Folkhälsomyndigheten

Circulation of respiratory pathogens: results from a retrospective analysis using a multi-pathogen panel on primary care sentinel samples

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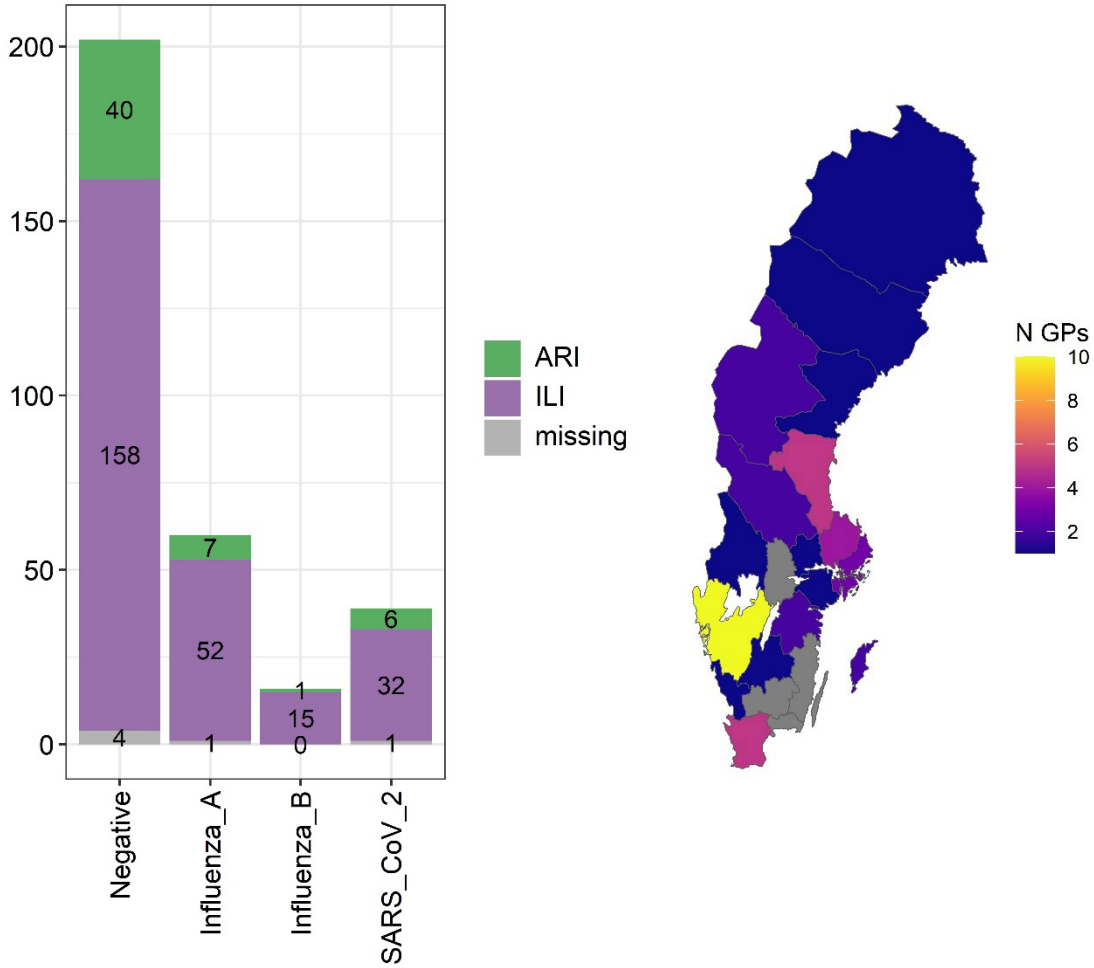
Swedish sentinel surveillance

- Influenza and SARS-CoV-2
- 55 designated primary health care centres
- Syndromic testing in patients presenting with:
  - Influenza-like illness (ILI):
    - Quick onset, at least one respiratory symptom and at least one **systemic symptom**.
  - Acute respiratory infection (ARI):
    - Quick onset, at least one respiratory symptom.
  - If COVID-19: in addition gastroenteric symptoms, or loss of taste and/or smell.

