

# MArS Webinar

## A possible second wave of Covid-19 in Germany

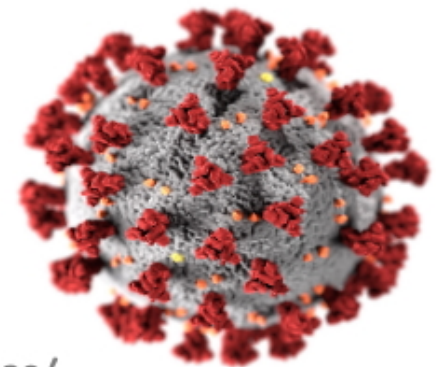
June 25<sup>th</sup> 2020

Dr. Stefan Walzer

MArS Market Access & Pricing Strategy GmbH, Germany  
State University Baden-Wuerttemberg, Germany  
University of Applied Sciences Ravensburg-Weingarten, Germany



# **Covid-19** **Task Force**

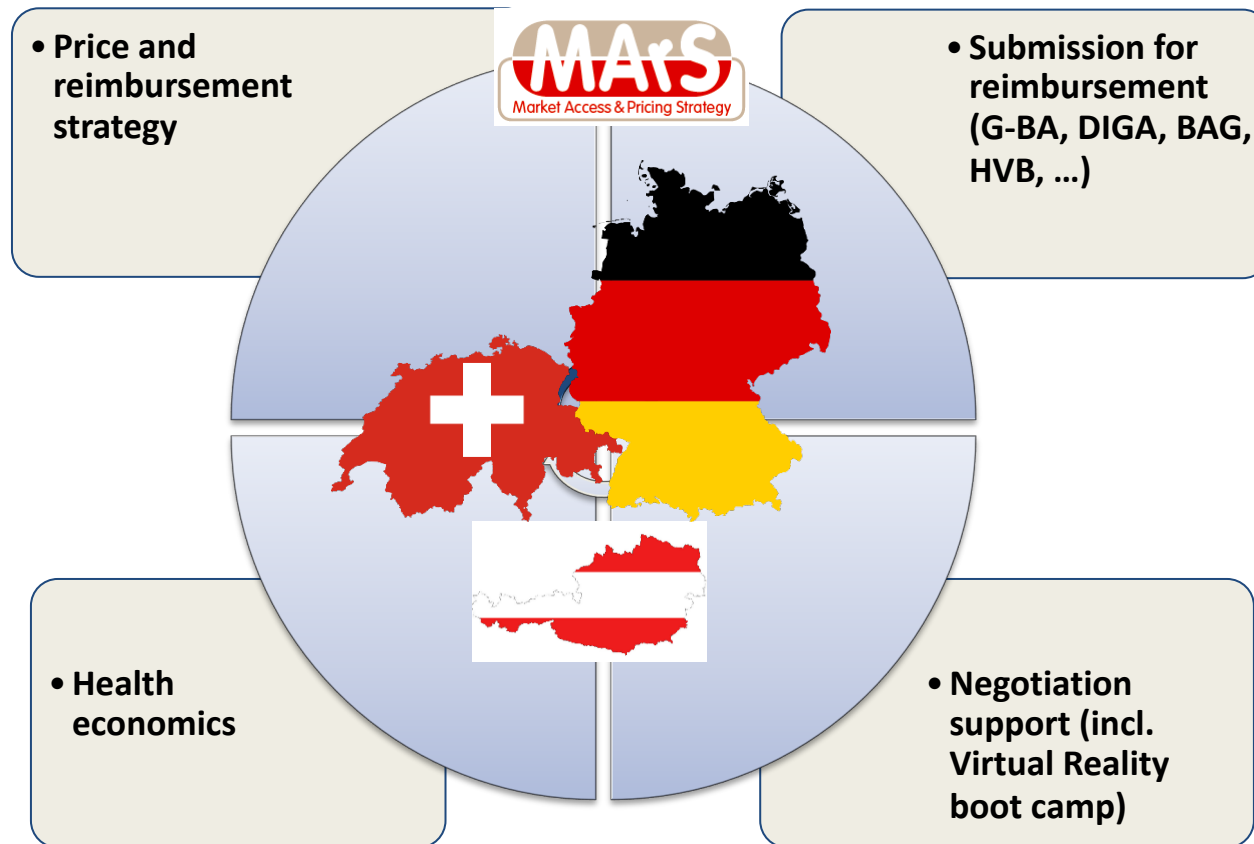


<https://marketaccess-pricingstrategy.de/en/covid-19-task-force/>

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MEDVANCE 



# MArS Webinar

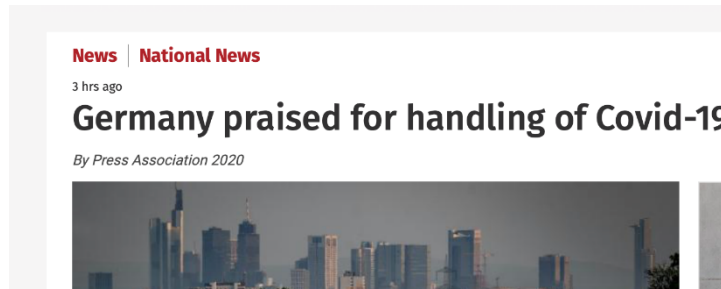
## A possible second wave of Covid-19 in Germany

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# Germany in Covid-19 times – well done, but...



The New York Times

## German Region in New Lockdown After Slaughterhouse Outbreak

By The Associated Press

June 23, 2020



BERLIN — German authorities slapped new lockdown measures Tuesday on a western region that has seen hundreds of coronavirus infections linked to a slaughterhouse, trying to make



GÖTTINGEN

## Strengere Regeln in Schulen nach Corona-Ausbruch

AKTUALISIERT AM 02.06.2020 - 05:42



Nach einem Corona-Ausbruch in Göttingen bemühen sich die Behörden, weitere Kontaktpersonen ausfindig zu machen. In 13 Schulen gelten ab sofort noch strengere Regeln.

# Epidemiologic question driven by the Covid-19 outbreak

When could a second wave of Covid-19  
appear in Germany and how strong will it  
be?

