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He/him

Country: Finland

Affiliation: Finnish Institute for Health and Welfare

Function: Statistician

Main expertise (1-2 lines): Ten years of experience working with register-based epidemiological analyses, with a focus on vaccine safety. Has developed register-based safety surveillance methods in the context of a large register-based influenza vaccine trial. Tuomo is completing a PhD in statistics at the University of Helsinki.

Finnish national registers in clinical trial settings

Adult Immunization Board

Helsinki 4.12.2024

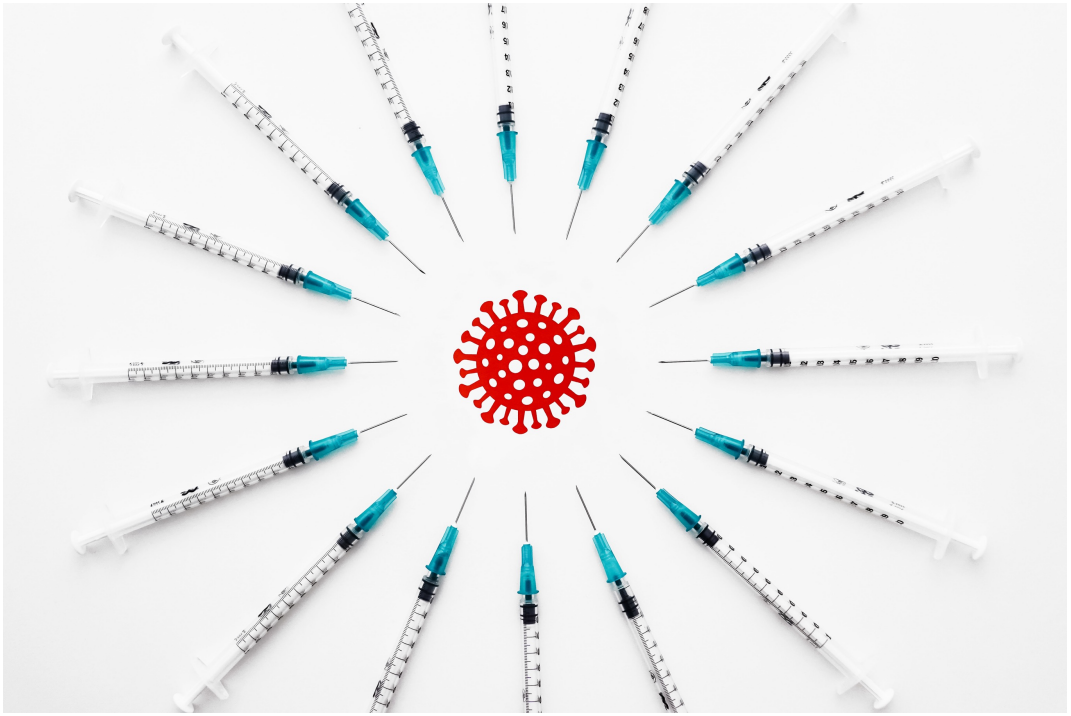
Tuomo Nieminen

Finnish Institute for Health and Welfare

04/12/2024

Outline

- Rationale for a register-based clinical trial
- Register data flows, delays, operationalisation
- Case FinFluHD: novel register-based safety surveillance



Rationale for a register-based clinical trial

If the registers are real-time, safety data can be collected and evaluated with novel comprehensive approaches.

