Examples of how health burden estimates are used to recommend adult vaccines in national vaccination programmes

Example NITAG (N-Europe): Finland

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Declaration of competing interests

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- Membership in several national vaccine-specific expert groups
- Member of National Advisory Committee on Vaccinations since 2014
- Adult Immunization Board (AIB) advisor 2023–2025

Introduction to the Finnish system

- Nordic high-income country
- Centralized NVP
- Vaccinations in the NVP are free-of-charge and voluntary
- Vaccines for the NVP are funded by taxes and procured through public tenders

The Finnish four steps approach
when evaluating whether a vaccine should be introduced into national vaccination programme

1. Expected public health benefit
2. Safety of vaccine individually
3. Safety effects on population level
4. Cost-effectiveness

National Advisory Committee on Vaccination (KRAR) 2003

How health burden estimates are used to recommend adult vaccines in NVPs?

- Health burden estimates are needed when assessing
  - expected public health benefit and
  - cost-effectiveness of the vaccination programme
- An economic evaluation supports the decision-making process

National vaccination programme (NVP) in Finland

- Vaccinations are free-of-charge and voluntary
  - Childhood vaccinations : protection against 13 diseases
  - Adult vaccinations (boosters)
  - Vaccinations for risk groups (e.g. influenza, BCG, PCV, TBE)
- Vaccine procurement for the NVP
  - Centrally through public tenders
  - Funded by the government budget
  - Government budget appropriations for vaccine purchases were 32 million euros in 2022 (covid-19 vaccines not included)
    - <1% of the total health expenditure

Adult risk-group vaccinations in the NVP

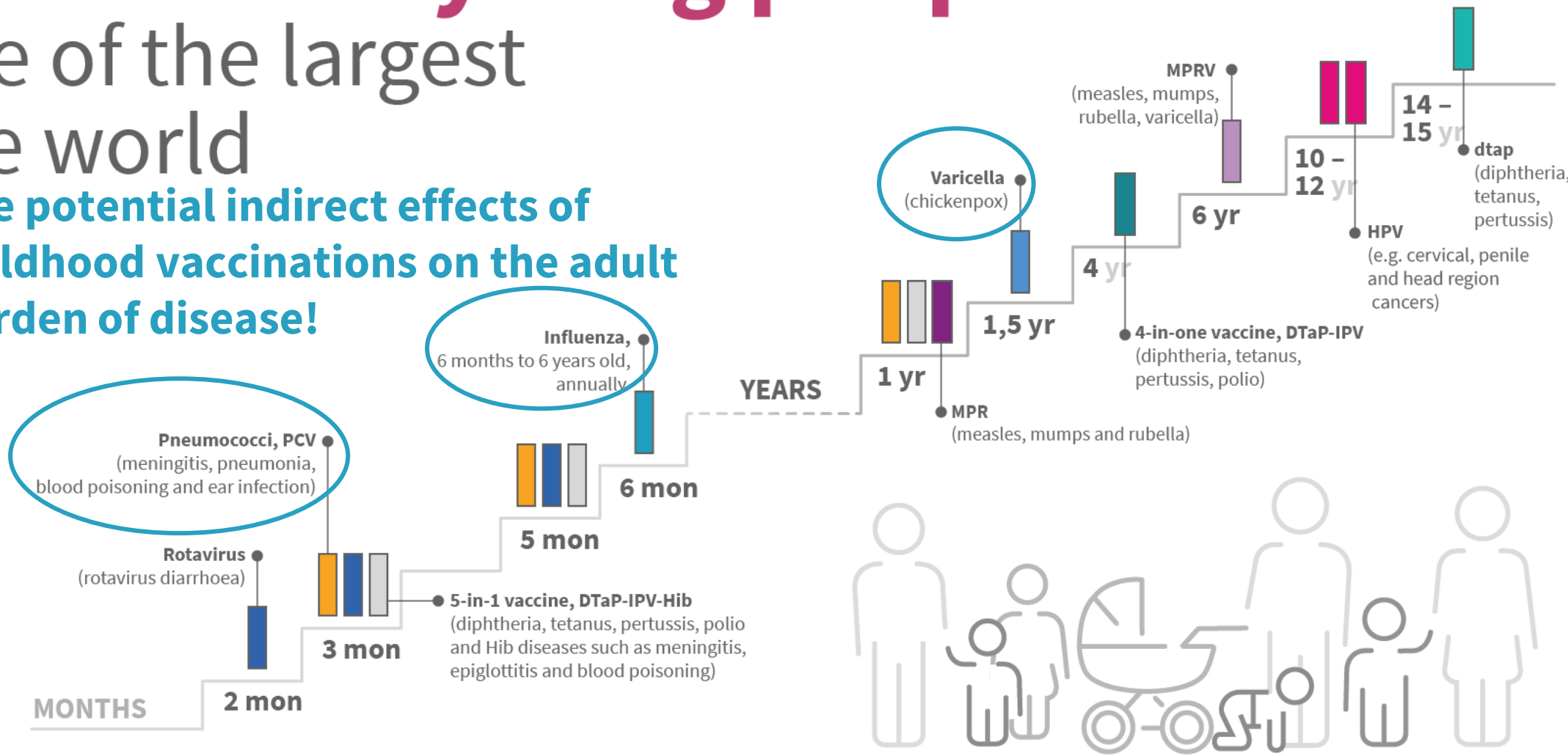
- Influenza
  - 65+ yrs, HCWs, pregnant women
  - Certain medical conditions or treatments
- Tick-borne encephalitis (TBE) vaccine
  - Targeted to areas with a high incidence of TBE (>15/100 000)
- Pneumococcal vaccination (more details later)
- Hepatitis A and B (low incidence)
  - Persons with an increased risk of hepatitis A or B
- Meningococcal vaccinations (low incidence)