# Epidemiologic basis of the analysis: covidSIM tool

- CovidSIM is a simulator developed for epidemiologic simulation of the Covid-19-pandemic outbreak
- This simulator was developed by Prof. Dr. Eichner and Dr. Schwehm (University of Tuebingen)

# Definitions

- $R_0$ : baseline reproduction number
- Indicates the average number of people infected by an infected person if no infection control measures are taken and no immunity in the population exist yet
- For SARS-CoV-2, the effective R is estimated at 2-3
- Without specific control measures and spontaneous changes in behavior: exponential curve with peak in spring/summer 2020



# Assumptions

- Contact reducing measures have led to a reduction of the effective R (before: 2-3 or even higher, since 15<sup>th</sup> March: 1,5-2)
- Since Monday, 23<sup>rd</sup> March general restraint of contacts (just 2 persons may meet in public, except families etc.),  $R < 1$
- Since Monday, 15<sup>th</sup> June, contact restrictions relaxed, schools opened partially, R (slowly) increasing again

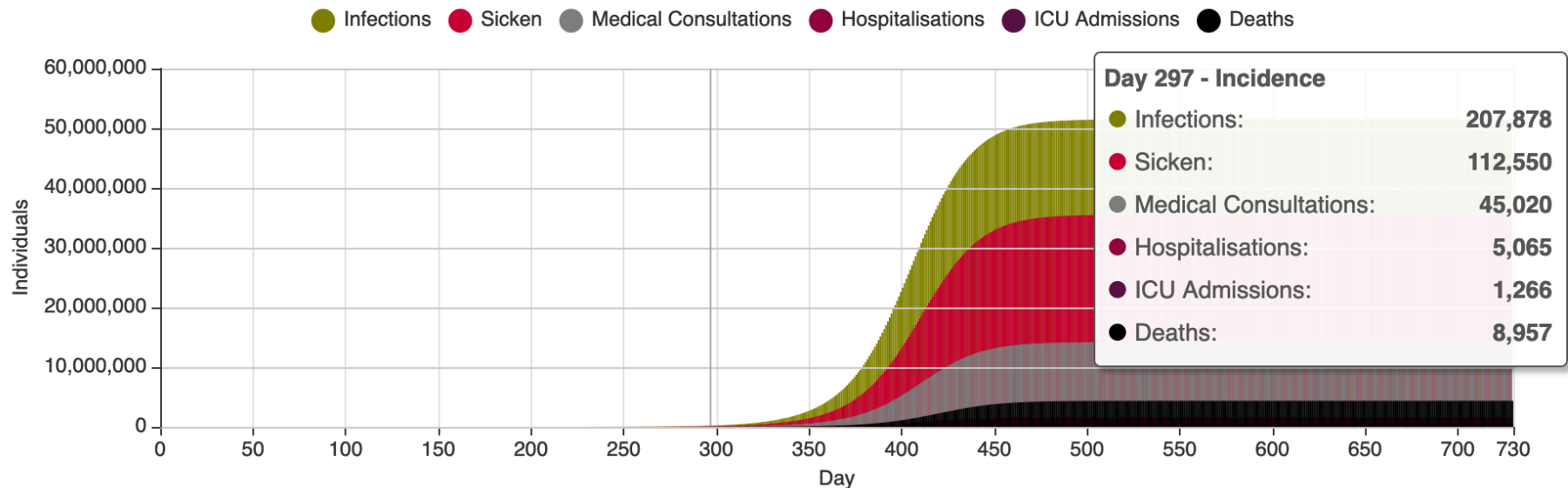
# Analysis assumptions

- Germany
  - Population: 83.2 million
  - 105 statutory health insurances (around 90% of market)
  - 45 private health insurances and special groups (around 10% of market)
- Assumptions on simulation:
  - Effective  $R = 2.1$
  - Contact reduction time: 91 days (from 16<sup>th</sup> March until 15<sup>th</sup> June)
  - Other assumptions aligned with the Robert Koch Institute and German Society for Epidemiology

# Confirmation that the assumptions can mimic German reality

- Day 297 in the CovidSIM → Today (**23<sup>rd</sup> June**):  
***207,878 infections (191,768 confirmed by JHU)***