Season 2022-2023

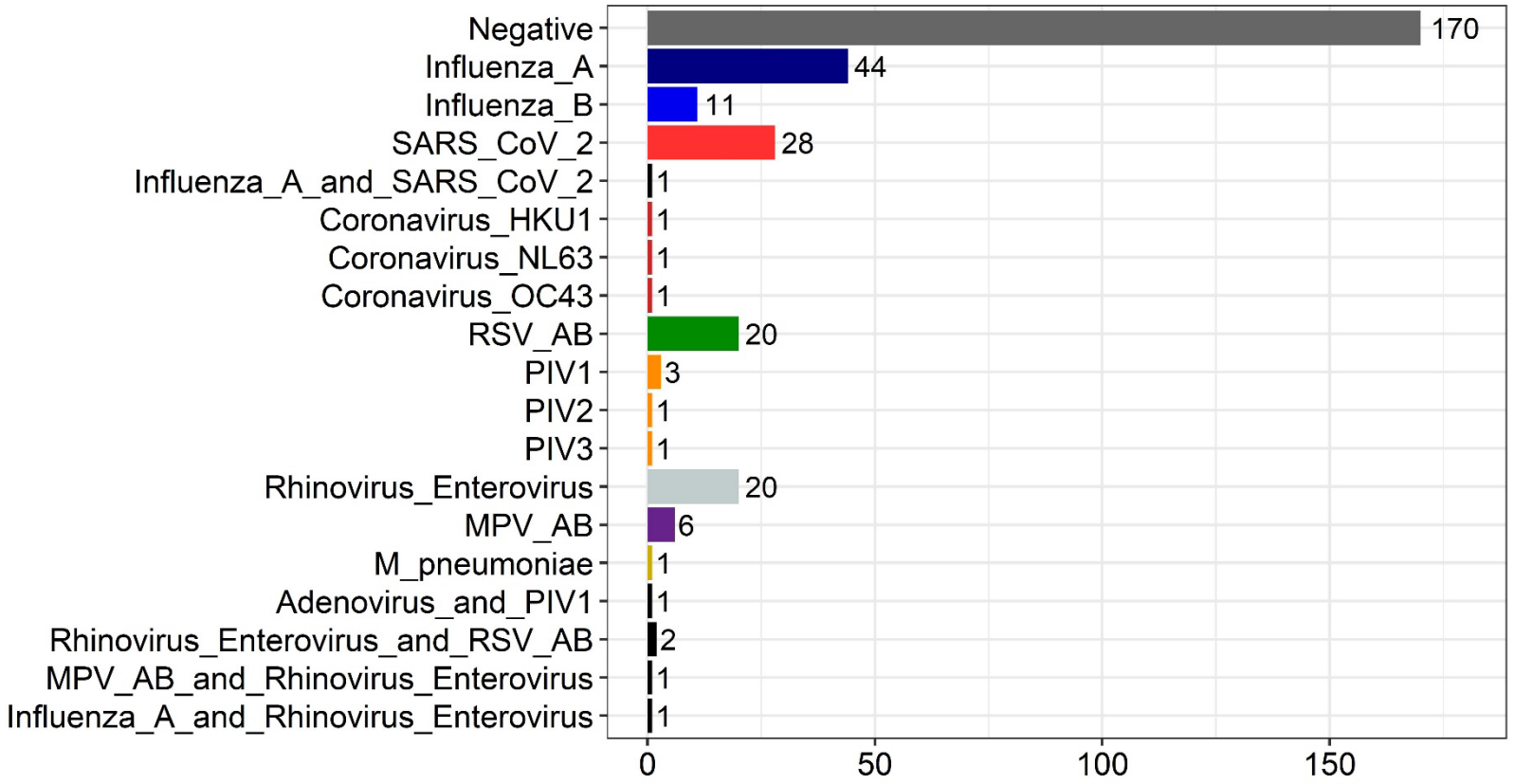
- 314 samples
- 38 healthcare centres
- ILI 80%
- Samples mostly from:
  - 30-60 year-olds (n=147)
  - Over 60 (n=100)
  - Few 0-4 year-olds (n=8)
- 35% positive for influenza or SARS-CoV-2