https://thl.fi/en/web/infectious-diseases-and-vaccinations/information-about-vaccinations/vaccination-programme-for-children-and-adults

The vaccination programme for children and young people

is one of the largest in the world

The potential indirect effects of childhood vaccinations on the adult burden of disease!



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Source: Finnish Institute for Health and Welfare 2020

Heini Salo, THL

Register-based surveillance

- Population-based nationwide administrative register data that is individually linkable and real-time
- Disease burden, effectiveness, safety, coverage

Registers:

- Finnish National Infectious Diseases Register
- Care Register for Health Care (hospitalizations, secondary outpatient care
- Register of Primary Health Care Visits
- Vaccination register

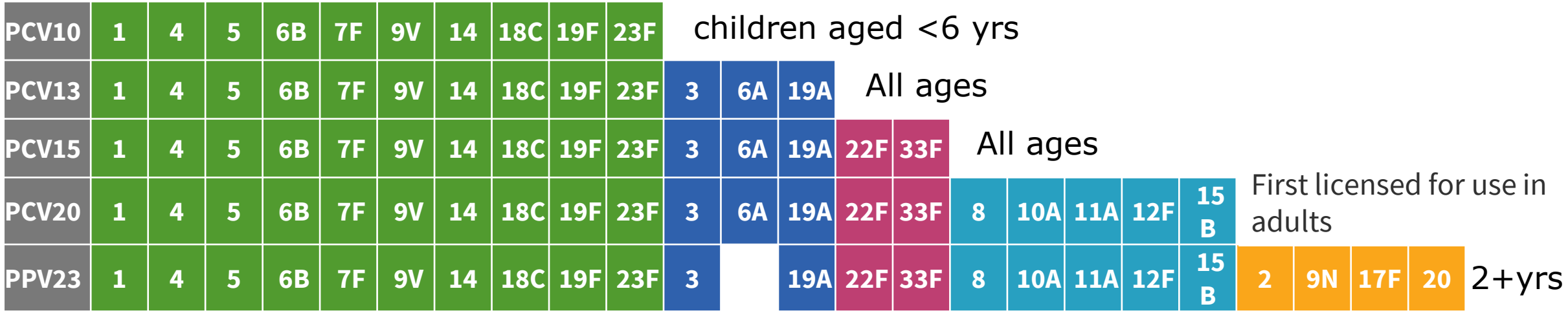
Pneumococcal vaccinations for risk groups

