies transm. Schweiz - Suisse. Pag. 469-473. Ausland - Etranger. Pag. 471.
Gesetzgebung - Législation: Hund - Canifédération. Circulaire del Servizio svizzero dell'igiene pubblica alle autorità sanitarie cantonali concernente la dissenteria epidemica. Pag. 474. — La dissenterie épidémica. Pag. 475.
Schweizerische Aerztekommission. Pag. 478. — Commission médicale suisse. Pag. 479.

Todesfälle in den städtischen Gemeinden mit über 10,000 Einwohnern
Décès dans les communes urbaines ayant plus de 10,000 habitants
Vom 29. September bis 5. Oktober 1918 — Du 29 septembre au 5 octobre 1918

Todesursachen / *Causes des décès*	Im Gesamten am Ende der Woche / *Ensemble à la fin de la semaine*	wert. Städte am Ende der Woche / *Villes ét. à la fin de la semaine*	Todesursachen / *Causes des décès*	Im Gesamten am Ende der Woche / *Ensemble à la fin de la semaine*	wert. Städte am Ende der Woche / *Villes ét. à la fin de la semaine*
Pocken — *Variole*	—	—	Carcinoma	30	7
Masern — *Rougeole*	—	—	Herzkrankheiten — *Affections valvul.*	6	1
Scharlach — *Scarlatine*	—	—	Schlagfluss — *Apoplexie cérébrale*	6	—
Diphtherie und Croup	1	1	Angeborene Lebensschwäche / *Faiblesse congénitale*	9	3
Keuchhusten — *Coqueluche*	—	—	Altersschwäche — *Marasme sénile*	9	1
Rotlauf — *Erysipèle*	—	—	Alle übrigen krankh. bescheinigten / Krankh. — *Autres causes de décès*	241	29
Typhus abdominalis	—	—	Ohne krankh. Todesbescheinigung / *Sans attestation médicale*	—	—
Kindbettfieber — *Fièvre puerpér.*	—	—	Unfall — *Accidents*[1]	12	3
Gastroenteritis im 1. Lebensjahr / *Diarrhée infantile*	4	2	Selbstmord — *Suicides*	2	—
Phthisis pulmonum	32	9	Fremde strafb. Handl. - *Homicides*	—	—
Andere tuberkulose Krankheiten / *Autres affections tuberculeuses*	9	4	Gewalts. Tod unbek. Ursprungs / *Mort violente de cause incert.*	1	—
Akute Krankh. der Atmungsorg. / *Affect. aiguës des organes respir.*	17	1			

[1] Inclusive - *Inclusivement*:

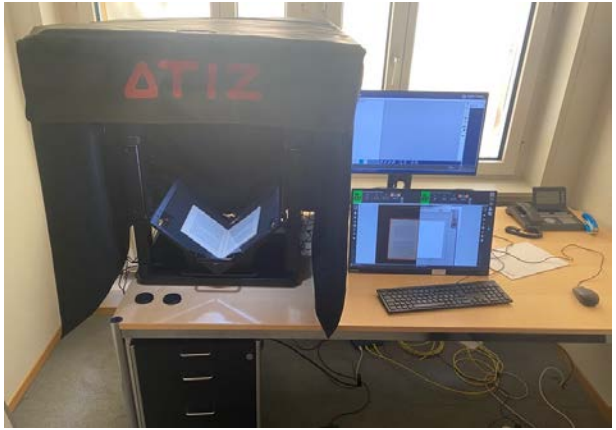
Zahl der Verstorbenen / *Total des décès*	379	Wovon Ortsfremde / *Etrangers à la localité*	61