Objectives

- What is the cause of infection in the remaining 65% negative samples?
- What is the value of testing the sentinel samples with a broad respiratory panel for the surveillance system (especially respiratory syncytial virus - RSV)?
  - Multiplex QiaStat Respiratory Panel (Qiagen) – 22 pathogens
  - Respiratory panel at Karolinska University Laboratory

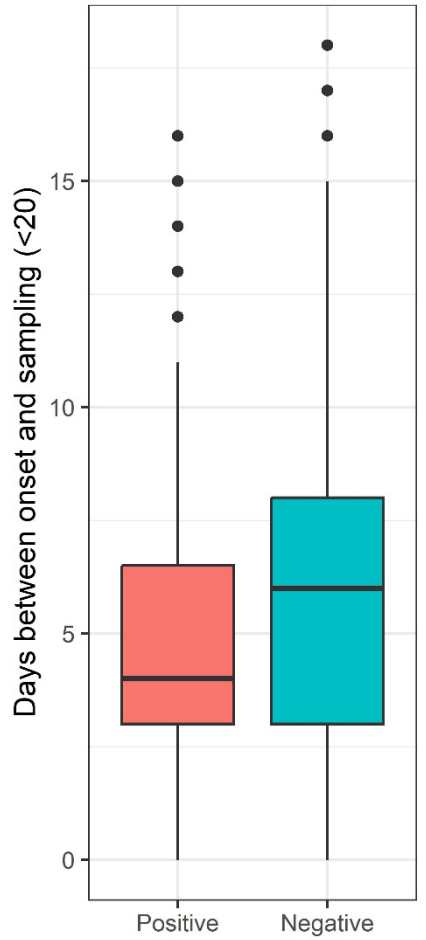
Results



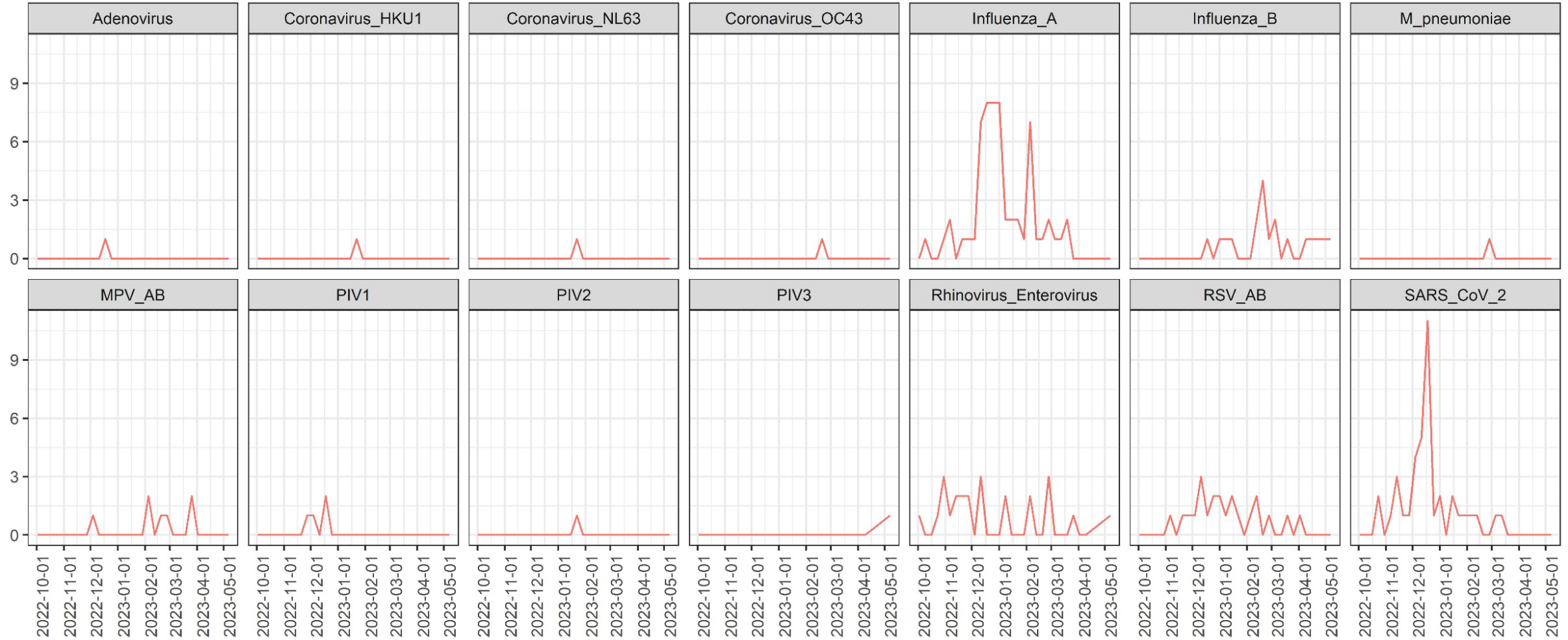
- Only RSV and rhinovirus/enterovirus had positivity rates >5%
- All samples were negative for:
  - *Bordetella Pertussis*
  - Bocavirus
  - *Chlamydophila pneumoniae*
  - Coronavirus 229E
  - *Legionella pneumophila*
  - PIV4

