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One Health status on *Campylobacter* in Denmark

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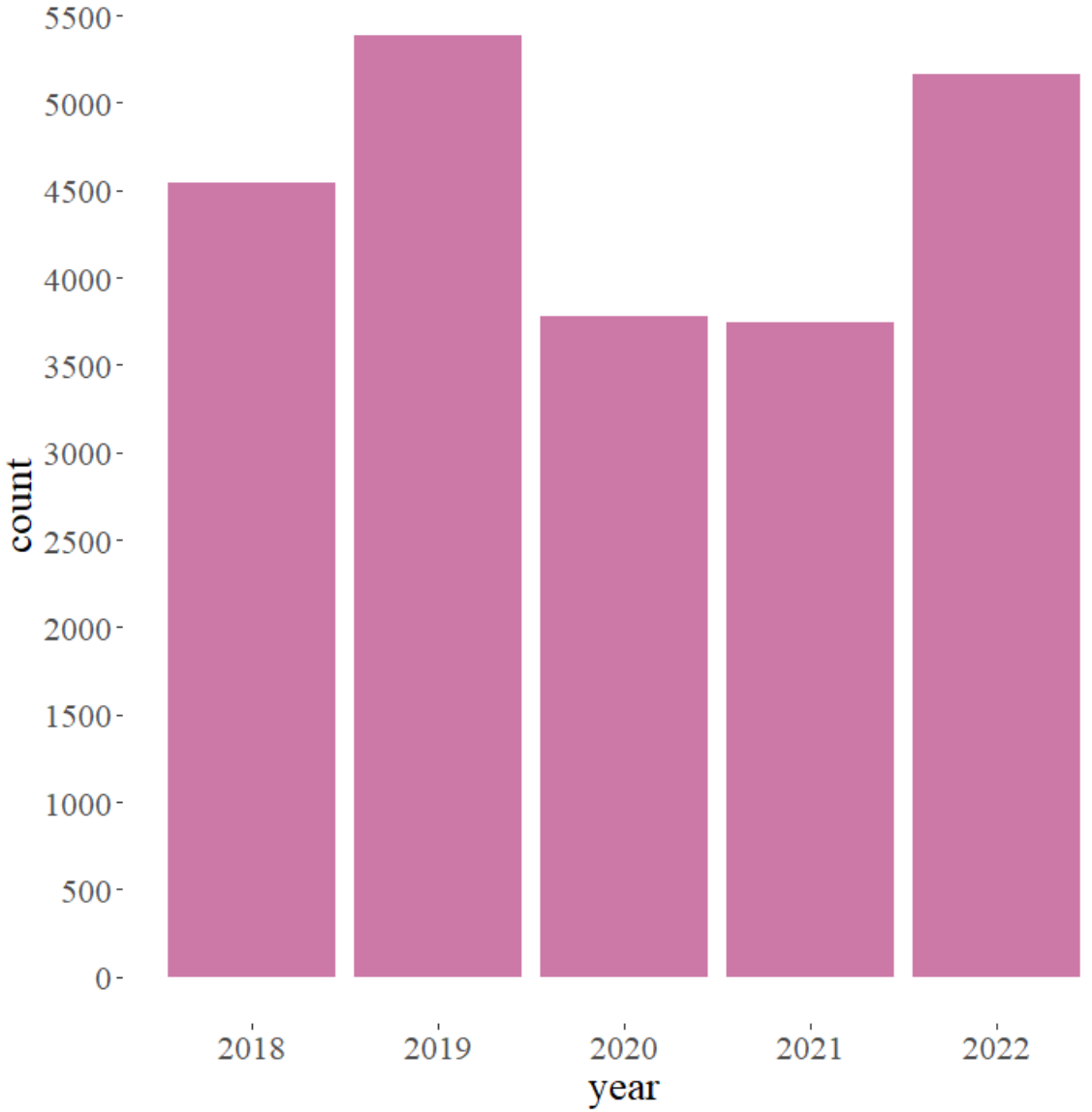
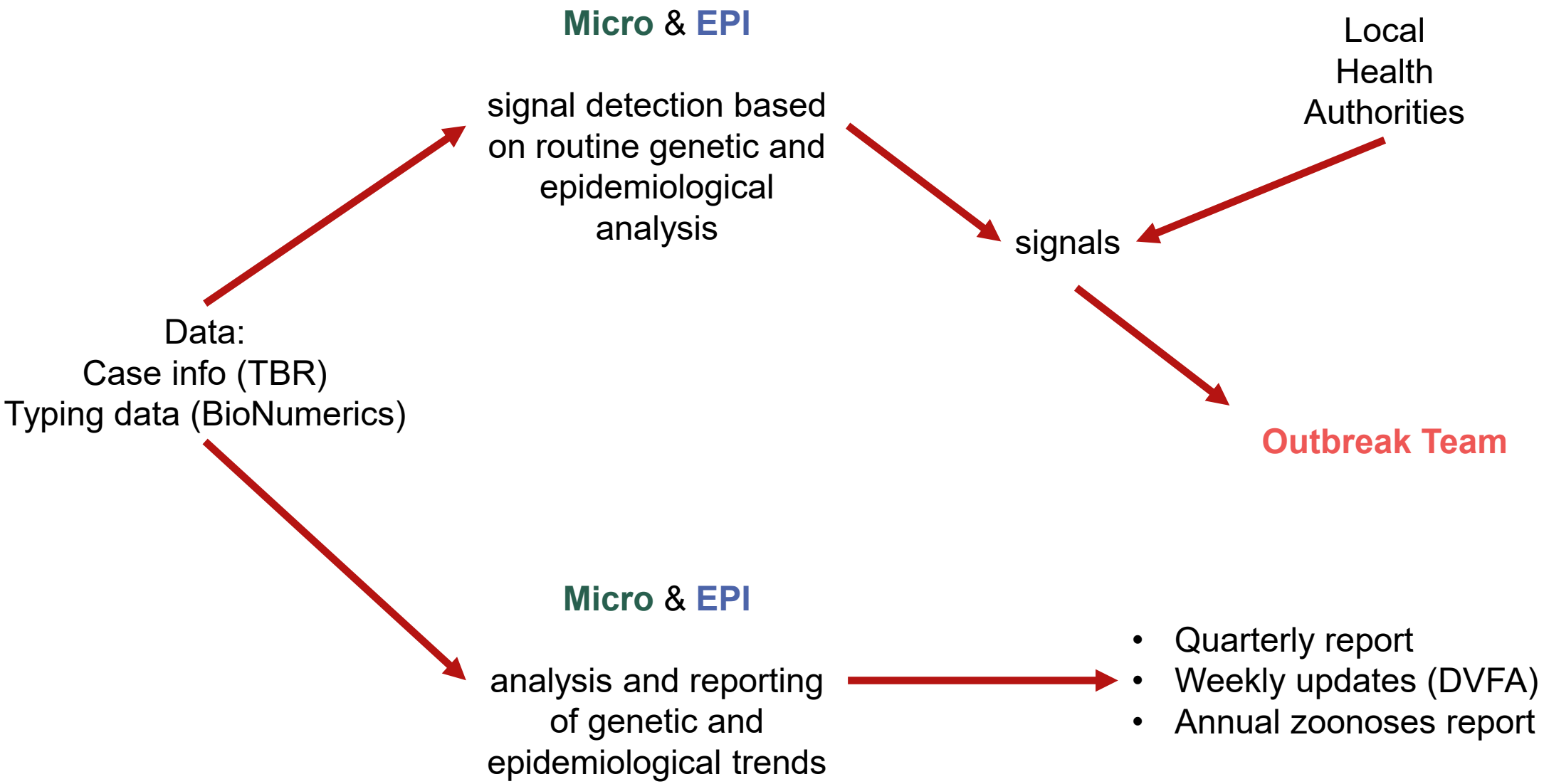
Campylobacter cases

