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Was können wir von einem SARS-CoV-2 Eintrittsscreening erwarten?

Peter Schreiber

62. Hygienekreis, Grosser Hörsaal Ost **02.11.2021**

SARS-CoV-2 transmission from a- or presymptomatic patients

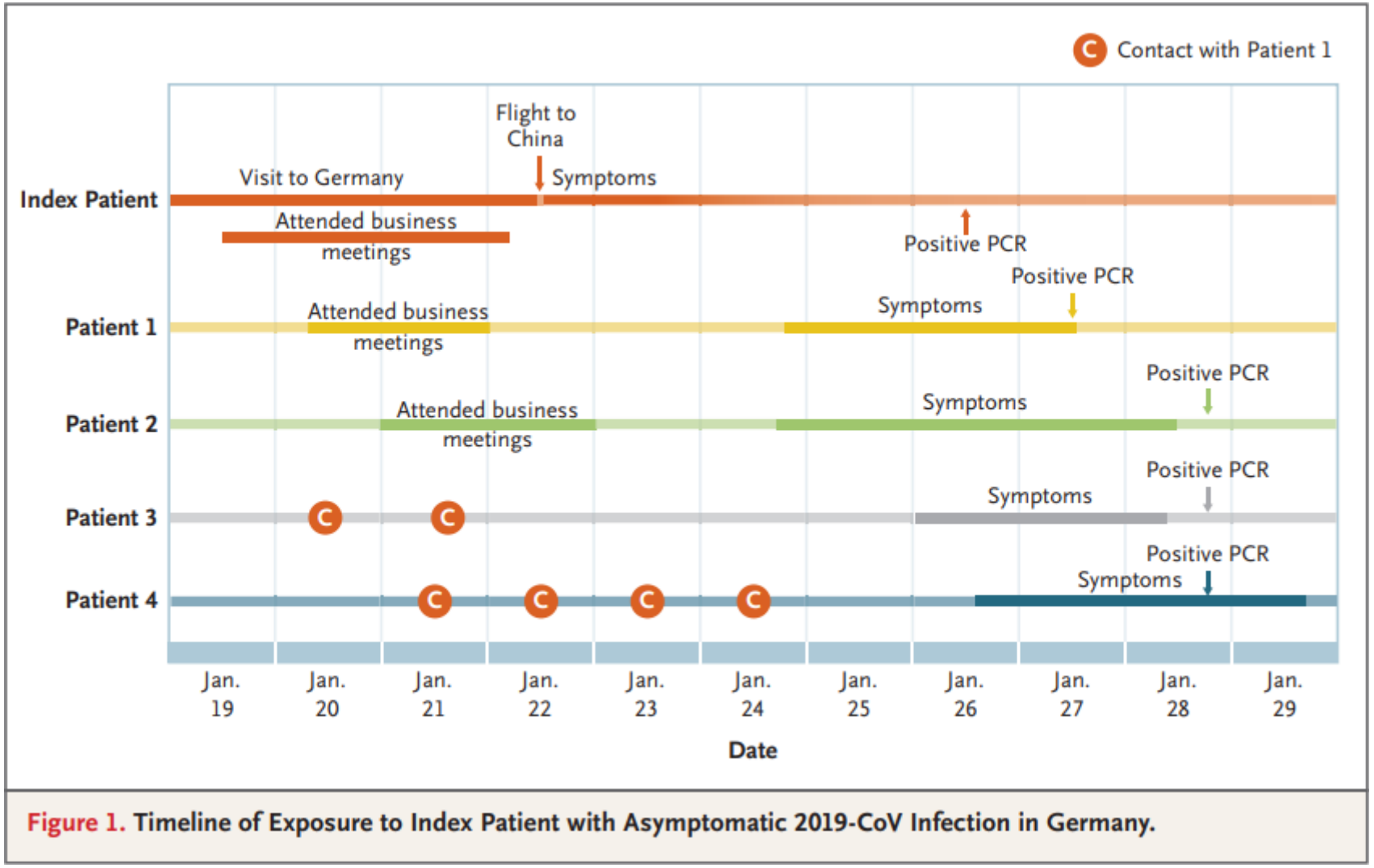

Figure 1. Timeline of Exposure to Index Patient with Asymptomatic 2019-CoV Infection in Germany.

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Rothe C et al. N Engl J Med 382;10

