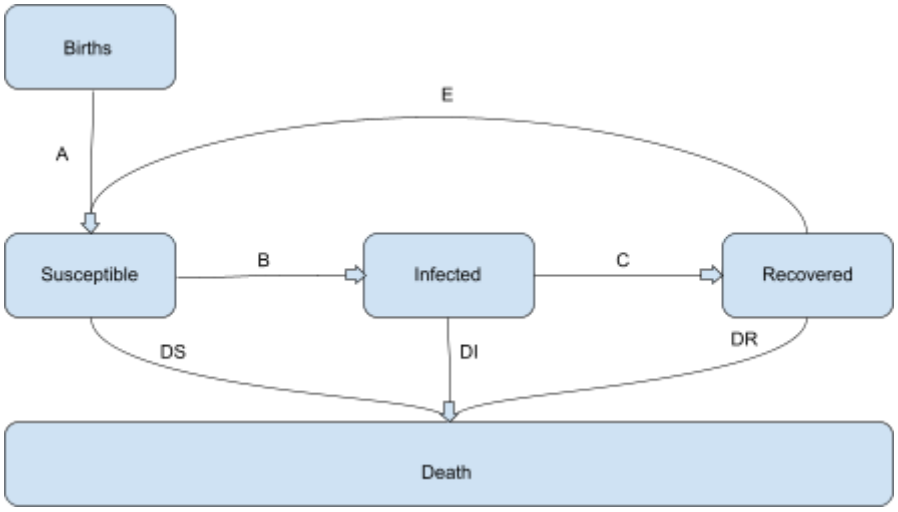
Affecting parameters of the SIRS model



Factors affecting A (Birth Rate): [number of births for every 1000 live people]

Initially set for a country from config

- **Current total population**: (α(S + R) + βI) (more weight to susceptible and recovered population, less weight to infected population) (Region specific)
- **Economic prosperity**: (Current Human Welfare resources) (Country Specific) (traded for GDP)

Factors affecting B (Infection Rate): [number of new infected people for 100 infected person]

Initially set (BIR) to a lower number at start of simulation and at some random time point for some region of a country its highly increased (simulating start of epidemic, allowing us to not hold a separate monitoring of epidemically infected population) (So

- Baseline Infection rate(BIR) of the virus (+ve) (dictating difficulty level of the game)
- Current infected population (region specific) (+ve) (initially a non zero value)
- Number of tourist spots (region specific) (+ve) (init set for region)
- Number of economic spots (region specific) (+ve) (init set for region)
- Rank and Num of ports and airports (region specific) (+ve) (init set of region/country)
- Population density (region specific) (+ve)
- Cleanliness Index (country specific) (+ve) (init set for country, can't change)
- Resistance to new procedures (country specific) (+ve)

- General Sanitation(Region specific) (implemented at cost of Sanitation Equipment stockpile) (-ve)
- Implementation of masks (Region specific) (-ve) (cost Healthcare resource, happiness index, Sanitation_equipments)
- Kits (Region Specific) (-ve) (cost sanitation_equipment_stockpile)
- Environmental cleaning and disinfection (Country specific) (to offset Cleanliness Index) (-ve) (cost, GDP, Healthcare resource))

Factors affecting C (Recovery Rate) [number recovered people per 1000 infected]

- Current number of general hospitals (Have an initial value per region) (more can be built with cost to GDP)(requires some min number of healthy people to run in every simulation step, if not it will close down) (+ve)
- Disease research centers (Country specific)(for complexity can make it region specific and its effect on C can vary for regions based on distance to state of construction) (built at cost of GDP and takes some fraction of GDP to maintain for every simulation step) (adds trickle to Sanitation Equipment stockpile, Healthcare resource stockpile) (has a stacking effect on C, where at point of building accounts for less but as the simulation runs, its impact increases) (+ve)
- Vaccine research Centers (A,B,C,D,E) Large GDP cost (takes some fraction of GDP to maintain for every simulation step) (Requires a minimum number of healthy people to run it)