- Over the last five years the number of registered humane *Campylobacter* cases in Denmark has ranged from 3,740 to 5,389 yearly cases

- In 2022 the number of registered *Campylobacter* cases was at 5,142
  - 28 % were travel-related

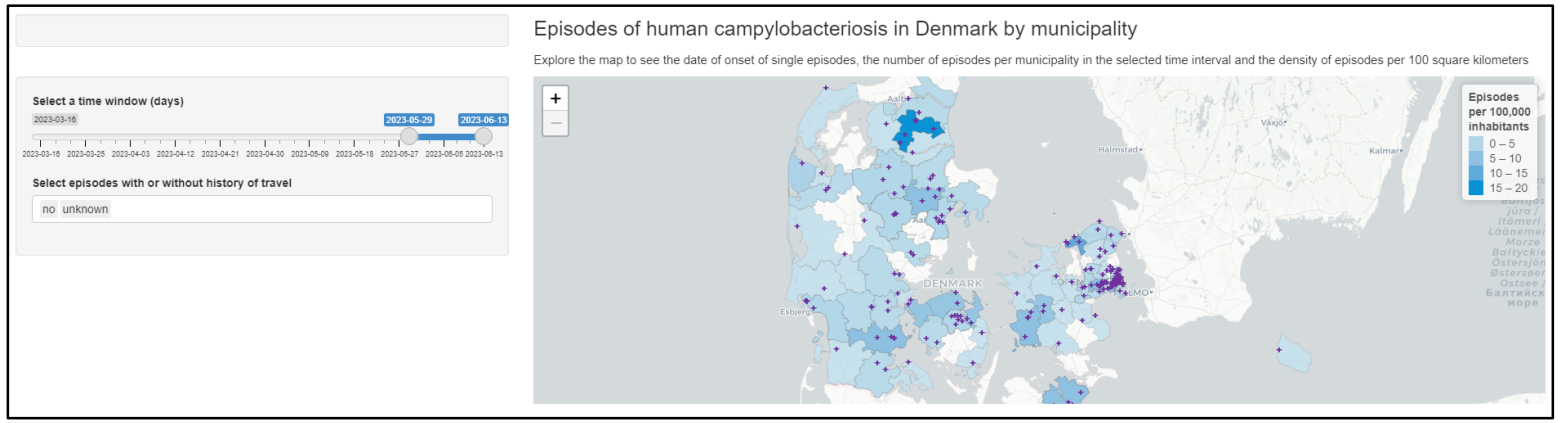


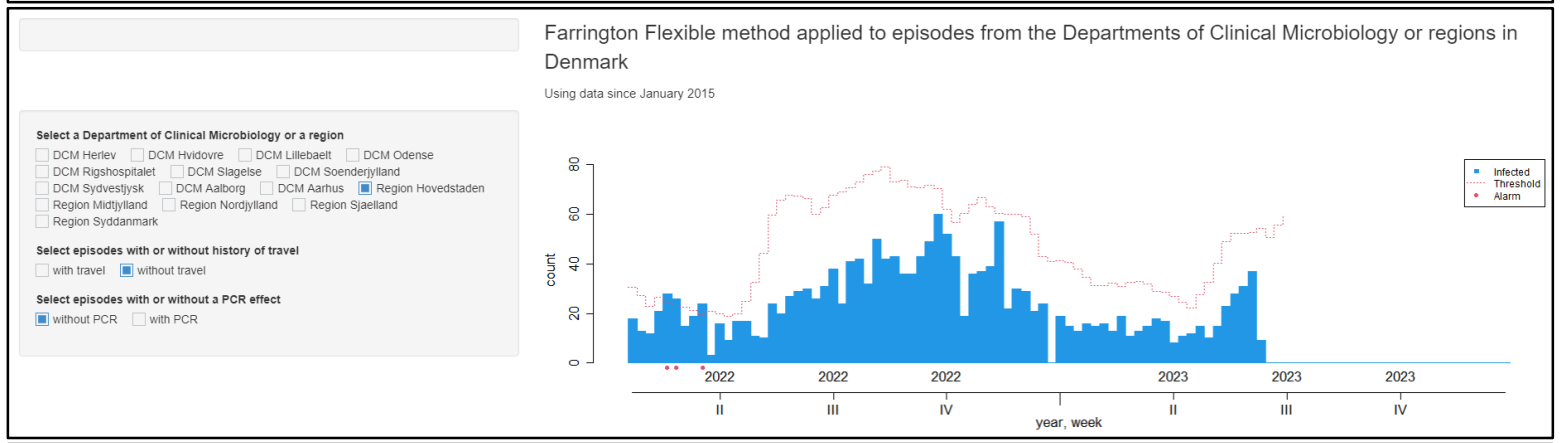
SSI surveillance setup overview

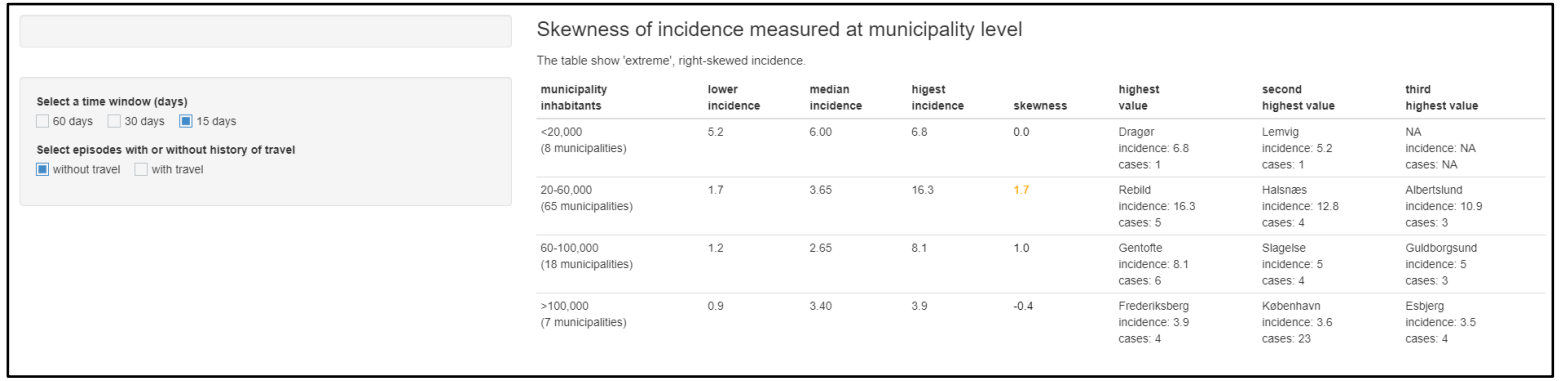


Surveillance of cases

- The patterns of cases are examined 3 times weekly to find unusual patterns
  -In time and geography



