Review of the 2021 influenza “season” in Australia and what to expect in 2022

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www.influenzacentre.org

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The Melbourne WHO Collaborating Centre for Reference and Research on Influenza is supported by the Australian Government Department of Health

Doherty Institute

A joint venture between the University of Melbourne and Melbourne Health

27 January 2022

2021; The record low year for influenza in Australia…. EVER?

ABC NEWS

Influenza cases hit an all-time low in Australia in 2021 — that could be a problem when it returns

By Melanie Vujkovic

Posted Thu 16 Sep 2021 at 5:36am, updated Thu 16 Sep 2021 at 9:42am

Key points:

- Experts say we have never, and probably will never see such low cases of the flu again
- Researchers say the flu will return when international borders reopen, but how severe is unknown
- Doctors say the flu vaccine is still our best protection against a future outbreak

https://www.abc.net.au/news/2021-09-16/queensland-what-happened-to-the-flu-in-2021/100456616

How was the 2021 SH influenza season for you?

- Normal season – nothing much different from any other
- Low season – similar to 2010, 2018
- Medium season – similar to 2011, 2013
- Big season – similar to 2012, 2014, 2015, 2016
- Massive season – Once in every decade or two
  - Pandemic of 2009
  - Flumageddon of 2017
  - Flunami of 2019
- **COVID-19 impacted seasons – little or NO influenza!!**
  - **2020, 2021, ???**

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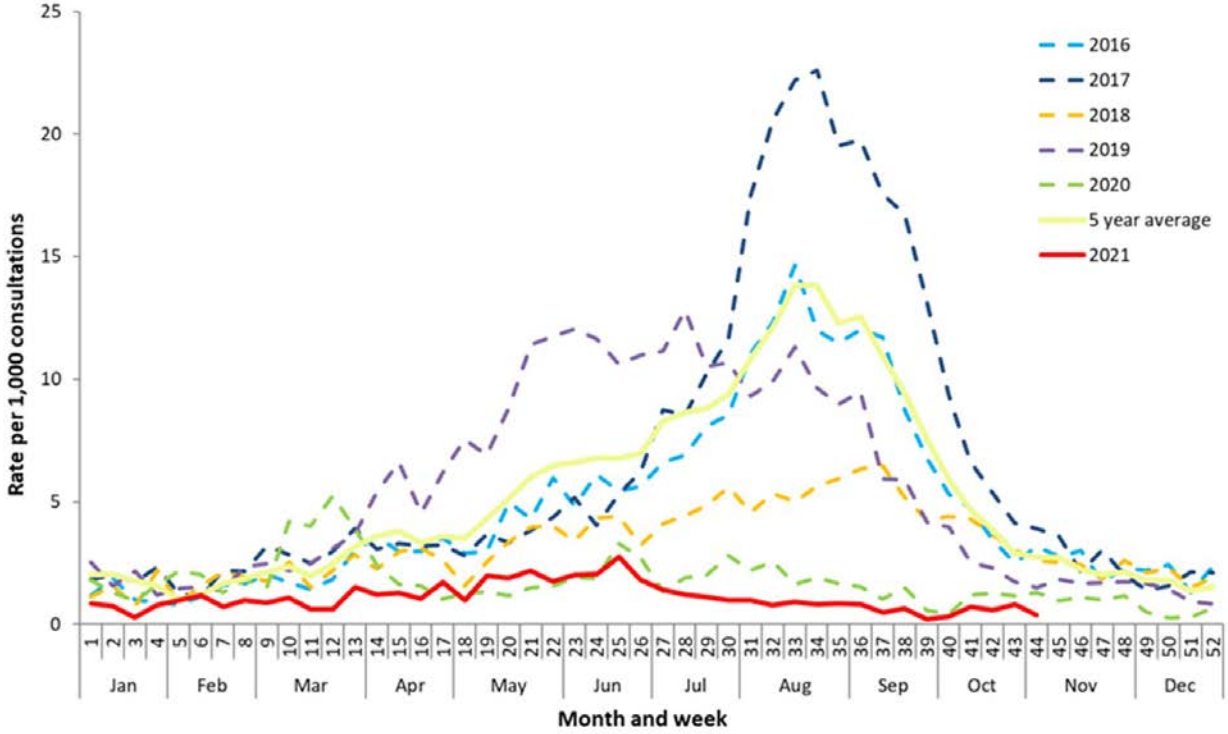
Summary of the 2021 Australian Influenza "season"

- A non "Influenza" season by most measures
  - NNDSS Lab confirmed influenza data (upto 7 Nov 2021)
    - In 2021 only 598 cases reported (2020 21,355, 2019 313,458)
    - Lowest detections since influenza made notifiable in 2001
  - ASPREN-GP ILI data – Flatline
  - Flutracking – Flatline-"ish"
- Characteristics of season
  - As typed by WHO CC 94% influenza A (14% A(H1N1)pdm09 and 77% A(H3N2)), 6% B/Victoria lineage, 0% B/Yamagata-lineage
  - FluCan data
    - Only a single hospital admission with influenza (general admission not ICU)
  - Influenza deaths (NNDSS); 2021: no deaths; 2020: 37 (2019: 902)

Influenza-like illness (ILI) 2016-21 in Australia

SENTINEL GP ILI SURVEILLANCE



Source: ASPREN

AUSTRALIAN INFLUENZA SURVEILLANCE REPORT

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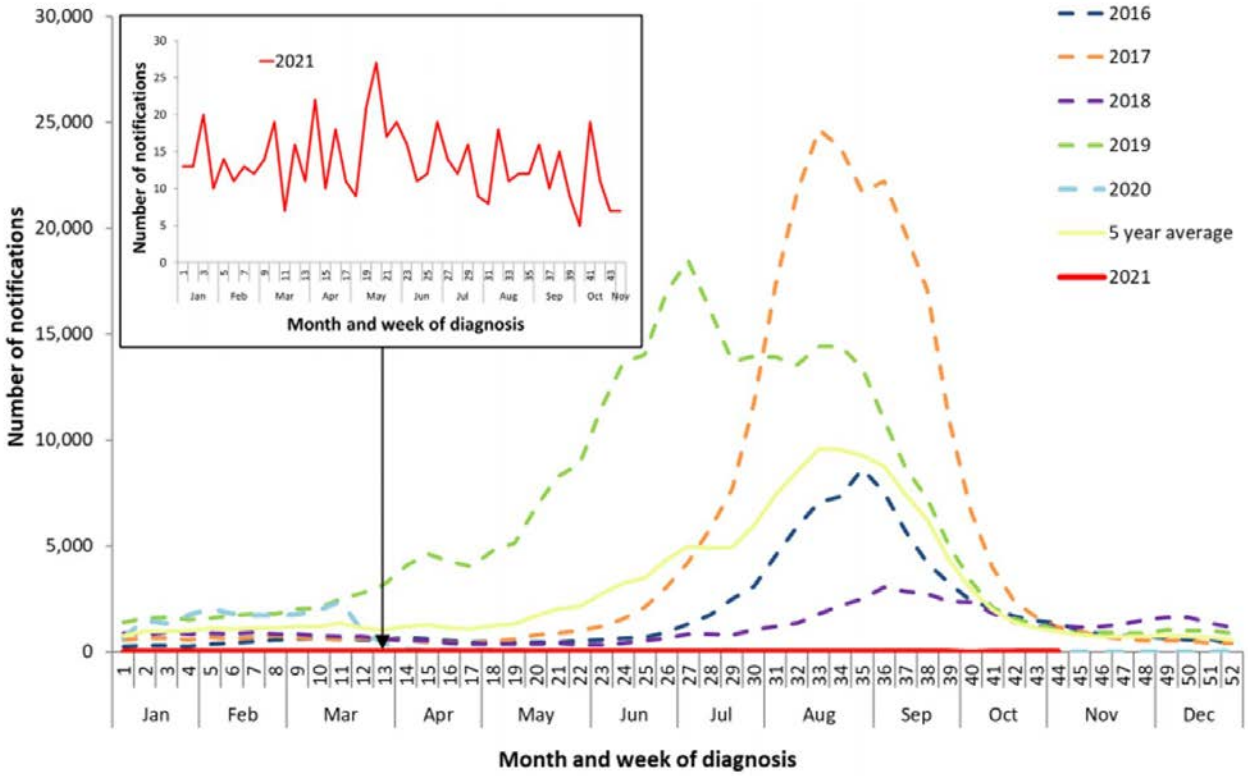
Lab confirmed influenza in Australia 2016-21

