STATENS SERUM INSTITUT

P3-G7

A Digital Transformation Programme preconditioned the Automated COVID-19 Surveillance System in Denmark

Karina Lauenborg Møller[1], Gudrun Witteveen-Freidl[1], Tomas Martin-Bertelsen[1], Sophie Agger[1], Marianne Voldstedlund[1], Sophie Gubbels[1]

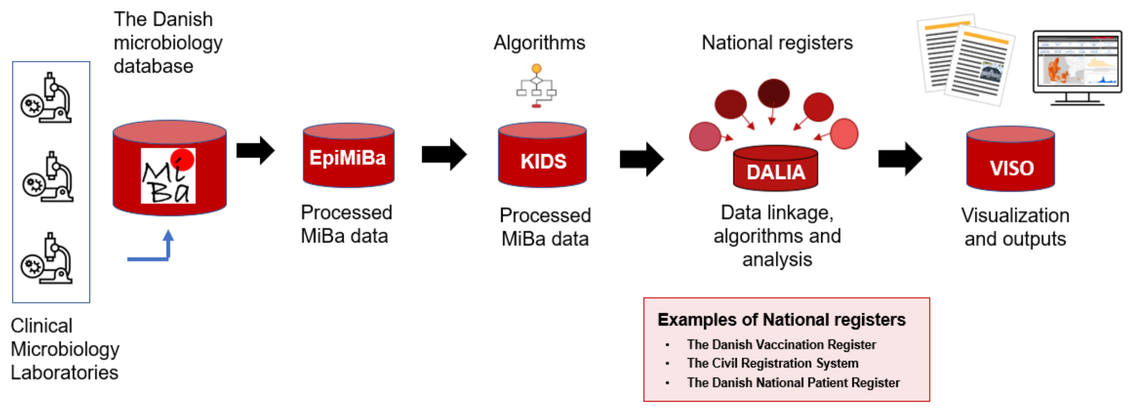
BACKGROUND AND AIM

- Denmark is one of the leading countries with respect to establishing digital solutions in infection control. The Danish Microbiology Database (MiBa), which contains all microbiological test results in Denmark, has since 2010 been a corner stone in digitalization of infectious disease surveillance.
- When SARS-CoV-2 arrived in Denmark in February 2020, there was great need for monitoring spread and severity, to support decision making and interventions.
- A real-time national surveillance system for COVID-19 was rapidly built on the existing infrastructure.

DESCRIPTION

- The system was built on centralized collection of test data from MiBa, linkage to other registers and application of algorithms. Raw data from MiBa, were standardized (KIDS) and linked to various National Registers using the unique Civil Registration Number to retrieve demographic data, data on healthcare contacts and epidemiological information.
- Algorithms were developed and applied to further tailor data for specific surveillance purposes, for instance to identify pregnancy (DALIA). Figure 1.

