Surveillance bias of COVID-19: a case study

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What is public health surveillance?

Public health surveillance is the **ongoing collection** and **analysis** of health-related data, followed by the **timely dissemination** of information **to policy makers**

The main goal is to provide **information useful for decision and action** in public health

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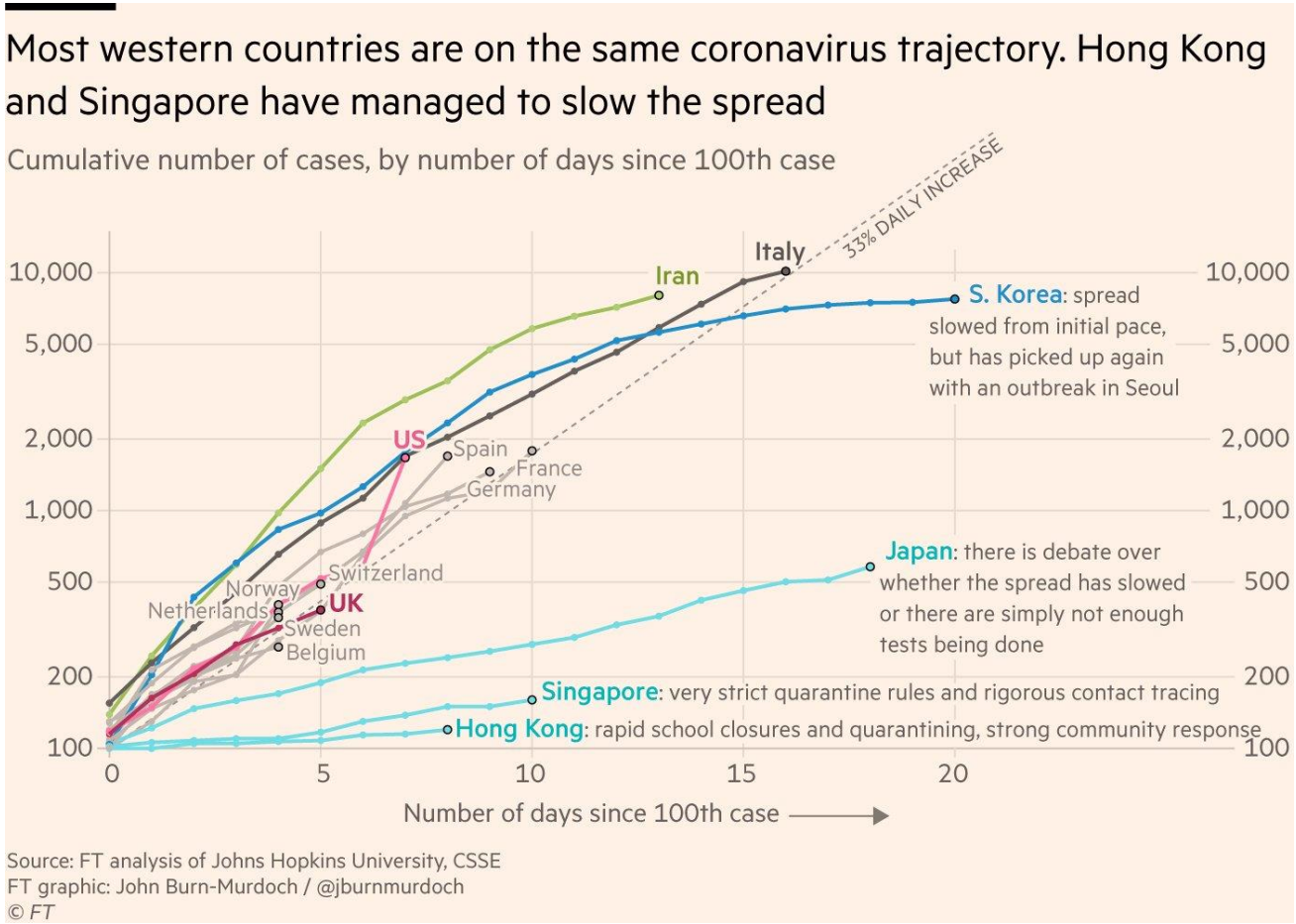
COVID-19 surveillance



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Surveillance bias

Surveillance bias arises when differences in the frequency of a condition are due to **differences in the modality of detection** rather than to a change in the actual risk of the condition

Consequences:

misinterpretation of the real burden of diseases or their trends

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Objective

To **estimate the scale of surveillance bias** in one region of Switzerland during the first and second wave of the COVID-19 pandemic

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Methods

- **Swiss**-wide research program
- Coordinated by Swiss School of Public Health (**SSPH+**)

Aim: to estimate the number of people who have developed anti-SARS-CoV-2 antibodies

Samples were analysed using the SenASTrIS assay
(CHUV, EPFL and the Swiss Vaccine Center)

