



Folkhälsomyndigheten  
PUBLIC HEALTH AGENCY OF SWEDEN

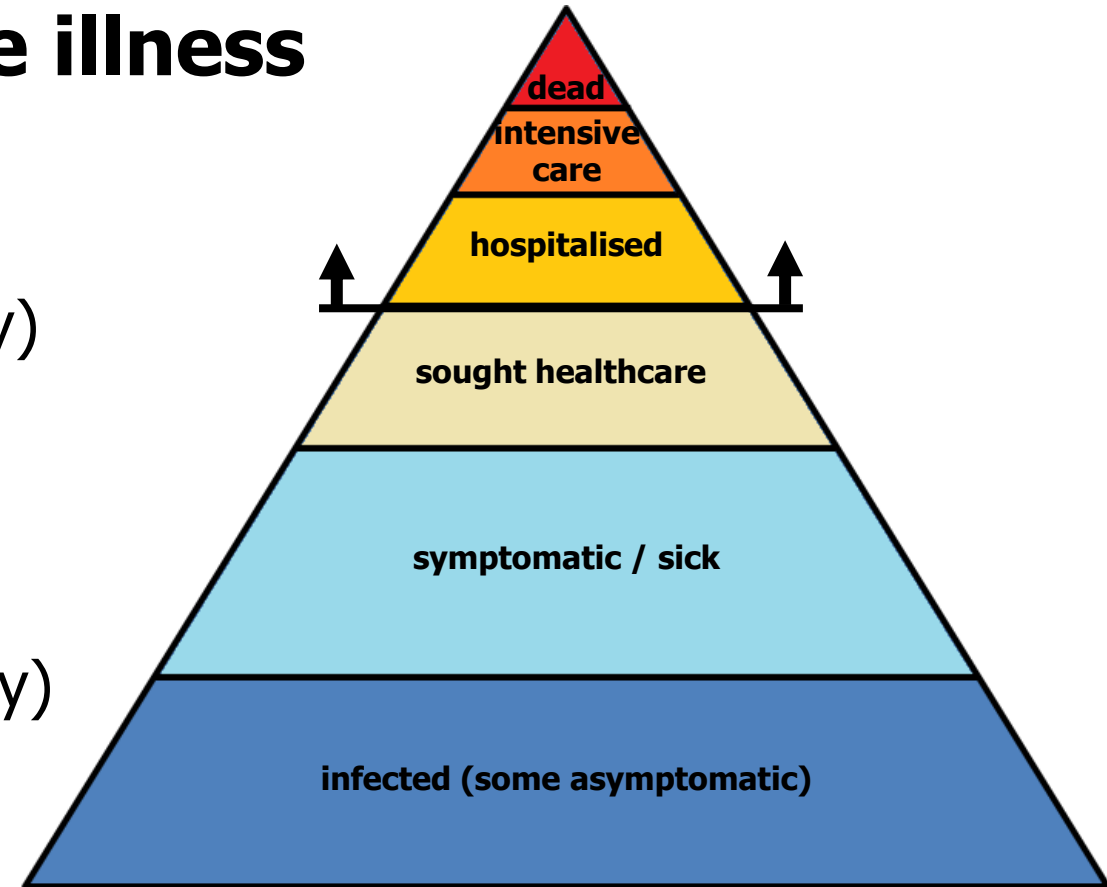
# Surveillance of severe influenza and COVID-19 in Sweden