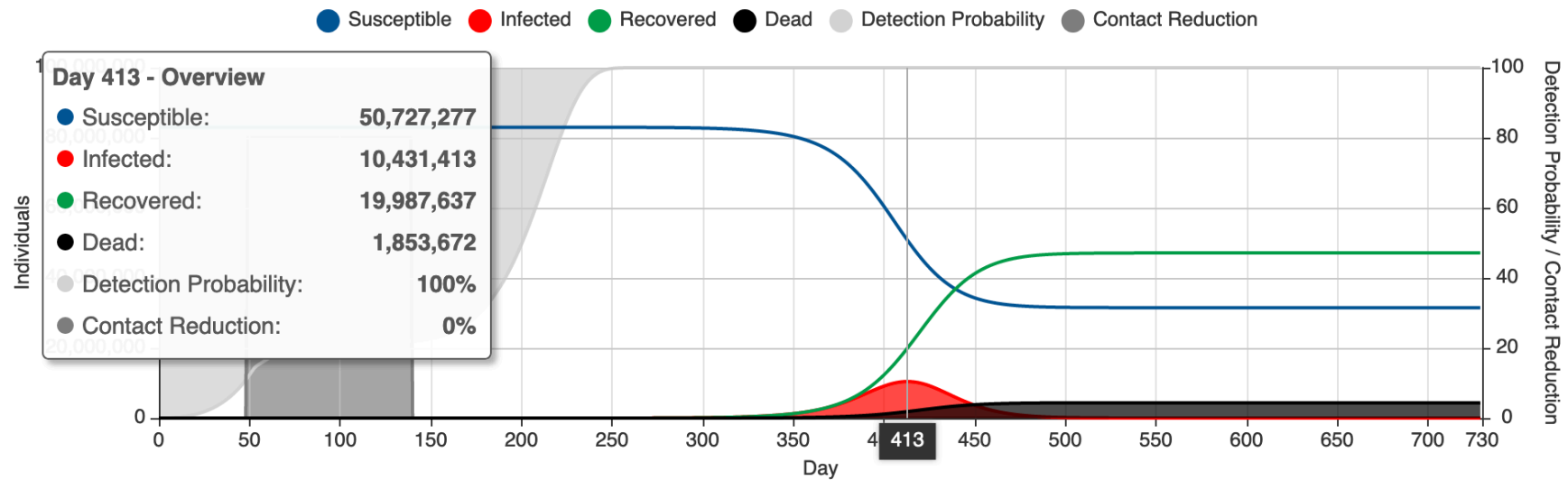
## Cumulative Events ▾



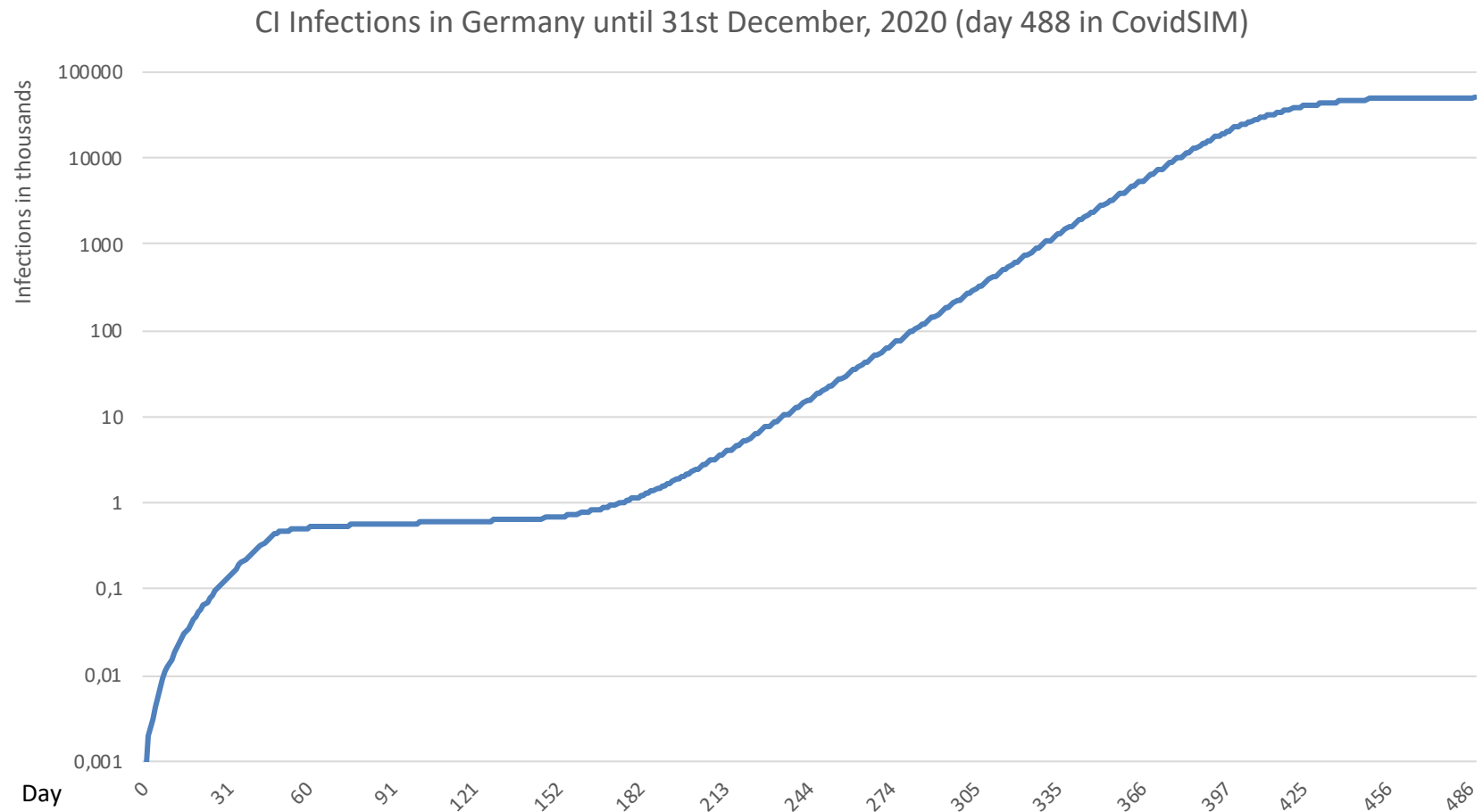
# Scenario analysis – Stop contact reductions mid of June

- Peak number of confirmed infections (by test) will be: Day 413 in the CovidSIM (116 days from day 297 (today) **23<sup>rd</sup> June** → 17<sup>th</sup> October): **10,431,413**

## Infection and Immunity Status



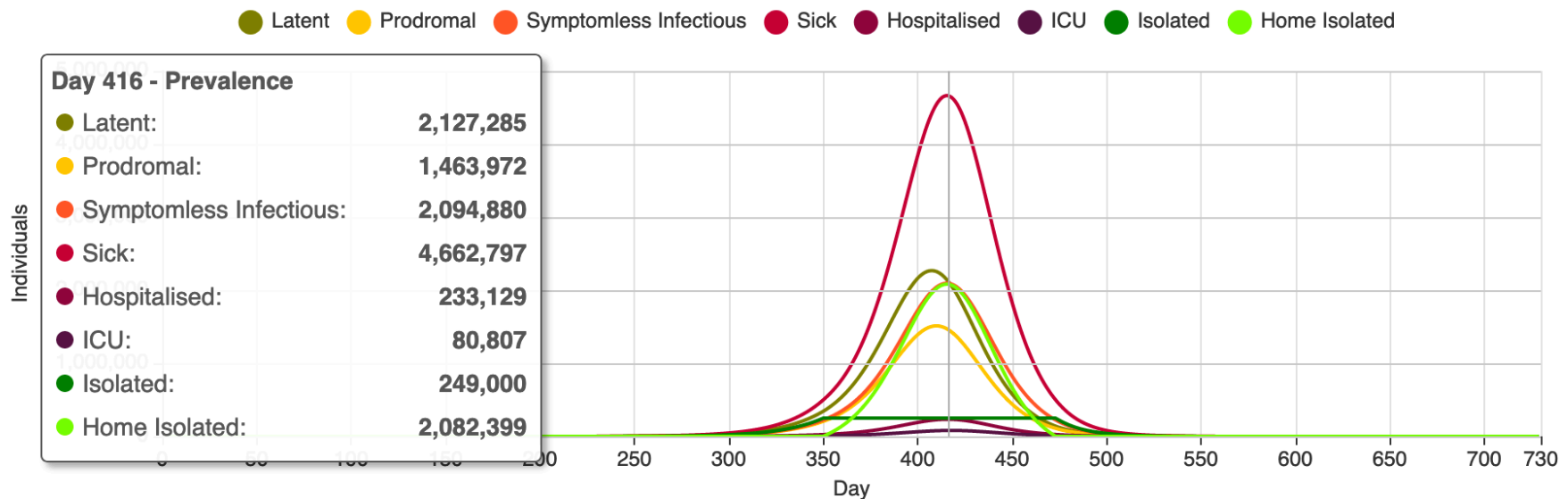
# Scenario analysis - Results



# Peak Hospitalizations

Peak number of hospitalizations will be: Day 416 in the CovidSIM (119 days from day 297 (today) **23<sup>rd</sup> June** → 20<sup>th</sup> October): **233,129**

