* Serious cases should be directly proportional to total cases on the micro level – within a demographic, e.g. healthy individuals between 18 and 25, the rate of serious cases should be constant. Hence if susceptible individuals become infected with rate $\beta$ then they become infected in serious cases with rate $\alpha\beta$.
* We can also make a fair assumption that the vast majority of deaths will come from serious cases and therefore serious cases become deaths with rate $\gamma$ and become recovered with rate $\epsilon$.
* We can also use the research on incubation period to estimate what time people will be exposed but not yet infectious.

Dates: 22/01/2020 – 6/6/2020

UK stops providing recovery data on 13th April, so need to make assumption

Have to assume that migration is negligible compared to tourism

Must assume that tourism was consistent with previous years until borders were closed

All non-essential business closure in UK on March 24th – assume tourism goes to 0 since hotels were closed

France Tourism data - <https://www.entreprises.gouv.fr/files/files/directions_services/etudes-et-statistiques/4p-DGE/2017-06-4p-N71-EVE-ENGLISH.pdf>

UK tourism data - <https://www.visitbritain.org/nation-region-county-data?area=9000&country=1040>

Italy tourism data - <https://www.bancaditalia.it/pubblicazioni/indagine-turismo-internazionale/2019-indagine-turismo-internazionale/en_statistiche_ITI_18062019.pdf?language_id=1>

Spain tourism data - <https://www.oecd-ilibrary.org/urban-rural-and-regional-development/oecd-tourism-trends-and-policies-2018/spain-domestic-inbound-and-outbound-tourism-spain_tour-2018-table89-en>

Germany tourism data - <https://www.germany.travel/media/pdf/dzt_marktforschung/DZT_ZahlenFlyer_April_2018_EN_RZ02_Web.pdf>

# Sources

<https://towardsdatascience.com/infectious-disease-modelling-beyond-the-basic-sir-model-216369c584c4>

<https://data.humdata.org/dataset/novel-coronavirus-2019-ncov-cases>

<https://www.statista.com/> for births in 2018 to calculate birth rate per day as a percentage of population

<https://www.france24.com/en/20200322-coronavirus-italy-shuts-all-non-essential-businesses-until-april-3>

<https://english.elpais.com/society/2020-03-16/spain-closes-its-borders-to-contain-coronavirus.html>

<https://www.bbc.co.uk/news/world-europe-51905129>

<https://en.wikipedia.org/wiki/COVID-19_pandemic_in_France#Lockdown>