

Browser-based SD software opportunities

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Challenges for SD software



SD is just plain *different* from anything people recognise

The underlying principles it tries to show are *unfamiliar*

... but many are willing to *have a go* at promising new things

... so long as the benefits show up *fast*

So ...

for new users, software must be instantly *usable*

... and *communicate* key principle with total clarity



Those “key principles”

We are concerned to explain and manage *performance over time*

... which depends on changing levels of *stocks*

... which are driven by their own *flow-rates*

... which depend on *existing stocks, decisions, and outside factors*

... causing *feedback*

So ...

show *time-charts ON* everything

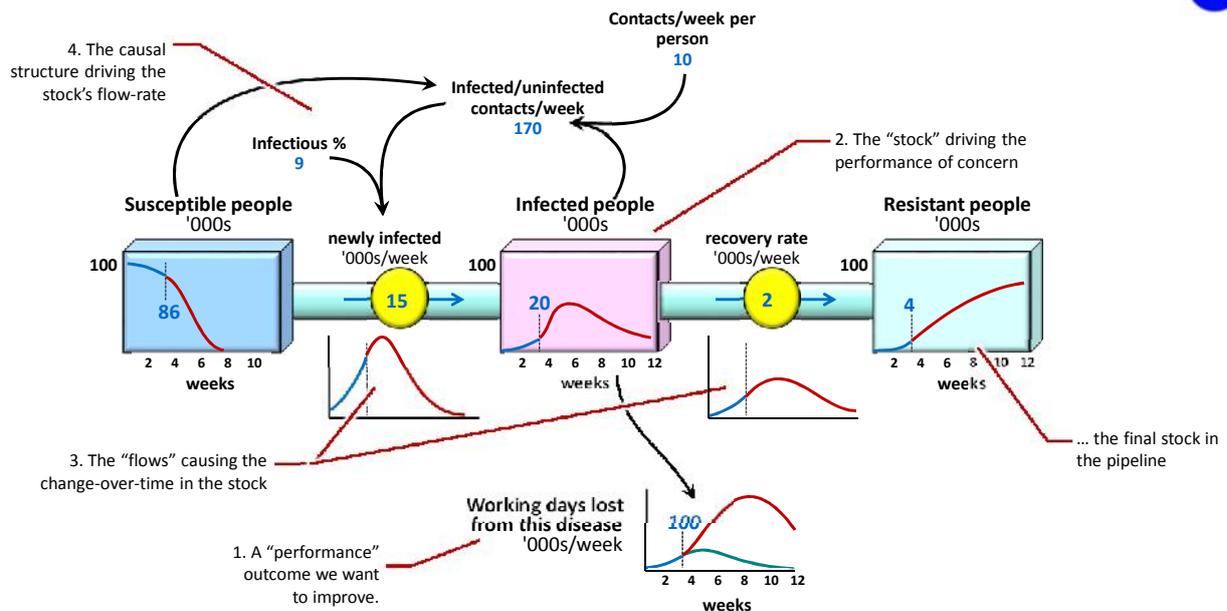
... make stocks and flows *explicit*

... offer *actual-v-simulated* results

(as originally done with the *mystrategy* app.)