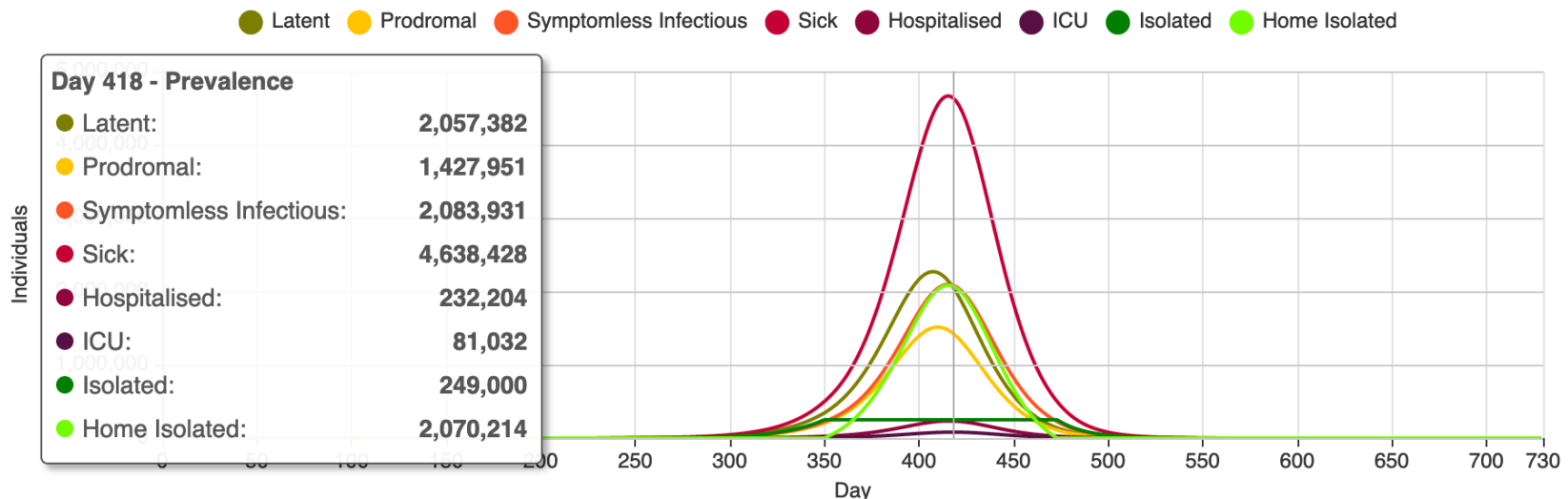
## Infection and Disease



# Peak ICU

Peak number of ICU admissions will be: Day 418 in the CovidSIM (121 days from day 297 (today) **23<sup>rd</sup> June** → 22<sup>nd</sup> October): **81,032**

## Infection and Disease



... coming back to the  
question we had...

When could a second wave of Covid-19  
appear in Germany and how strong will it  
be?



# Assumptions

- Contact reducing measures have led to a reduction of the effective R (before: 2-3 or even higher, since 15<sup>th</sup> March: 1,5-2)
- Since Monday, 23<sup>rd</sup> March general restraint of contacts (just 2 persons may meet in public, except families etc.),  $R < 1$
- Since Monday, 15<sup>th</sup> June, contact restrictions relaxed, schools opened partially, R (slowly) increasing again
- Since Monday, 22<sup>nd</sup> June, schools generally opened

# Children being less infectious? Likely not!

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The role of children in the spread of COVID-19: Using household data from Bnei Brak, Israel, to estimate the relative susceptibility and infectivity of children

Itai Dattner<sup>1</sup>, Yair Goldberg<sup>2</sup>, Guy Katirji<sup>3</sup>, Rami Yarni<sup>4</sup>, Nuri Gal<sup>5</sup>, Yoav Miron<sup>1</sup>, Arnon Ziv<sup>5</sup>, Yoram Hano<sup>4</sup>, Amit Happonen<sup>4</sup>

<sup>1</sup>University of Haifa, Israel

<sup>2</sup>Technion - Israel Institute of Technology, Israel

<sup>3</sup>ORT Braude College of Engineering, Israel

<sup>4</sup>The Gertner Institute for Epidemiology and Health Policy Research, Israel

<sup>5</sup>Tel Aviv University, Israel

<sup>1</sup> Contributed equally

## Summary

### Background

One of the significant unanswered questions about COVID-19 epidemiology relates to the role of children in transmission. In this study we estimate susceptibility and infectivity of children compared to those of adults. Understanding the age-structured transmission dynamics of the outbreak provides precious and timely information to guide epidemic modelling and public health policy.

### Methods

Data were collected from households in the city of Bnei Brak, Israel, in which all household members were tested for COVID-19 using PCR. To estimate relative transmission parameters in the absence of data on who infected whom, we developed an estimation method based on a discrete stochastic dynamic model of the spread of the epidemic within a household. The model describes the propagation of the disease between household members allowing for susceptibility and infectivity parameters to vary among two age groups. The parameter estimates are obtained by a maximum likelihood method, where the likelihood function is computed based on the stochastic model via simulations.

### Findings

Inspection of the data reveals that children are less likely to become infected compared to adults (25% of children infected over all households, 44% of adults infected over all households, excluding index cases), and the chances of becoming infected increases with age. An interesting exception is that infants up to age one year are more likely to be infected than children between one and four. Using our modelling approach, we estimate that the susceptibility of children (under 20 years old) is 45% (40%, 55%) of the susceptibility of adults. The infectivity of children was estimated to be 85% (65%, 110%) relative to that of adults.

### Interpretation

It is widely observed that the percentage of children within confirmed cases is low. A common explanation is that children who are infected are less likely to develop symptoms than adults, and thus are less likely to be tested. We estimate that children are less susceptible

*„Moreover, our results indicate that children, when infected, are somewhat less prone to infect others compared to adults; however, this result is not statistically significant."*

**Preprint:** This document is a snapshot of research work in progress. It is released to provide an impression of viral loads based on diagnostic testing. It reports new medical research that has yet to be evaluated. As with other preprints, it should not be used to guide clinical practice.

