1 Literature

1.1 General

[Heesterbeek et al., 2015] review

[Klepac et al., 2020] [Gog, 2020] BBC Pandemic project: user-based data of contact patterns; [Kucharski et al., 2020] effect of isolation/contact tracing

[Mossong et al., 2008] empirical estimation of contacts

Review IBM https://www.innovationinfo.org/articles/JBRR-102.pdf

Coupling reaction-diffusion and metapopulation models https://www.nature.com/articles/nphys560

1.2 Covid

[Rathinakumar and Quaini, 2020] pedestrian dynamics coupled with SI

[Sahasranaman and Jeldtoft Jensen, 2020] toy network model (Erdos-Renyi, random interactions) distinguishing poor/non-poor

[Dowd et al., 2020] role of demographic structure

https://www.medrxiv.org/content/10.1101/2020.03.21.20040022v1 metapopulation model

[Squazzoni et al., 2020] JASSS: abm, policy

[Adam, 2020]

2 Projects

- RAMP call in UK https://epcced.github.io/ramp/

- CASA kaggle https://github.com/MeldaS/CASA-COVID

- Sarah mapping project https://github.com/swise5/KatMapBRC

- Covprehension https://covprehension.org/ https://github.com/covprehension/CoVprehension

- Overmortality in France https://mtmx.github.io/blog/deces_pandemie/

- Imperial team: https://www.imperial.ac.uk/mrc-global-infectious-disease-analysis/news--wuhan-coronaviru
  Model https://github.com/mrc-ide/covid-sim; https://github.com/ImperialCollegeLondon/covid19model
  (refactored in R?); Comment Ferguson model https://lockdownsceptics.org/code-review-of-fergusons-model/

- Leeds questionaire transportation

- Montpelier http://alizon.ouvaton.org/Rapport3_Modele.html

- INSERM https://www.epicx-lab.com/covid-19.html

- Global forecasts https://epiforecasts.io/covid/posts/global/

- Gleam model http://www.gleamviz.org/model/

- Multivac https://covid19.multivacplatform.org/

- Ifisc mobile phone https://analytics.ifisc.uib-csic.es/es/respuesta-covid-19/

- Arenas metapopulation https://covid-19-risk.github.io/map/model.pdf

3 Data

Real-time data

- Worldwide cases [Xu et al., 2020] https://github.com/beoutbreakprepared/nCoV2019 (missing half of cases, no proper outcome)

- ECDC: European Center for Disease Control, daily data `https://www.ecdc.europa.eu/en/publications-data/download-todays-data-geographic-distribution-covid-19-cases-worldwide` (at the country level)

- For the US: by state, including testing rate: Covid tracking project `https://covidtracking.com/data`

- Italy: province `https://github.com/pcm-dpc/COVID-19/blob/master/dati-province/dpc-covid19-ita-province-2` `csv`

- Worldwide and US `https://github.com/CSSEGISandData/COVID-19/blob/master/csse_covid_19_data/csse_covid_19_time_series/time_series_covid19_deaths_global.csv` ; data of interactive dashboard [Dong et al., 2020]

- European datasets `https://www.europeandataportal.eu/en/covid-19/datasets`

- French data (départements) `https://www.data.gouv.fr/fr/datasets/donnees-hospitalieres-relatives-a-lepidem`

- UK: Local authority mortality data from ONS `https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/causesofdeath/datasets/deathregistrationsandoccurrencesbylocalauthorityandhealthbc`

- Governement response data: https://www.bsg.ox.ac.uk/research/research-projects/oxford-covid-19-government-response-tracker

4 Individual-based modeling

4.1 Scales and parameters

Link micro-macro for Covprehension

[Willem et al., 2017] systematic review IBM

[Kuylen et al., 2017] in the IBM, estimation of R_0 as a function of micro transmission proba.

[Delamater et al., 2019] difficulty to estimate the basic reproduction number; to not be confused with reproduction number (on full population).