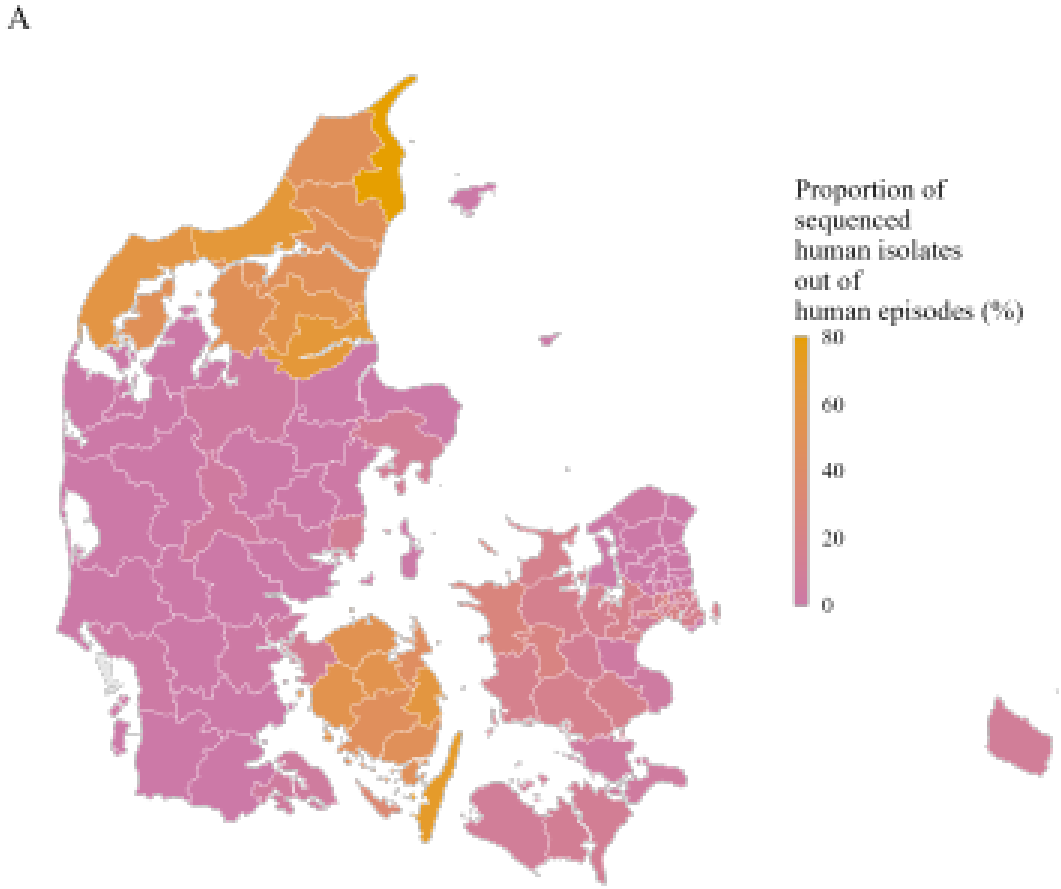




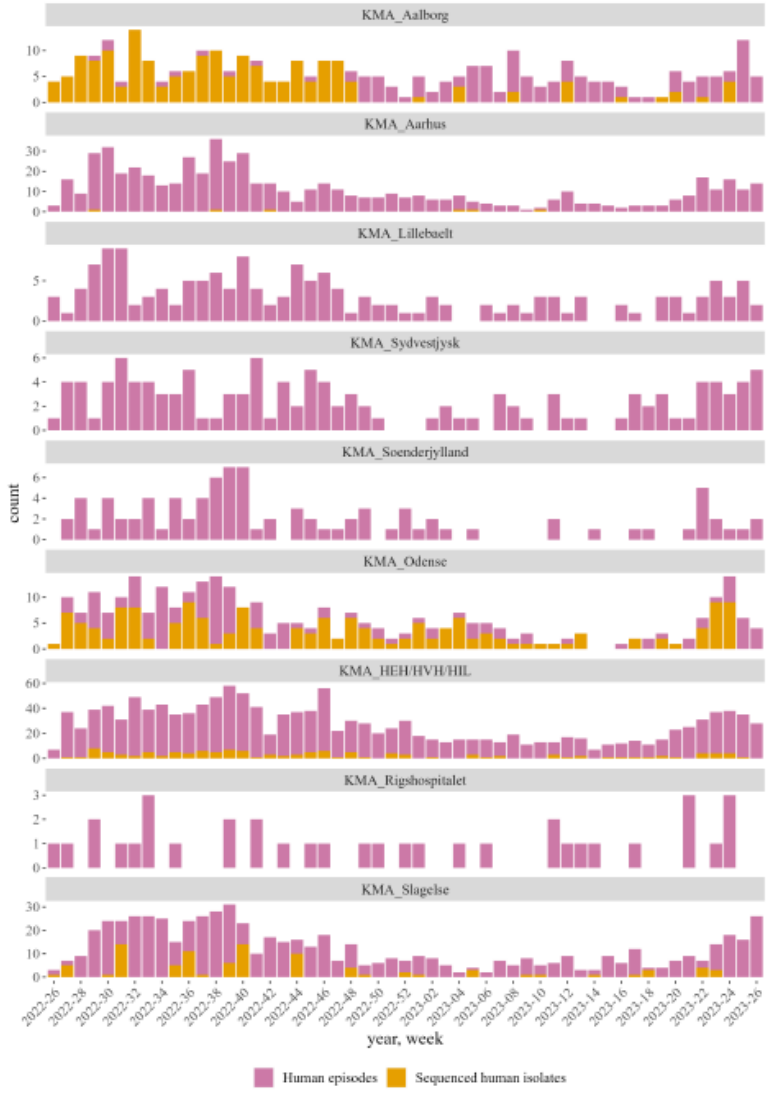
municipality inhabitants	lower incidence	median incidence	higest incidence	skewness	highest value	second highest value	third highest value
<20,000 (8 municipalities)	5.2	6.00	6.8	0.0	Dragør incidence: 6.8 cases: 1	Lemvig incidence: 5.2 cases: 1	NA incidence: NA cases: NA
20-60,000 (65 municipalities)	1.7	3.65	16.3	1.7	Rebild incidence: 16.3 cases: 5	Halsnæs incidence: 12.8 cases: 4	Albertslund incidence: 10.9 cases: 3
60-100,000 (18 municipalities)	1.2	2.65	8.1	1.0	Gentofte incidence: 8.1 cases: 6	Slagelse incidence: 5 cases: 4	Guldborgsund incidence: 5 cases: 3
>100,000 (7 municipalities)	0.9	3.40	3.9	-0.4	Frederiksberg incidence: 3.9 cases: 4	København incidence: 3.6 cases: 23	Esbjerg incidence: 3.5 cases: 4