SARS-CoV-2 transmission from a- or presymptomatic patients

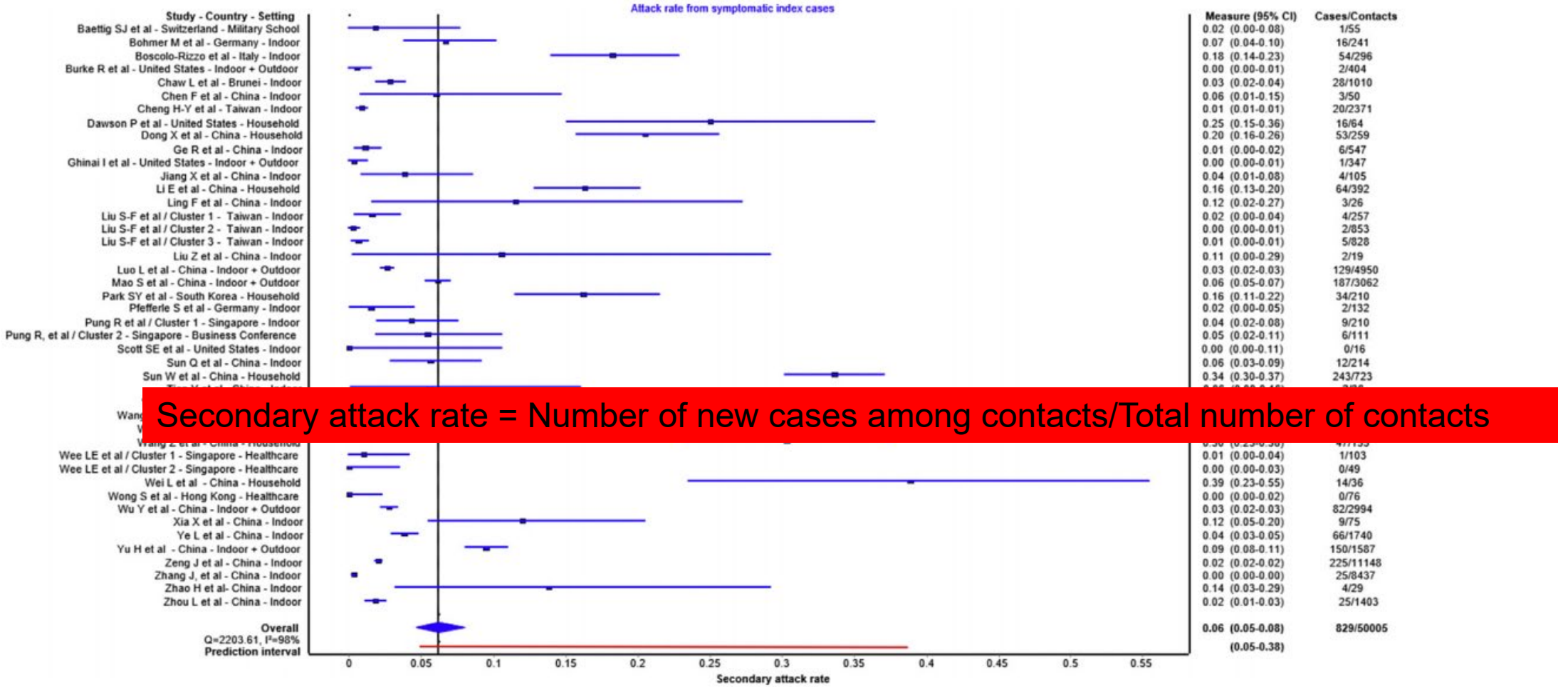

Fig. 4. Secondary attack rates from symptomatic index cases to their contacts. For each study the secondary attack rate is reported with its 95% CI. A prediction interval at the bottom of the forest plot is depicted.

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SARS-CoV-2 transmission from a- or presymptomatic patients