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Methods

Characteristics	Serosurvey 1	Serosurvey 2
	July – October 2020	November 2020 – February 2021
Number of participants (%)	418 (100%)	449 (100%)
Female/male, n (%)	226 (54%) / 192 (46%)	245(55%) / 104 (45%)
Age, mean (SD)	58 (17)	54 (16)
Age groups, n (%)		
20-64	227 (54%)	302 (67%)
≥ 65	191 (46%)	147 (33%)
Educational level, n (%)		
Primary	38 (9%)	29 (6%)
Secondary	207 (50%)	222 (49%)
Tertiary	169 (40%)	198 (44%)
Employment status, n (%)		
Retired	190 (45%)	160 (36%)
Student	12 (3%)	16 (4%)
Self employed	32 (8%)	30 (7%)
Employed	176 (42%)	240 (53%)
Not employed	17 (4%)	17 (4%)
Comorbidities, n (%)		
Cancer	15 (4%)	10 (2%)
Diabetes	26 (6%)	22 (5%)
Immunological diseases	20 (5%)	10 (2%)
Hypertension	94 (22%)	74 16%)
Cardiovascular diseases	39 (9%)	45 (10%)
Respiratory diseases	22 (5%)	32 (7%)
Allergies	78 (19%)	92 (20 %)

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Methods

Seroprevalence data:
bayesian logistic regression model adjusted for the antibody test sensitivity and specificity performances and **weighted by age and sex** of the population of the canton of Fribourg

Routine surveillance data (number of cases):
retrieved from the Federal Office of Public Health

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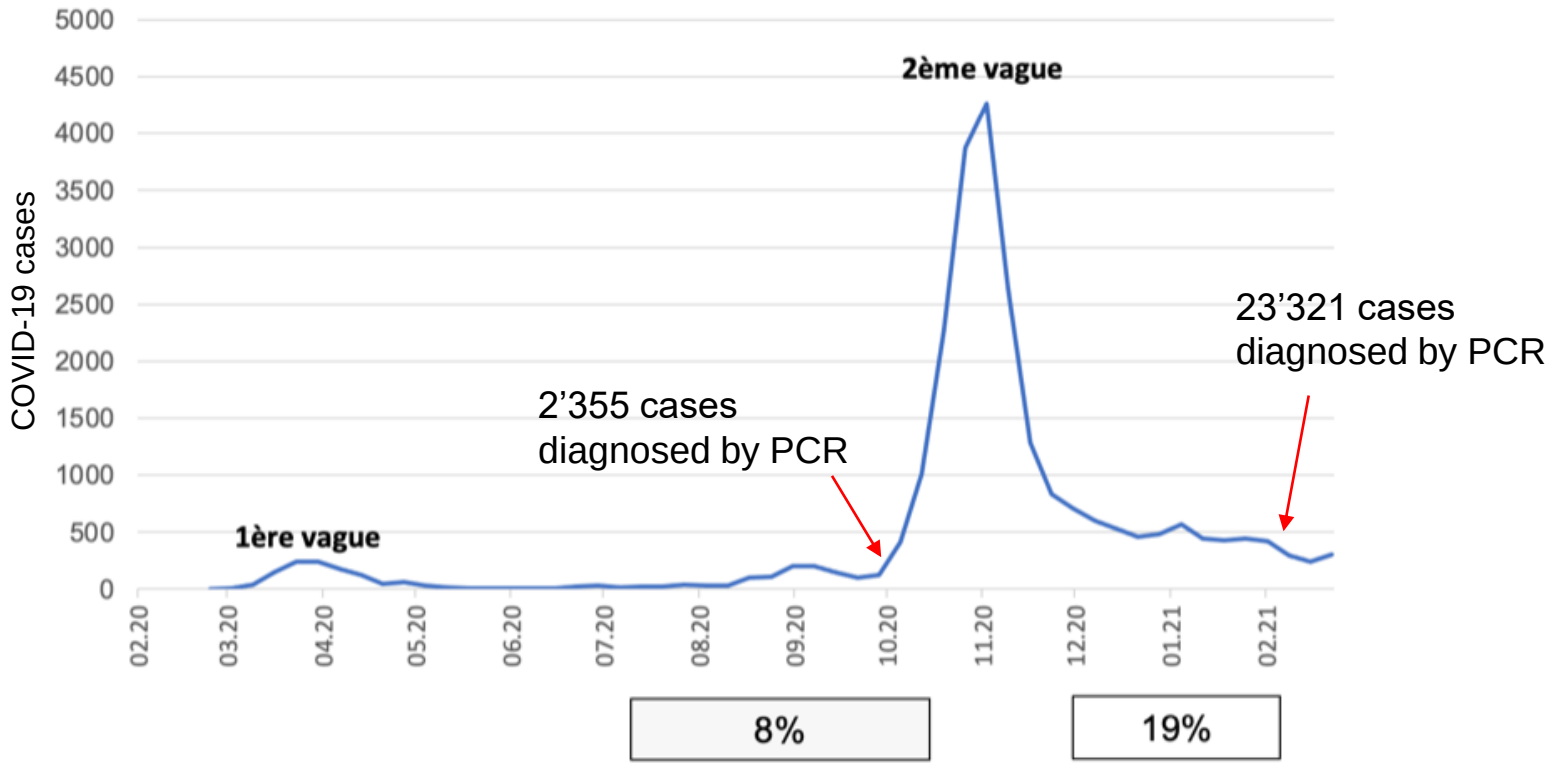
Results



After 1st wave: 1 out of 8 infection diagnosed (2’355 vs 20’000)

After 2nd wave: 1 out of 2 infection diagnosed (23’321 vs 50’000)

Seroprevalence after the 1st wave

↓

20’000 adults infected

Seroprevalence after the 2nd wave

↓

50’000 adults infected

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Conclusions

- Differences in testing strategies and capacity led to **different estimates of the spread** of the virus in two different phases of the pandemic and influenced decision making

- Surveillance bias can lead to poor decision making and waste of resources; accounting for it is **essential for an accurate public health surveillance** and monitoring activity

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Thank you for your interest

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