WOVON — *dont*

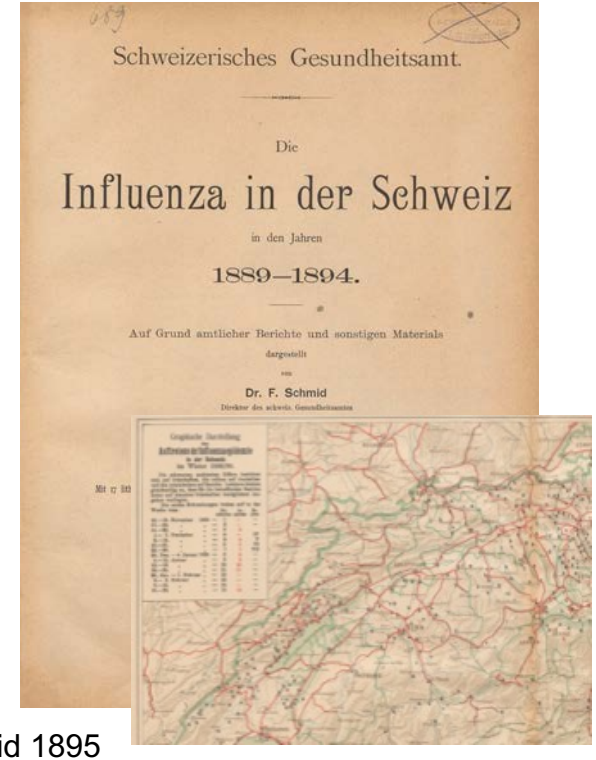
Alkoholismus 1 Fälle - *cas* (1 *masculins*, — *féminin*).
Syphilis 4 " (— " 1 " 3 Kind - *enfant*).
Influenza - *Grippe* 145 Fälle - *cas*.

Eine Sektion fand statt in 93 Fällen. — *L'autopsie a eu lieu dans 93 cas.*

1897-today



Book scanner



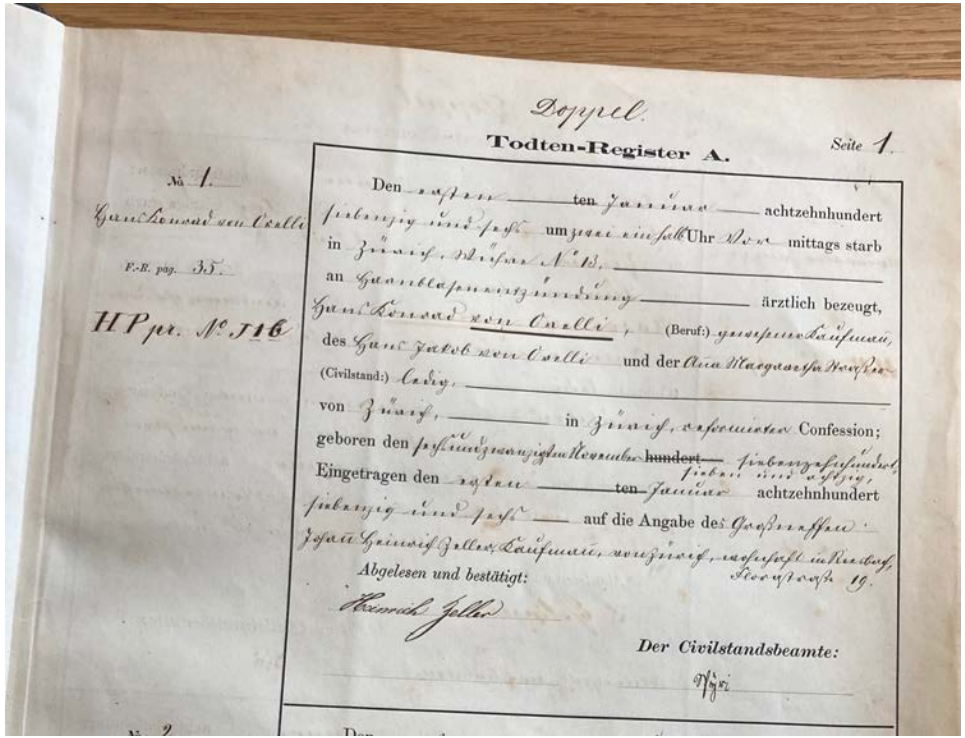
Schweizerisches Gesundheitsamt.

Die
Influenza in der Schweiz
in den Jahren
1889—1894.

Auf Grund amtlicher Berichte und sonstigen Materials
dargestellt
von
Dr. F. Schmid
Direktor des schweiz. Gesundheitsamtes

Schmid 1895

Future work: Individual death register data 1837, 1890, 1918…



Doppel.