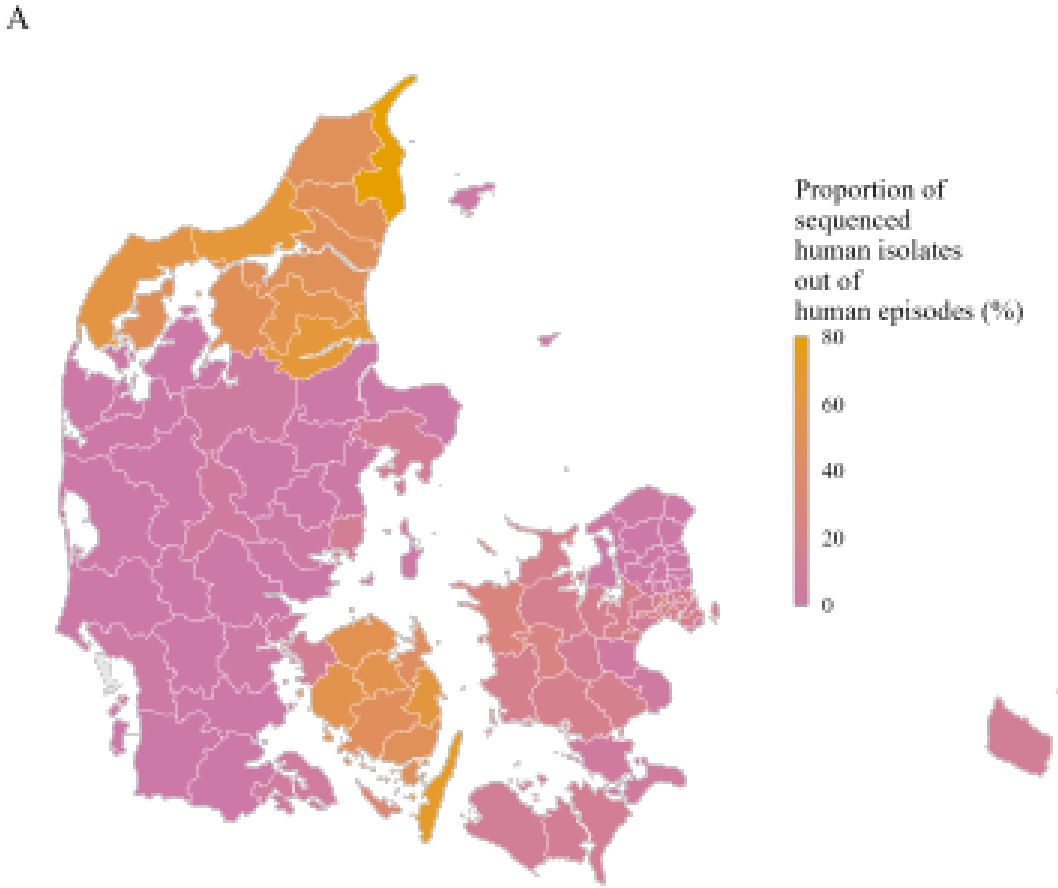
WGS-based typing

- Done routinely in Denmark since 2019
- 10-15% of the humane cases; isolates from 4 regions
- To find genetic clusters/outbreaks among patients
- For AMR surveillance



WGS-based typing





WGS-based typing

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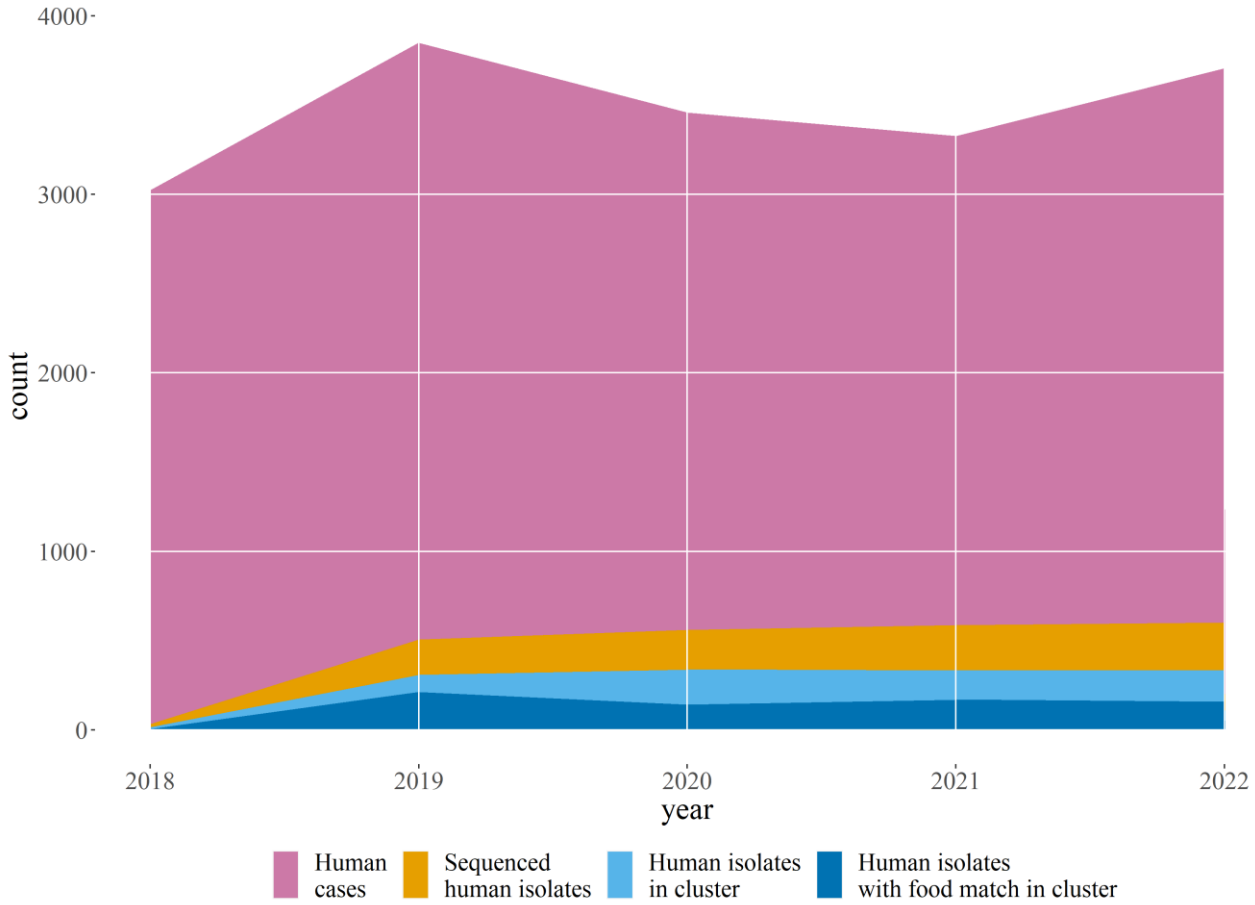
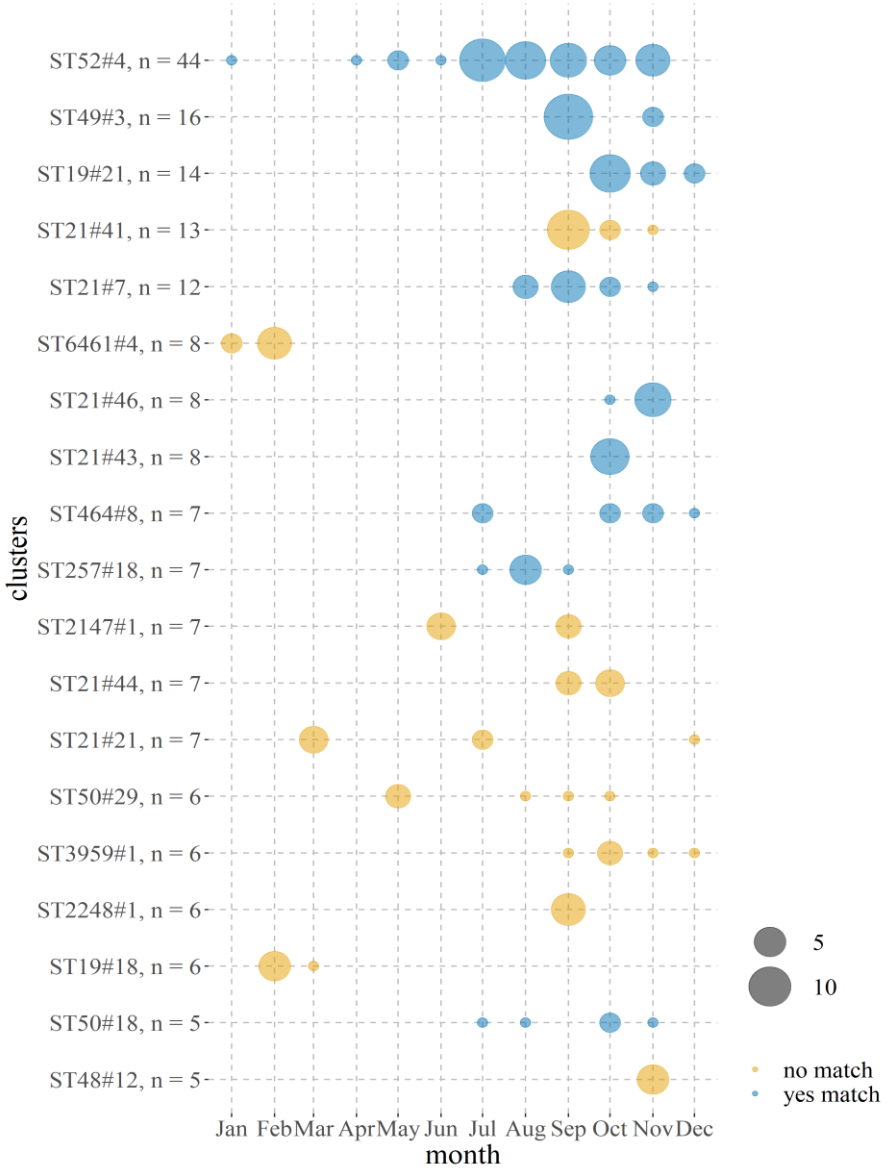
- At SSI we recieve WGS data from DVFA and compare in real-time to find food matches
- Clusters with isolates from cases detected within a 3-month period:
- Clusters with **≥ 5 isolates** (+/- food match)
  -> registered in the FUD database.
- Clusters with **≥ 10 isolates** (+/- food match)
  -> reported to the Outbreak Team
- If no food match
  -> patients are interviewed
- Clusters are monitored in time/place/person