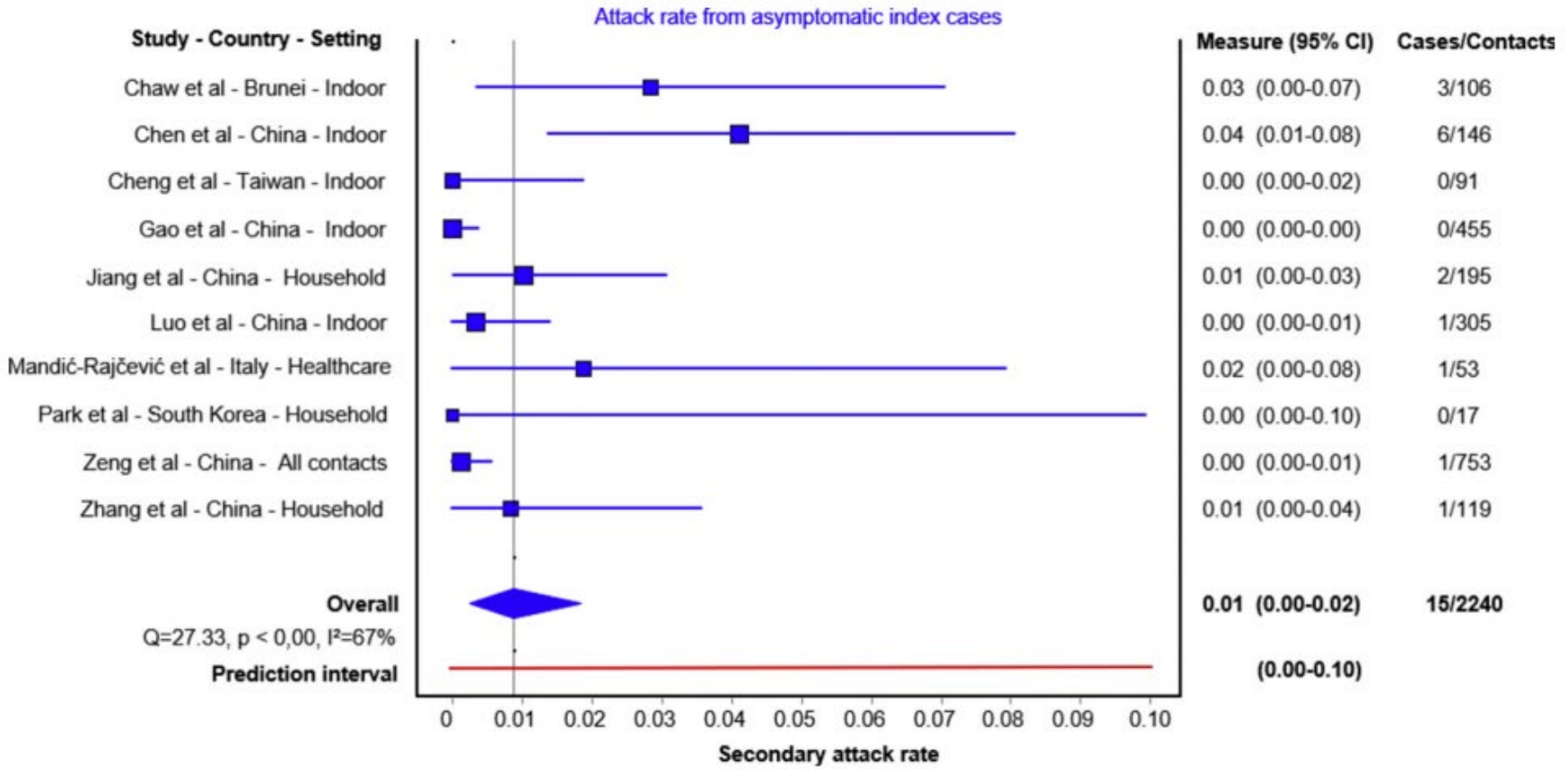

Fig. 2. Secondary attack rates from asymptomatic index cases to their contacts. For each study the secondary attack rate is reported with its 95% CI. A prediction interval at the bottom of the forest plot is depicted.

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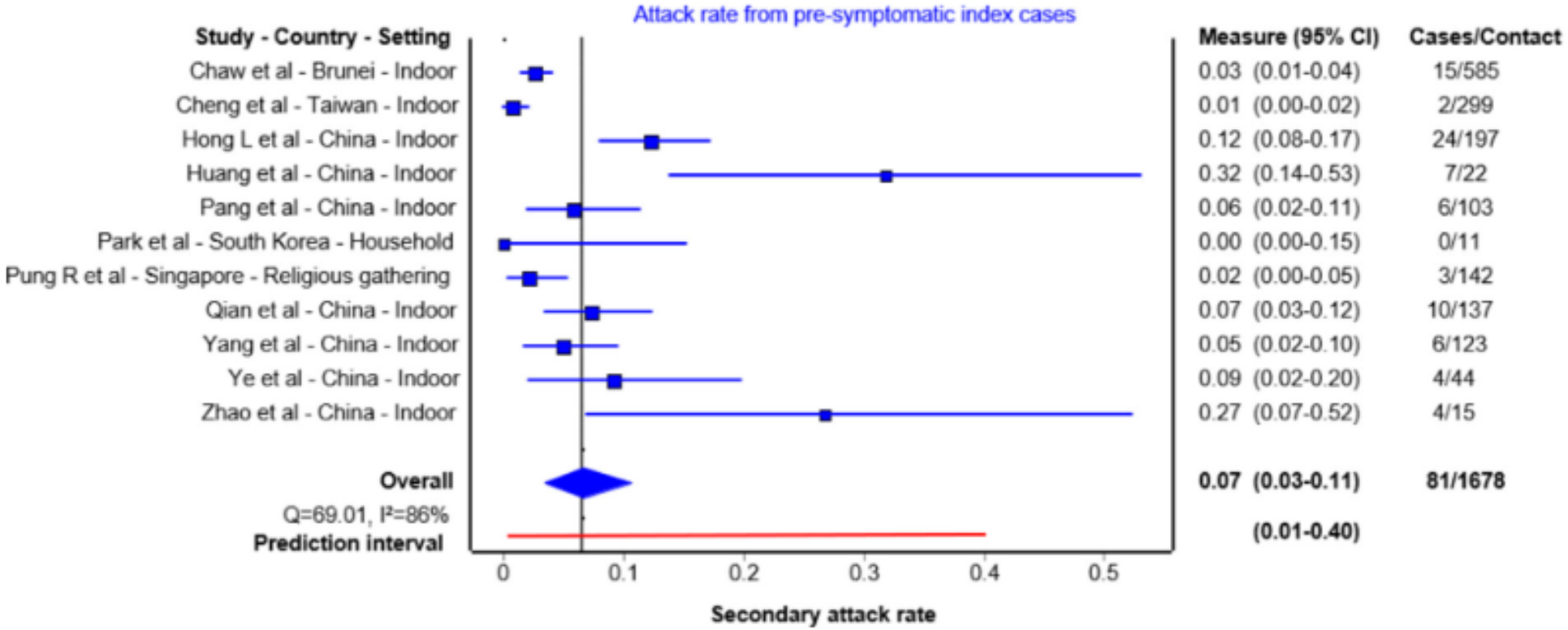

Fig. 3. Secondary attack rates from pre-symptomatic index cases to their contacts. For each study the secondary attack rate is reported with its 95% CI. A prediction interval at the bottom of the forest plot is depicted.

