

COVID-19

COVID-19 MODELING EXERCISE

A “HOW TO” GUIDE for CovidSIM

COVID-19

Projections with **covidSIM.eu**

→ Go to <http://www.covidsim.eu/> or <http://www.covidsim.de>

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Step 1:

Enter population parameters

Population

Population size[million]

0

Size of population you want to model

Initial infections

0

Cumulative number of new infections over the 7 days prior the date we want to start modelling from

Determines the number of individuals who are infected at the beginning of the simulation. The remaining population is assumed to be non-immune.

We recommend that you do not change this value.

It is not a good idea to set it to the number of cases who have already been identified and isolated, because they should not be able to spread the infection in the population. It may be more relevant to assume that at some unknown time point one person (or a few persons) have brought in the infection into a population, but have remained undetected, and to see how the infection is spreading in such a scenario. The detection probability (see below) can then be used to see how far this infection has spread before it actually is detected by a random SARS-CoV-2 test.

Should be 0 if it is assumed that all transmission is local

Infections from outside of the population[per day]

0

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Step 2:

Enter Time Periods

Durations

Simulation duration[days] 60

The number of days to be simulated

Latency period[days] 3.1

Prodromal period[days] 2

Early infective period[days] 5

Late infective period[days] 7

Hospitalisation[days] 14

ICU admission[days] 21

(advanced setting)

Number of Erlang stages 16

← It is recommended to perform short-median term projections e.g. 60 days

← 3.1 (do not change)

← 2 (do not change)

← 5 (do not change)

← 7 (do not change)

← 14 (suggested)

← 21 (suggested)

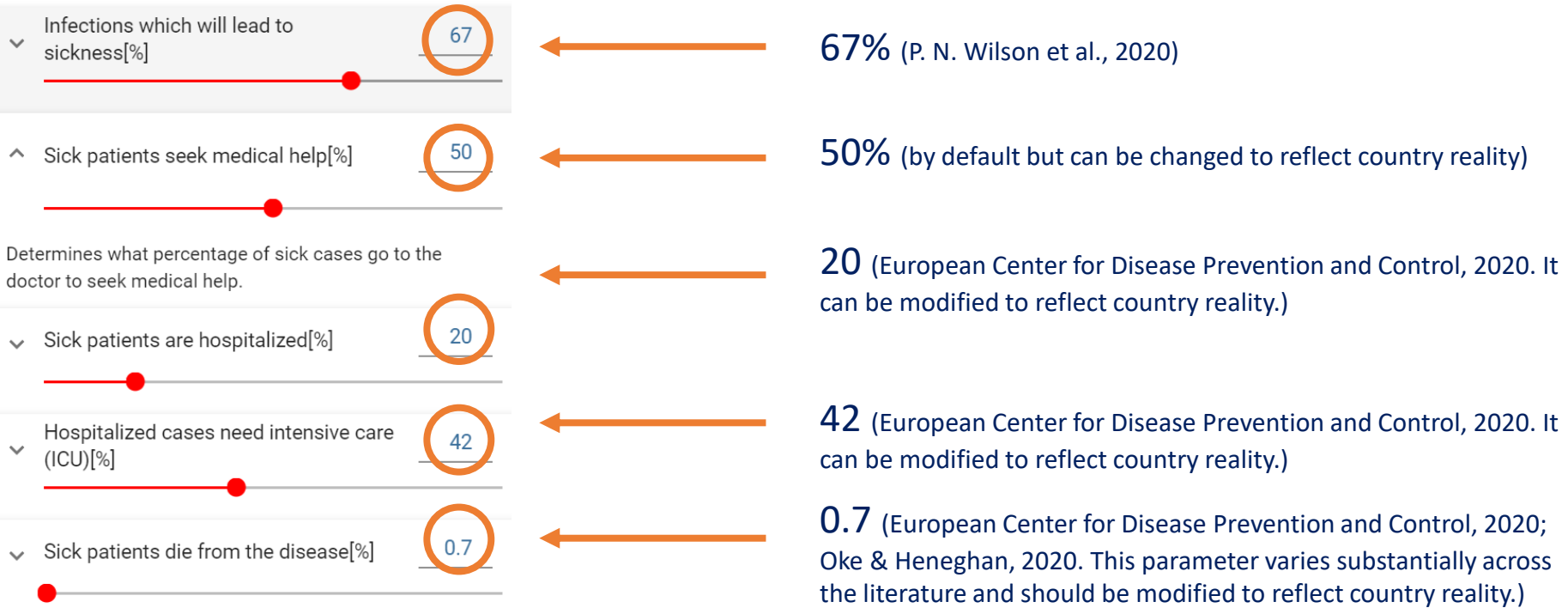
← 16 (default)