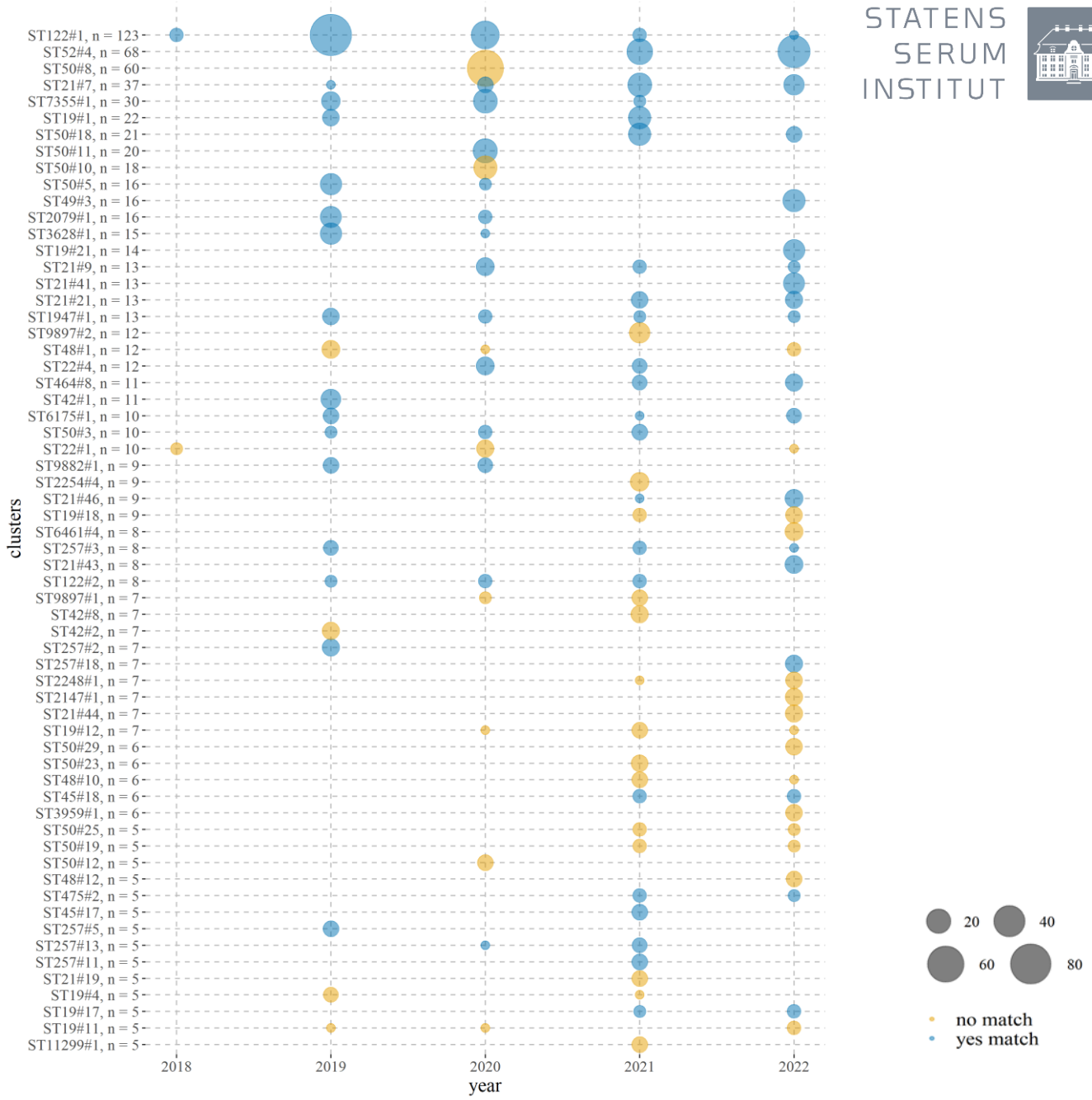
WGS-based typing (2022)