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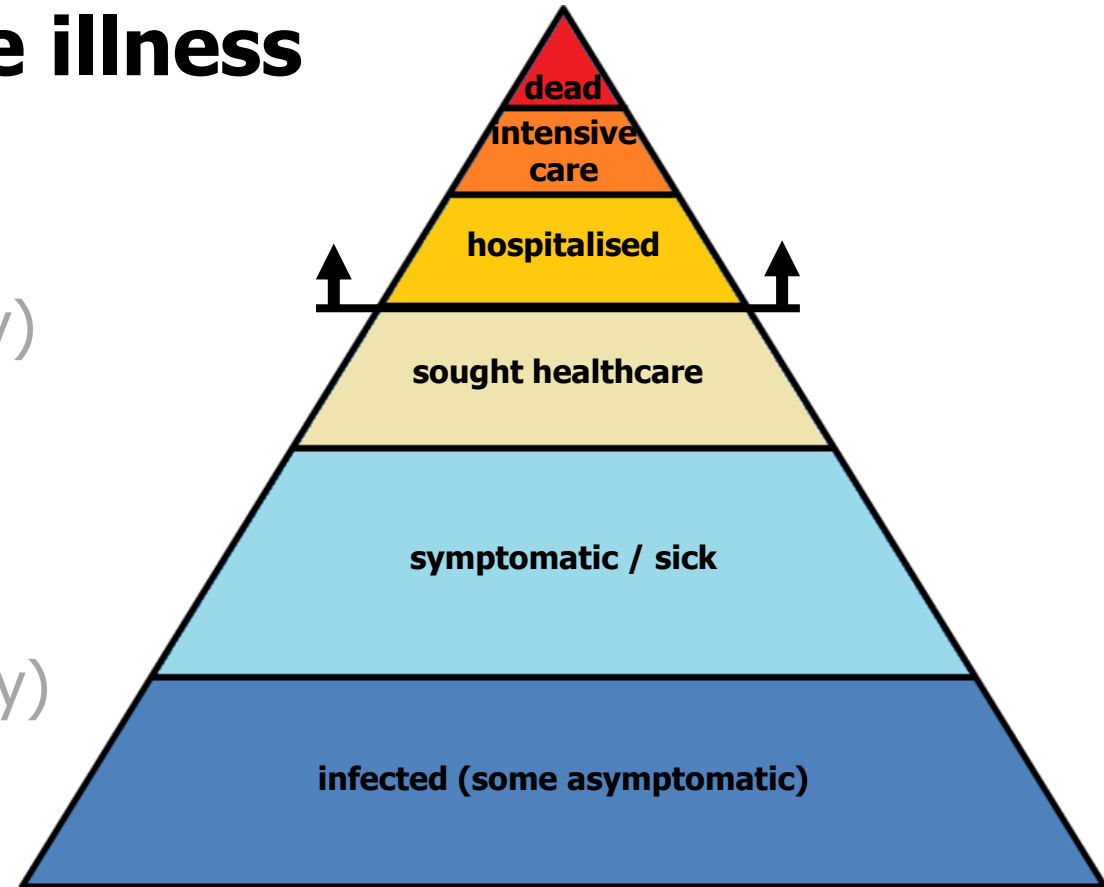
# Surveillance sources for severe illness

- Hospital/intensive care bed occupancy
- Hospital admissions (with significant delay)
- Intensive care admissions
- Deceased laboratory-confirmed cases
- Cause of death data (with significant delay)
- Excess mortality modelling
- Virus characterisation and sequencing, including antiviral resistance monitoring, monitoring of genetic groups



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# Surveillance of intensive care admissions

- All patients admitted to intensive care with laboratory-confirmed influenza or COVID-19
  - Combined with mandatory notifications from laboratories
- Developed during the 2009 influenza pandemic
- Nearly universal coverage, ca 10 million population
- Data from the Swedish Intensive Care Registry added once care ends
  - <https://www.icuregswe.org/en/>
- Year-round surveillance

# Variables collected upon intake

- Virus and subtype (if available)
- Travel abroad
- Risk group status
- Vaccination status
- Antiviral treatment
- Secondary bacterial infections
- Unusual symptoms (e.g. CNS or heart symptoms)

