Hello everybody, I am here to introduce the work titled ‘An integrated epidemic simulation workflow for submodular intervention strategies.

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The main objective of this work is simple: integrate graph-theoretic or network science based intervention strategies into epidemic simulators. And use that framework to conduct some experiments where we try and empirically evaluate the quality of one vaccination scheme against another.

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The problem of influence maximization in social networks is the basis of the most recent graph theoretic approach to intervention.

This was first formulated for viral marketing and advertisement purposes on social media. If you have a social network and a diffusion process which governs the flow of information/influence on the network, you as a company with limited number of free samples of your product to give out, wants to identify the most influential agents on the network to give those samples to. So that the word-of-mouth advertisement is maximized.

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This idea has been adapted in the vaccination setting wherein, you want to identify key nodes in a contact network so that once they are vaccinated, the disease spread is minimized.

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Then I will talk about the Covid-19 simulator that I use for this framework called Covasim.

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This will be followed by an explanation of the workflow where we incorporate a few seed selection strategies, network-based or otherwise into the existing simulator.

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Finally, some experiments to empirically evaluate the efficacy of some vaccination strategies over others:

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For example, what’s the better seed selection strategy,

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what is the effect of vaccinating in batches over vaccinating a huge portion of the population in one go.

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Whether the size of batches while vaccinating matters…and so on..

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Hopefully, this set of preliminary results will provide a good starting point while developing more robust vaccination policies.