Time between onset, sampling and lab test

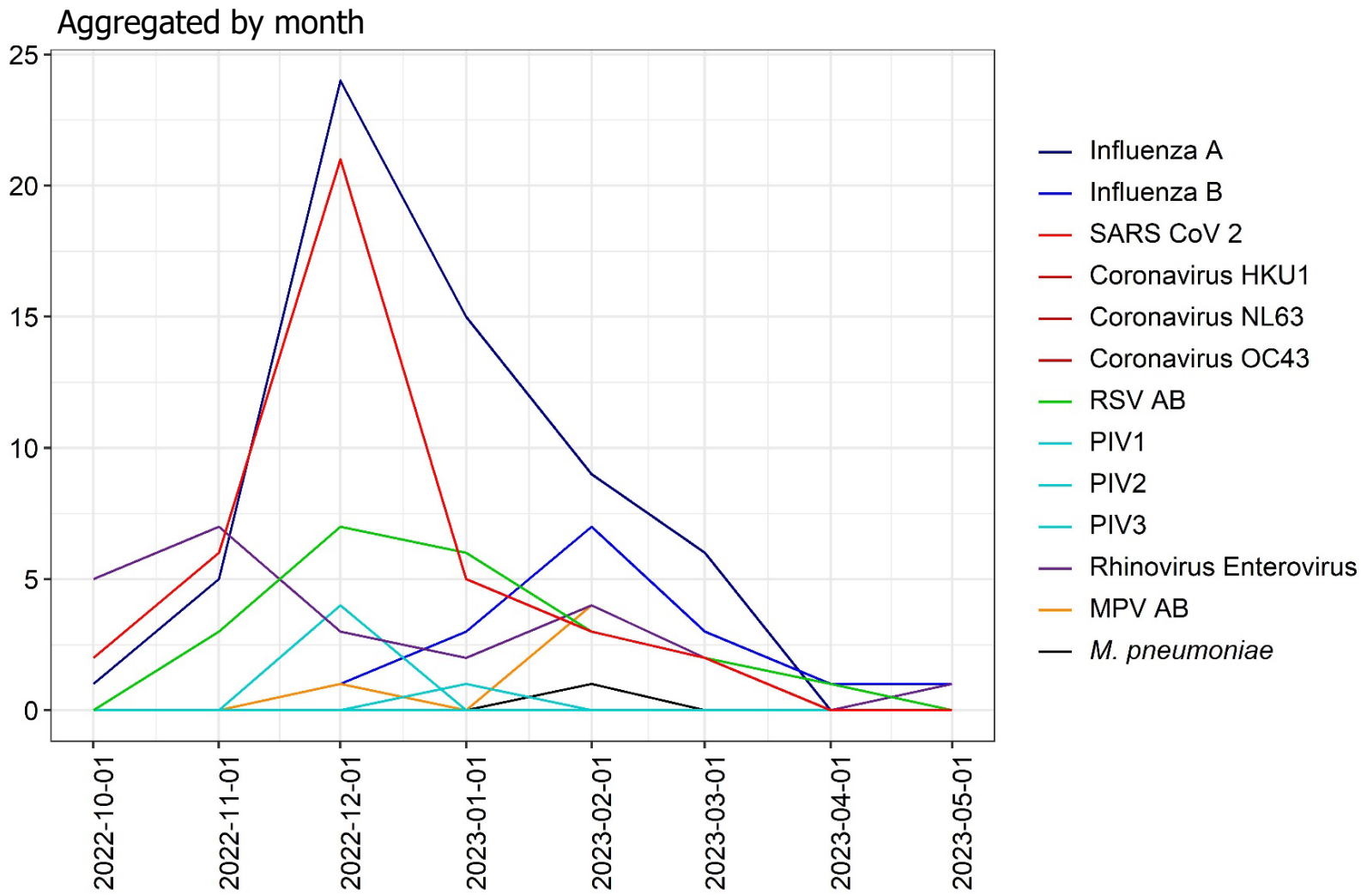
- Each extra day between **onset** and **sample collection** increases the risk of being negative by x1.1 (95% CI: 1.04-1.2)
  - Mean and median days onset-sample = 6
  - Range 0-91