Conclusion: A- and presymptomatic patients can transmit SARS-CoV-2 to others

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Universal Admission Screening for SARS-CoV-2 Infections among Hospitalized Patients, Switzerland, 2020 – Canton of Zurich

Figure 1

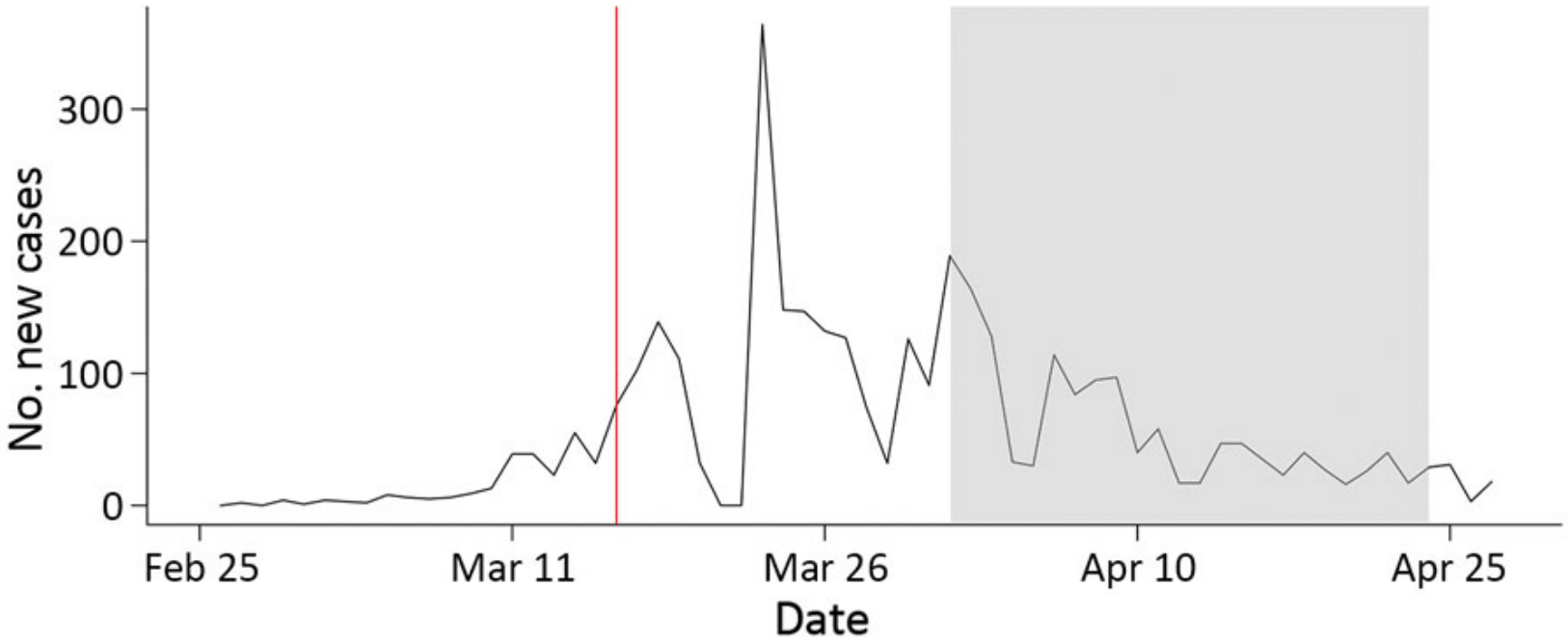

Figure 1. Incidence of severe acute respiratory syndrome coronavirus 2 infection, canton of Zurich, Switzerland, 2020. Data reported as absolute number of daily new diagnosed cases. Red vertical line indicates start of lockdown in Switzerland. Gray shading indicates study period.

T Scheier et al. Emerg Infect Dis. 2021 Feb;27(2):404-410

Universal Admission Screening for SARS-CoV-2 Infections among Hospitalized Patients, Switzerland, 2020 – Canton of Zurich

- All admitted patients ≥ 16y
- NPS for SARS-CoV-2 PCR regardless of the presence of compatible symptoms
- Prospective symptom information collection at admission
  - cough
  - dyspnea
  - temperature >38.0°C or feeling feverish
  - sore throat
  - myalgia
- Suspicion of COVID-19 at admission

Table 1

Characteristics of 4 hospitals in study on severe acute respiratory syndrome coronavirus 2

Hospital	No. beds	No. patients in 2018	Screening period
GZO Wetzikon	156	10,368	2020 Apr 8–2020 Apr 24
Cantonal Hospital Winterthur	445	27,451	2020 Apr 9–2020 Apr 19
City Hospital Triemli	396	24,335	2020 Apr 8–2020 Apr 24
University Hospital of Zurich	941	41,916	2020 Apr 1–2020 Apr 24

