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Assignment 5 – Modeling of infectious diseases

1. Research

Virus chosen: A/H1N1 (2009, swine flu pandemic)

Population: Germany

Reliable sources:

- Robert Koch Institut (RKI) (https://www.rki.de/DE/Content/InfAZ/I/Influenza/Pandemie/Pandemie.html)
- Statista (https://de.statista.com/statistik/daten/studie/2861/umfrage/entwicklung-der-gesamtbevoelkerung-deutschlands/)
- https://flexikon.doccheck.com/de/Influenza-A-(H1N1)?utm_source=DocCheck&utm_medium=DC%20Weiterfuehrende%20Inhalte&utm_campaign=DC%20Weiterfuehrende%20Inhalte%20flexikon.doccheck.com

Time frame of outbreak: April 2009 – March 2010

Reported cases during the time frame: 220,000

Reported deaths during the time frame: 250

Model:

Compartments:

- Model for the first 274 days after the outbreak (beginning until the end of the year)
- N = Population of Germany 2009: 81.9 million

Factors that influence an outbreak:

- Infection rate: 0.3 - 0.7
- Incubation period: 1-4days
- Susceptibility: every member of the population
- Immunity: after infection
- Recovery: after 7 days

Interventions:

- Vaccination campaign (7.5% of the population was vaccinated)
- Quarantine of sick people or contact persons
- Obligation to report infections
- Closing of individual schools
- Experiments with the efficiency of masks

➔ Since only a small number of people got vaccinated and the other interventions were mostly abandoned by November 2009 only a small change in the infection rate is assumed (new infection rate: 0.28)

- how did you define the intervention factors in the equations? what are the values based on?
- determine which variables are available and can be used to model this event
- What is R0? How is it different to Re? Note the answer down.

2. Analysis:

With the help of intervention such as vaccination and quarantine the infection numbers were reduced. The intervention was effective