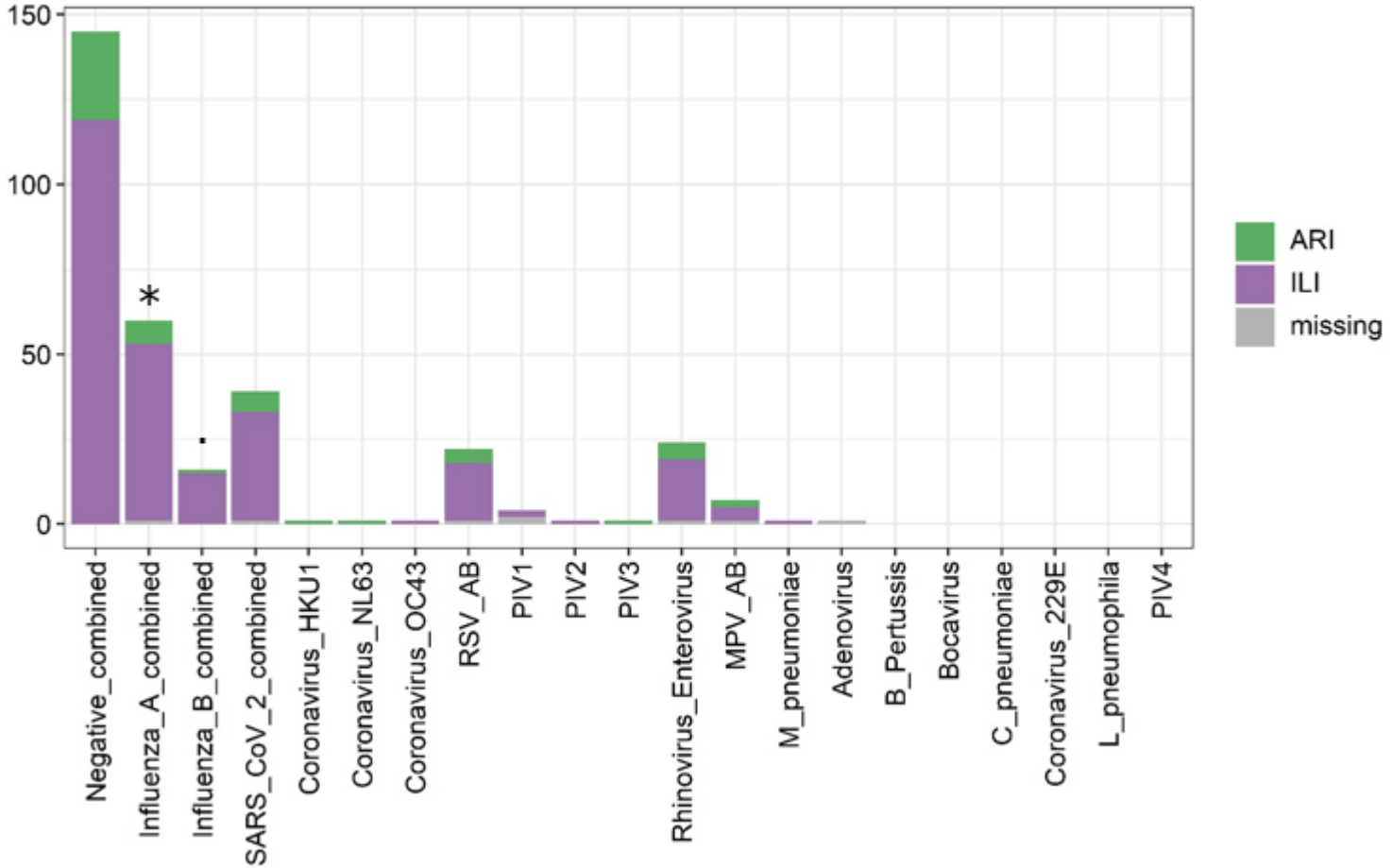
Results – seasonal trends I



Results – seasonal trends II

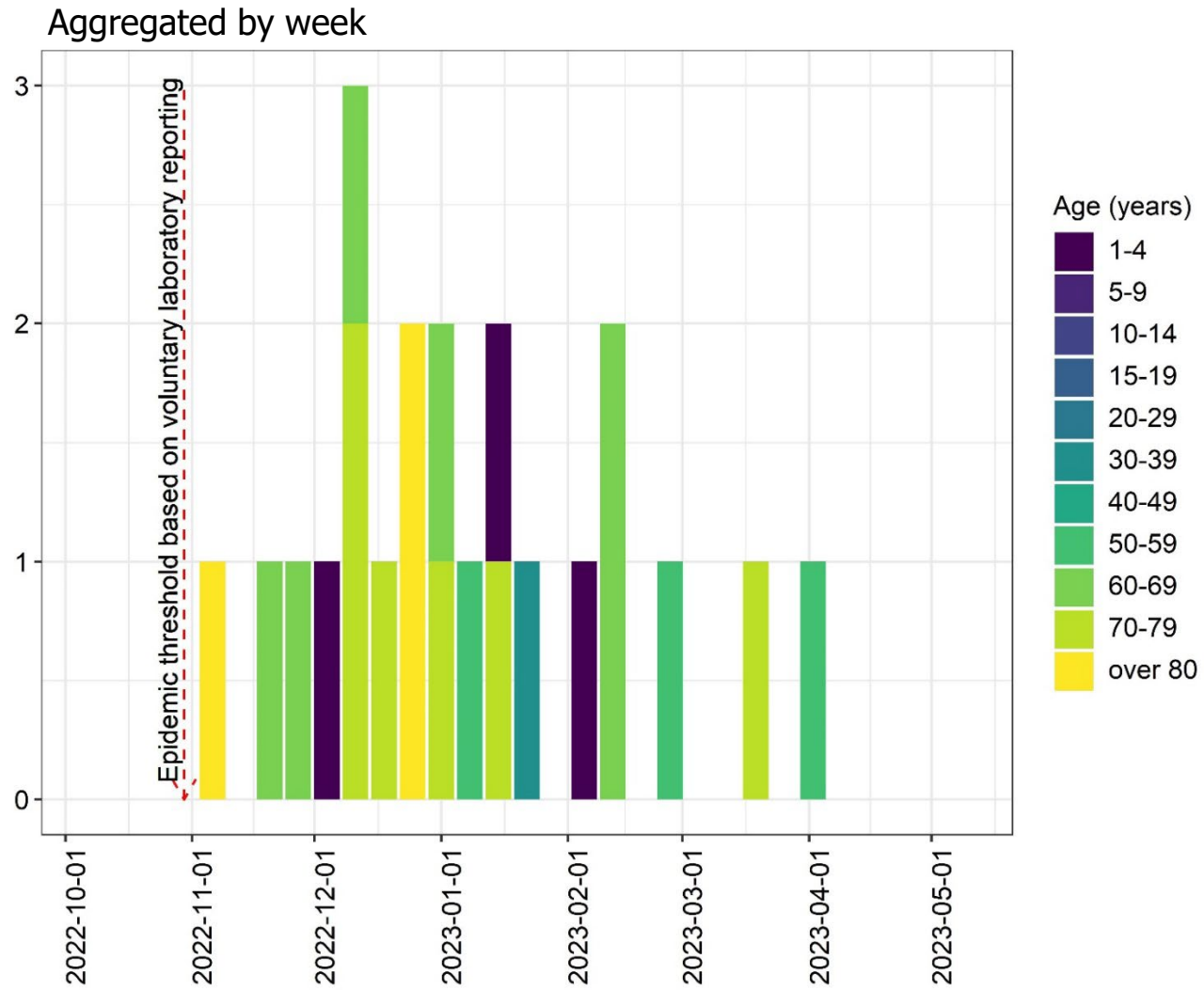


Is ILI associated with any particular pathogen?