Infant PCV10 programme started in 2010

- Finnish Invasive Pneumococcal disease (FinIP) vaccine (PCV10) effectiveness trial 2009–10
- Introduction of PCV10 into the NVP in September 2010
- PCV10 is still used in the NVP
- Vaccine product is selected in a tendering process
  - Economic evaluation is used for the criteria of the tendering process http://en.opasnet.org/w/Tendering_process_for_pneumococcal_conjugate_vaccine

Pneumococcal vaccine serotypes (vaccine types, VT)

~100 different serotypes of pneumococcal bacteria



Pneumococcal conjugate vaccines (PCVs)
Pneumococcal Polysaccharide Vaccine (PPV)

The indirect effects of childhood PCV programmes

- Infant programme decrease vaccine-type (VT) nasopharyngeal (NP) carriage
- Pneumococcal disease caused by VT-serotypes decrease in vaccinated children and in the unvaccinated population (**herd protection**)
  - E.g. in Finland invasive pneumococcal disease (IPD) caused by VT-serotypes have almost disappeared
- VT serotypes are replaced with non-VT serotypes (**serotype replacement**)
  - reduces the net effectiveness of the vaccines
- Serotype replacement in Finland:
  - low in children,
  - higher among adults (especially elderly aged 65+yrs)

Impact of infant PCV10 programme on the IPD serotype distribution in adults in Finland

Persons aged 65+ yrs

- had the greatest increases in non-PCV10 st
- Percentages of IPD cases caused by vaccine-type st
  - PCV13 st 47%
  - PCV15 st 58%
  - PCV20 st 66%
  - PPV23 st 67%

Most common non-PCV10 serotypes: 19A (23.6%), 3 (15.6%), 6C (12.9%) and 22F (10.0%)

In epidemic years 2004/10 and 2017/19
(National Infectious Diseases Register)