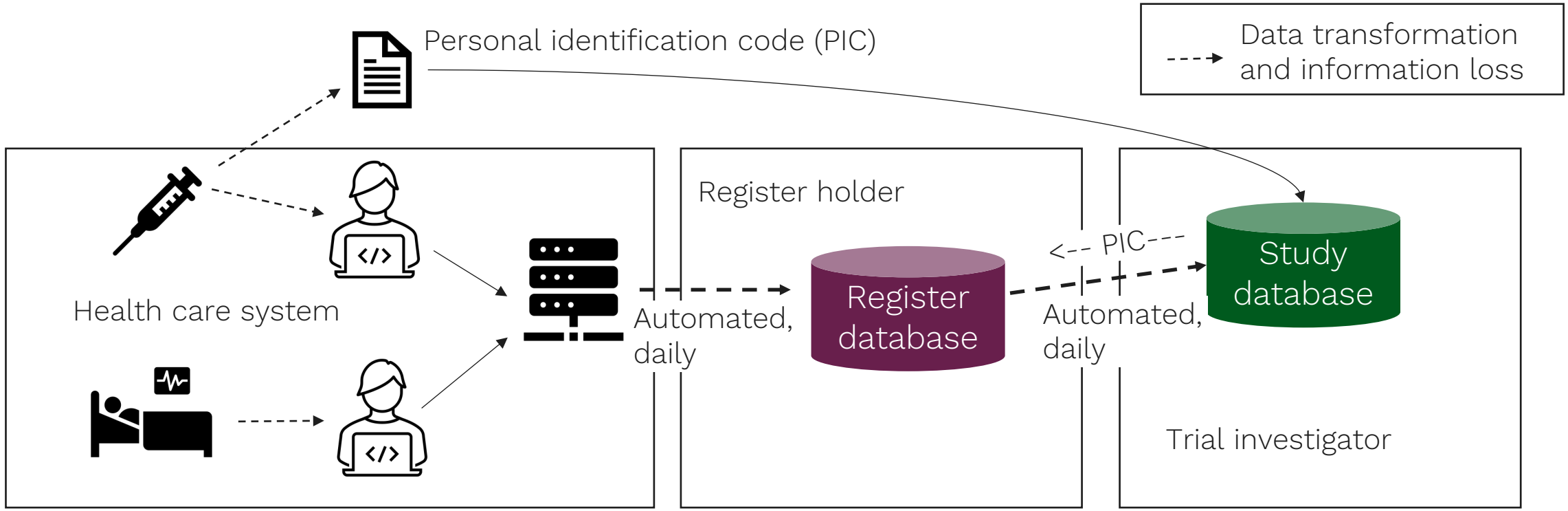
When studying rare rare health outcomes, studies using conventional active surveillance to capture events would necessarily be large and expensive.*

The collection of large sets of health data in national electronic registers provides a cost-effective data collection method and allows assessment of health outcomes within a real-world healthcare practice.

The study design in a register-based setting can still be a randomized clinical trial with an active intervention.