- Mandatory Vaccinations (region specific) (implemented at cost of healthcare stockpile, happiness index) (No cost if there is a Vaccine distribution center in state, if not GDP cost based on distance from Distribution center) (Costs more if no vaccine distribution centers) (Have to set time period off effect, GDP cost depends on that if there are no centers) (+ve)
- Increase Healthcare stockpile (Country Specific) (bought at cost of GDP) (Can also be traded at cost of GDP) (neutral)
- Quarantine Periods (Region Specific) (cost Healthcare stockpile, happiness Index) (Bool)
- Vaccine distribution Centers (Region Specific) (GDP cost to set up, Healthcare Resource) (neutral)
- Extreme LockDowns (Region Specific) (High hit to happiness index of state) (Bool)

Factors affecting D1 and D3 (Death rate) [number people dead per 1000 susceptible]

Accounts to natural death in the non treated population

- Baseline Death Rate (Set for every country)

- GDP (country specific)
- Happiness Index
- Human_welfare resource

Factors affecting D2 (Death rate) [number people dead per 1000 infected]

Accounts to death from diseases and natural death in the infected population

- Baseline Death Rate (Set for every country)
- Base infection lethality (Set for the whole simulation)
- GDP (country specific)
- Human_welfare resource
- Happiness Index
- Infected Population density (Region Specific)
- A sigmoidal relation to B value

Factors affecting E [number of people put under susceptible population per 1000 recovered population]

- Vaccine (completion percentage) (if all vaccine components are collected then E will be set to 0 for that country)

Currencies for a Country

- Healthcare resource stockpile (Country specific) (traded for GDP) (bought by GDP)
- GDP
- Sanitation Equipment stockpile (Country specific) (traded for GDP) (bought by GDP)
- Happiness index
- Human Welfare resource
- Vaccine (A,B,C,D,E)

Some Country Consts

- Cleanliness Index
- Baseline Death Rate
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Hubs Tier
Volume_transport
Prob_transfer
People_transfer

Zones
  happines_trickle: 0.1
  gdp_trickle: 0.1

PROCESS

1. User Process
    a. Implementation
        i. Mask
        ii. Environmental cleaning and disinfection
        iii. Aid Kits
        iv. Mandatory Vaccinations
        v. Quarantine Periods
        vi. Extreme Lockdown
        vii. Increase Sanitary awareness
        viii. Turning On/off Hotspots (partial offable)
        ix. Turning On/Off Economic spots (partial offable)
        x. Turning On/Off Tourist Spots (partial offable)
    b. Trading
        i. Healthcare Resource Stockpile vs GDP
        ii. Sanitation Equipment stockpile vs GDP
        iii. Human Welfare resource vs GDP
        iv. Vaccine Components vs GDP
        v. GDP loans
    c. Research and Development
        i.
2. Machine Process
    a. Process A (Birth) [number of births(new sus) for every 1000 live people]
    b. Process B (Infection) [number of new infected for 1000 infected people]
    c. Process C (Recovery) [number recovered people per 1000 infected]
    d. Process Ds (Death Sus) [number people dead per 1000 susceptible]
    e. Process Di (Death Infected) [number people dead per 1000 infected]
    f. Process Dr (Death Recovered) [number people dead per 1000 recovered]
    g. Process E (Re-entry) [number of sus for every 1000 recovered]

h. Trickle Rates:
    i. Dormant trading routes (small trickle of GDP to countries connected if left alone, can be stopped to use for other processes)
    ii. Disease research centers (trickle Sanitation Equipment stockpile, Healthcare resource stockpile)
    iii. Economic Zones (Trickle of Human welfare resource, Happiness Index)
    iv. Tourist Zones (Trickle of GDP, Happiness Index)
    v. Vaccination centers (Trickle of some component of cure Vaccine)