**Riskgruppstillhörighet\* (flerval)**

- ☐ Ingen
- ☐ Personer 65 år eller äldre - beräknas på personnummer
- ☐ Barn under 3 år, som fötts för tidigt (före graviditetsvecka 35)
- ☐ Gravida
- ☐ Hypertoni
- ☐ Kronisk hjärtsjukdom, oavsett ålder
- ☐ Barn med medfödda eller akuta hjärtfel
- ☐ Kronisk lungsjukdom (inklusive astma >3 år), oavsett ålder
- ☐ Nedsatt immunförsvar (av sjukdom, oavsett ålder)
- ☐ Kronisk leversjukdom

**SIRI-protokoll för influensa och virus**

**Steg 1 - Grunduppgifter**

IVA\*: Din egen avdelning kommer upp automatiskt när du loggar in med SITHS-kort

Personidentitet\* (enval)

☐ Korrekt (giltigt svenskt personnummer eller samordningsnummer): \_\_\_\_\_

☐ Reservnummer: \_\_\_\_\_

Om reservnummer angivits skall födelsedatum om möjligt anges: \_\_\_\_\_

Datum för insjuknande\*. Avser datum för första debut av symtom: \_\_\_\_\_

Vårdtillfällets start på IVA\*: \_\_\_\_\_

**Steg 2 - Diagnostik**

Laboratoriefynd\* (enval)

☐ Influensa A. Om Ja

Subtyp efter identitet på H- och N-proteinerna. (enval)

☐ H1N1

☐ H3N2

☐ H5N1

☐ H7N9

☐ Annan Subtyp (fritext): \_\_\_\_\_

☐ Subtyp ej känd

☐ Influensa B

☐ Coronavirus

☐ Covid-19 (SARS-CoV-2)

☐ RS-virus (Respiratory syncytial virus - RSV)

☐ Annat agens. Vilket agens? (fritext): \_\_\_\_\_

☐ Ej laboratorieverifierad

(vid stark misstanke om influensa eller annan svår luftburen luftvägssjukdom kan rapporter ske här, men skall ses som en ofullständig registrering och korrigeras alternativt raderas när laboratorieresvar anlämt)

**Steg 3 - Bakgrund**

Utlandsvistelse före insjuknandet. Avser utlandsvistelse <10 dagar för insjuknande\* (enval, ej aktuell om RS-virus angivits)

☐ Nej

☐ Ja. Om Ja kommer en lista upp på alla länder i världen. Välj vilket land som avses: \_\_\_\_\_

Är patienten vaccinerad mot influensa innevarande säsong (v40-v20)?\* (enval, ej aktuell om RS-virus angivits)

☐ Nej

☐ Ja

☐ Okänt

Skadeanmälan (fritext): \_\_\_\_\_

Skada i samband med cirkulationssvikt/hypoxi

# Variables added from the Swedish Intensive Care Registry

- Length of stay
- Interventions in intensive care (ECMO\*, mechanical ventilation, etc.)
- Primary diagnosis, secondary diagnoses
- Status at end of intensive care (died, moved to other ward, discharged)