*Hollingsworth at al. https://doi.org/10.1016/j.ahj.2021.03.007

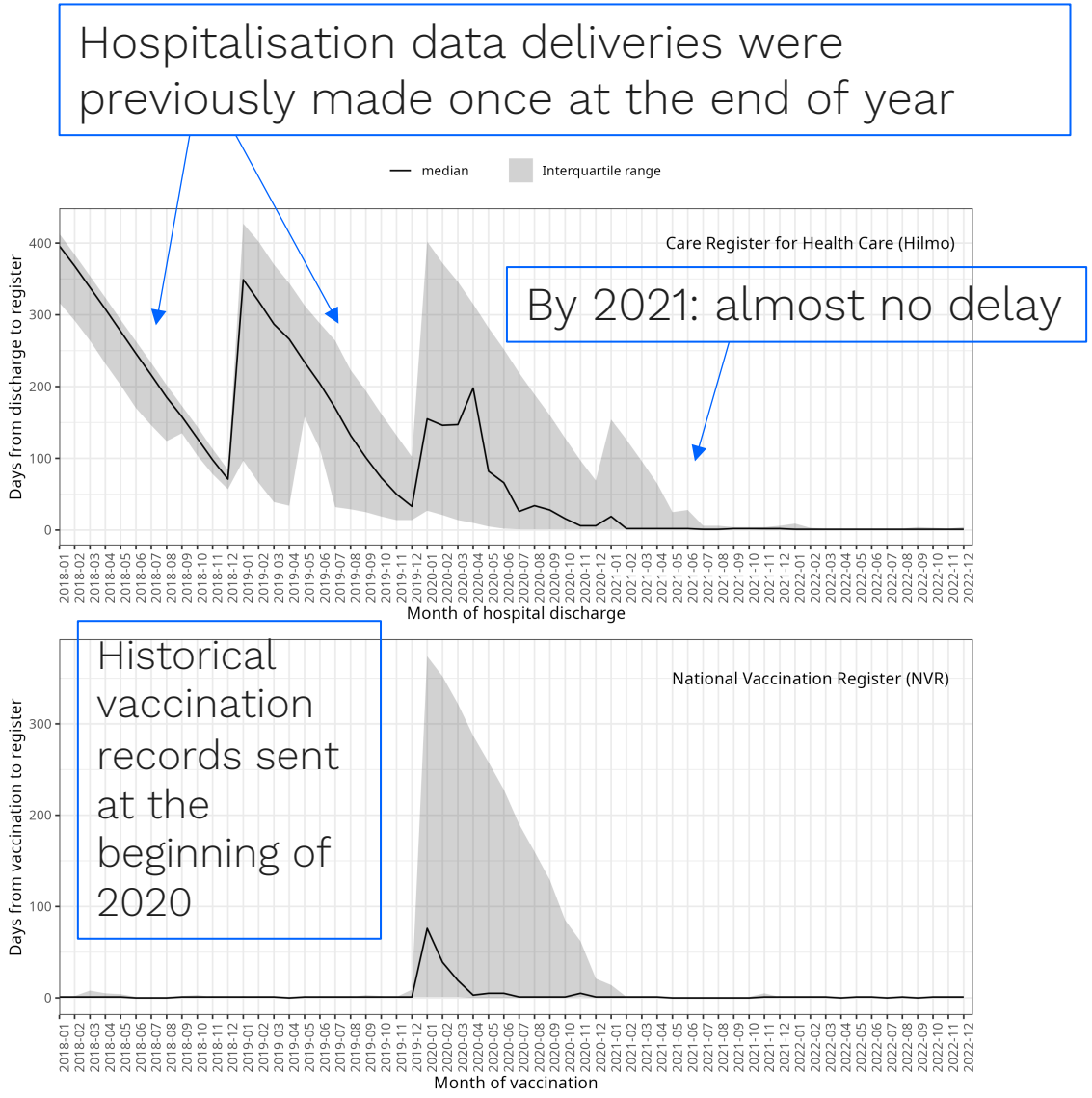
Register-based vaccine trial data flow



Register delays in hospitalisations and vaccinations in Finland

The Care Register for Health Care (Hilmo) changed into a real-time register during 2020–2021. The coverage was 95% already by 2012*

The National Vaccination Register (NVR) is a real-time register, but a lot of historical records were sent at the beginning of 2020. The coverage is excellent especially after large private health care providers joined the data collection in 2020.



*Sund et al. 2012 https://doi.org/10.1177/1403494812456637

Image from 'Development of real-time surveillance for serious adverse events in a pragmatic clinical trial using national registers in Finland'. In press

Operationalisation of an outcome event

Health registers do not necessarily include direct structured information related to the specific disease/symptoms of interest, but rather the outcome event must be operationalised.

- This includes development of an algorithm which identifies the specific disease/symptoms of interest.
- The algorithm may simply be a list of ICD-10 disease classification codes, but is often a more complicated list of rules.

Identifying emergency room-, inpatient-, and outpatient visits from the Hilmo register