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Step 3:

Enter Severity

Severity



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Step 4:

Enter Contagiousness

Contagiousness ^

^ Annual average of the basic reproduction number R_0 **3.7** ← 3.7 (do not change)

Determines the average number of infections which are caused by a single infected individual in a population where nobody is immune and where nobody takes any preventive measures (no contact reduction, no isolation, no treatment etc.). It is important to note that this only refers to people who are infected by the "index case", but it does not include infections which are caused by the infected people themselves. Other parameters like the duration of the infective period (see above) are already

Amplitude of the seasonal fluctuation of R_0 [%] **0** ← 0 (not modeled)

Day when the seasonal R_0 reaches its maximum **0** ← 0 (not modeled)

Relative contagiousness in the prodromal period[%] **100** ← 100% (do not change)

Relative contagiousness in the late infective period[%] **2.5** ← 2.5% (do not change)

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Step 5:

Enter Detection

Detection ^

(advanced settings)

Detection of COVID-19 in an apparently free Population by random SARS-CoV-2 tests in patients with Influenza-Like Illness (ILI)

- in ILI patients who seek medical help[%] 0.1
- in hospitalized ILI patients[%] 0.1
- in patients who died from ILI[%] 0.1

Leave all parameters as set by default in the model (at 0.1).

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Step 6:

Interventions

Case Isolation

Probability that a sick patient is isolated[%]

50

50% (suggested but can be changed based on country information)

Maximum capacity of isolation wards[per 10,000]

1000

Assume large capacity (e.g. 1000)

Contact reduction for cases in home isolation[%]

75

75% (suggested but can be changed based on country information)

Begin of case isolation measures[day]

1

1 day

Determines when the isolation measures start.

Duration of case isolation measures[days]

60

The entire duration of the modeling period entered in Step 1 (e.g. 60 days)

Enter Interventions – Case Isolation

With the parameters suggested here we can quantify the impact from the intervention “case isolation.”

For example, assuming that 67% of the cases get sick, 50% of sick patients are isolated, and there is a 75% contact reduction for cases in home isolation, the resulting R_0 would be 0.82.

Thus, the initial $R_0=3.7$ considered is corrected according to the public health and social measures on contact reduction, resulting in a R_t of 3.

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Step 7:

Enter General Contact Reduction

The screenshot shows a settings panel titled 'General Contact Reduction'. It contains three adjustable parameters, each with a slider and a numerical input field:

- General contact reduction[%]**: The slider is set to 50, and the input field contains the number 50.
- Contact reduction begin[day]**: The slider is set to 1, and the input field contains the number 1.
- Contact reduction duration[days]**: The slider is set to 14, and the input field contains the number 14.

Orange arrows point from the text on the right to the input fields for 50, 1, and 14.