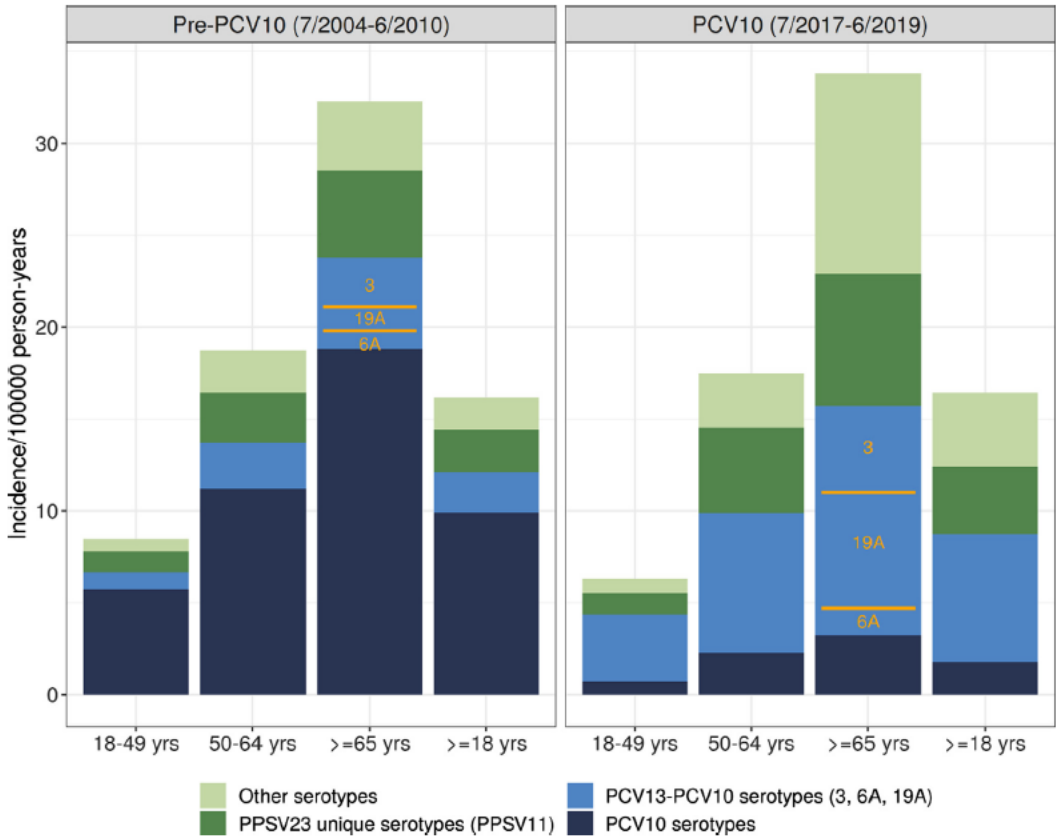
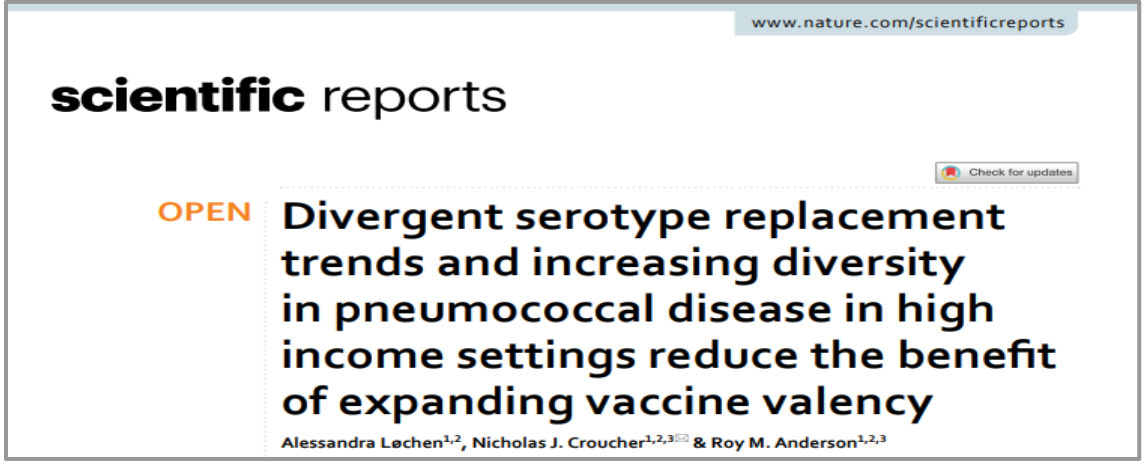


Fig. 4. Changes in absolute incidence rates of invasive pneumococcal disease in adults ≥18 years of age by pneumococcal vaccine serotype-group before and after infant PCV10 introduction. Pre-PCV10 period: July 1, 2004–June 30, 2010. PCV10-period period (last two years): July 1, 2017–June 30, 2019.

Nuorti et al. Vaccine 2022
https://pubmed.ncbi.nlm.nih.gov/36075797/



Løchen et al. Sci Rep 2020
https://www.nature.com/articles/s41598-020-75691-5

The countries included:
Australia, Finland, France, Norway, US

- Overall national IPD incidence decreased in all countries following the introduction of PCV7 and PCV10/13
- The childhood PCV programmes (as a consequence of **serotype replacement**)
  - Have chanced the serotype distribution in countries and between countries
  - There are **no specific dominating serotypes common to all countries**, as pre-vaccination with PCV7 or PCV10/13
- Future vaccines with additional serotypes might be less effective in global populations than previous PCVs
- Post-vaccination **surveillance data on serotype distribution and serotype-specific invasiveness is needed**
  - expanding the current vaccination programmes
  - increasing vaccine valency

Finland: risk-groups entitled to pneumococcal vaccination in the NVP

- Stem cell transplant recipients
- Severe chronic renal disease aged <75 yrs
- Chronic obstructive pulmonary disease (COPD) aged 65–74 yrs

- Favourable recommendations but pending funding
  - Astma aged 65–74 yrs
  - Severe disorders of the immune system <75 yrs
  - COPD and Asthma aged 75–84 yrs

- risk-group vaccinations are extended according to an economic evaluation
  - *Wikman et al. Economic evaluation of pneumococcal vaccinations among high-risk groups in Finland. Virtual ISPOR 2020, May 18-20, 2020


many thanks!