Example, the “SIR” model of infections

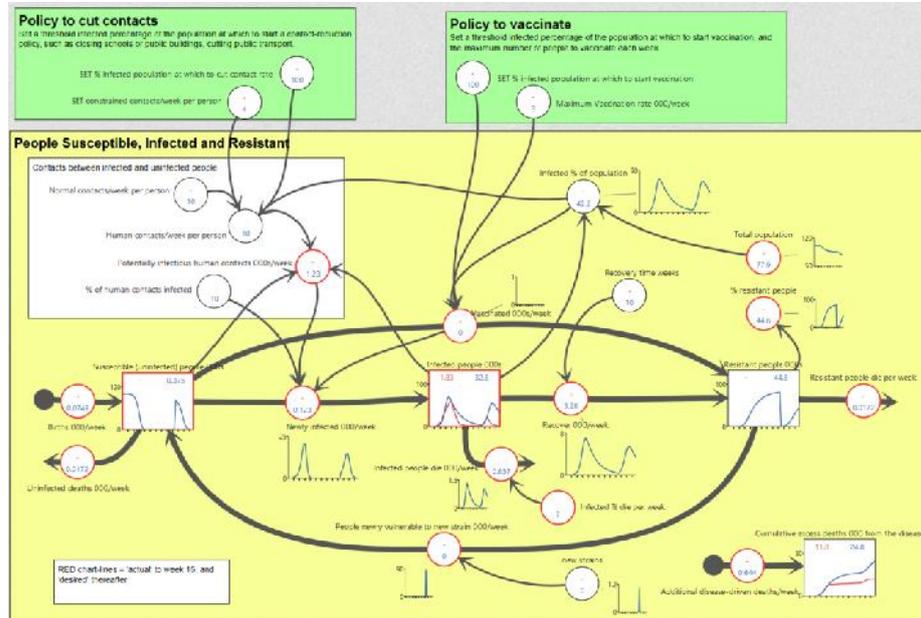
Susceptible-Infected-Resistant



The SIR model – <http://sdl.re/SIR>

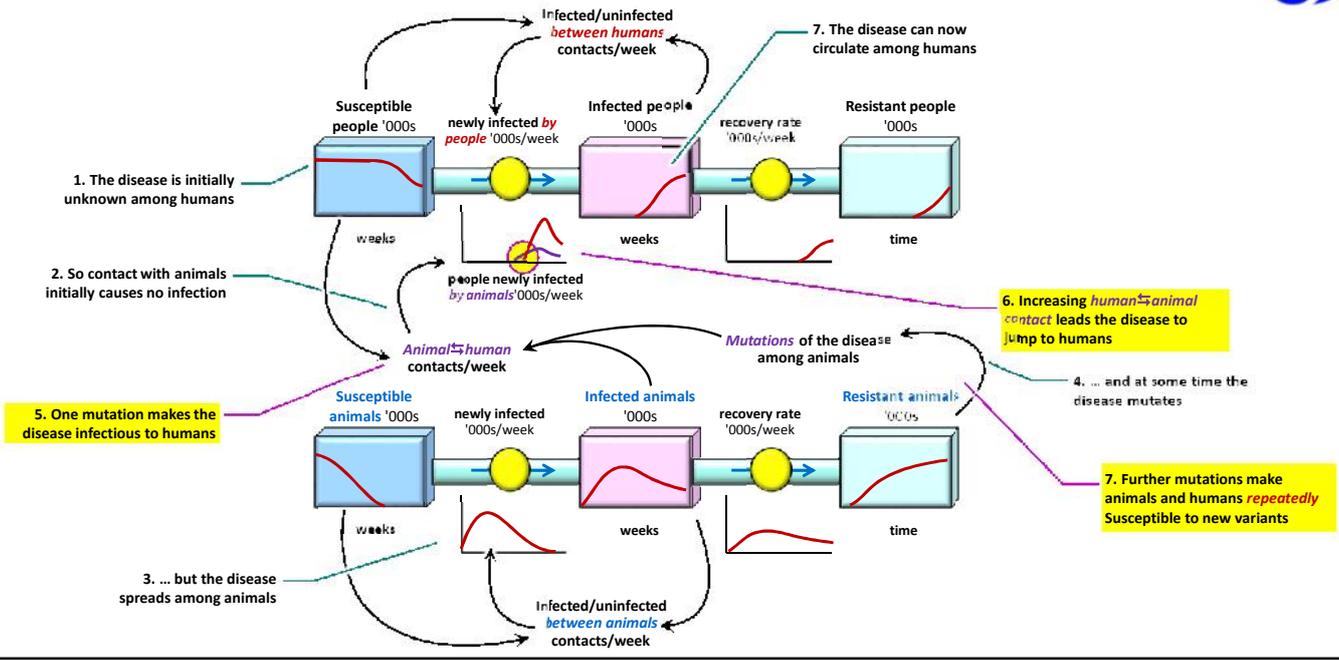


Stop Simulation	
Simulation	
Reset	Back
Step	Play
End	
Control Variables	
% of human contacts infected	10
Recovery time weeks	10
Disease human fatality %	20
Maximum Vaccination rate 000/week	3
SET % infected population at which to cut contact rate	100
Normal contacts/week per person	10
SET constrained contacts/week per person	4
SET % infected population at which to start vaccination	100
SET initial % infected people	0



The *animal* ↔ *human* infection system (“zoonosis”)

... a working model is at <http://sdl.re/OneHealthDiseaseModel>



Policy-testing in the One-Health model ..

<http://sdl.re/OneHealthV2>



ANIMAL/HUMAN DISEASE DIFFUSION MODEL.

INFECTION + X INFECTION People become infected with a disease through contact with animal populations. The disease then spreads through contact between individuals within both animal and human populations.

The rate of disease progress depends on the frequency of contact and the disease infectiousness (the % of contacts that result in acquiring the disease). The most rapid spread requires BOTH large numbers of already-infected people or animals and large numbers of uninfected.