(NNDSS upto 7 Nov 2021)



Source: NNDSS

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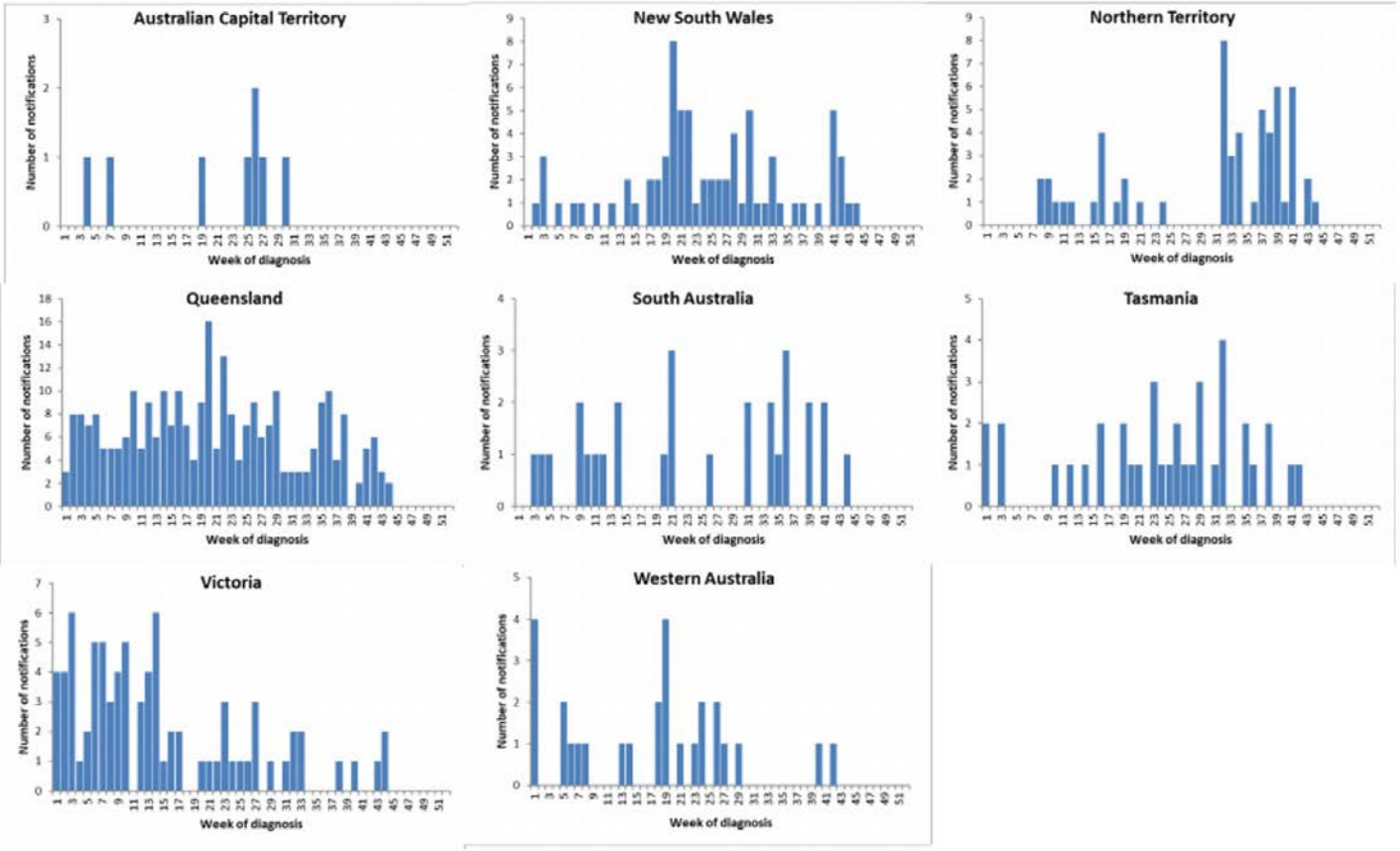
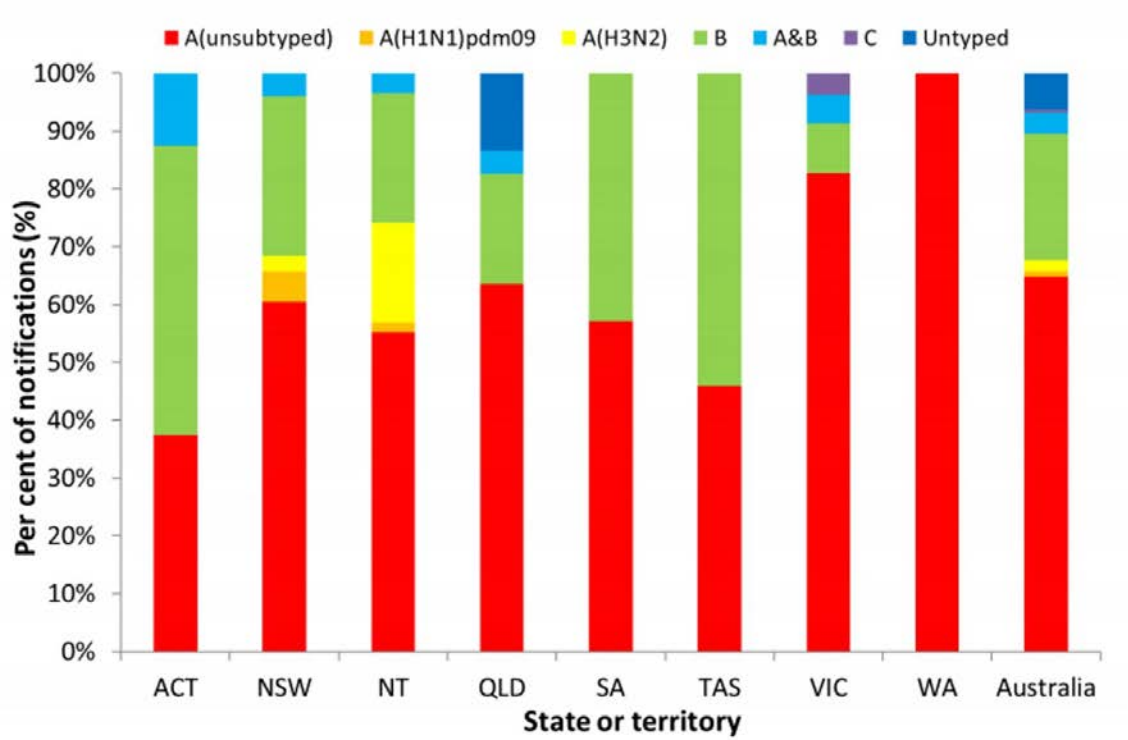
Lab confirmed influenza in Australia 2021 by State