## An analysis of SARS-CoV-2 viral load by patient age

Terry C. Jones<sup>1,2</sup>, Barbara Mühlemann<sup>1,3</sup>, Talitha Velthuis<sup>1,3</sup>, Guido Biele<sup>4</sup>, Marta Zuchowksi<sup>5</sup>, Jörg Hofmann<sup>1,5</sup>, Angela Stein<sup>5</sup>, Anke Edelmann<sup>5</sup>, Victor Max Corman<sup>1,3</sup>, Christian Drosten<sup>1,3</sup>

### Affiliations:

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2: Centre for Pathogen Evolution, Department of Zoology, University of Cambridge, Downing St., Cambridge, CB2 3EJ, U.K.

3: German Centre for Infection Research (DZIF), partner site Charité, 10117 Berlin, Germany

4: Norwegian Institute of Public Health, 0473 Oslo, Norway

5: Labor Berlin - Charité Vivantes GmbH, Sylter Straße 2, 13353 Berlin, Germany

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### Abstract

As children are under-represented in current studies aiming to analyse transmission of SARS-coronavirus 2 (SARS-CoV-2), their contribution to transmission is unclear. Viral load, as measured by RT-PCR, can inform considerations regarding transmission, especially if existing knowledge of viral load in other respiratory diseases is taken into account. RT-PCR threshold cycle data from 3303 patients who tested positive for SARS-CoV-2 (out of 77,996 persons tested in total, drawn from across Germany) were analysed to examine the relationship between patient age and estimated viral load. Two PCR systems were used. In data from the PCR system predominantly used for community and cluster screening during the early phase of the epidemic (Roche LightCycler 480 II), when such screening was frequent practice, viral loads do not differ significantly in three comparisons between young and old age groups (differences in log<sub>10</sub> viral loads between young and old estimated from raw viral load data and a Bayesian mixture model of gamma distributions collectively range between -0.11 and -0.43). Data from a

*„In particular, there is little evidence from the present study to support suggestions that children may not be as infectious as adults."*

## BRIEF

## Israel braces for possible second COVID-19 wave as cases spike in capital

Carriers of the virus have been confirmed in a total of 11 educational institutions in Jerusalem.



Dattner 2020: [LINK](#)

Jones 2020: [LINK](#)

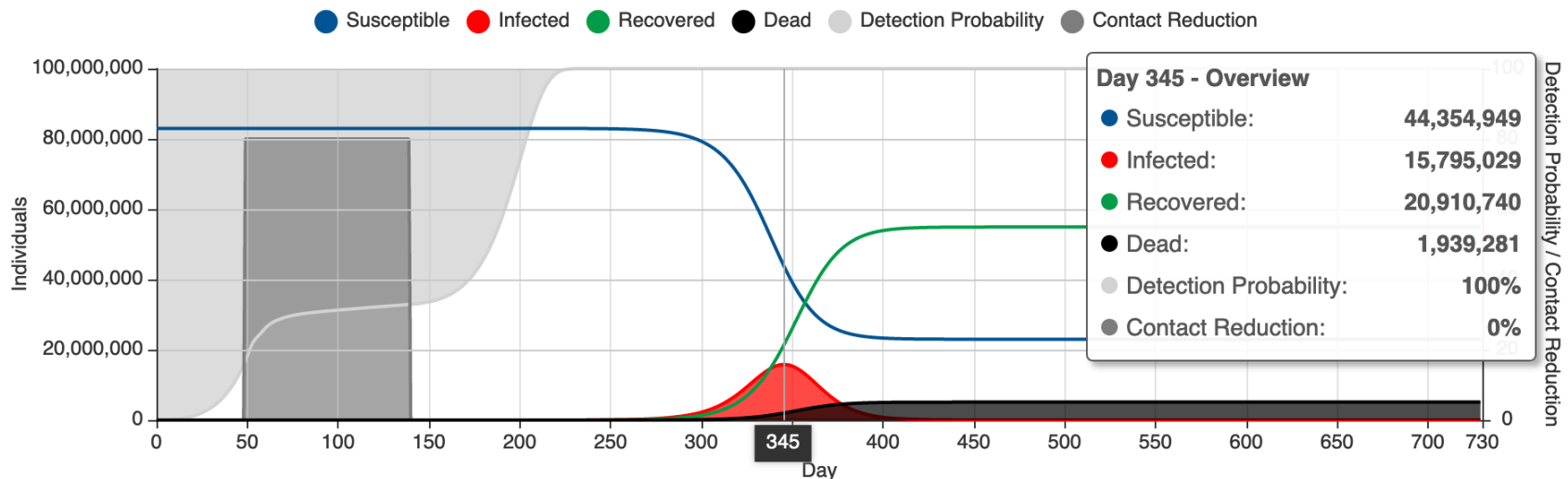
# Analysis assumptions

- Germany
  - Population: 83.2 million
  - 105 statutory health insurances (around 90% of market)
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- Assumptions on simulation:
  - Effective  $R = 2.1$
  - Contact reduction time: 91 days (from 16<sup>th</sup> March until 15<sup>th</sup> June)
  - Probability that a sick patient is isolated: from 50 to 30%, because of no standard testing in schools
  - Other assumptions aligned with the Robert Koch Institute and German Society for Epidemiology

# Scenario analysis – Stop contact reductions middle of June and opening of schools

- Peak number of confirmed infections (by test) will be: Day 345 in the CovidSIM (48 days from day 297 (today) **23<sup>rd</sup> June** → 10<sup>th</sup> August): **15,795,029**