Todten-Register A.

Seite 1.

No 1.

Hans Konrad von Orelli

F.-B. pag. 35.

HP pr. No 716

Den sechsten ten Januar achtzehnhundert siebenzig und sechs um zwei ein halb Uhr Nachmittags starb in Zürich, Brüder No 13, an Hirnblasenentzündung ärztlich bezeugt, Hans Konrad von Orelli, (Beruf:) Spinnereibesitzer, des Hans Jakob von Orelli und der Ana Margaretha Hess (Civilstand:) Ledig, von Zürich, in Zürich, reformirter Confession; geboren den fünfundzwanzigsten November ~~hundert~~ siebenzehnhundert sieben und achtzig, Eingetragen den sechsten ten Januar achtzehnhundert siebenzig und sechs auf die Angabe des Großvaters Johann Heinrich Geller, Kaufmann, von Zürich, wohnhaft in Rheinfelden, Hauptstrasse 19.

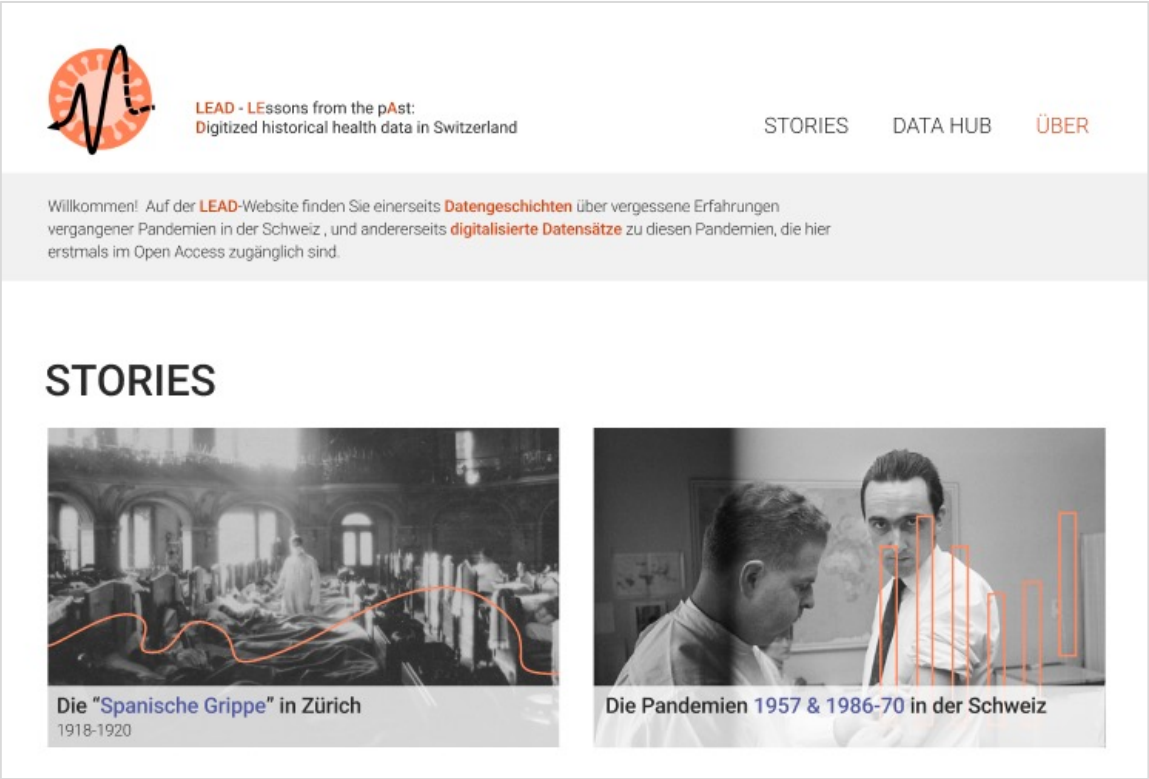
Abgelesen und bestätigt:

Heinrich Geller

Der Civilstandsbeamte:

Meyer

LEAD Data & Visualisation Hub

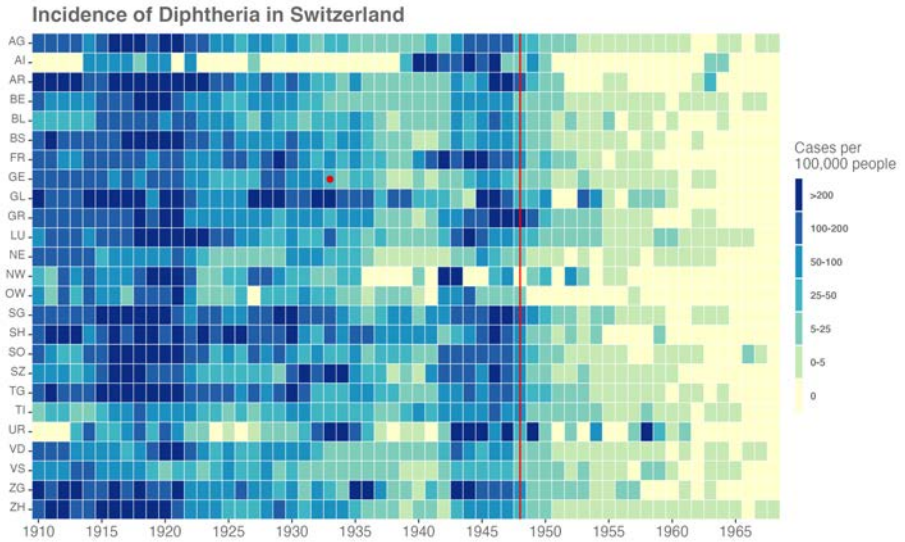


Collaboration with ZHAW (DIZH)

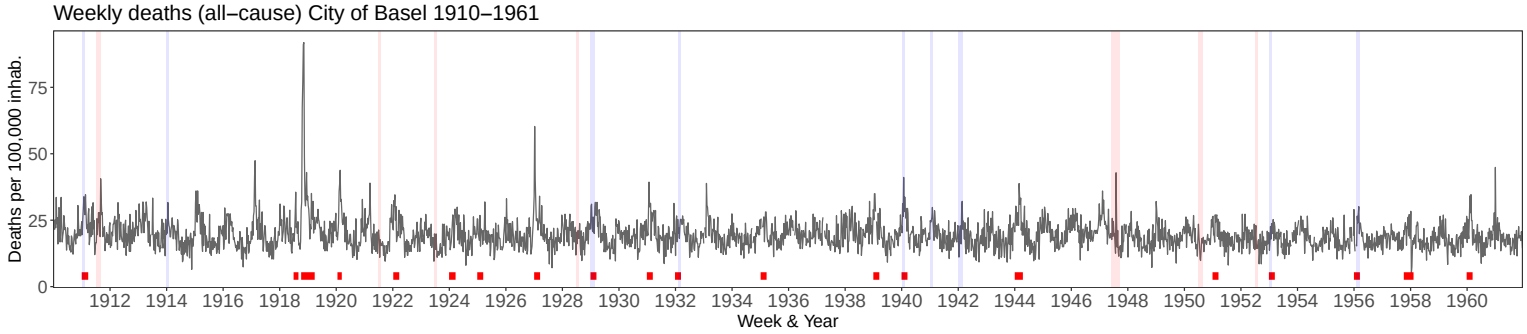
- ORD Data Hub: Infectious diseases, mortality, health
- Meta data & limitations are important!
- Collaboration with FSO
- Tech. Details: Zenodo, YAML, PX-Format, FLASK-Python, PostgreSQL, HTML, CSS, Java, etc.
- Selected interactive data stories written by ZHAW experts
- Go live in Spring 2023, continuously expanded afterwards