Source: NNDS

Typing of influenza viruses in Australia 2021



Source: NNDSS

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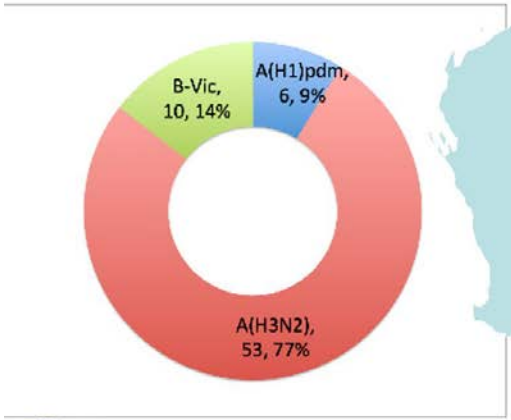
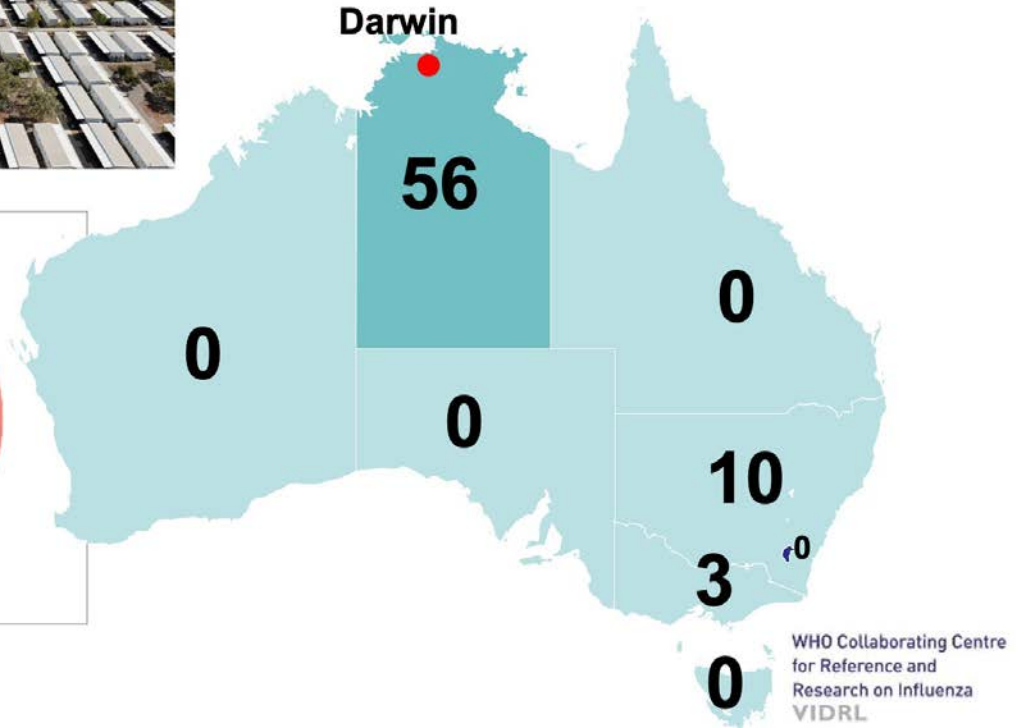
Darwin – the 2021 Australian hotspot for influenza

True influenza positive samples submitted to WHO CC in 2021

Howard Springs Quarantine facility





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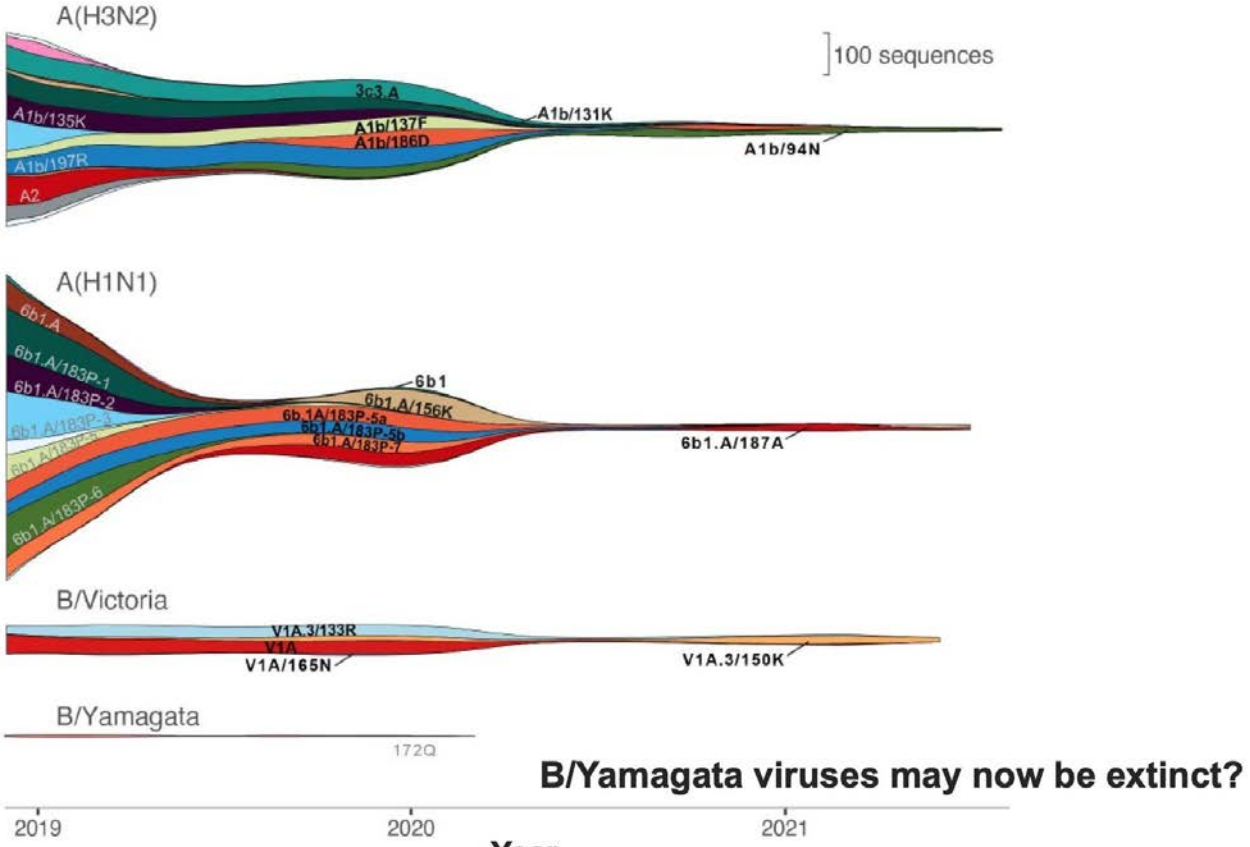
Along with reduced numbers, the genetic diversity has also reduced for A(H1pdm)09 and A(H3N2) viruses



DOI: https://doi.org/10.21203/rs.3.rs-850533/v1

NNDSS reported influenza associated deaths in Australia

	1 January to 31 December						
	2015	2016	2017	2018	2019	2020	2021
Notifications*†	100,556	90,858	251,151	58,858	307,907	21,266	598
Deaths §	222	273	1181	148	902	37	0
Case Fatality Rate	0.22%	0.30%	0.47%	0.25%	0.29%	0.17%	0%

•Data on 'Deaths' should always be used with extreme caution as clinical information is not always collected across the various jurisdictions and timely mortality data is not available.These notification data are based on data extracted from the NNDSS on the date indicated above. Due to the dynamic nature of the NNDSS, data on this extract are subject to retrospective revision and may vary from data reported in published NNDSS reports and reports of notification data by states and territories. In general notification data represent only a proportion of the total cases occurring in the community, that is, only those cases for which health care was sought, a test conducted and a diagnosis made, followed by a notification to health authorities. The degree of under-representation of all cases is unknown and is most likely variable by disease and jurisdiction. In interpreting these data it is important to note that changes in notifications over time may not solely reflect changes in disease prevalence or incidence. Depending on the disease changes in testing policies; screening programs including the preferential testing of high risk populations; the use of less invasive and more sensitive diagnostic tests; and periodic awareness campaigns, may influence the number of notifications that occur annually.