\*ECMO = extracorporeal membrane oxygenation

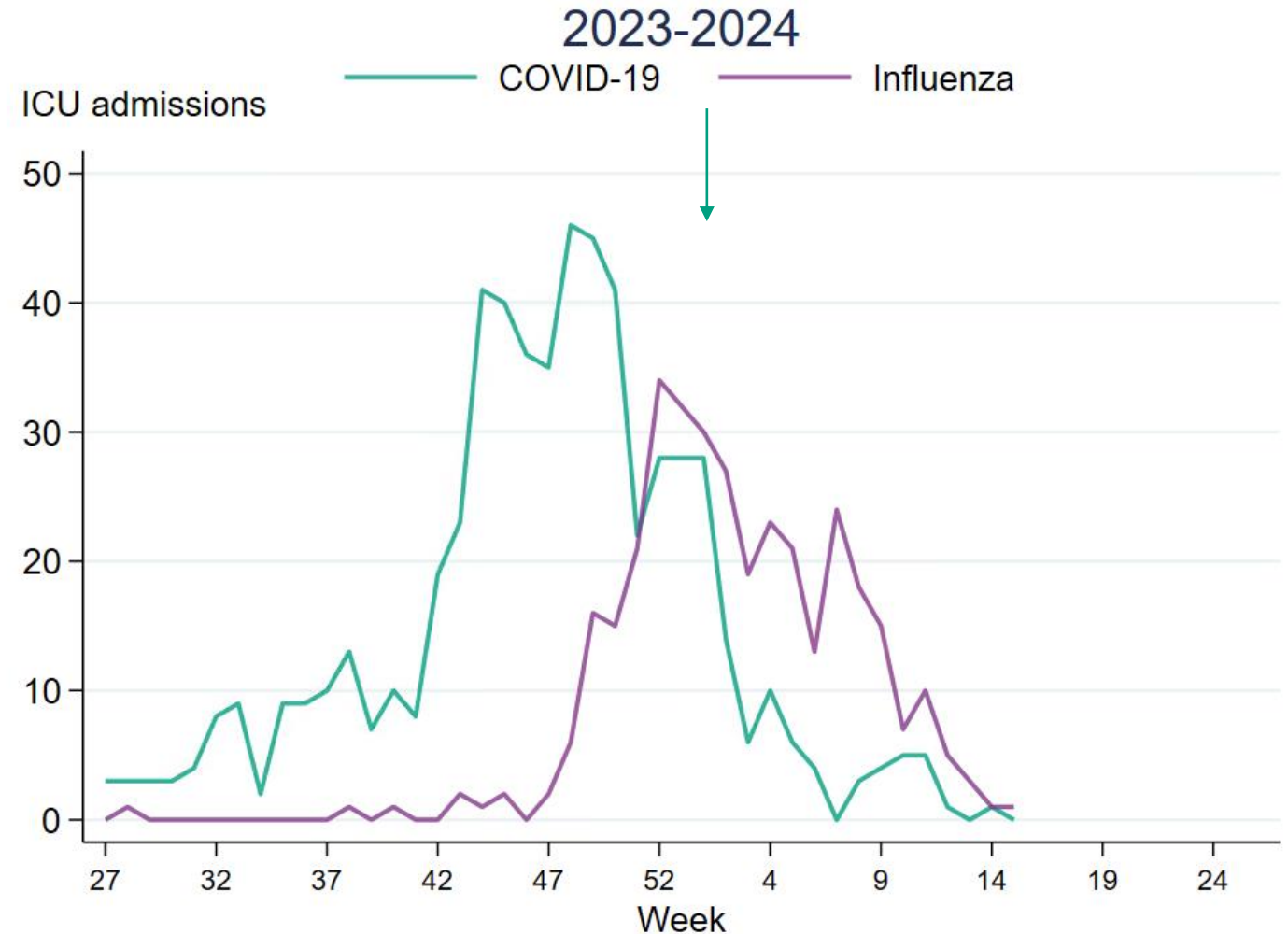
# The 2023-2024 season in Sweden

## Influenza (94 % flu A)

- 80 % of subtyped samples A(H1)pdm09
- Median age 61 years
  - 41 percent  $\geq 65$  years
- Peak week 52 (n=36)

## COVID-19

- Median age 71 years
  - 68 percent  $\geq 65$  years
- Peak week 49 (n=53)

