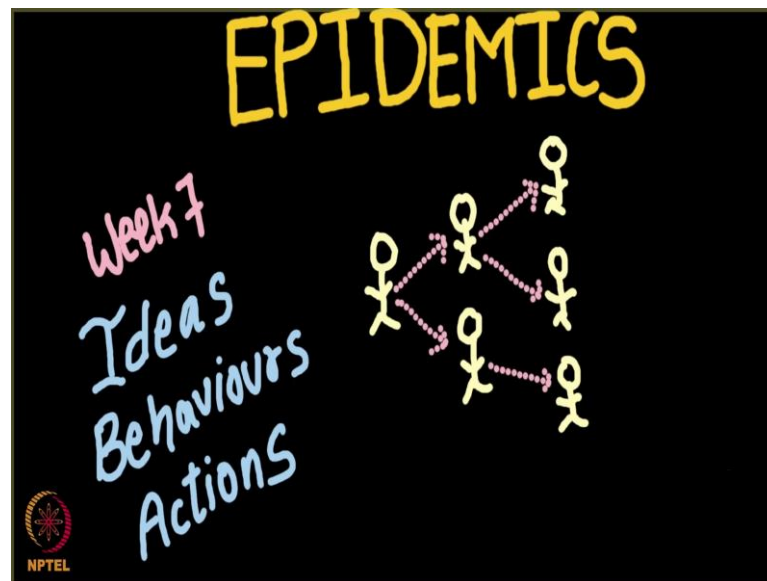


**Social Networks**  
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**Rich Get Richer Phenomenon – 2**  
**Lecture - 128**  
**Epidemics- An Introduction**

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This week we are going to start off with a new chapter and the name of the chapter is Epidemics. So, before starting off with this chapter, I would like to all of you to recall what we studied in week 7 the cascading behavior in networks. So, we have looked at how ideas, behaviors and actions spread on a network. We have looked at people who are connected with the help of a network and then will look at how these ideas, behaviors and actions spread between these people and we have talked about a number of ideas and behaviors.

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So, let me recall some of the examples. We talked about the sports shoes example where one of my friend who is in a healthcare industry and he had come up with his own brand new technology of sports shoes and he wanted me to advertise his sports shoes, which I advertised to some people and some people means some of my friends and they advertised it to some of their friends and so on, there was this cascade of sports shoes on these networks.

And then we have looked that smoking as a behavior is contagious. One of my friend could be smoking and when I look at this and when I look at my friend I could feel like smoking is cool and I might also start smoking which leads to a cascade of smoking on the network.

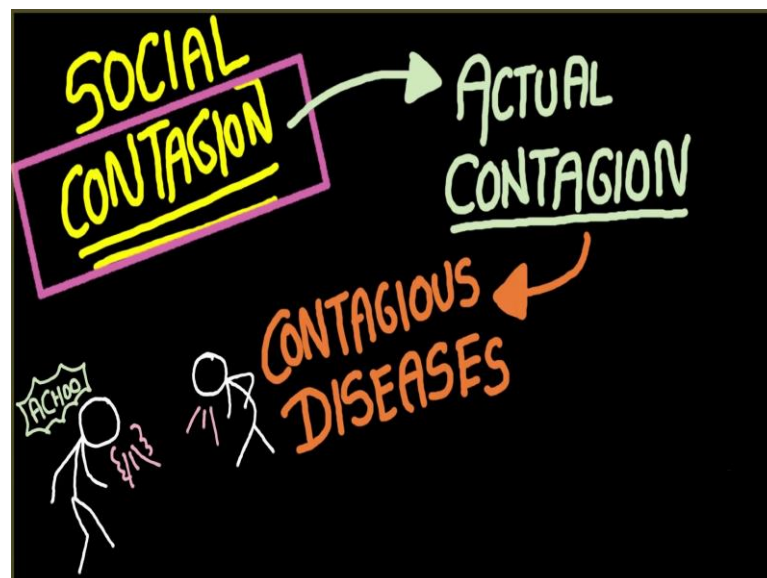
And then obesity; obesity is contagious. We have also studied this in the preliminary video. It does not appear much like obesity is contagious. Obesity seems to be quite an individualistic behavior, but actually not. There is a very interesting piece of research which says that if your friend is a obese, your chances of becoming obese increases by 45 percent. If your friends friend is obese still your chances of becoming obese increases by 25 percent; if your friend is obese still your chances of becoming obese increases by 12 percent and its only when you reach to a friend that there is no longer of a correlation between that guys body weight and your body weight.

All in all obesity is also a behavior which spread on a network similar to obesity depression and happiness are also the behavior which spread on a network and yet another product which can spread on a network is iPad. I basically wanted to recap that there are these ideas, behaviors and actions which can spread on a social networks and we have studied all of these in a week 7 which is cascading behavior in networks and most of these behaviors which are spreading are known as social contagion social contagion.