*Up to 29.11.20
Data kindly supplied by OHP, DoH

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But not all respiratory disease circulation in Australia has been as heavily suppressed as influenza during the COVID-19 pandemic

Circulation of respiratory viruses in 2020-1 in NSW Australia

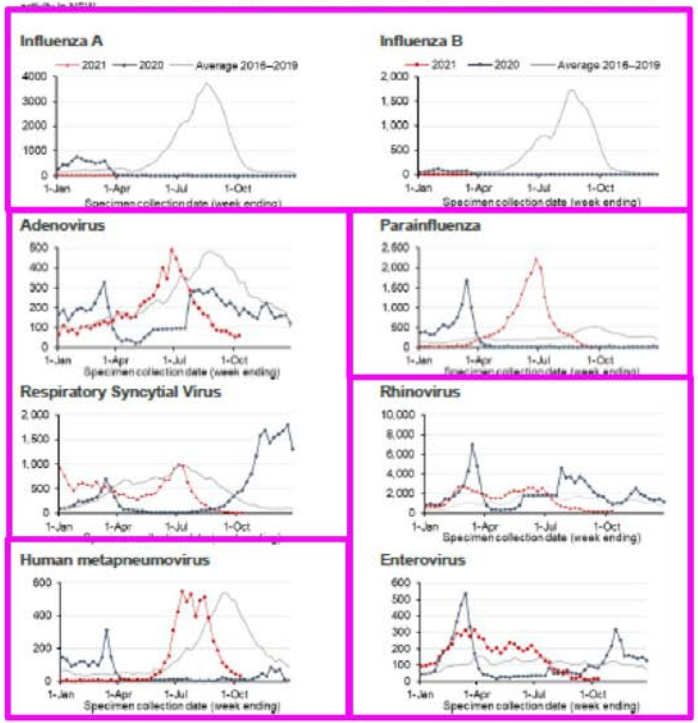
- Tracking 8 winter respiratory viruses by lab confirmed cases
- Post-April 2020; no circulation 2020/1
  - Influenza A and B
- Post-April 2020; circulated 2020/21:
  - Adenovirus
  - RSV (late 2020)
  - Rhinovirus
  - Enterovirus
- Post-April 2020; circulated only in 2021
  - Parainfluenza
  - HMPV

COVID-19 WEEKLY SURVEILLANCE IN NSW
Epidemiological week 41, ending 16 October 2021

www.health.nsw.gov.au/coronavirus

Appendix C: Number of positive PCR test results for influenza and other respiratory viruses at sentinel NSW laboratories, January 2020 to 10 October 2021

Not all samples are tested for all respiratory viruses. Therefore, data presented may tend to under-represent current respiratory virus



Note: Preliminary laboratory data is provided by participating sentinel laboratories on a weekly basis and are subject to change. Serological diagnoses are not included.

Influenza vaccines for Australia and NZ in 2022**

- A(H1N1)pdm – A/Victoria/2570/2019-like*
- A(H3N2) – A/Darwin/9/2021*

Trivalent vaccine:

- B – B/Austria/1359417/2021 (B/Vic)

Quadrivalent vaccine:

- B – B/Phuket/3073/2013-like (B/Yam)*
- B – B/Austria/1359417/2021 (B/Vic)

Changes to 2021 recommendations

*Isolated at the WHO CC Melbourne
** Like viruses are used in Cell-based influenza vaccines which may have different virus designations

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Influenza vaccines available in Australia in 2022

- Egg-based influenza vaccines
  - Quadrivalent inactivated influenza vaccines (Ages vary with brand)
  - Adjuvanted Quadrivalent inactivated influenza vaccine (≥65y)
  - ?? High dose Quadrivalent inactivated influenza vaccine (≥65y)

- Cell-based influenza vaccine
  - Quadrivalent inactivated influenza vaccine (Flucelvax QUAD) (≥9y)
    Available in Australia since 2021

- Still waiting???
  - LAIV (Astra-Zeneca)
  - Recombinant protein - HA (Baculovirus; Protein Sciences/Sanofi)
  - ????mRNA

UK JCVI (Joint Committee on Vaccination and Immunisation)
Advice on influenza vaccines for 2022-3

Adults 65 years of age and over. For vaccination of those aged 65 y and over JCVI advises the use of the following vaccines:

- Adjuvanted quadrivalent inactivated influenza vaccine (aQIV)
- High-dose quadrivalent inactivated influenza vaccine (QIV-HD)
- Quadrivalent Recombinant Influenza Vaccine (QIVr)

https://app.box.com/s/t5ockz9bb6xw6t2mrrzb144njplimfo0/file/863135232161

UK JCVI (Joint Committee on Vaccination and Immunisation)
Advice on influenza vaccines for 2022-3

At-risk adults (including pregnant women) aged 18-65 years of age* JCVI advises:

- Quadrivalent influenza cell-culture vaccine (QIVc)
- Quadrivalent Recombinant Influenza Vaccine (QIVr)

(The Quadrivalent influenza egg-culture vaccine (QIVe) can also be considered for use in this age group if other options are not available subject to the considerations below).

There is a potential advantage to using influenza vaccines which do not use eggs in the manufacturing process (cell-culture or recombinant) compared with egg-culturedinfluenza vaccines, due to the possible impact of “egg-adaptat ion” on the effectiveness of influenza vaccines, particularly against A(H3N2) strains. The evidence on additional benefit is available for only very few seasons but the issue of egg adaptation remains a real concern particularly for the AH3N2 virus which is the more virulent influenza subtype in terms of morbidity and mortality.

There is limited but good evidence that the recombinant vaccine QIVr, which also is not affected by egg adaptation, is more effective than QIVe in adults under 65 years age. Therefore, QIVr is also preferred over QIVe in adults under 65 years old.

UK JCVI (Joint Committee on Vaccination and Immunisation)
Advice on influenza vaccines for 2022-3

Children aged two to less than 18 years of age in an at-risk group Children aged 2 - <18y) JCVI advises in the following order of preference:

- 1. Live attenuated Influenza vaccine (LAIV)
- 2. Quadrivalent influenza cell-culture vaccine (QIVc)

In those for whom LAIV is not suitable, JCVI advises the use of QIVc. The Quadrivalent influenza egg-culture vaccine (QIVe) can also be considered for use in this age group if other options are not available. LAIV to be used unless it is medically contraindicated or otherwise unsuitable.

https://app.box.com/s/t5ockz9bb6xw6t2mrrzb144njplimfo0/file/863135232161

UK JCVI (Joint Committee on Vaccination and Immunisation)
Advice on influenza vaccines for 2022-3

Children aged less two years old. For vaccination of at-risk children aged less than 2 years of age in an at-risk group JCVI advises the use of the following vaccine:

- Quadrivalent influenza egg-culture vaccine (QIVe)
- The Committee has also advised that Egg-allergic children aged less than two years can also be offered the quadrivalent inactivated egg-free vaccine, QIVc (Flucelvax® TETRA). This is an off-label recommendation which is supported by unpublished data which shows non inferiority immunogenicity and a very similar safety profile for QIVc compared with QIVe in children less than two years old.

https://app.box.com/s/t5ockz9bb6xw6t2mrrzb144njplimfo0/file/863135232161

ATAGI Guidelines as at Dec 2021

Influenza (using 2021 vaccines) and SARS-CoV-2 vaccinations (Presumably to be confirmed for 2022 influenza vaccination?)

Co-administration with COVID-19 vaccines;

- Influenza vaccines can be co-administered with COVID-19 vaccines. Subject to availability of influenza vaccines, an ideal time to vaccinate could be on the same day as a COVID-19 booster vaccine.