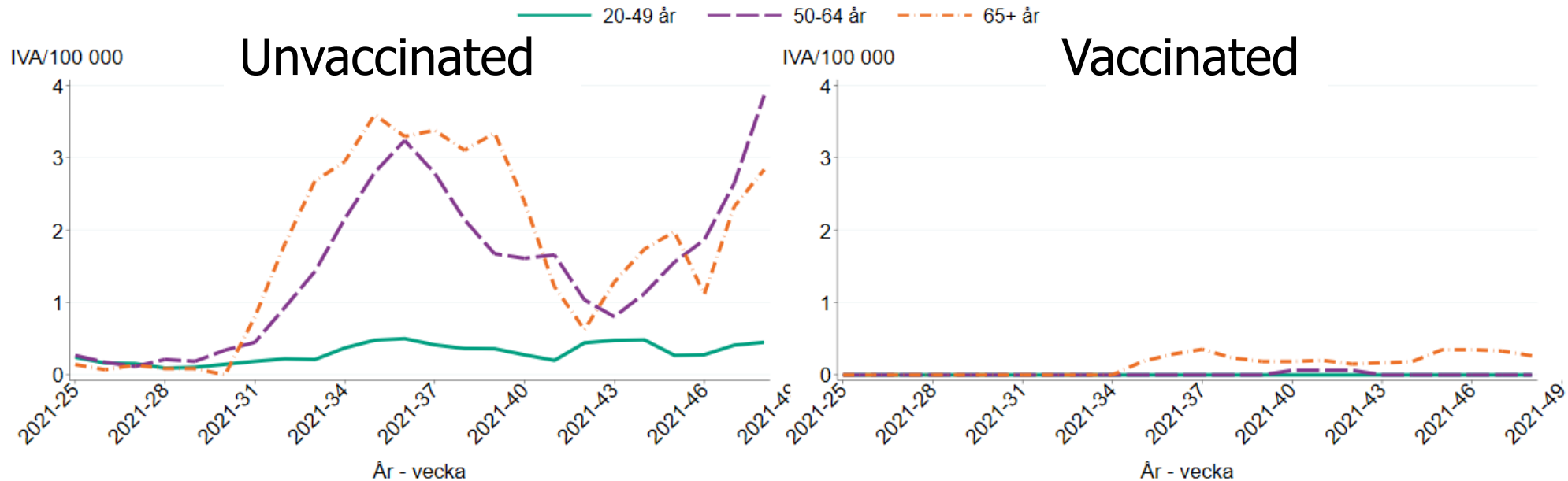


# COVID-19 intensive care incidence by week and vaccination status, 2021

- Three-week moving average of ICU admissions with COVID-19 per week (weeks 25-47, 2021)

## Legend

green solid: 20-49 yrs  
purple dashed: 50-64 yrs  
orange dot-dashed:  $\geq 65$  yrs





# COVID-19 intensive care rates

week 47 2022 – week 2 2023

■ Unvaccinated ■ Vaccinated ■ Vaccinated with autumn booster

ICU  
admissions  
per 100k

80

60

40

20

0

65-79 yrs

≥80 yrs

In-home  
care

Legend (left to right)