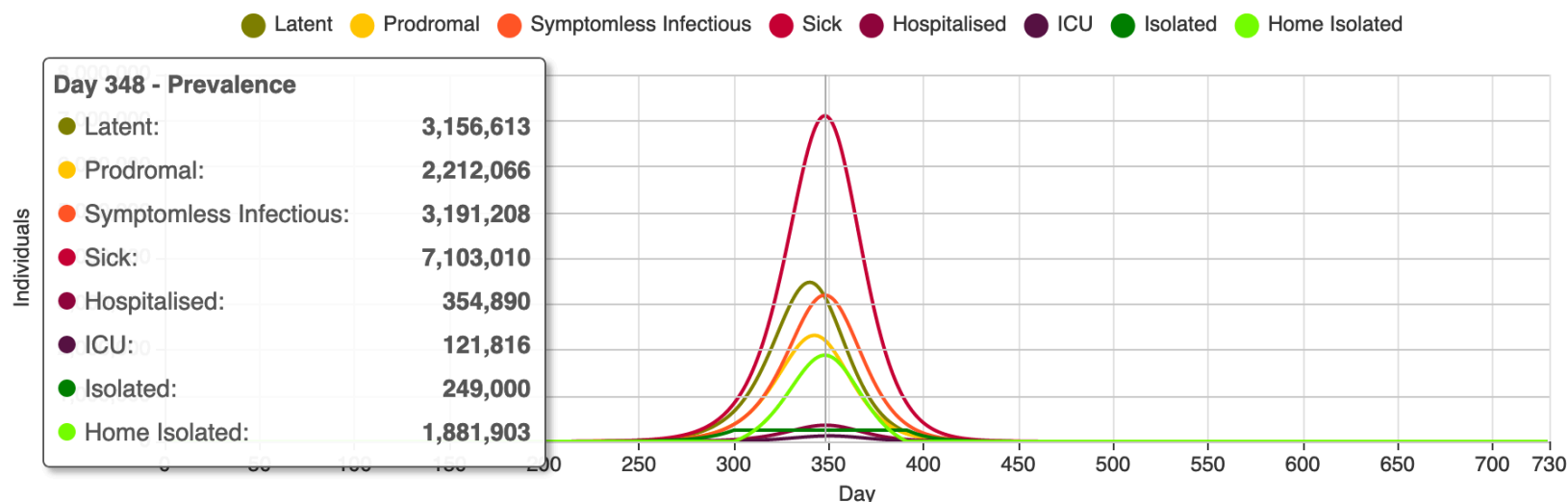
## Infection and Immunity Status



# Peak Hospitalizations

Peak number of hospitalizations will be: Day 348 in the CovidSIM (51 days from day 297 (today) **23<sup>rd</sup> June** → 13<sup>th</sup> August): **354,890**

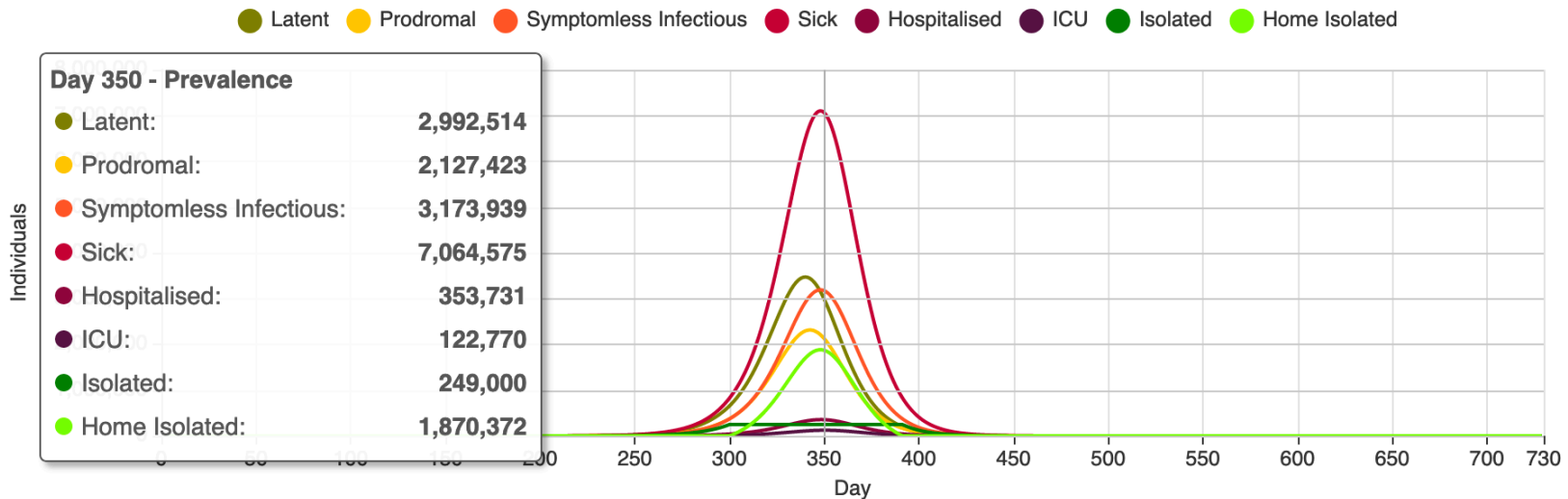
## Infection and Disease



# Peak ICU

Peak number of ICU admissions will be: Day 350 in the CovidSIM (53 days from day 297 (today) **23<sup>rd</sup> June** → 15<sup>th</sup> August): **122,770**