- Expiry of 2021 influenza vaccines.2021 influenza vaccines should continue to be offered as long as valid, unexpired vaccine is available. Some vaccine brands now have expiry dates up to late February 2022.

- Immunisation providers should check a vaccine's expiry date before administration and not issue expired vaccines.

https://www.health.gov.au/news/updated-atagi-advice-on-the-administration-of-seasonal-influenza-vaccines-in-2021-december-2021

https://www.health.gov.au/sites/default/files/documents/2021/12/atagi-advice-on-seasonal-influenza-vaccines-in-2021-december-2021-update.pdf

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AIR data on influenza vaccinations in 2021

- Some 20.5m doses (which could cover >80% population) were supplied to the market in 2021 (TGA)
- This is a record number exceeding 2020's 18m doses
- By AIR records 8,816,128 vaccines administered – 35.3 % of the eligible population and only 43% of the available vaccines
- Reduced vaccination rates in:
  - <5y
  - 5-64y
- High rates still in 65y+

https://www.health.gov.au/resources/publications/influenza-flu-immunisation-data

Australian Government
Department of Health

Influenza (flu) immunisation data – 1 November 2021

Influenza (flu) vaccines reported to the Australian Immunisation Register (AIR) as at close of business 31 October 2021

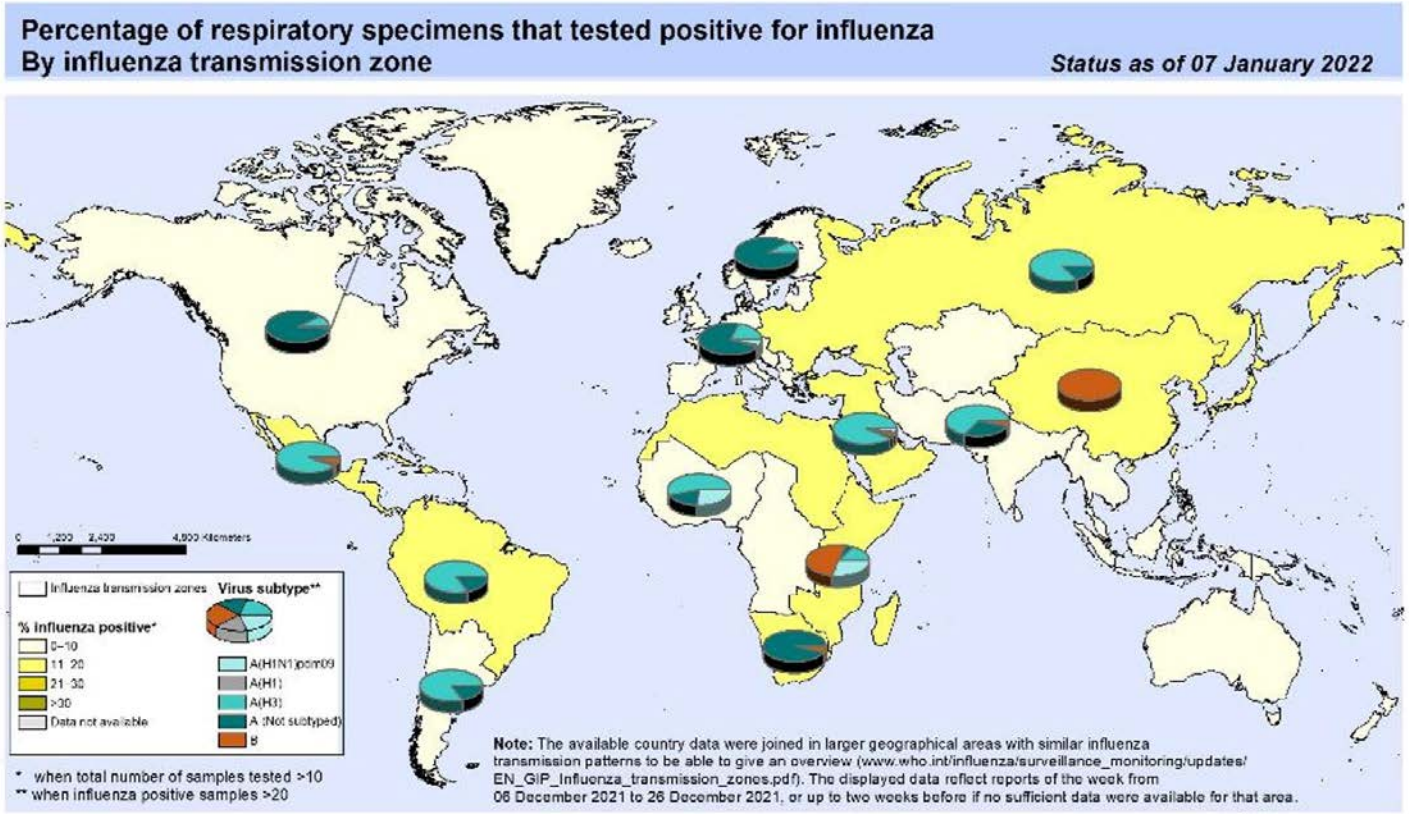
Jurisdiction	Total	Age			Aboriginal or Torres Strait Islander		Provider types		
		<5	5 –64 years	65+ years	Yes	No	GP	Pharmacy	Other
AUS	8,816,128	408,081	5,272,313	3,135,734	201,008	8,615,120	5,900,195	1,122,778	1,793,155
ACT	188,151	14,039	125,179	48,933	2,473	185,678	100,693	16,792	70,666
NSW	2,641,177	115,112	1,545,274	980,791	64,667	2,576,510	1,856,609	287,838	496,730
NT	70,509	7,694	50,588	12,227	24,842	45,667	23,784	5,571	41,154
QLD	1,747,928	68,879	1,044,447	634,602	53,743	1,694,185	1,163,436	226,976	357,516
SA	766,594	30,108	461,288	275,198	10,858	755,736	478,645	112,992	174,957
TAS	221,884	9,004	126,352	86,528	8,294	213,590	139,361	33,476	49,047
VIC	2,294,529	121,447	1,383,825	789,257	15,635	2,278,894	1,568,325	257,451	468,753
WA	883,461	41,756	533,574	308,131	20,484	862,977	569,022	181,414	133,025
Unknown state^	1,895	-	-	-	-	-	-	-	-

^ Individuals are recorded as 'unknown state' where they are not registered with Medicare and there are no address details reported to the AIR.

The NH 2021-22 influenza season and elsewhere

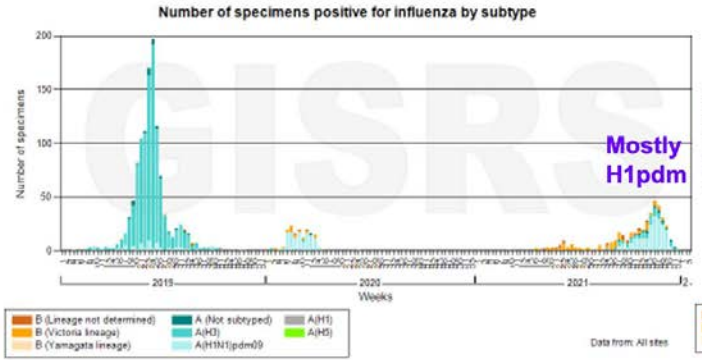
(so far)