green: unvaccinated

purple: vaccinated

orange: autumn booster

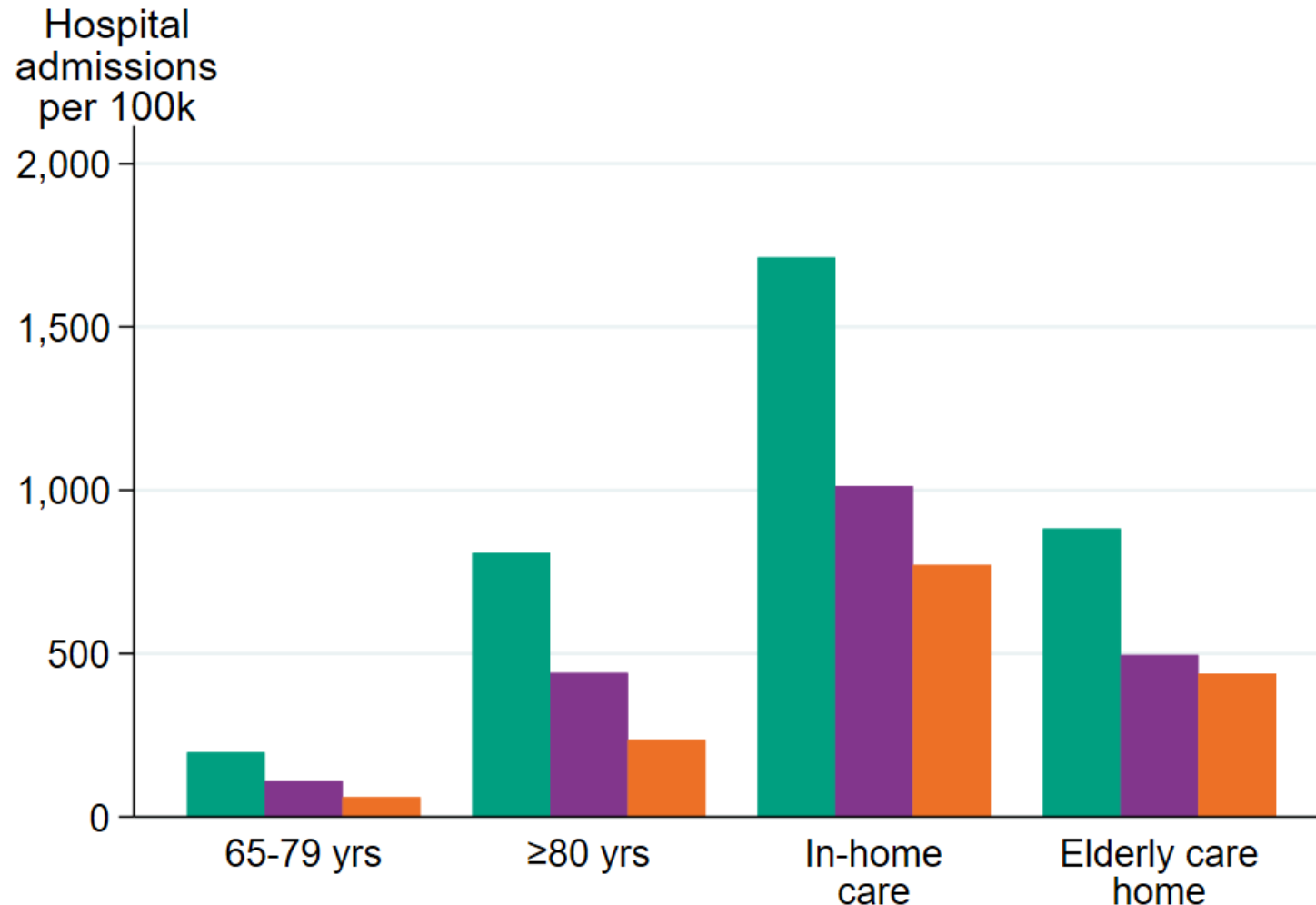


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# COVID-19 hospitalisation rates