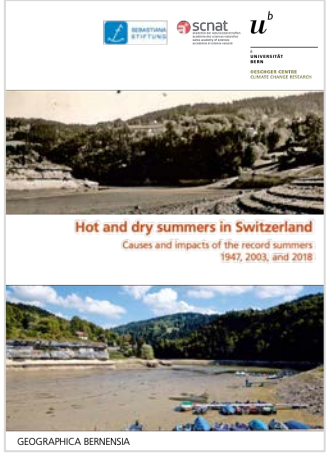
Examples of data series…

➡️ Childhood diseases and vaccination across the 20th century

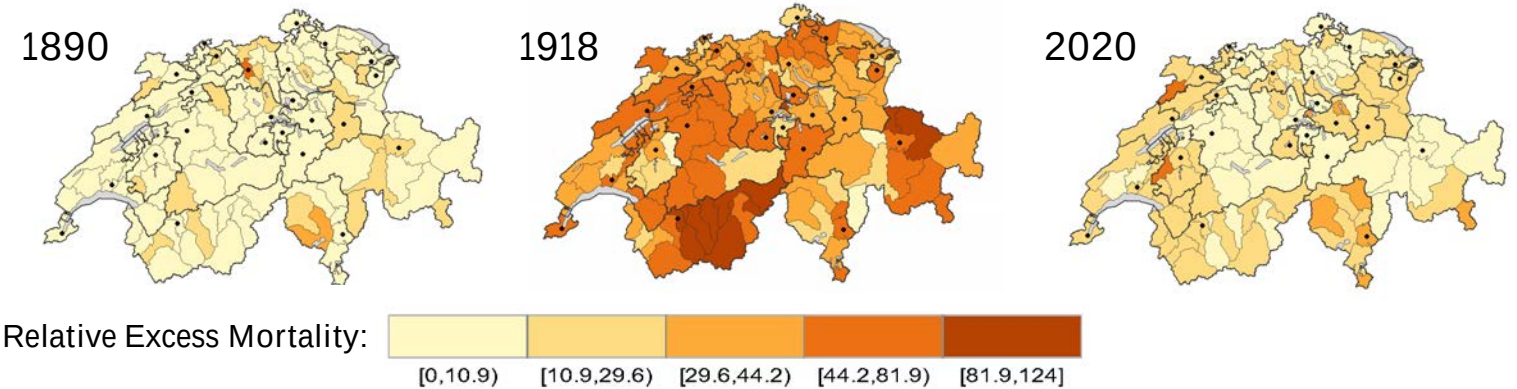


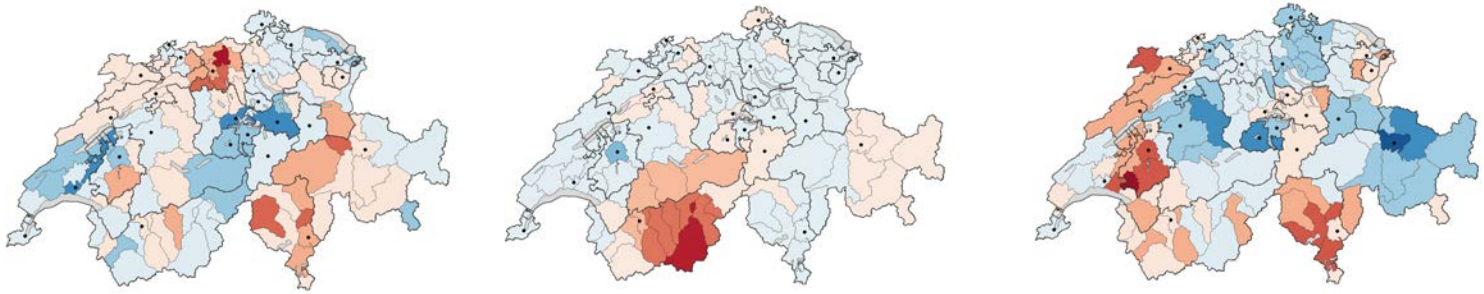
⬇️ Weekly death counts for the largest 8 Swiss cities 1890s-1960s





Excess mortality (age, sex) per districts 1890, 1918, 2020 (INLA, GI*)