T Scheier et al. Emerg Infect Dis. 2021 Feb;27(2):404-410

Universal Admission Screening for SARS-CoV-2 Infections among Hospitalized Patients, Switzerland, 2020

Characteristic	Total	PCR results for severe acute respiratory syndrome coronavirus 2	
		Negative	Positive
Total	2,807	2,739 (97.6)	68 (2.4)
Hospital			
GZO Wetzikon	283	277 (97.9)	6 (2.1)
Cantonal Hospital Winterthur	409	403 (98.5)	6 (1.5)
City Hospital Triemli	583	567 (97.3)	16 (2.7)
University Hospital Zurich	1,532	1,492 (97.4)	40 (2.6)
Median age, y (IQR)	60 (39–74)	60 (39–74)	54.5 (44.5–69)
Sex			
M	1,368	1,330 (97.2)	38 (2.8)
F	1,439	1,409 (97.9)	30 (2.1)
Symptoms			
Any symptom of coronavirus disease	529	469 (88.7)	60 (11.3)
Fever/feeling feverish	205	167 (81.5)	38 (18.5)
Cough	192	152 (79.2)	40 (20.8)
Dyspnea	282	255 (90.4)	27 (9.6)
Sore throat	30	22 (73.3)	8 (26.7)
Myalgia	27	14 (51.9)	13 (48.1)

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*Values are no. (%) except as indicated.

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Universal Admission Screening for SARS-CoV-2 Infections among Hospitalized Patients, Switzerland, 2020

- 68 (2.4%) patients tested positive for SARS-CoV-2 RNA by PCR
- Of the 529 patients with ≥1 sign or symptom of COVID-19, 60 (11.3%) tested positive
- In contrast, only 8 (0.4%) of 2,278 patients without symptoms tested positive
- Asymptomatic SARS-CoV-2–positive patients were identified at all 4 hospitals: 1 (12.5%) at GZO, 3 (37.5%) at KSW, 1 (12.5%) at STZ, and 3 (37.5%) at USZ
- Of the 164 patients admitted primarily for suspected COVID-19, 52 (31.7%) tested positive for SARS-CoV-2 infection by PCR.
- For every 285 persons without symptoms whom we tested, we identified 1 asymptomatic SARS-CoV-2 infection.
- The absence of COVID-19 signs or symptoms yielded a negative predictive value of 99.6% for SARS-CoV-2 infection.

T Scheier et al. Emerg Infect Dis. 2021 Feb;27(2):404-410

Systematic screening on admission for SARS-CoV-2 to detect asymptomatic infections – data from Basel

- All adult patients admitted from 01.04.2020 to 14.06.2020 to the University Hospital Basel were routinely tested for SARS-CoV-2 within 72 h of admission.
- Retrospective classification as symptomatic or asymptomatic for COVID-19 at time of testing based on medical chart review.
- Classification criteria: acute pulmonary symptoms and/or fever≥38.0°C and/ or sudden onset of anosmia or ageusia, and/or acute confusion or deterioration in the elderly
- During study period, cantonal incidence of 676 SARS-CoV-2 infections (average population 201’504)

RN Stadler et al. Antimicrob Resist Infect Control (2021) 10:44

Systematic screening on admission for SARS-CoV-2 to detect asymptomatic infections – data from Basel