Influenza type	p-value	OR	2.5%	97.5%
Influenza A	0.04 *	8.5	1.06	15.12
Influenza B	0.06	2.6	1.1	181.1

RSV

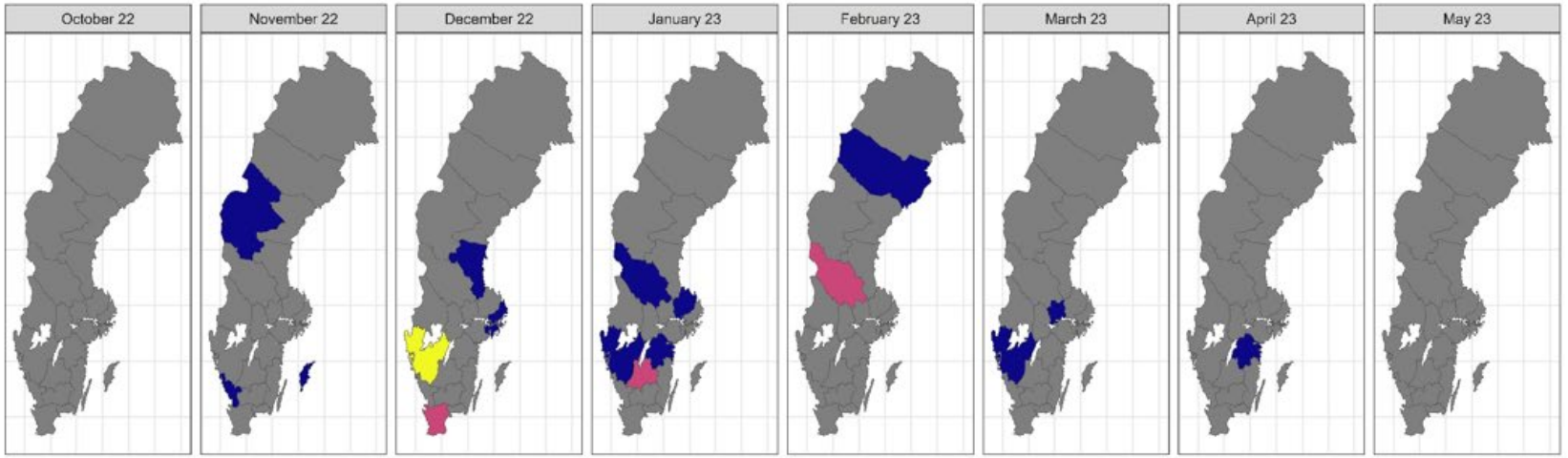


- RSV was detected in 22/314 samples, primarily among individuals over 60 (15/22)
- Children 0-4 years: minimally represented in the sentinel, but high positivity (3/8)
- Earliest case detected a week after the laboratory-based threshold was crossed