## Infection and Disease



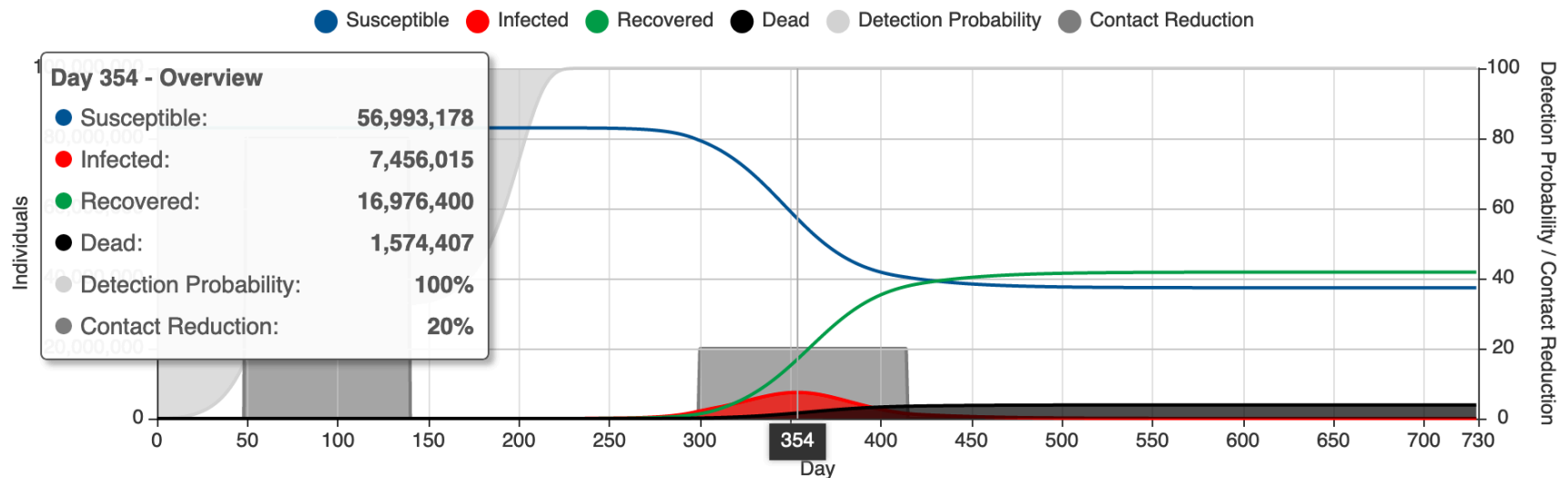
# Analysis assumptions

- Germany
  - Population: 83.2 million
  - 105 statutory health insurances (around 90% of market)
  - 45 private health insurances and special groups (around 10% of market)
- Assumptions on simulation:
  - Effective  $R = 2.1$
  - Contact reduction time: 91 days (from 16<sup>th</sup> March until 15<sup>th</sup> June)
  - Probability that a sick patient is isolated: from 50 to 30%, because of no standard testing in schools
  - Including a hospitalisation resource threshold and its triggered contact reductions
  - Other assumptions aligned with the Robert Koch Institute and German Society for Epidemiology

# Scenario analysis – Stop contact reductions middle of June and opening of schools

- Peak number of confirmed infections (by test) will be: Day 354 in the CovidSIM (57 days from day 297 (today) **23<sup>rd</sup> June** → 19<sup>th</sup> August): **7,456,015**

## Infection and Immunity Status

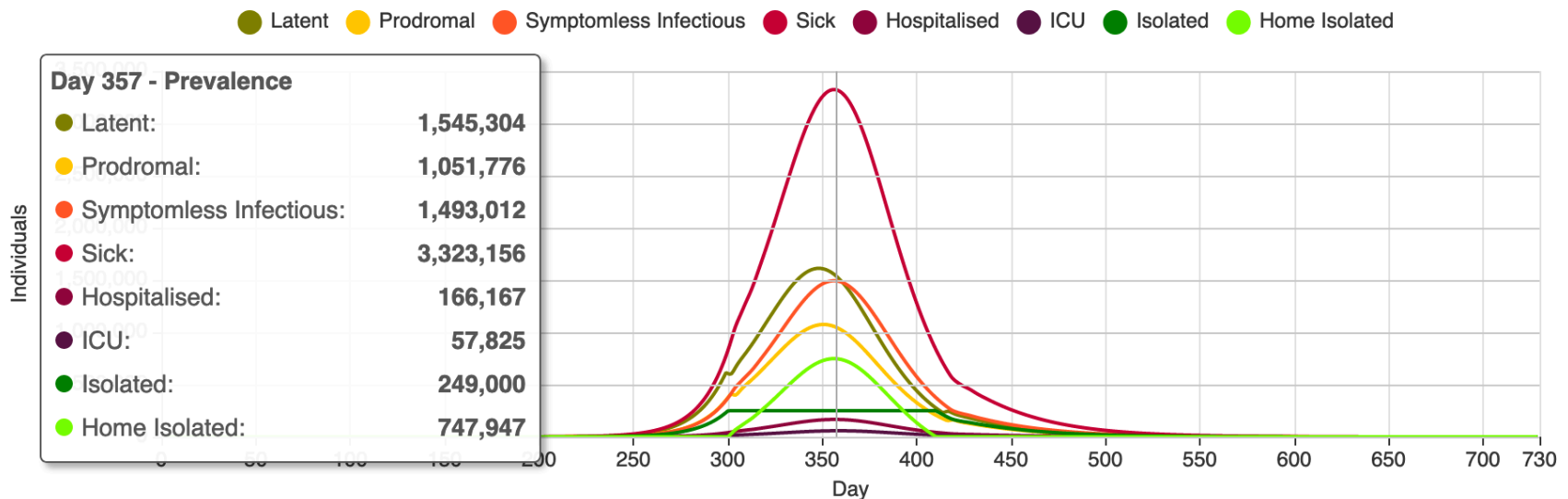




# Peak Hospitalizations

Peak number of hospitalizations will be: Day 357 in the CovidSIM (60 days from day 297 (today) **23<sup>rd</sup> June** → 22<sup>nd</sup> August): **166,167**

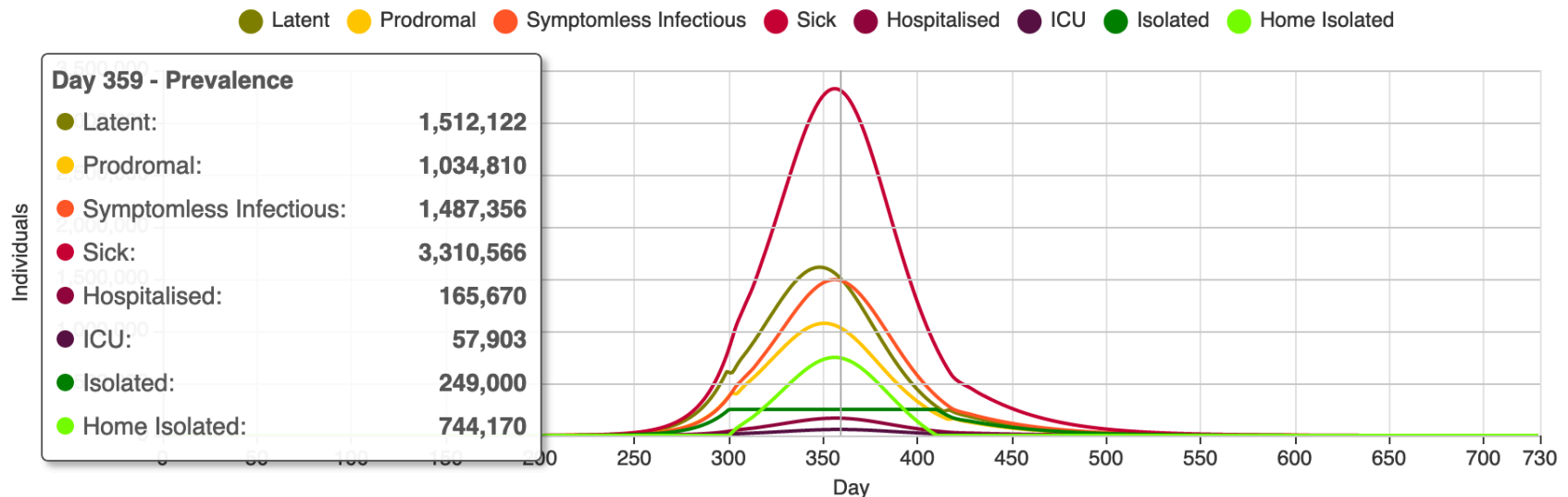
## Infection and Disease



# Peak ICU

Peak number of ICU admissions will be: Day 359 in the CovidSIM (62 days from day 297 (today) **23<sup>rd</sup> June** → 24<sup>th</sup> August): **57,903**