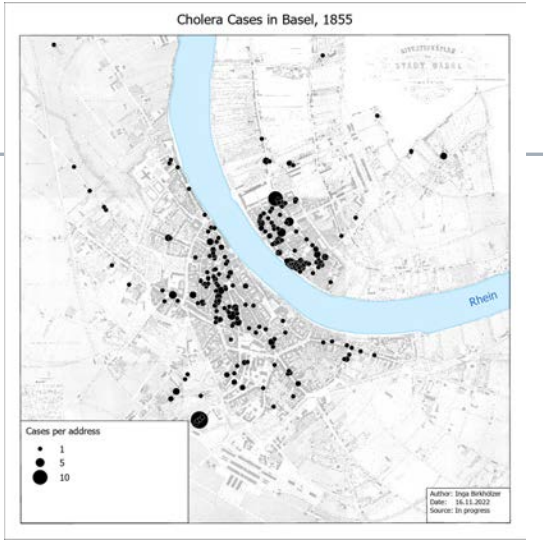


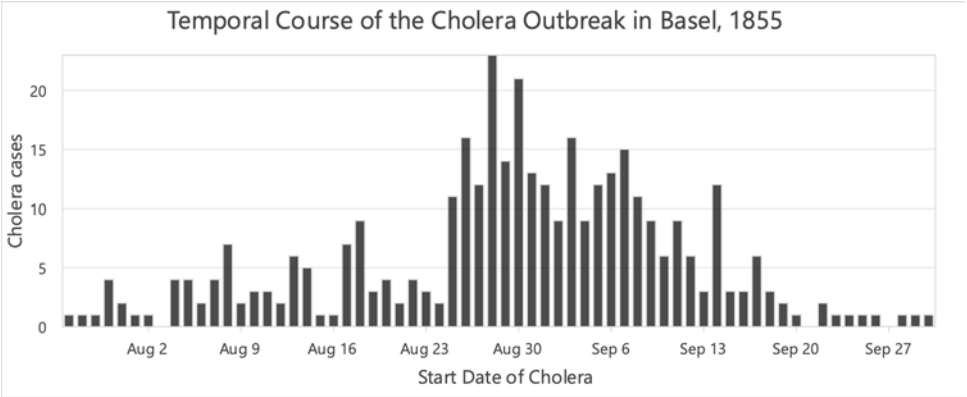
University of Zurich[UZH]

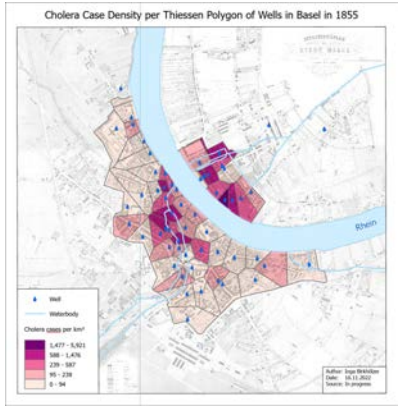
Institute of Evolutionary Medicine (IEM)

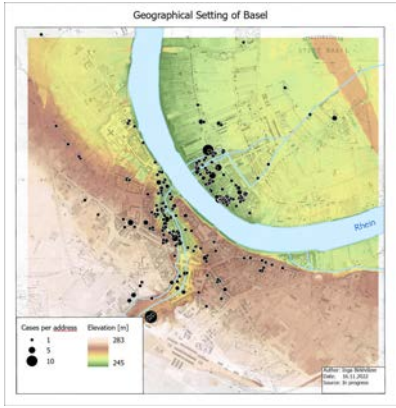
Reconstruction Cholera Outbreak Basel 1855

Late July to end of September 1855
399 people infected, 205 died









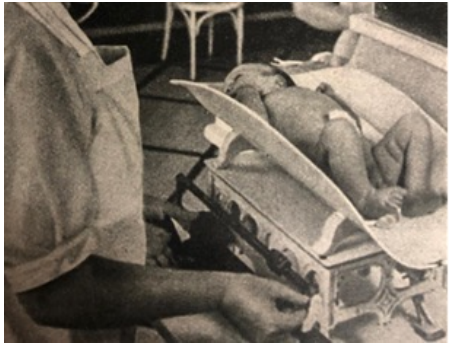
University of Zurich[UZH]