RESISTANCE People or animals who do not die from the disease become resistant, but that resistance is lost if the disease mutates. (The model assumes permanent resistance if no mutation occurs).

DISEASE MUTATION The disease spreads through the animal population, and when the resistant proportion reaches a threshold, a mutation occurs to which both humans and animals are not resistant, so both resistant populations return to the uninfected group where they may once again catch the disease.

Using the model

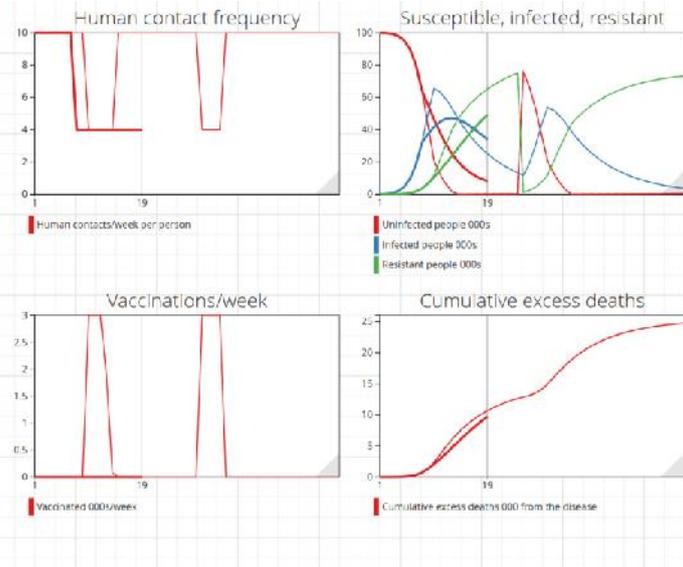
Click 'Reset' at top left to ensure the model is at the start.

Change any of the 'SET ...' parameters to implement contact-reduction or vaccination policies. Play or Step the model to explore results.

OPTIONALLY, Reset and change other parameters in the left-panel.

Dashed lines (red in the model itself) = base case with no vaccination or contact reduction.

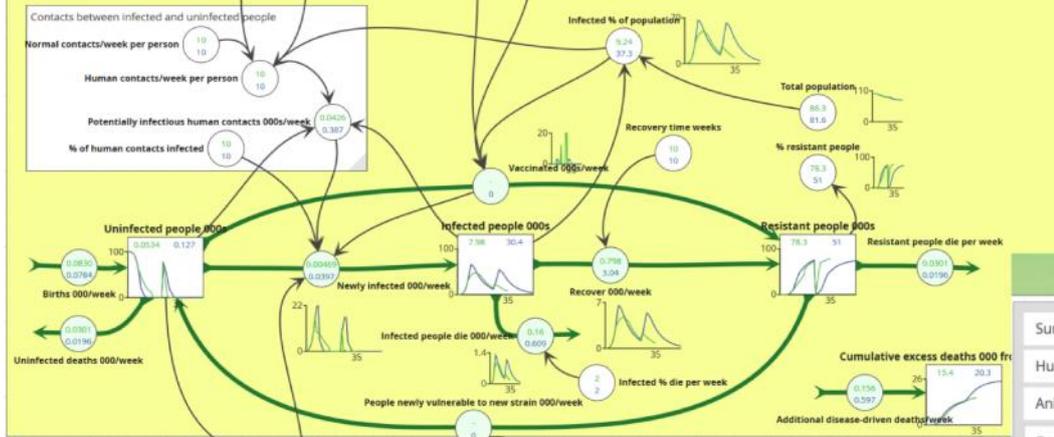
Current week ... 19



Bookmarks and *Controls* add to *transparency*



HUMANS



Bright people can “get it” with SD



For example, Royal Veterinary College/School of Hygiene and Tropical Medicine *One-Health Masters*

... in 2 hours ... introduced *SD principles*

... and *SIR + One-Health* models

... NO software tuition

Students adapted the model to a disease in 10 days

(not a “good” SD model, but shows potential + more learning speed to go for)

Browser solution has big benefits ...



... *speed* (models compiled to fast JavaScript, not interpreted)

... and *Excel* integration (central model running and management)

... and *stability* (on-line/off-line)

... and *mass-user* management (for the provider and Institutions)

... and always *latest-Version*, no installation

... but *non-Cloud* options too (for security)

Then ... *power* (sub-models, arrays, sensitivities, analytics ...)

NEXT: new-release Beta shortly, all current users will migrate, www.sysdea.com