**Flow of the whole analysis**

**(fin.) 1. Parameter specification.**

- Estimate virus shedding distribution.

**2. Geographical data preparation.**

- (fin.) Prepare vaccination coverage data at a district level.

- Read vaccination coverage data.

- Visualise vaccination coverage data.

- (fin.) Prepare under 5 years old population map.

- Change aggregation scale. (TODO: decide an appropriate scale of aggregation).

- (fin.) Visualise the population size map, also set a threshold for the exclusion criteria.

- (fin.) Relate the population size to the vaccination coverage.

- (fin.) Calculate mobilisation probability using the radiation model.

- (fin.) Save population data (full), unimmunised population, mobilisation probability

- (fin.) Visualise mobilisation parameters in a histogram, and bubble plot.

**3. Single cohort model.**

- (fin.) Run transmission model, surveillance models.

- (fin.) Visualise the cumulative probability of detection, and lead time distribution.

**4.1 Spatio-temporal model**

- (fin.) Run transmission model for baseline

- TODO: Update to record the cumulative value when the AFP surveillance and ES detect the first polio cases.

- TODO: Change a pattern of introduction of polio virus into the population.

- TODO: Change the ES coverage order based on susceptible population.

- Visualise baseline scenarios

- (fin.) Visualise example epidemic trajectories for the baseline setting.

- (fin.)Visualise the cumulative probability of detection, and lead time distribution.

- (fin.) Record the computation time and aggregation scale for a histogram

- (fin.) Run transmission model varying R0 and α.

**4.2. Surveillance model and visualisation.**

- (fin.) Run ES and AFP surveillance model for baseline parameters

- Varying sampling frequency, ES catchment area, detection sensitivity.

- (fin.) Visualise the relationships.

- (fin.) Run ES and AFP surveillance model for sensitivity analysis.

**5. Visualise the main results.**

- (fin.) Visualise the baseline scenario.

- (fin.) Visualise the baseline sensitivity analysis.

**Schedule of simulations**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Explanation | R0 (Re0) | α | Introduction pattern | ES cover pattern |
| Baseline | 14 (1.13) | 0.05 | Proportional | Population |
| R0 sensitivity | 12, 13, 14, 15, 16  (0.97, 1.05  1.13, 1.21, 1.29) | 0.05 | Proportional | Population |
| α sensitivity | 14 | 0.001, 0.01, 0.05, 0.10, 0.15 | Proportional | Population |
| Introduction pattern | 14 | 0.05 | International airport | Population |
| ES catchment strategy | 14 | 0.05 | Proportional | Susceptible population |

If I have time, run for the baseline increasing the spatial resolutions.