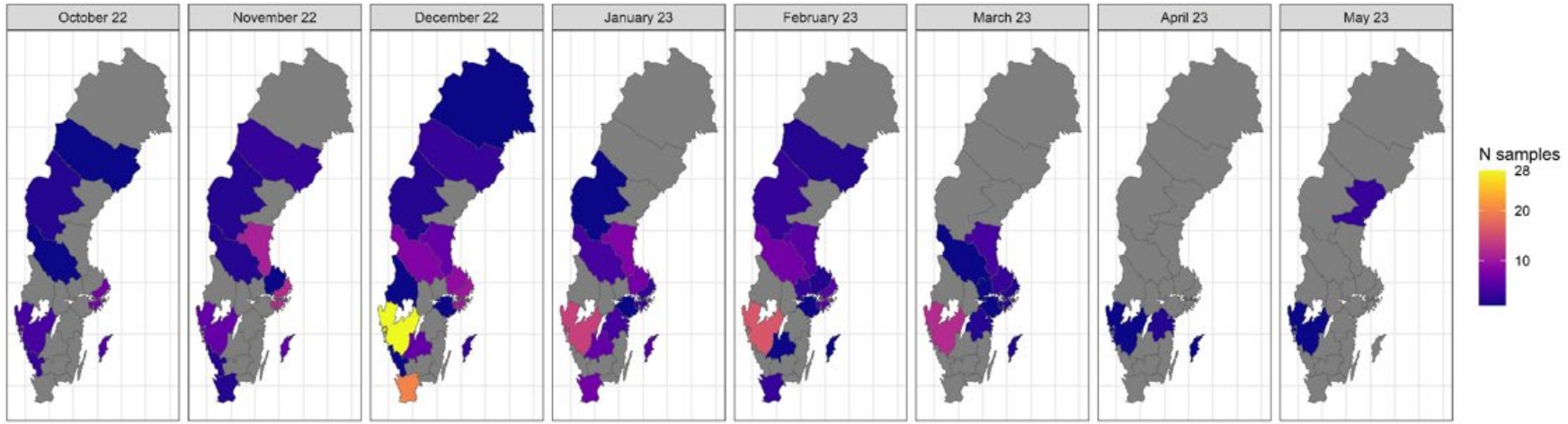
RSV geographic distribution

- Uneven sampling by county and month (not corrected for population)

RSV +



Samples



Conclusions and perspectives

- Most sentinel samples presented with ILI (80%): consider in syndromic algorithms
- Nearly 50% of sentinel samples remain negative
  - Reduce time between onset and sampling
- Only RSV and rhinovirus/enterovirus presented positivity rates >5%
  - Typing to discern rhinovirus from enterovirus
- Inclusion of RSV testing in the sentinel system has upsides and downsides

  Upsides:
  - Systematic collection of data with informative metadata
  - Possible contribution to future vaccine effectiveness studies (e.g., VEBIS)
  - Lay foundation for future RSV genomic surveillance

  Downsides: small sentinel size so limited representability (especially of children), late detection of cases

Tack

- MI-LV:
  - Emmi Andersson
  - Neus Latorre-Margalef
  - Elin Arvesen
  - Eva Hansson-Pihlainen
  - Tove Samuelsson Hagey
  - Lena Dillner
- SH-SÖ:
  - Moa Rehn
  - AnnaSara Carnahan
  - Sarah Zanetti
- KUL:
  - Johan Brynedal Öckinger