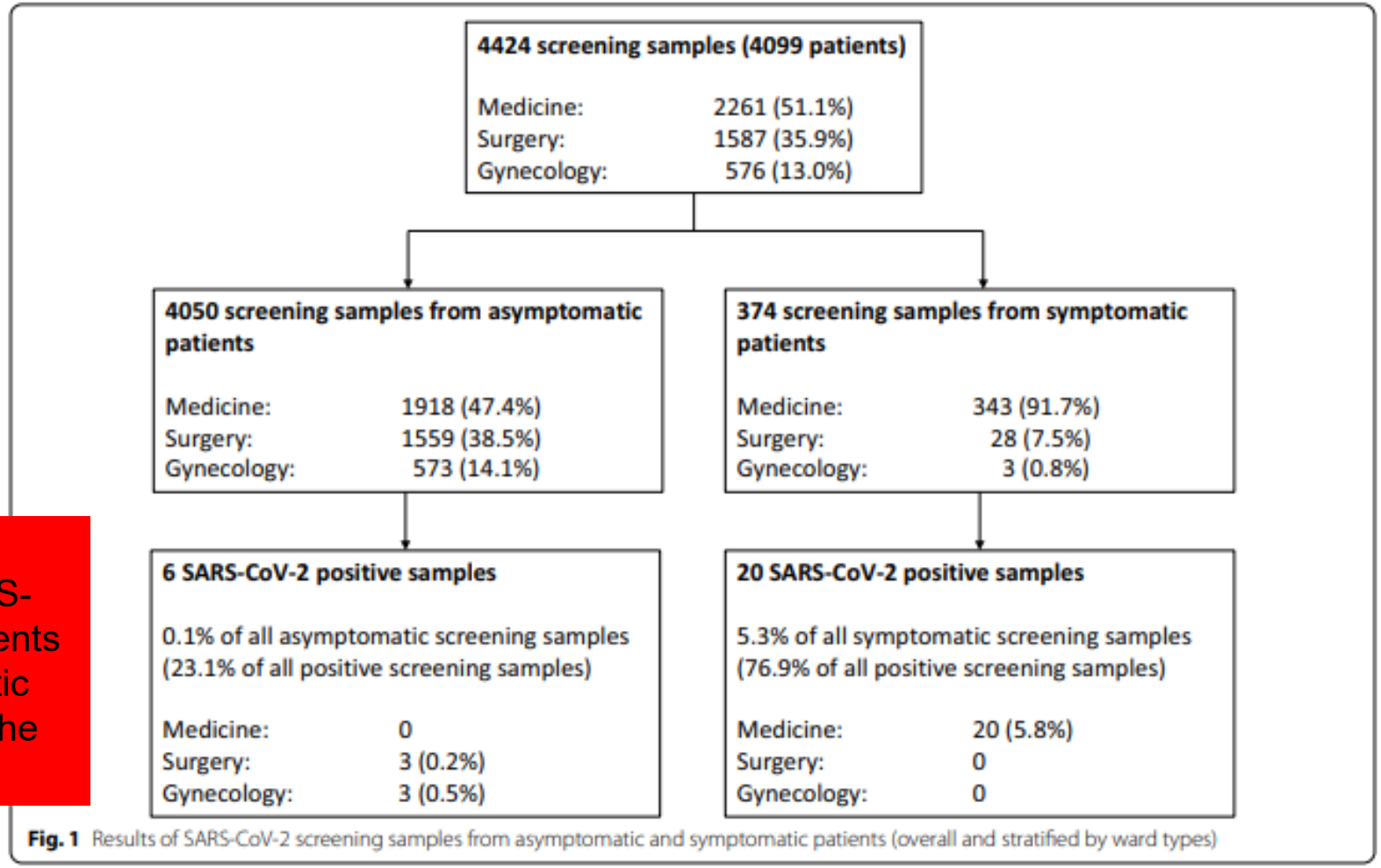

Fig. 1 Results of SARS-CoV-2 screening samples from asymptomatic and symptomatic patients (overall and stratified by ward types)

One out of six asymptomatic SARS-CoV-2-positive patients became symptomatic over the course of the hospitalization.

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Systematic screening on admission for SARS-CoV-2 to detect asymptomatic infections – data from Basel

- Constant proportion of asymptomatic patients among all SARS-CoV-2-infected inpatients throughout the study period (21% (4/19) in April, 33% (2/6) in May, 0% (0/0) in June, p=0.634), while the population-wide prevalence decreased.

→ The substantial proportion of asymptomatic SARS-CoV-2 infections, even in a low prevalence setting, emphasizes the need for universal infection and transmission control measures in health care institutions to prevent onward transmission by undetected SARS-CoV-2-carriers.

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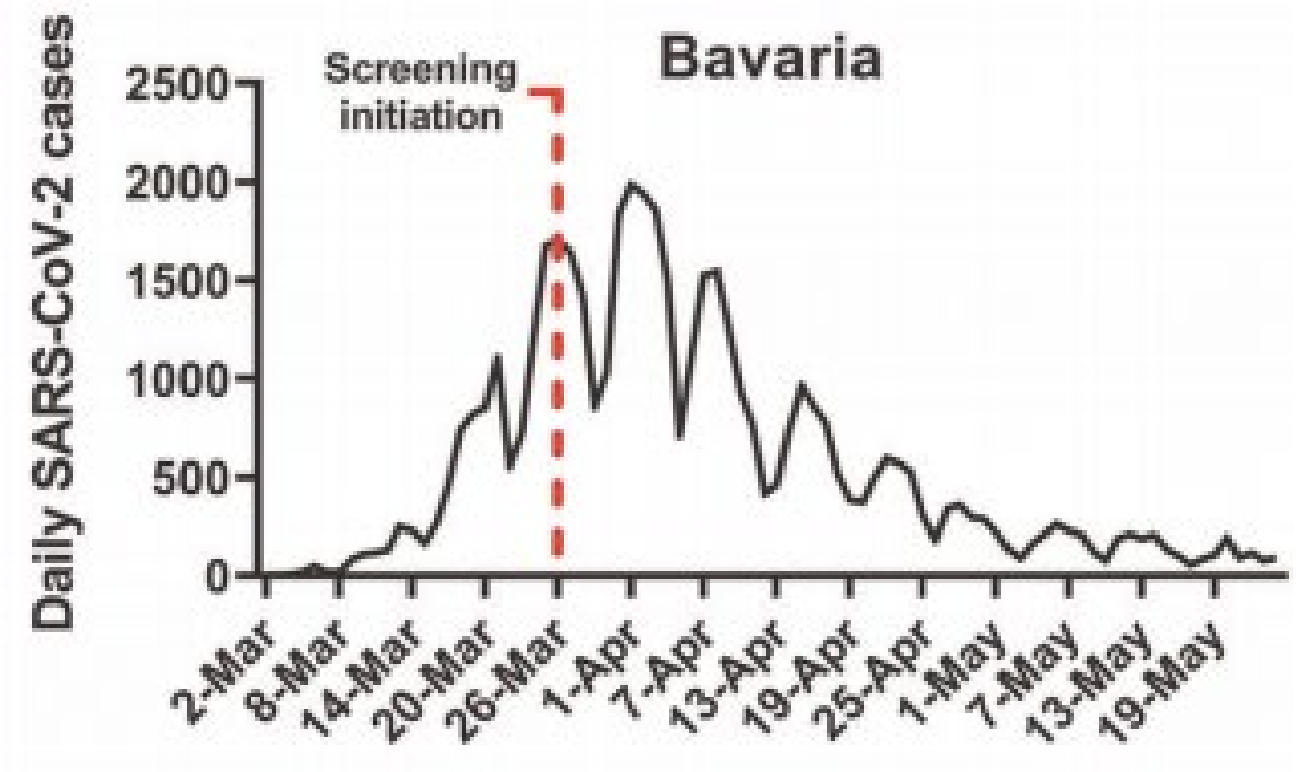
Performance and feasibility of universal PCR admission screening for SARS-CoV-2 in a German tertiary care hospital