[McLure and Glass, 2020] simple formulas for reproduction number in SIS, SIR, with reservoir, demographics, and imported cases.

[Hunter et al., 2018] use R_0, proba of contact estimated by running the model, disease duration, to determine micro transmission proba.

[Willem et al., 2015] large scale optim ABM

[Kisjes et al., 2014] IBM no vaccination

Rq: why focus on R_0 and not statistical distribution (superspreader etc.: what is the shape of the distrib?)

[Chao et al., 2010] linear relation R_0/proba transmission (rescale contact proba matrix between groups)

[Bacaer, 2011] definition de R_0 comme rayon spectral d'un operateur

[Bonté, 2011] couplage modele de controle, de prise de decision, et systeme under controle. triade de Minski: // perspectivism?

4.2 Sensitivity analysis

Spatial sensitivity analysis of the Imperial model

Description of the model in SI of [Ferguson et al., 2005] `https://static-content.springer.com/esm/art%3A10.1038%2Fnature04017/MediaObjects/41586_2005_BFnature04017_MOESM1_ESM.pdf`

5 Transportation modeling

5.1 Objective

Role of transportation system in social contacts

5.2 Literature

[Mller et al., 2020] using Matsim for a microscopic SIR in Berlin

5.3 Resources

Matsim group Episim `https://matsim-vsp.github.io/covid-sim`; repo `https://github.com/matsim-org/matsim-episim`
Matsim config files schemas `http://www.matsim.org/files/dtd/`
Matsim scenario files `https://svn.vsp.tu-berlin.de/repos/public-svn/matsim/scenarios`

5.4 Data

- London

  - O/D data by mode or occupation: census (2010)
  - transit station count data: TFL (2017) (TFL open data: `https://tfl.gov.uk/info-for/open-data-users/our-open-data`)
  - O/D between transit stations: TFL
  - Traffic: vehicle count in the congestion charge area; flows by boroughs `https://data.london.gov.uk/dataset?tag=traffic`
  - Rail counts?

- Paris

  - EGT: O/D at 100m grid scale, by time of the day. Sample, no mode.
  - RATP open data `https://data.ratp.fr/explore`: station counts; Transilien (SNCF) `https://ressources.data.sncf.com/explore/dataset/comptage-voyageurs-trains-transilien/table/?sort=year`
  - Traffic: Sytadin (congestion by time, not counts)
  - VLib: arrivals/departures by station

5.5 Methods

Open issues

1. How accurately parameterize Ma tsim for multimodal/public transport?

2. What description/level of detail of network/transit schedule?

3. How to get output statistics: traffic flows, colocation of agents?

6 Urban Density

Linking urban form and epidemiological dynamics
[Heroy, 2020] no effect of city size on growth rates in US
[Angel et al., 2020] effect of population on number of deaths, no significant effect of density
[Tarwater and Martin, 2001] theoretical effect of pop density in a lattice model
[White and Hébert-Dufresne, 2020] effect of population density on doubling times (US States)
[Rader et al., 2020] impact of population density on total impact of the epidemics; model trained on Chinese cities (includes humidity), extrapolateed to 380 global cities (GHSL).
[Mishra and Wargocki, 2020] association between GDP/latitude and cases? doubtful, as no dynamics is furthermore included
[Burghardt and Lerman, 2020] bias when aggregating

7 Mobility network

[Pepe et al., 2020] Indicators: total trips, radius of gyration, degree of user proximity network. Very precise data (up to 10m).
[Jia et al., 2020] real-time mobile phone data, transmission model
[Zhang et al., 2020] contact and tracing data
[Salje et al., 2020] impact of lockdown in France
Data:

- mobility flow on 8h slice

- unique O/D using from and to of linestrings

8   Scientometrics

[Colavizza et al., 2020] analysis of open corpus: too broad?
    [Khamsi, 2020] AI within full-text

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