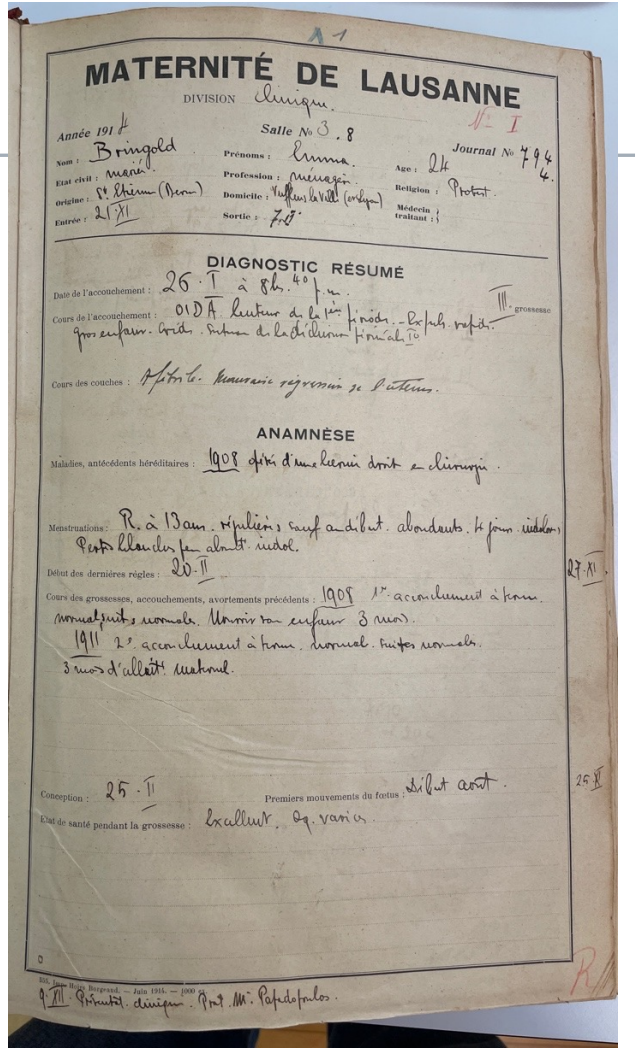
Institute of Evolutionary Medicine (IEM)

Swiss National Science Foundation

Determinants of neonatal health in Lausanne, 1905-1925

- Approx. 15,000 births (ca. 50% complete)
- Among other determinants: ILI infection during pregnancy
- 2 PhD students, 1 Postdoc





MATERNITÉ DE LAUSANNE

DIVISION clinique

Année 1914 — Salle No 3.8 — Journal No 794.

Nom : Bringold — Prénoms : Luna — Age : 24

Etat civil : mar. — Profession : ménagère

Origine : St Stephan (Berne) — Domicile : Vaulruz de Vaud (canton) — Religion : Protest.

Entrée : 21.XI — Sortie : 7.XI — Médecin traitant : ?

DIAGNOSTIC RÉSUMÉ

Date de l'accouchement : 26.I à 8 h. 40 p.m.

Cours de l'accouchement : OIDA. Lenteur de la 1re période. - Rupture rapide. III. grossesse. gros enfant. - Suites. Infection de la cicatrice finale 1o

Cours des couches : Pétrité. Insuffisance régression de l'utérus.

ANAMNÈSE

Maladies, antécédents héréditaires : 1908 opéré d'une hernie droite en chirurgie.

Menstruations : R. à 13 ans. Réguliers sauf au début. abondants. 4 jours. indolores. Pertes blanches fort abonds. indol.

Début des dernières règles : 20.II — 27.XI.

Cours des grossesses, accouchements, avortements précédents : 1908 1er accouchement à terme. normal, suites normales. Nourrit son enfant 3 mois.

1911 2e accouchement à terme. normal. suites normales. 3 mois d'allaitt. maternel.

Conception : 25.II — Premiers mouvements du fœtus : début août. — 25.XI

Etat de santé pendant la grossesse : Excellent. Sg. varia.

9.XI. Présentat. clinique. Prof. Mr. Papadopulos.