WHO influenza activity map as at 7 Jan 2022

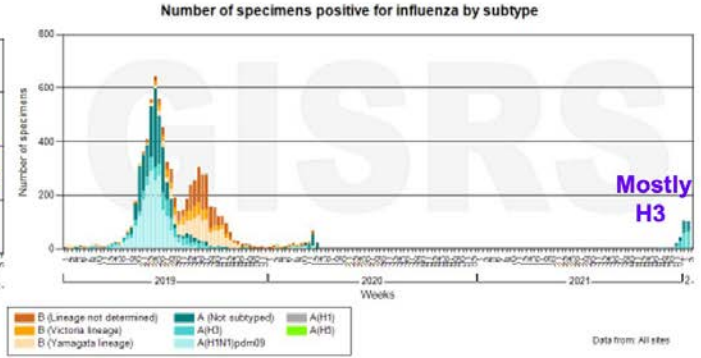


Some countries in SH have had summer influenza outbreaks – not Australia

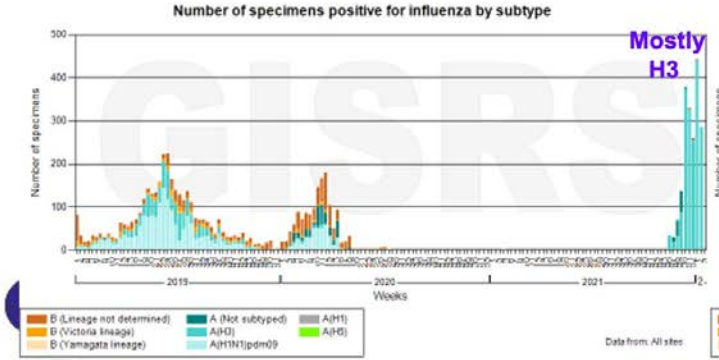
South Africa



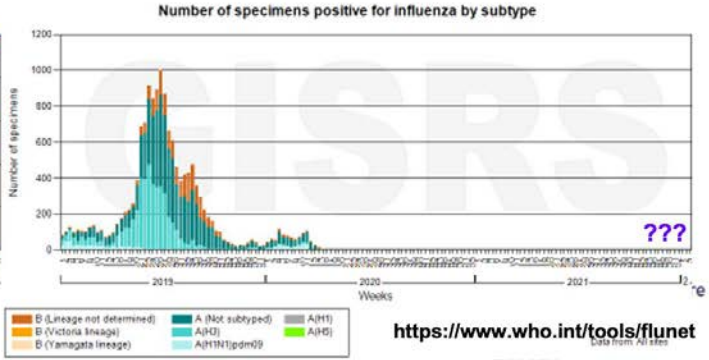
Chile



Brazil

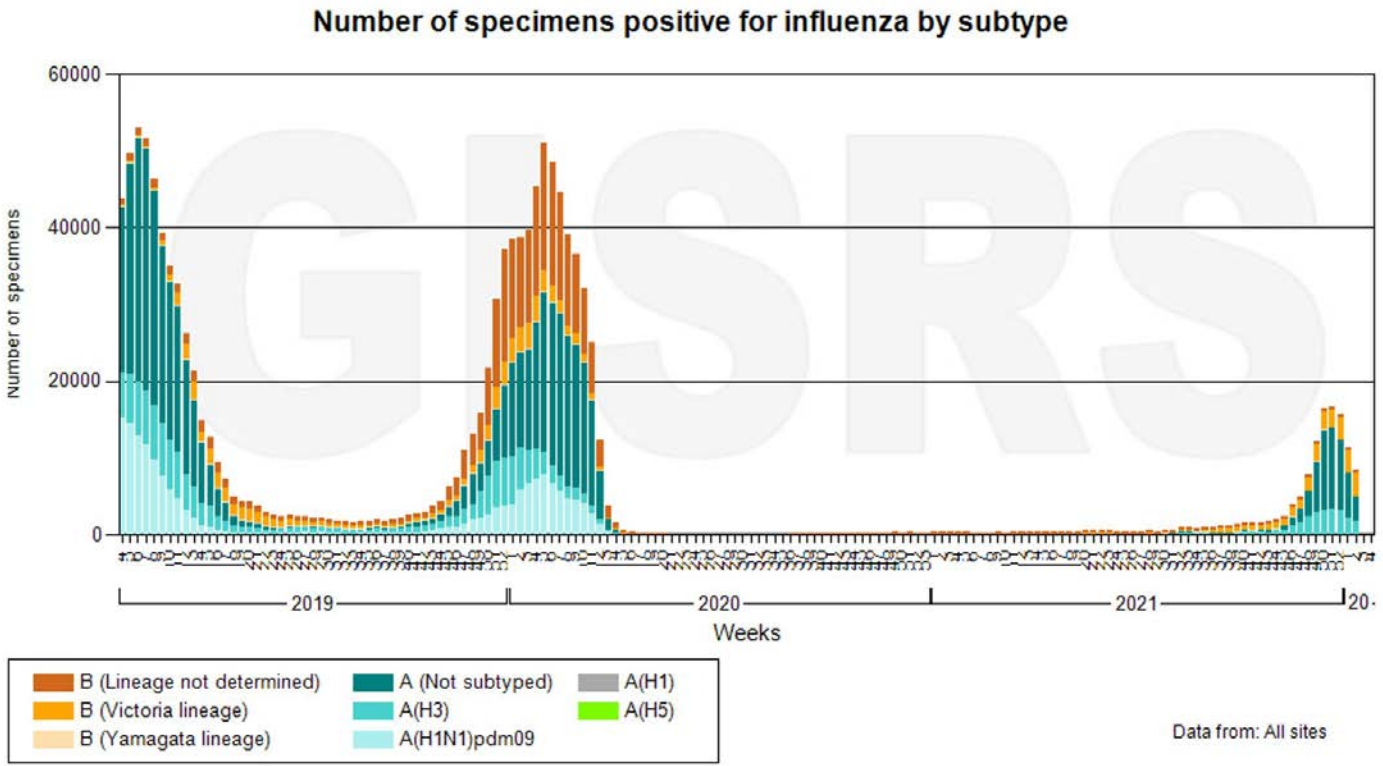


Australia



https://www.who.int/tools/flunet

Influenza viruses detected in NH 2019-22



https://www.who.int/tools/flunet

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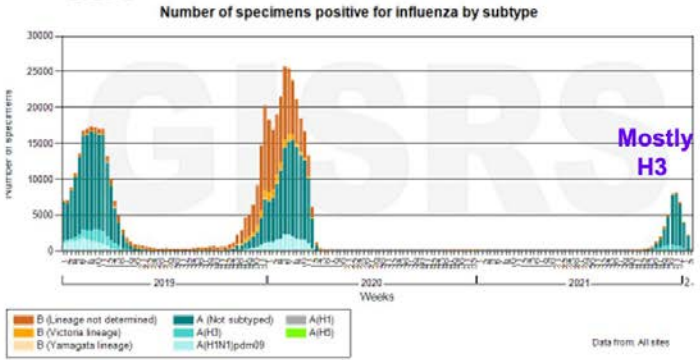
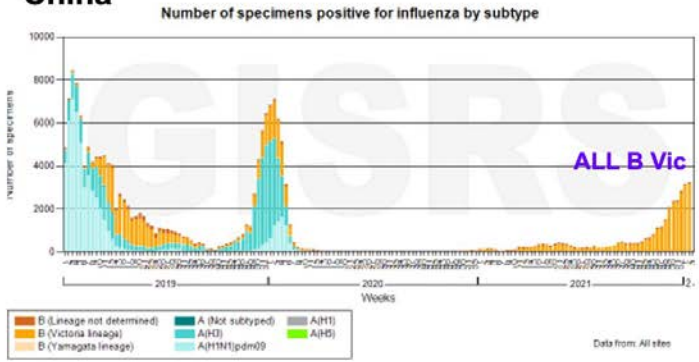
Influenza in selected NH countries - 2019-22