## Infection and Disease



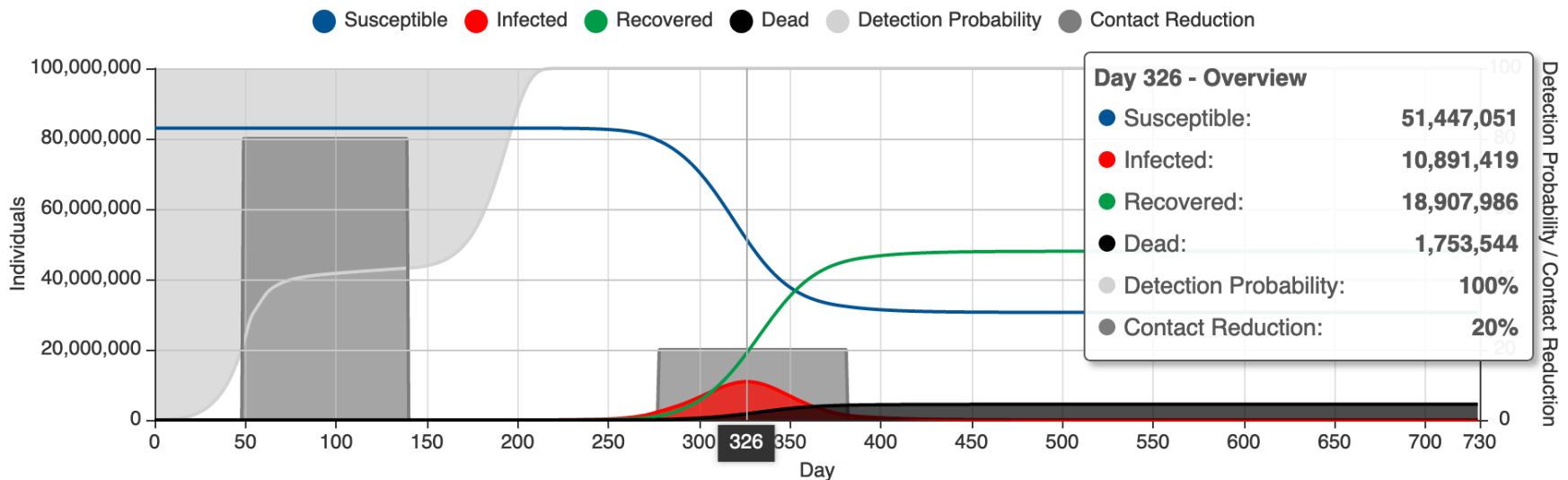
# Analysis assumptions

- Germany
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- Assumptions on simulation:
  - Effective  $R = 2.1$
  - Contact reduction time: 91 days (from 16<sup>th</sup> March until 15<sup>th</sup> June)
  - Probability that a sick patient is isolated: from 50 to 30%, because of no standard testing in schools
  - Including a hospitalization resource threshold and its triggered contact reduction
  - Increasing  $R$  because of local hotspots, especially in the district of Guetersloh
  - Other assumptions aligned with the Robert Koch Institute and German Society for Epidemiology

# Scenario analysis – Stop contact reductions middle of June and opening of schools plus local hotspots

- Peak number of confirmed infections (by test) will be: Day 326 in the CovidSIM (29 days from day 297 (today) **23<sup>rd</sup> June** → 22<sup>nd</sup> July): **10,891,419**

## Infection and Immunity Status



# Consistent with warning of German epidemiologists



**CORONA  
VIRUS  
UPDATE**  
mit Christian Drosten

### Das Coronavirus-Update mit Christian Drosten

Sars-CoV-2, das neue Coronavirus, hat sich zuerst in China ausgebreitet und ist nun Tag für Tag in den Schlagzeilen. Doch wie können wir so viele Menschen wie möglich so fundiert wie möglich informieren - ohne dabei unnötige Panik zu verbreiten? Die NDR Info Wissenschaftsredakteurin Korinna Hennig sprach mit einem der führenden Virus-Forscher Deutschlands: Christian Drosten, dem Leiter der Virologie in der Berliner Charité.

Welche Spur verfolgt die Forschung aktuell? Welche neuen Erkenntnisse gibt es zu Ansteckung und Krankheitsverlauf? Ist die Aufregung um das neue Virus überhaupt angemessen? Und: Wie ergeht es den Forschern persönlich in diesen Monaten? Hinweis: Der Podcast befindet sich im Juli und August in der Sommerpause.

Prof. Drosten (Charite) on Tuesday in the NDR podcast:

„I am not optimistic that we are in such a relaxed situation in 4 weeks from now as we are currently in.

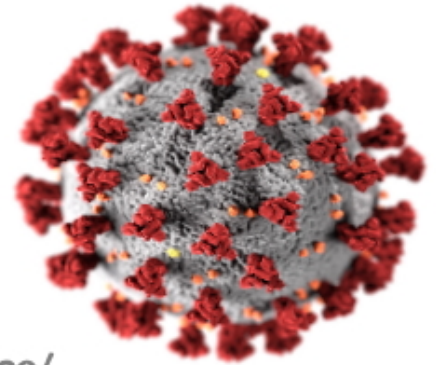
[...] I am pessimistic for 2 months and further if we do not react now!“

# Conclusions

- The Covid-19 outbreak could result in a second wave of different impact!
- Factors like travel not yet included, will also begin soon as summer holidays began already in some parts of Germany and are continuing the next weeks
- However, as German virologists say: “It is up to us to control the pandemic, especially by adhering to physical distancing.”



# **Covid-19** **Task Force**



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June 25<sup>th</sup> 2020

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## Our next MArS Webinar



MEDVANCE 

„Start up failures  
- from product concept to market –  
91% failure rate.  
How can you plan for a successful  
market launch?“



SPEAKERS:

Dr. Stefan Walzer

Ron de Graaff

30. July 2020  
21h CET  
12h PET