- Sample-based surveillance (10-15%)
  – captures only the tip of the iceberg
- The outbreak clusters that are reported represent minimum 40-50 diagnosed humane cases



Genetic clusters over time

- Many clusters
- Primarily small with few cases
- ~50% of human isolates in clusters
- 62 large (≥5 cases) in 2018-2022
- Many persistent clusters
- Clusters generally have patients in more regions



Matches to the DVFA surveillance

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- In general we find food matches to the large genetic clusters
- 20-30% of humane *C. jejuni* isolates have a DVFA match (27% in 2022)
- Primarily Danish chicken (26% of human *C. jejuni* isolates in 2022)

cluster size	**cluster match**	**human isolates**
Small (2-4 cases)	no match, n: 149	365 (71%)
n: 199	food match, n: 50	147 (29%)
Large (≥5 cases)	no match, n: 27	249 (30%)
n: 62	food match, n: 35	593 (70%)
Sporadic cases	no match	1060 (96%)
	food match	45 (4%)

C. jejuni-clusters in 2019-2022 with and without source matches

WGS for *Campylobacter* surveillance

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- Has provided new knowledge and greater understanding of epidemiological data
- Allows for finding matches to foods (and gives clear answers for outbreaks!)
- Allows authorities to intervene
- The synergy between microbiology and epidemiology is essential
- Expands the One Health approach in finding sources of disease

Many thanks

STATENS SERUM INSTITUT

- A Special thanks to Guido Benedetti
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- Department for Infectious Disease Epidemiology & Prevention, Statens Serum Institut
- The Departments of Clinical Microbiology at the Danish Hospitals
- The Danish Veterinary and Food Administration (DVFA)

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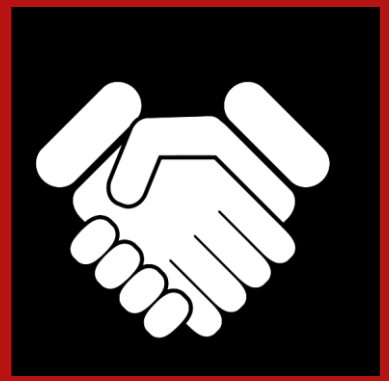
Questions?



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