- A 1438-bed tertiary care hospital in Germany, located in the state of Bavaria, lower Franconia
- retrospective, observational study
- Screening of hospital admissions between March 26th and May 24th 2020

S Krüger et al. J Med Virol. 2021 May;93(5):2890-2898

Performance and feasibility of universal PCR admission screening for SARS-CoV-2 in a German tertiary care hospital



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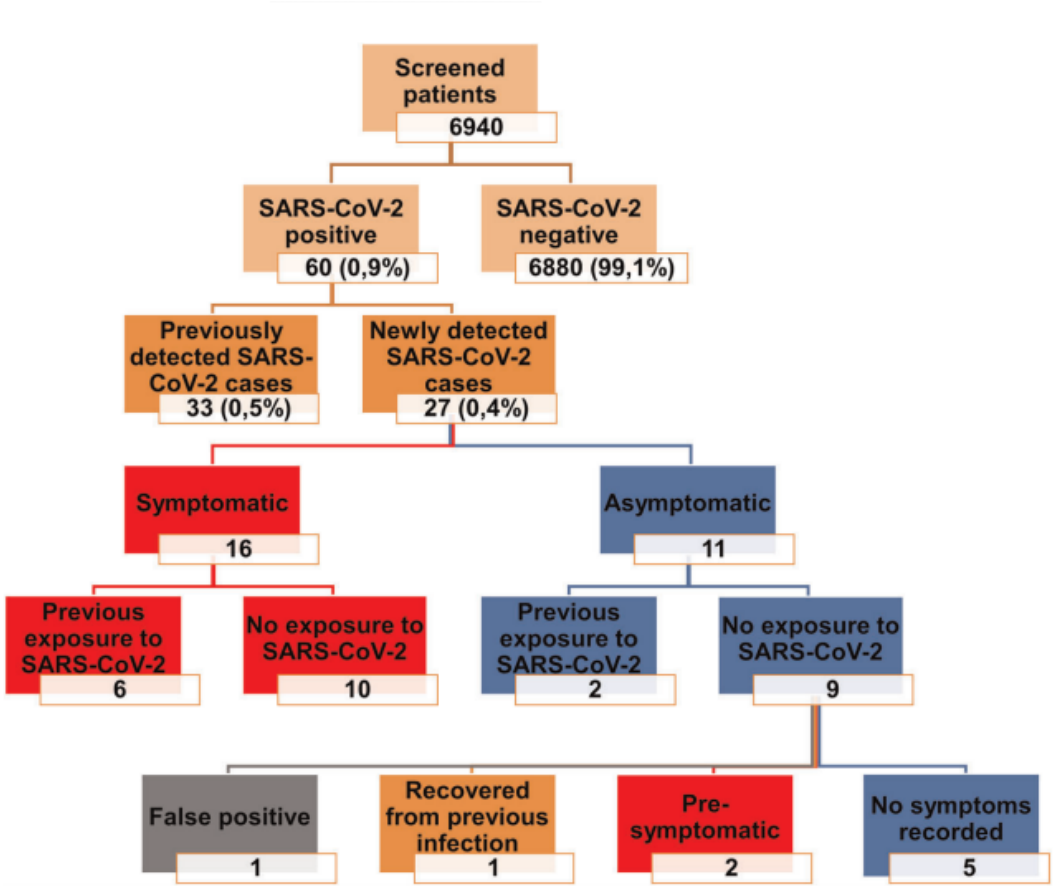

FIGURE 2 Polymerase chain reaction (PCR) testing results from March 26th till May 24th, 2020. The 6940 patients were tested for severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) using quantitative reverse transcriptase PCR. Displayed percentages refer to the total number of 6940 patients