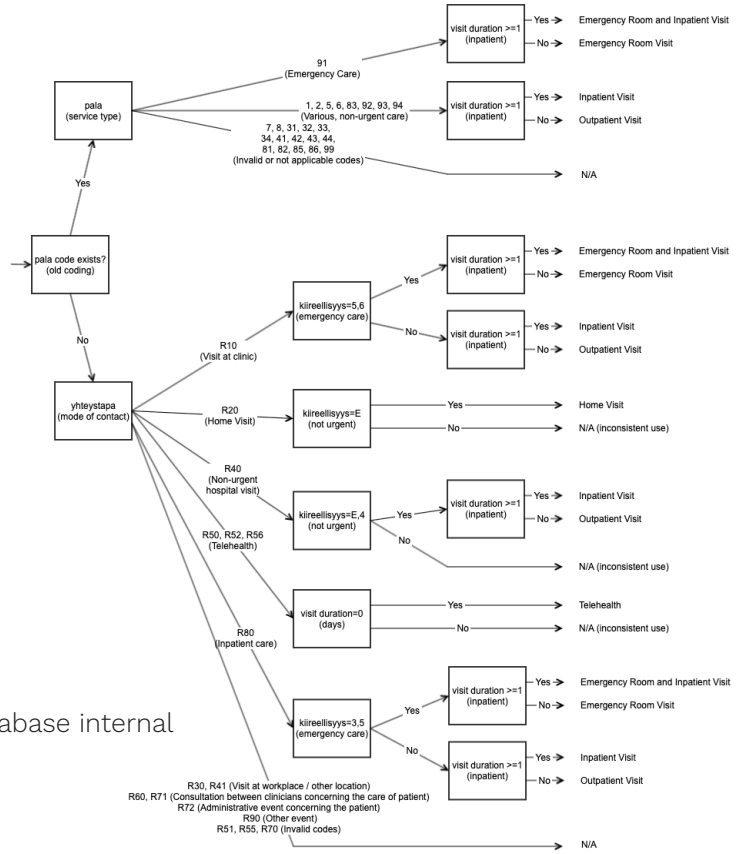
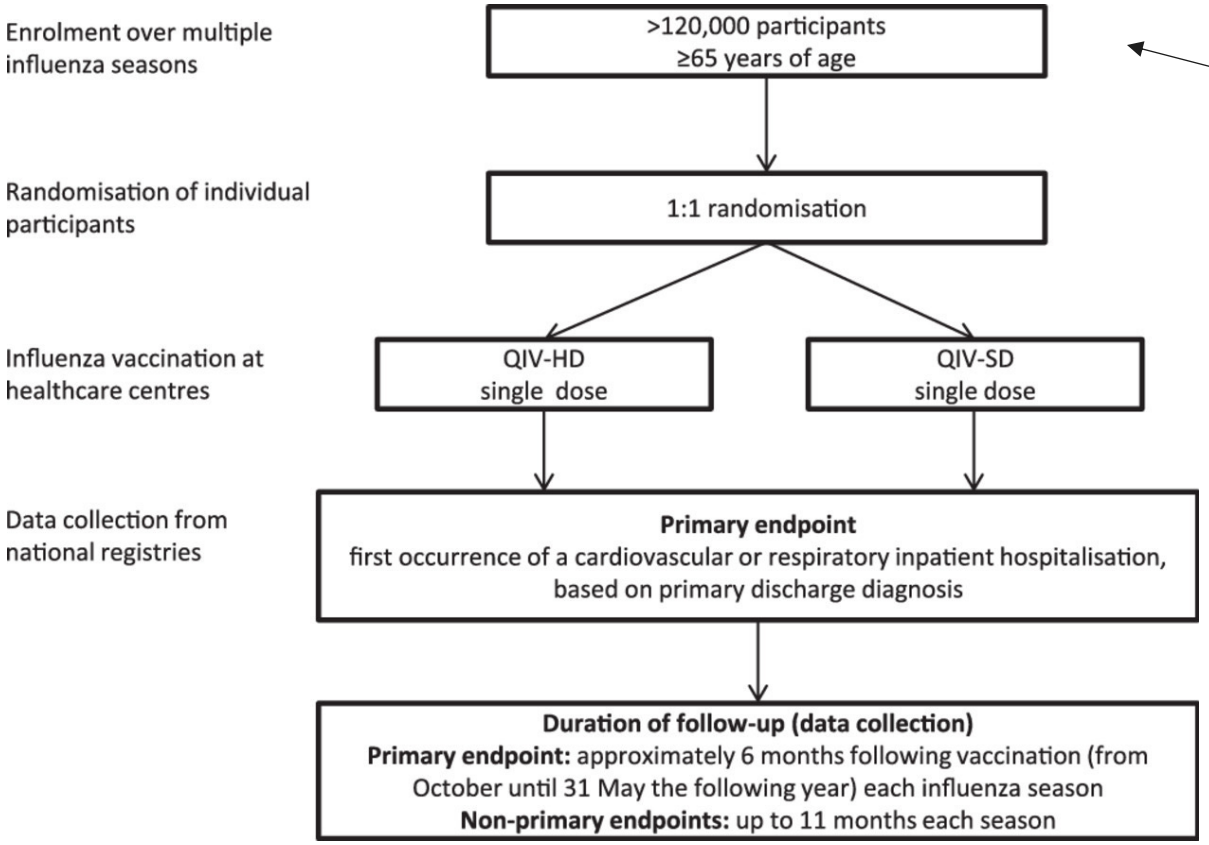