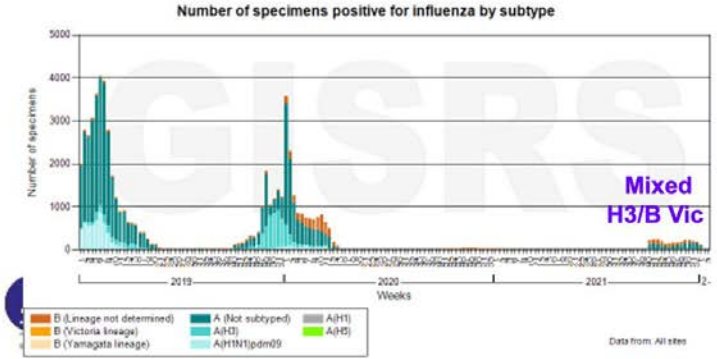
USA



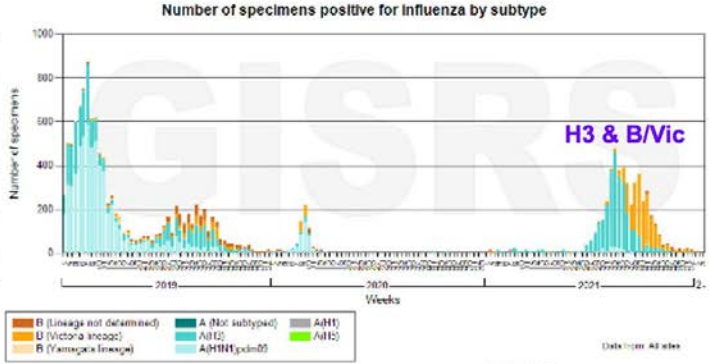
China



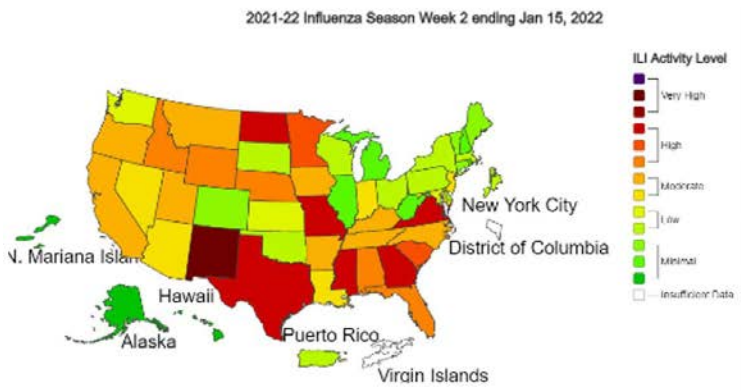
UK

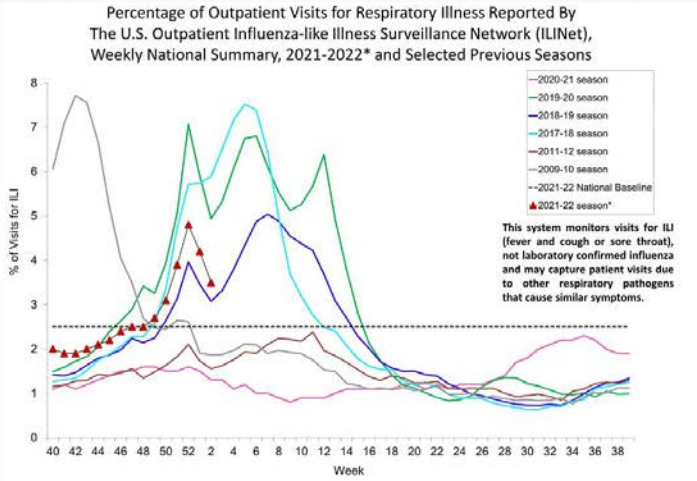


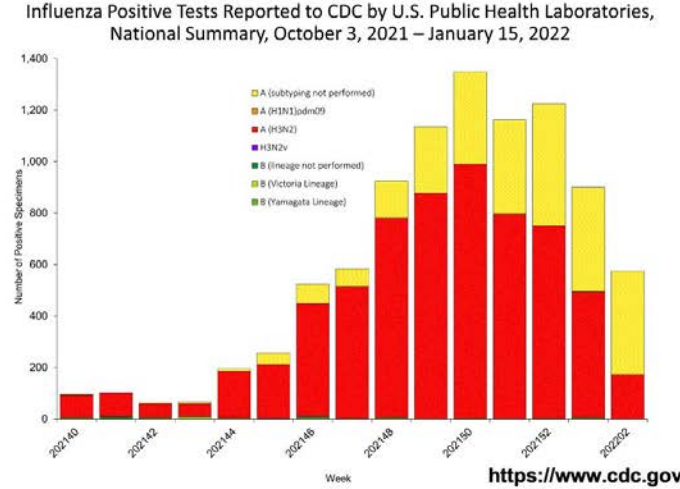
India

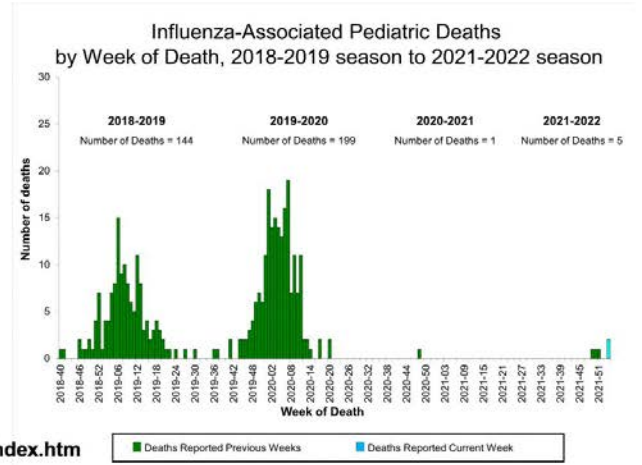


CDC data on influenza in USA IN 2021-2



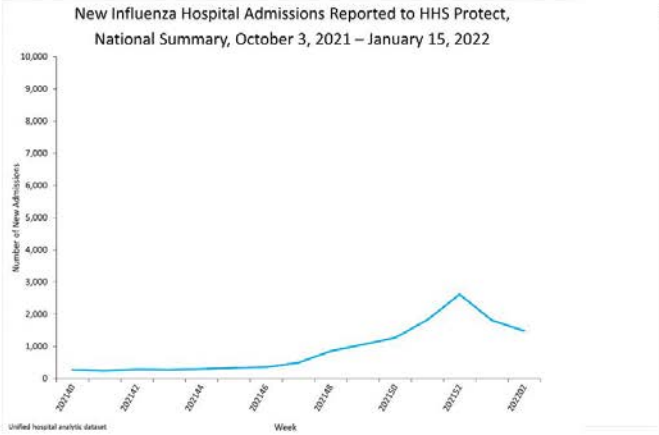


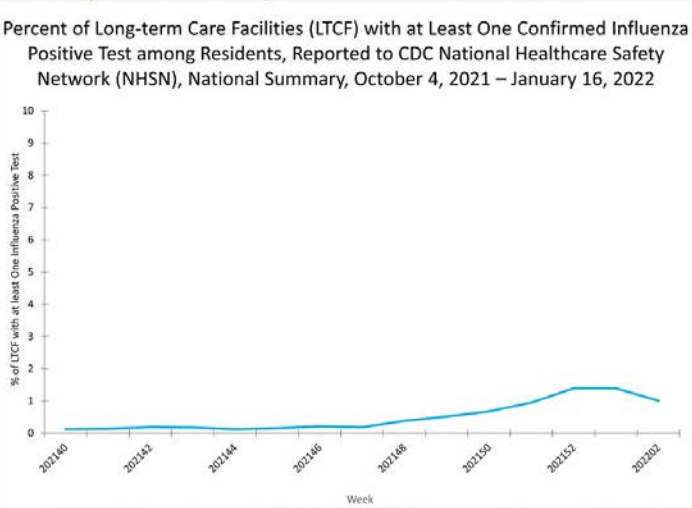


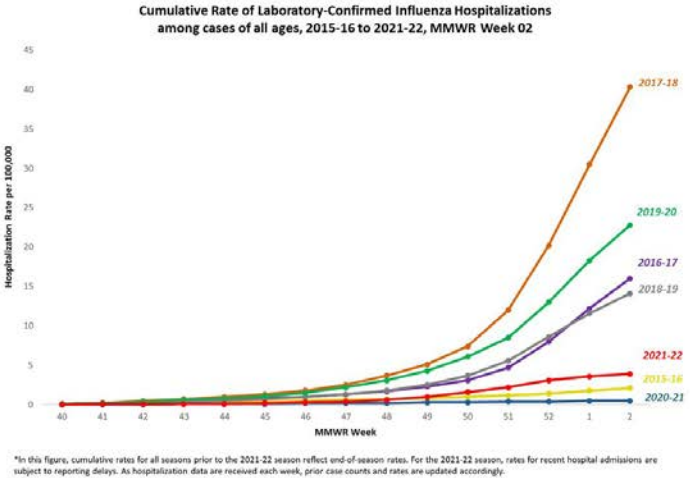


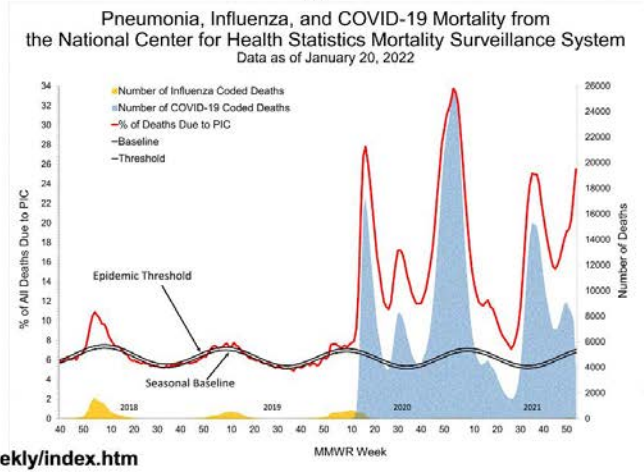
https://www.cdc.gov/flu/weekly/index.htm

USA; CDC hospitalization, LTCF, death data



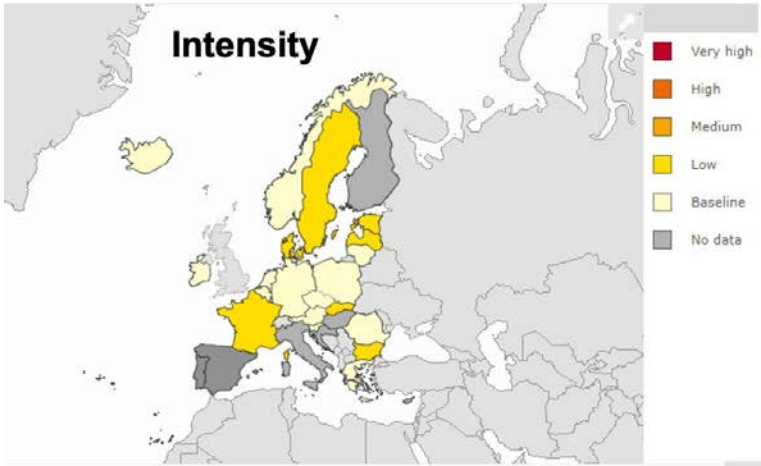


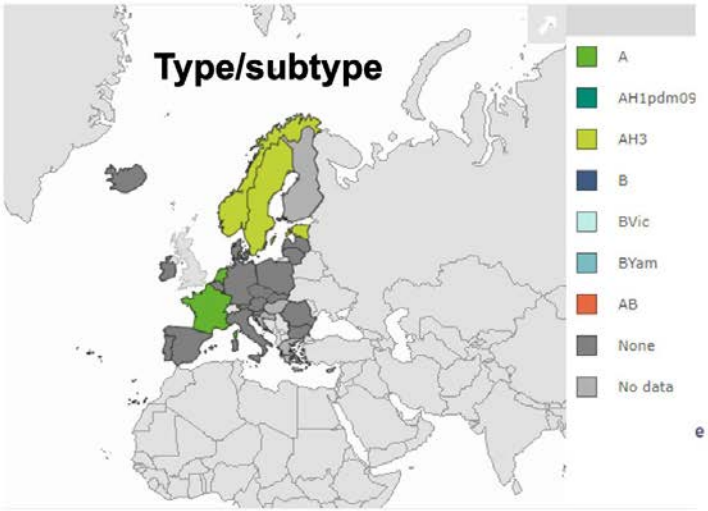




https://www.cdc.gov/flu/weekly/index.htm

Influenza in the EU (up to week 2 2022)





http://atlas.ecdc.europa.eu/public/index.aspx

And on the zoonotic front – “Asian” A(H5N1) HPAI has swept across Europe and is now in USA

MARYN MCKENNA SCIENCE JAN 24, 2022 8:00 AM

Bird Flu Is Back in the US. No One Knows What Comes Next

The fast-moving pathogen, which has already invaded Europe, was found in East Coast ducks. The last outbreak that tore through the US killed 50 million birds.

PHOTOGRAPH: JALAA MAREY/GETTY IMAGES

Maryn McKenna is a senior writer at WIRED covering health, public health and medicine, including the Covid pandemic, and a faculty member at Emory University’s Center for the Study of Human Health. Before coming to WIRED she freelanced for magazines in the US and Europe including Scientific American, Smithsonian.

https://www.wired.com/story/bird-flu-is-back-in-the-us-no-one-knows-what-comes-next/

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Summary

- 2021 an historically low influenza season in Australia – lowest ever
- 2021 even lower incidence of influenza seen in NZ
- Influenza A(H3N2) predominated in Aus but very few cases