week 47 2022 – week 2 2023

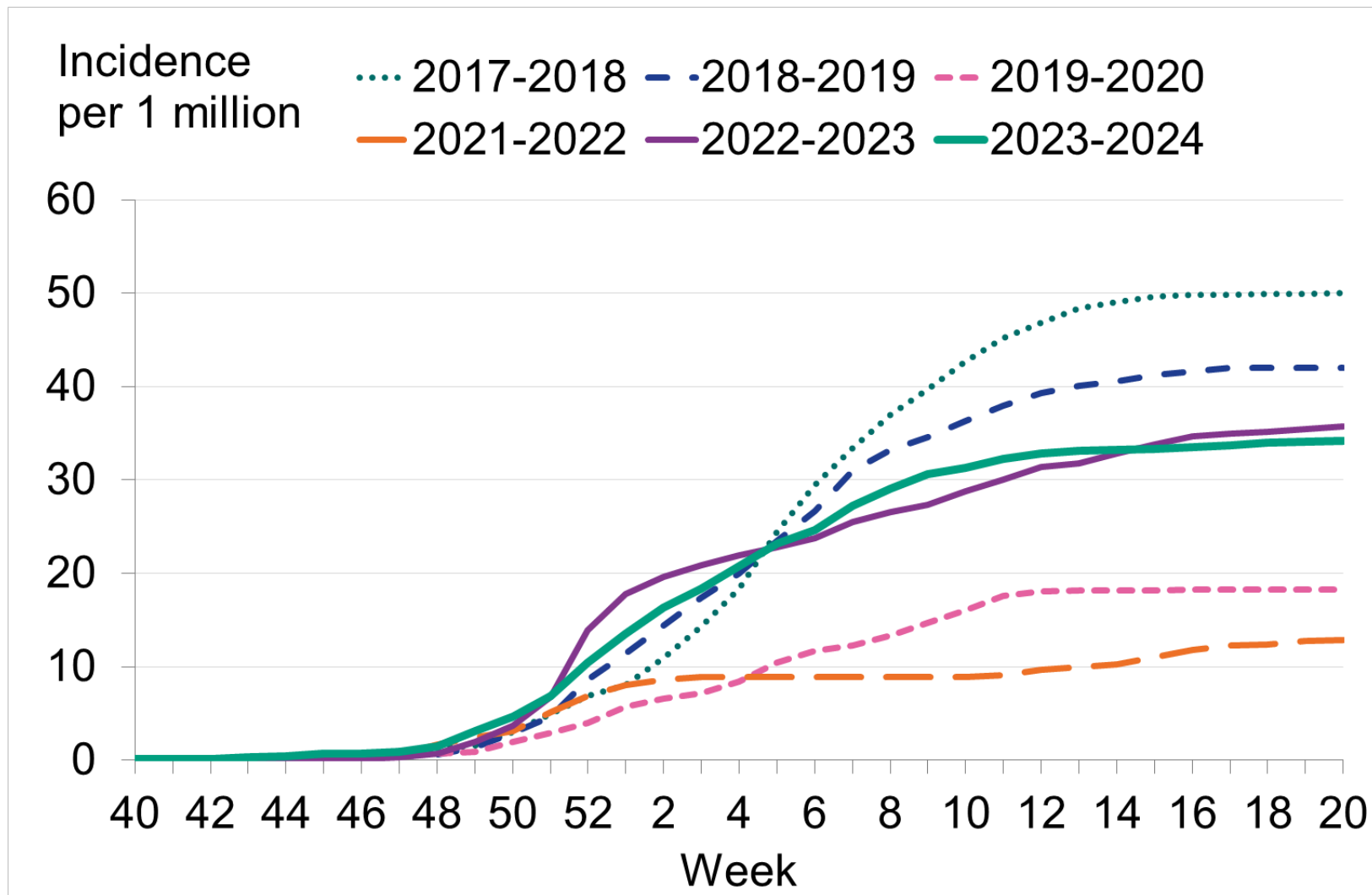
Unvaccinated Vaccinated Vaccinated with autumn booster



Legend (left to right)

green: unvaccinated  
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# Cumulative incidence of ICU admissions for influenza, per week and season



## Dominant types

**2017-18: B/Yam**

**2018-19: A/H1**

**2022-23: mixed season**

**2023-24: A/H1 and A/H3**

**2019-20: mixed season**

**2021-22: A/H3**

# Challenges and successes

## Successes

- Continuous data availability, most reported within one week
- Only highest level of care
  - Manual entry feasible
- National coverage (-ish)
- Flexible system, easy to add new pathogens
- In routine use

## Challenges

- Manual data entry
  - Delays longer in lower priority periods
- Only highest level of care
  - Does not give earliest warning
- Not all patient samples are subtyped or sent for further virological analysis
- New pathogens require prioritisation
- Some data comes from patient recall (flu vaccination)

# Lessons learned and future plans

- Systems in routine use before a pandemic, work during a pandemic
- National vaccination registry important for evaluation of interventions
- Systems requiring manual data entry should focus on most prioritised pathogens, at a feasible level of care
- Integration of surveillance of COVID-19, influenza and RSV continues throughout all levels of disease severity
- Evaluation and further development, identification of gaps and overlaps
- Preparedness for the next pandemic



# Thank you!

Foto: Elliot Elliot/Johnér

[www.folkhalsomyndigheten.se](http://www.folkhalsomyndigheten.se)



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