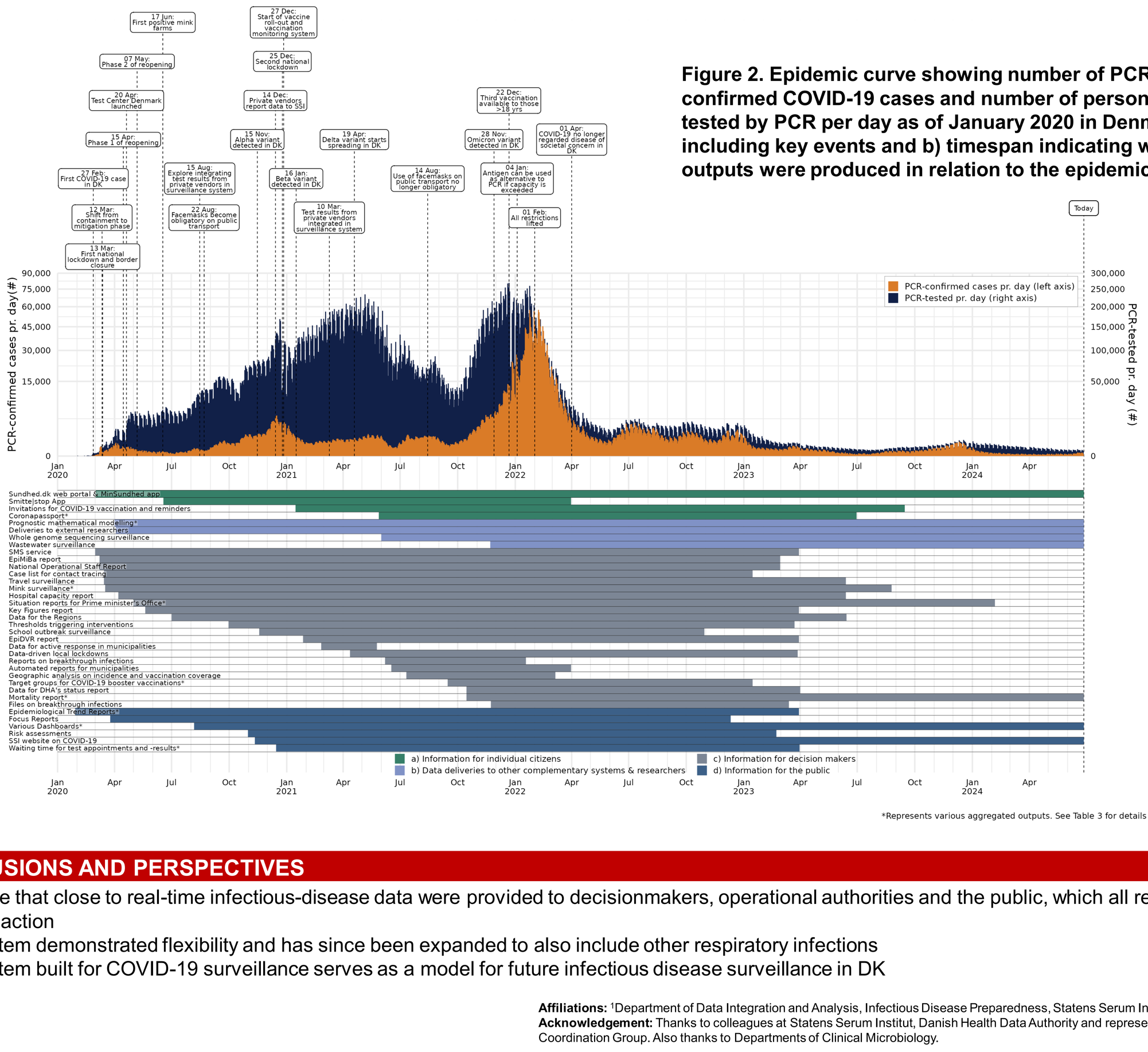
Figure 1. Data flow of the Danish digital surveillance system



OUTCOME

- Persons were included in the automated surveillance system by their first SARS-CoV-2 test. From 2. February 2020 until 8. April 2024, the system contained 5,950,731 unique persons (The Danish population: 5.9 mil). Of these, 3,437,988 COVID-19 cases tested positive one or more times.
- The system enabled production of various types of outputs for stakeholders: 1. Information to the individual citizen about own tests results, 2. Information for decisionmakers, 3. Aggregated data for the public via dashboards and 4. Information for complementary systems (wastewater and whole genome sequencing and researchers).
- The system supported contact tracing, interventions and outbreak investigations in special settings e.g. long-term care facilities, schools, mink farms and mass gatherings. Figure 2

Figure 2. Epidemic curve showing number of PCR-confirmed COVID-19 cases and number of persons tested by PCR per day as of January 2020 in Denmark including key events and b) timespan indicating when outputs were produced in relation to the epidemic



*Represents various aggregated outputs. See Table 3 for details

CONCLUSIONS AND PERSPECTIVES

- First time that close to real-time infectious-disease data were provided to decisionmakers, operational authorities and the public, which all relied on data for action
- The system demonstrated flexibility and has since been expanded to also include other respiratory infections
- The system built for COVID-19 surveillance serves as a model for future infectious disease surveillance in DK

Affiliations: [1]Department of Data Integration and Analysis, Infectious Disease Preparedness, Statens Serum Institut, Denmark
Acknowledgement: Thanks to colleagues at Statens Serum Institut, Danish Health Data Authority and representatives in the Data Coordination Group. Also thanks to Departments of Clinical Microbiology.