Image: THL OMOP database internal documentation

FinFluHD: a pragmatic influenza vaccine trial



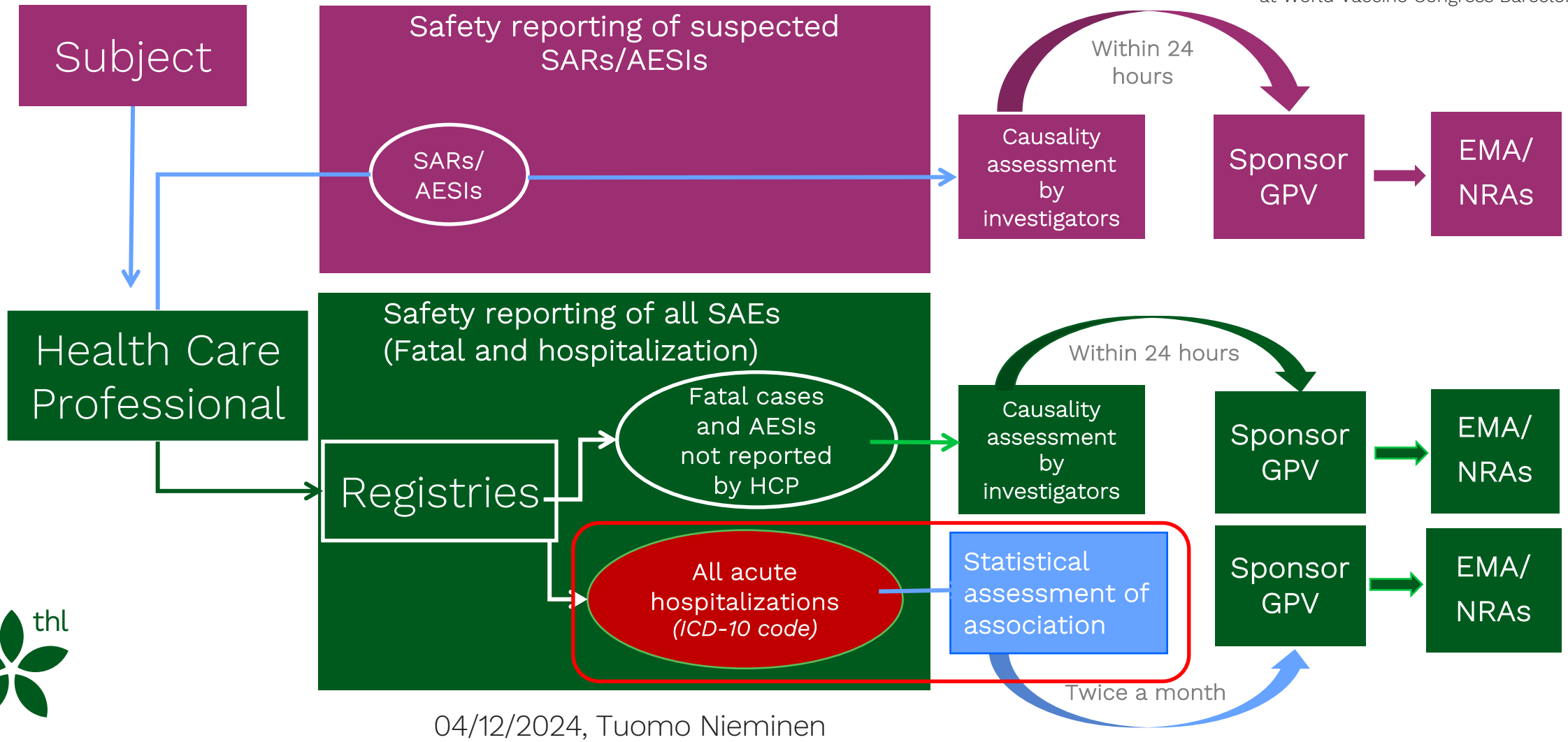
Recruited ~33,000 participants for 2019–2020 season.

The study was terminated after one season due to COVID-19. (Palmu et al. https://doi.org/10.1111/irv.13270)

Image from Hollingsworth et al 10.1016/j.ahj.2021.03.007

Safety surveillance in the FinFluHD trial

Image from poster by Nieminen et al. presented at World Vaccine Congress Barcelona 2024



