**EPIC COVID19 SIMPLE MODEL PARAMETERS AND DATASET USED**

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**Parameters**

**Table 1.** Description of parameters used in the model

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **symbol** | **Definition** | **value** | **priors** | **ref.** |
| ps(a) | age-dependent probability of developing symptoms | infered if a≥20yo | Beta(9,3) |  |
|  |  | 0.1 if a<20yo |  | doi:10.1542/peds.2020-0702 |
| h(a) | age-dependent probability of hospitalisation if case |  |  | <https://www.ecdc.europa.eu/sites/default/files/documents/RRA-seventh-update-Outbreak-of-coronavirus-disease-COVID-19.pdf>) |
| pd(a) | age-dependent probability of death given hospitalisation | pd(a) = cfr(a)/ h(a) |  |  |
| cfr(a) | Age-dependent, case fatality ratio |  |  | doi.org/10.2807/1560-7917. ES.2020.25.12.2000256 |
| θl | mean latent period | 4 days |  | doi.org/10.1101/2020.04.01.20049908 |
| θi | mean asymptomatic period | 1.5 days |  | doi.org/10.1101/2020.04.01.20049908 |
| θs | mean symptomatic period prior hospitalization | 7 days |  | doi.org/10.1101/2020.04.01.20049908 |
| θh | mean hospitalisation stay | 5 days |  | <https://www.icnarc.org/Our-Audit/Audits/Cmp/Reports> |
| θr | mean time to recovery if symptomatic infection | 11 days |  | doi.org/10.1101/2020.04.01.20049908 |
| 𝚲(a,t,d,q) | age-dependent infection rate, function of time and efficacy/compliance of control activities |  |  |  |
| λ(t) | Background transmission rate prior lockdown |  | Unif(1e-9,1e-6) |  |
| pi | probability of infection given contact when a≠hcw |  | Beta(3,9) |  |
| phcw | probability of infection given contact when a=hcw |  | Beta(3,3) |  |
| c(a,j|t,d) | average number of contacts between age groups a and j, given control strategy and their efficacy/compliance when a≠hcw |  |  | doi.org/ 10.1371/journal.pcbi.1005697 |
| chcw | mean number of HCW-patient contacts per day |  | Poisson (42) | doi/10.1098/rsif.2012.0134 |
| q | Factor modulating number of contacts of Is, proxy of quarantine efficacy/compliance |  | Beta(3,3) |  |
| d | Factor modulating number of contacts of I, proxy of efficacy/compliance in social/physical distancing |  | Beta(3,3) |  |
| K | Capacity limit of bed suitable for COVID patient in hospital | 2000 |  | assumed |
| u | Reduction factor of infectiousness for asymptomatic infectious individuals. | 1 |  | assumed |

**Datasets**

* Disease information
  + Number of deaths due to COVID as reported by HPS (up to Apr28)
    - https://raw.githubusercontent.com/watty62/Scot\_covid19/master/data/processed/regional\_deaths.csv
  + Number of cases of COVID as reported by HPS (up to Apr28)
    - <https://raw.githubusercontent.com/watty62/Scot_covid19/master/data/processed/regional_cases.csv>
* Population descriptors
  + Age distribution in Scotland and in each Scottish health board:
    - Ref: **Scotland's Census 2011 - National Records of Scotland.**
    - <https://www.scotlandscensus.gov.uk/ods-web/data-warehouse.html#standarddatatab>
    - **Table DC1117SC - Age by sex**
  + Population size
    - <https://raw.githubusercontent.com/watty62/Scot_covid19/master/data/processed/HB_Populations.csv>
  + Number of HCW in Scotland
    - Value considered Nhcw= 112,974
    - All staff in NHSS but administrative staff in 2016
    - Ref: <https://www.isdscotland.org/Health-Topics/Workforce/Publications/2016-09-06/2016-09-06-Workforce-Report.pdf>
    - Table 1: NHSScotland workforce trend (WTE) by staff group
* CFR and probability of severe cases requiring hospitalisation
  + CFR: case fatality ratio in the Diamond Princess
  + source: https://www.eurosurveillance.org/content/10.2807/1560-7917.ES.2020.25.12.2000256

Table 2 : case fatality ratio in the Diamond Princess. HCW considered behaving as individuals of the 20-59 age classes

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| age group | cases | externel | nCFR | Used in model |
| 0–9 | 0 | 0.00% | (0.0–0.9) | 0.00100 |
| 10–19 | 2 | 0.20% | (0.0–1.0) |
| 20–29 | 25 | 0.20% | (0.1–0.4) | 0.00200 |
| 30–39 | 27 | 0.20% | (0.1–0.4) | 0.00200 |
| 40–49 | 19 | 0.40% | (0.3–0.6) | 0.00400 |
| 50–59 | 28 | 1.30% | (1.1–1.5) | 0.01300 |
| 60–69 | 76 | 3.60% | (3.2–4.0) | 0.03600 |
| 70–79 | 95 | 8.00% | (7.2–8.9) | 0.11400 |
| 80–89 | 29 | 14.80% | (13.0–16.7) |
| HCW |  |  |  | 0.00525 |

* + h(a): probability of severe cases requiring hospitalisation
  + source: <https://www.ecdc.europa.eu/sites/default/files/documents/RRA-seventh-update-Outbreak-of-coronavirus-disease-COVID-19.pdf>
  + Figure 3 : Age-specific hospitalisation rates among all cases, data from 14 countries in TESSy with >50% completeness for hospitalisation and >50 cases, 24 March 2020

Table 3: Age-specific hospitalisation rates among all cases from 14 countries and used in the model. HCW considered behaving as individuals of the 20-59 age classes

|  |  |
| --- | --- |
| age group | h(a) |
| Under20 | 0.143 |
| 20-29 | 0.1141 |
| 30-39 | 0.117 |
| 40-49 | 0.102 |
| 50-59 | 0.125 |
| 60-69 | 0.2 |
| Over70 | 0.303 |
| HCW | 0.114525 |