- Vaccine match – very few viruses to determine but H1pdm good, H3/B not so good
- NO B-Yamagata lineage viruses detected AND confirmed globally since April 2020 - **?GONE**
- Record number of vaccines available in Australia in 2021 – 20.5m doses – reduced uptake
- No oseltamivir/zanamivir resistant viruses detected; No baloxavir marboxil resistance
- A single hospital admission and NO deaths in Australia due to influenza
- Vaccine Effectiveness: Australia; ??? Too few viruses in post vaccination period to calculate!
- Resurgence of many other respiratory viruses has occurred in 2020-2021
- Influenza activity 2021-2 in Nth Hemisphere variable; increased USA, moderate in China (all B/Vic viruses no influenza A detected, Japan virtually no influenza circulating currently
- H3N2 + B Vic components of Australian/NZ 2022 vaccine updated from 2021
- Likely to be ongoing challenges in increasing influenza vaccination rates in 2022 in 6m-64y of age if low influenza circulation continues and COVID-19 boosters, distribution issues etc
- Prediction for 2019: A moderate year with mixed viruses and more H3N2!! ✗ ✓
- Prediction for 2020: A quiet year with H1pdm viruses predominating!! ✓ ✓
- Prediction for 2021: A very quiet year with H3 viruses predominating!! ✓ ✓
- **Prediction for 2022: A low-moderate year with H3 viruses predominating!!**

Acknowledgments

- Various influenza reports
  - Australian influenza surveillance report
  - NSW COVID-19 weekly report
  - ESR Influenza weekly update
  - CDC Fluview
  - ECDC Influenza report
  - WHO reports
  - AIR influenza database
- NICs and labs that have sent us samples
- Staff at Melbourne WHO CC
- Sheena Sullivan for VE data
- Other WHO CC's, TGA
- Surveillance Division of OHP, Commonwealth DoH
- WPRO and WHO HQ Geneva