FinFluHD SAE surveillance observational cohort study

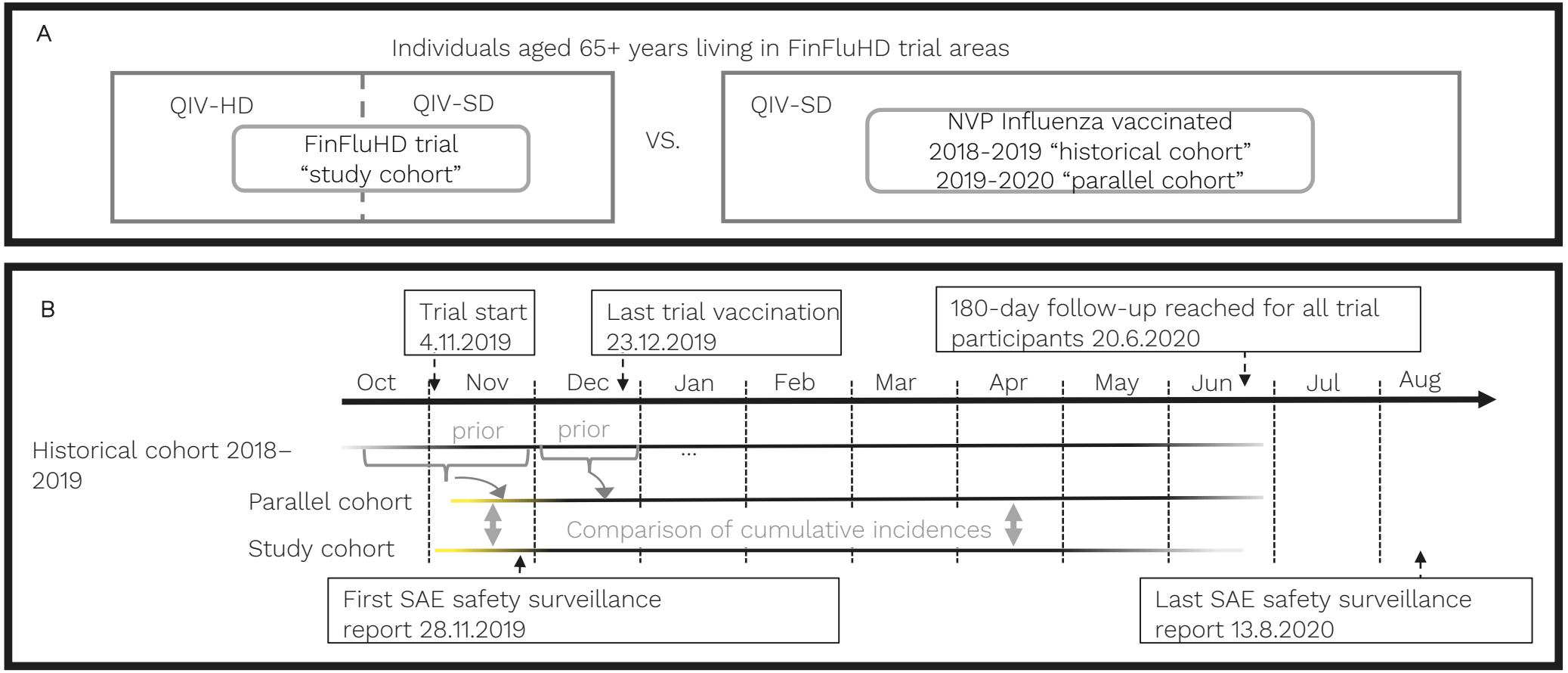
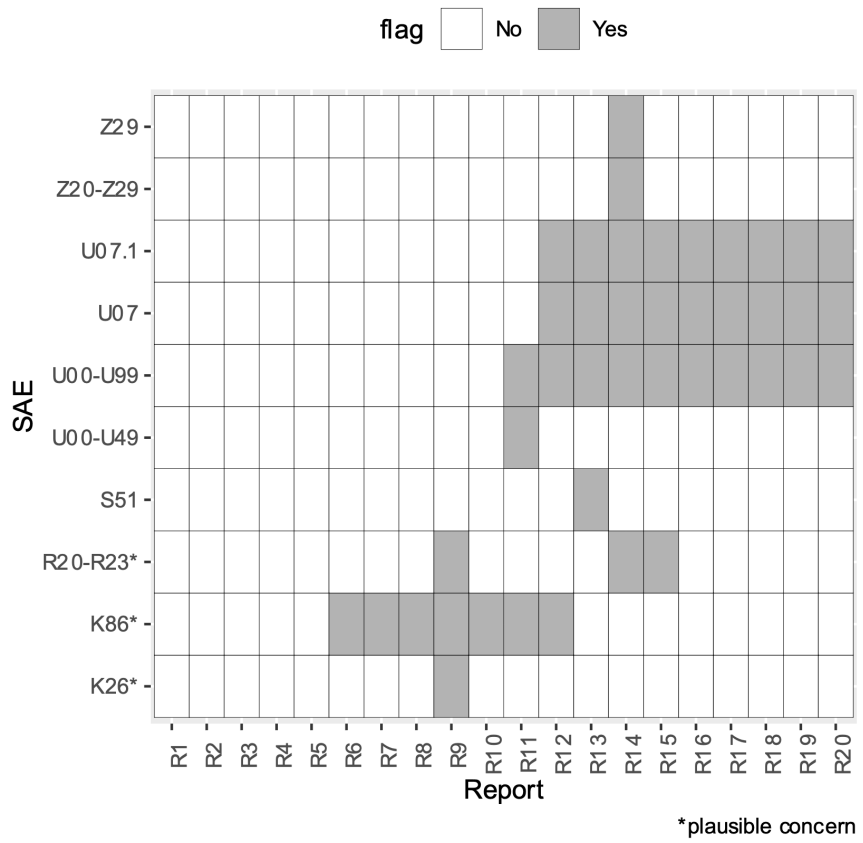