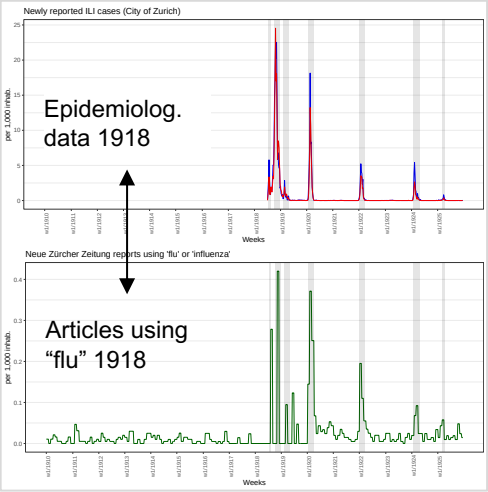
Extensive documentation, incl. health history & infection status in pregnancy 1918 and 1919 (35% reported infection)

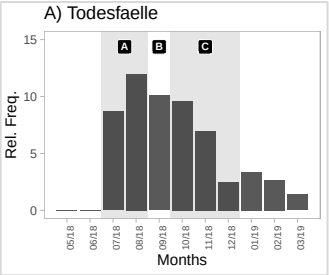
6. Interdisciplinarity is important

Pandemic courses vs. narratives in newspapers

- Collaboration: Computational Linguists / Digital Humanities

- Pilot study (*under review*): **Reconstructing pandemic narratives** in ca. 2000 newspaper articles in Bern 1918, using text mining methods:
  - Temporal overlap with epidemiological data
  - Narratives change across waves

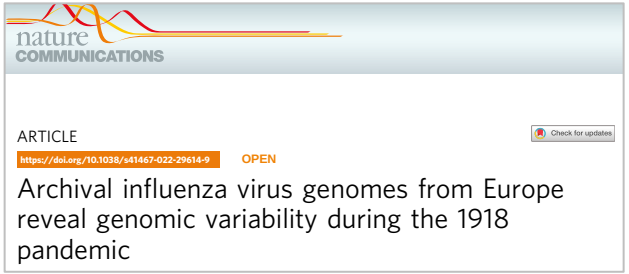




Topic modelling

Conceptual maps

Adding genetics (aRNA) to the picture

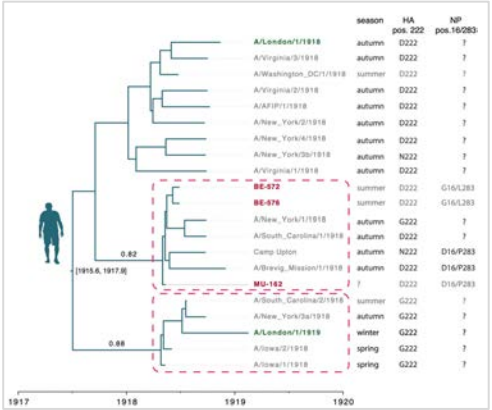


nature COMMUNICATIONS

ARTICLE

https://doi.org/10.1038/s41467-022-29614-9 OPEN

Archival influenza virus genomes from Europe reveal genomic variability during the 1918 pandemic



Sample #496/18, Male 18 years, 15.07.1918

- Did pandemic viruses also changed during past multi-wave pandemics?
- aRNA very volatile; new methods to isolate genomes from formalin-fixed samples.
- Consortium published 3 European 1918/19 genomes: Virus changed (nucleoprotein sites, associated with host antiviral response).
- IEM Zürich: Successful extraction of a 1918 genome (30x coverage depth, >90% genome), publication currently been written.

7. Conclusion

Conclusion

- Experience with recent and more distant epidemics / pandemics can inform present and future pandemic planning.
- History never repeats itself, but the past offers scenarios & warnings to be adapted to a new challenge & context.
- The past must be systematically analysed, in an interdisciplinary way and combining quantitative & qualitative approaches.
- Knowledge transfer and science communication are crucial.
- What would be the alternative: ignore the past and repeat mistakes?

Thank you!

- The **audience**
- The **IEM**, Frank Rühli (Director), MeF, UZH, etc.
- My **research group**
- All **collaborators** in Zurich, Bern, etc. Switzerland and abroad
- The **funding agencies**:
  - Foundation for Research in Science and the Humanities, UZH
  - UniGE & UZH Cofunds
  - Digital Society Initiative, UZH
  - DIZH
  - Mäxi Foundation
  - Swiss National Science Foundation
- Contact: kaspar.staub@iem.uzh.ch
- Webpage: https://www.iem.uzh.ch/en/pastpandemics.html