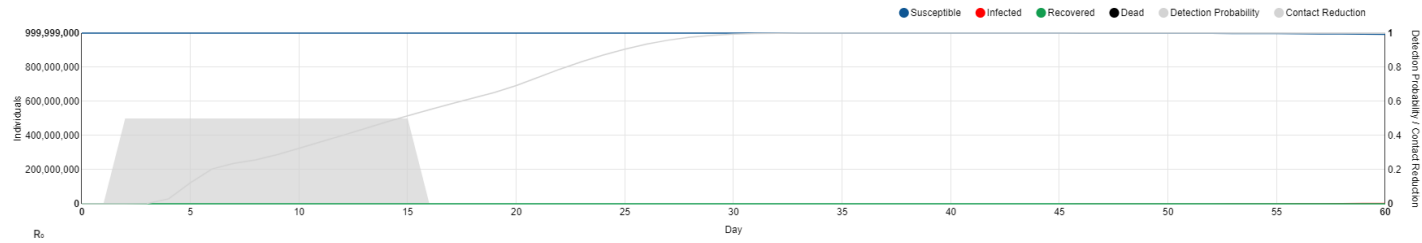
A further intervention to reduce the R_0 is to adjust the R_t obtained in Step 6 for contact reduction. This will allow us to achieve the observed R_t (the one obtained on EpiEstim in Phase 1).

Examples :

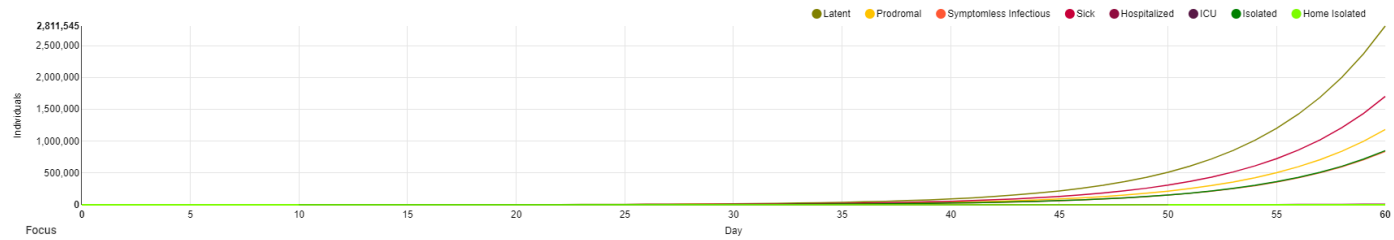
- Hence, if we have a R_t of 3 and we want a further reduction to a R_t of 2. To obtain that we assume a further reduction of the in the R_t by 33%, through the parameter “contact reduction”.
- Likewise, if we have a R_t of 3 but want to model a R_t of 1.5, we would a contact reduction parameter of 50%.
- Finally, to obtain a R_t of 1, we would need a contact reduction parameter of 66%.

Lifting measures scenario: state the “contact reduction duration” (in days) up to the date at in which you want to simulate the lifting of measures.

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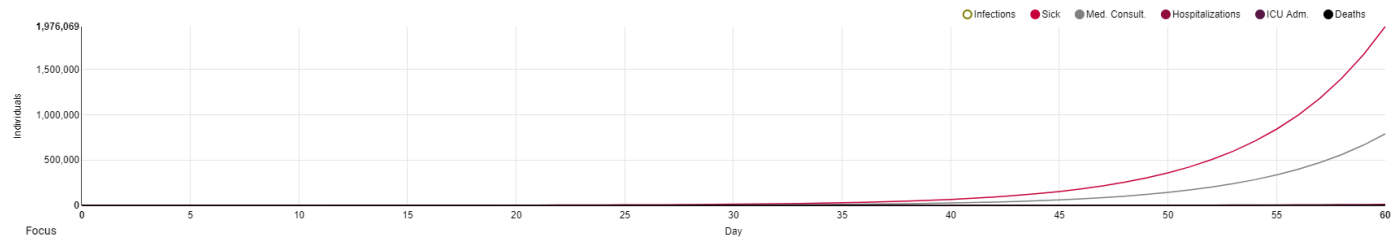


Infection and Disease



New Events

Cumulative Incidence



Thank you

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