Image from 'Development of real-time surveillance for serious adverse events in a pragmatic clinical trial using national registers in Finland'. In press

FinFluHD SAE surveillance results



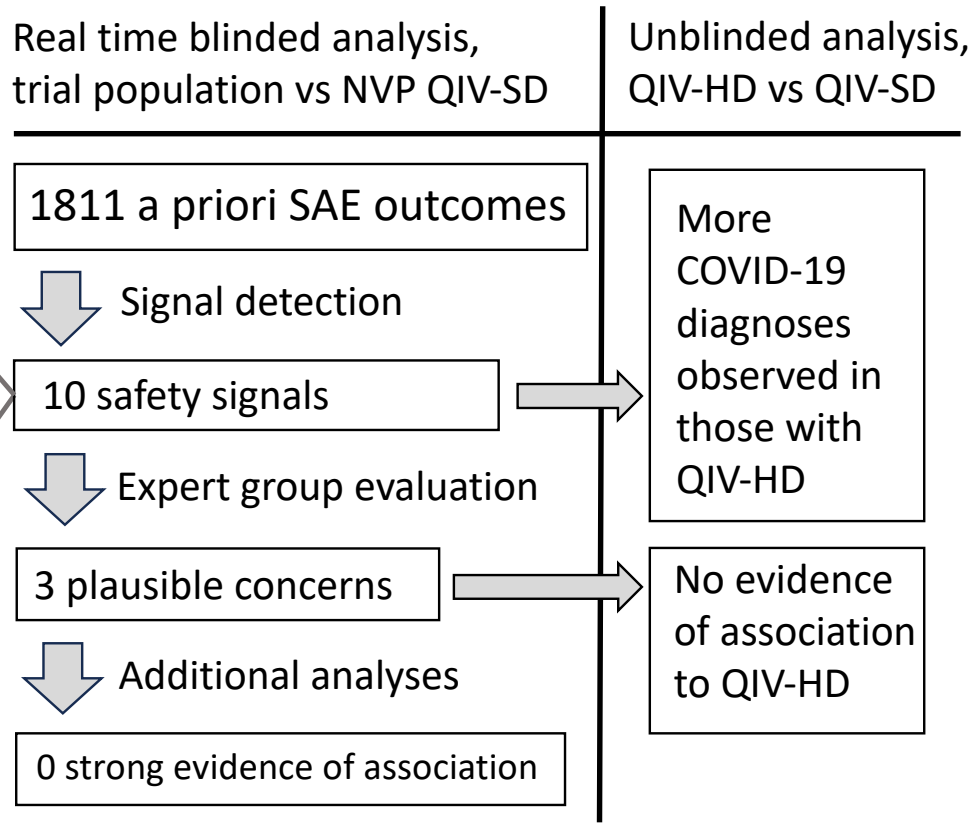


Image from 'Development of real-time surveillance for serious adverse events in a pragmatic clinical trial using national registers in Finland'. In press

Some pros and cons of register data collection

Pro	Con
+++ Outcome data collection is cheap because it is based on established infrastructure	- The data collection infrastructure is complex and temporary issues are possible.
++ Compared to a conventional vaccine trial, data collection can be more comprehensive and is not limited by e.g. patient recall.	- Events of interest can be missed, as there is always some information loss in the register data collection
+ The trial data collection is based on objective criteria (rules, algorithms).	- Events of interest must be algorithmically operationalised from the register data. The design of these rules (algorithms) can be complicated.

The Finnish register data collection infrastructure provides real-time data on real-world health events, including vaccinations and hospitalisations, and the coverage of these data are excellent

Thank you