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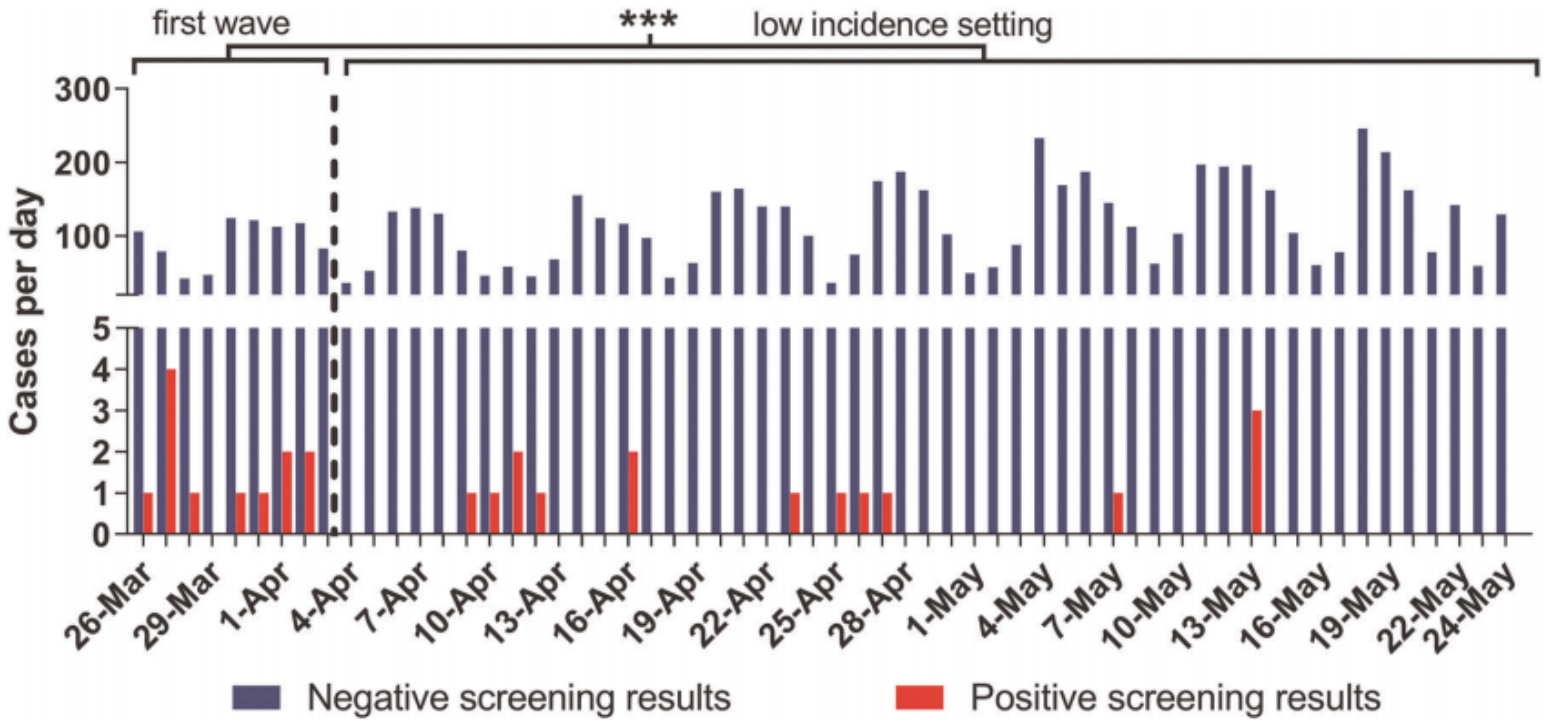

FIGURE 4 Polymerase chain reaction (PCR) testing results and local epidemiology following social distancing interventions. Blue bars show the absolute number of daily negative PCR testing results. Red bars show the absolute number of daily positive PCR testing results. *Y*-axis is interrupted to better display the range of values. Vertical dotted line indicates the border between the first wave of the pandemic and the low incidence setting when social distancing measures were taking full effect on the epidemic on April 4th, two weeks after their implementation (March 21st). ***$p < .001$ in a two-tailed Fisher's exact test comparing positive testing results before and after April 4th

<u>Number needed to identify one asymptomatic patient:</u>

- 425 in the first wave
- 1218 in the low incidence phase

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Performance and feasibility of universal PCR admission screening for SARS-CoV-2 in a German tertiary care hospital

Costs per identification of a single asymptomatic patient:

- average testing costs were approximately 58,469 € per newly detected asymptomatic SARS-CoV-2 patient (59 € per SARS-CoV-2 PCR test)

- Significant difference between the first wave (25,075 € per newly detected asymptomatic SARS-CoV-2 patient) and the low incidence setting (71,862 € per newly detected asymptomatic SARS-CoV-2 patient)

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Pros and Cons

Pro
- Sufficient evidence for transmission from a- or presymptomatic individuals
- Faster isolation of contagious index cases
- Reduction/prevention of secondary cases

Contra
- Resource-consuming
- “false sense of safety”
- Critical evaluation especially needed, if shortage of consumables

Other potential strategies
- Changes in standard precautions
- Repetitive testing
- Implementation “on demand”, e. g. after increase in community incidence

Vielen Dank für Ihre Aufmerksamkeit!