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### The pandemic in Germany







### The pandemic in Germany

Air travel and travel-related clusters were first precursers of the pandemic to come





### Airport screening of returning travelers

- February 1st, 2020: Evacuation flight from Wuhan arrives in Frankfurt
- 125 passengers were tested with a throat swab
  - 7 symptomatic and 2 contacts: Negative
- One mildly symtpomatic, one symptomatic passenger test positive by PCR
- Detection of viral RNA does not confirm infectivity



Caco2 (48h p.i.)



Hoehl, Rabenau, Berger et al, N Engl J Med 2020; 382:1278-1280



- Symptom based screening ineffective
- Potential transmission from asymptomatic and mildly symptomatic individuals
- Considerable viral load in upper airways
  - useful in diagnostics, but also hazardous for transmissions
- Can this virus be stopped?





Figure source: Our world in data





Picture source: https://media1.popsugar-assets.com//





Picture source: © TVB Paznaun Ischgl On https://www.skigebiete-test.ch/



- Superspreading events and limited community transmission
- Generally good coherence to public health measure
  - Masks generally worn
  - Gatherings limited
  - Day care and schools only open to children of "essential workers"

### Few cases in summer of 2020

#### Daily new confirmed COVID-19 cases



Shown is the rolling 7-day average. The number of confirmed cases is lower than the number of actual cases; the main reason for that is limited testing.





### The second wave in fall and winter



Source: Johns Hopkins University CSSE COVID-19 Data

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## The second wave : How can we curb community spread?



Mina M, Parker R, Larremore D, NEJM, 2020



# The second wave : How can we curb community spread?

- Application of rapid tests to help keep schools open?
- Teachers commonly index case
- The SAFE School Hessen Study
  - 7 weeks, 86 schools from 3 school districts in Hessen
  - 711 teachers performed rapid antigen test every 48 hours
  - >10.000 tests recorded





### The SAFE School Hessen Study



CALENDAR WEEK



## The SAFE School Hesse study: Results

- 5 true positive results (0.05%), confirmed by PCR
  - 4 cases: symptomatic
  - 1 case: presymptomatic
  - 0 cases: asymptomatic
  - Range of Ct values: 20.2 to 17.6
  - Local incidence: 108 to 275 cases / 100 000
- 16 false positive tests
- 4 likely false negative tests



### The second wave in winter

- Testing could be done by the teachers with little difficulty
  - 0,43% of tests invalid
- Self-testing can help identify cases, especially if symptomatic
- NPIs need to be upheld





### Virus variants in Germany



Figure source: Robert Koch-Institut, Berlin, Germany



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### Daily new confirmed COVID-19 cases



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### The second and third wave in Germany

Germany - Weekly COVID-19 incidence (per 100.000)

Our World in Data

#### Daily new confirmed COVID-19 cases

Shown is the rolling 7-day average. The number of confirmed cases is lower than the number of actual cases; the main reason for that is limited testing.



![](_page_20_Picture_5.jpeg)

# The second and third wave in Germany in intensive care

![](_page_21_Figure_1.jpeg)

Figure source: Deutsche Interdisziplinäre Vereinigung für Intensiv- und Notfallmedizin, www.divi.de

![](_page_21_Picture_4.jpeg)

### The second and third wave in winter

- Two waves in short succession put strain on health care and entire population
- Increased measures to curb infection
  - In-person schooling very restricted
  - Shops largely closed
  - Gatherings restricted
- Repercussions of NPIs became palpable

![](_page_22_Picture_8.jpeg)

### Covid-19 and out-patient pediatric care

- Increase in cases among young children in the third wave
- Strong decline of acute respiratory tract infections
- How much does SARS-CoV-2 contribute to airway infections?

![](_page_23_Picture_4.jpeg)

https://mansoorpediatrics.com/

![](_page_23_Picture_7.jpeg)

### Covid-19 and out-patient pediatric care

- 799 children with signs of acute infection were tested for SARS-CoV-2, influenza A and influenza B
- No case of influenza
- 19 (2.4%) positive for SARS-CoV-2 RNA
  - What factors are associated with testing positive?

![](_page_24_Picture_6.jpeg)

### Symptoms of an acute infection

![](_page_25_Figure_1.jpeg)

Hoehl, Schneider, et al., submitted for publication

![](_page_25_Picture_4.jpeg)

### Findings on examination

![](_page_26_Figure_1.jpeg)

Hoehl, Schneider, et al., submitted for publication

![](_page_26_Picture_4.jpeg)

### Exposure history

![](_page_27_Figure_1.jpeg)

![](_page_27_Picture_3.jpeg)

# Gaining control of the pandemic through vaccination

![](_page_28_Figure_1.jpeg)

#### 15, 2021 Jun 3, 2021

- Recent drop in cases: **Reason for optimism** in Germany
- Reasons for decline
  - Vaccination currently 45% one dose, 20% full vacc. schedule
  - NPIs
  - Seasonality of viral infections

### Outlook

- Progress of vaccination campaign will likely have strong impact on development
- Uptick in cases in UK with VOC delta: Surveillance of variants of concern

![](_page_29_Figure_3.jpeg)

Figure source: Robert Koch-Institut

![](_page_29_Picture_6.jpeg)

### The pandemic in Germany

![](_page_30_Picture_1.jpeg)

![](_page_30_Figure_2.jpeg)

![](_page_30_Picture_4.jpeg)