Why social contagion? Contagion is a word which is generally used for the spreading of a contagious disease. Let us say flu, measles, chickenpox, etcetera.

But here, contagion refers to something its spreads from person to person and what is spreading here is a social behavior, social norm; hence, the term social contagion.

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So, we have talked in detail about social contagion in week 7. What we are going to do in this chapter is we are removing this word social and we are going to top just about contagion that is an actual contagion, a real contagion. And what is an actual and real contagion is nothing, but a contagious diseases; a contagious disease like flu. So, in this chapter we are going to see how we can model the spreading of contagious diseases on a networks.

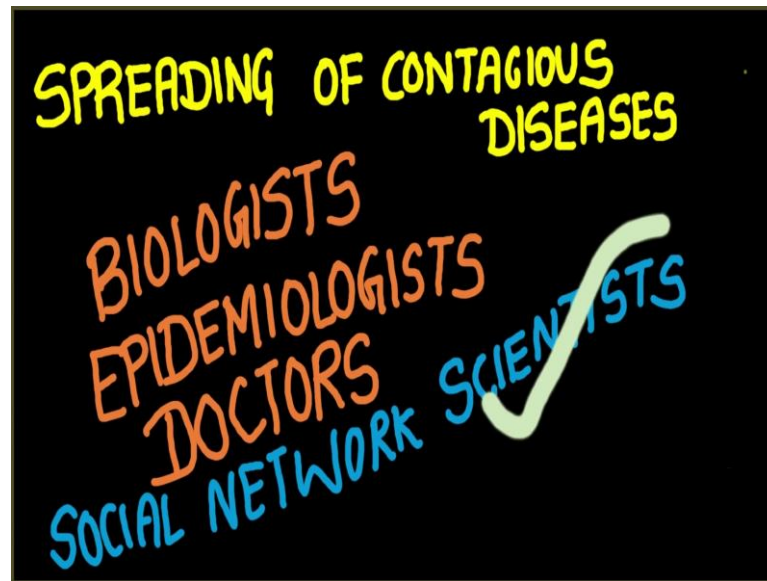
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Now, one question is why is it even important, why the modeling of contagious diseases is important? And the answer have actually flashed it on the screen and the answer is it helps us in fighting epidemics. Whenever a contagion is spreading on a network and it spreads way too much; way too much means, it infects a lot of people almost everybody in the world, we say that it has become an epidemic.

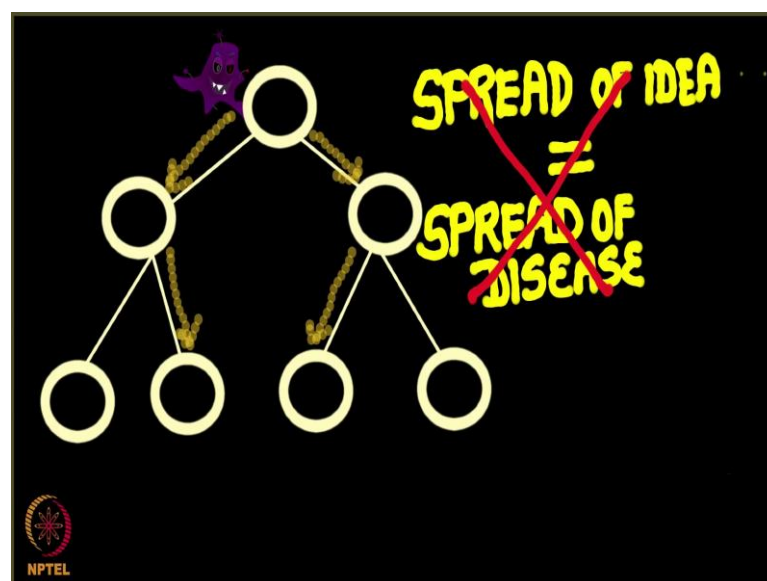
So, these contagious diseases can become epidemics overtime and such epidemics the need to be controlled, we cannot afford to have epidemics. World has suffered from dangerous epidemic from time to time and all of us know about various deadly epidemics. For example, Ebola; the most recent one, Swine flu and then Black death and there is a large number you can search on Google or Wikipedia. The world has suffered from a lot of epidemics throughout the history.

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So, we are going to see in this chapter how can we model this is spreading of contagious diseases. But, now again a question should not it be biologists who should be studying how this contagious diseases spread or should not it be epidemiologists or rather medical doctors. Though social network scientists have much to offer there what will social network scientist have to what they will be having to say about the spreading of contagious diseases, can be even work in this direction? And the answer is a big yes. Why the answer is a big yes is actually very simple.

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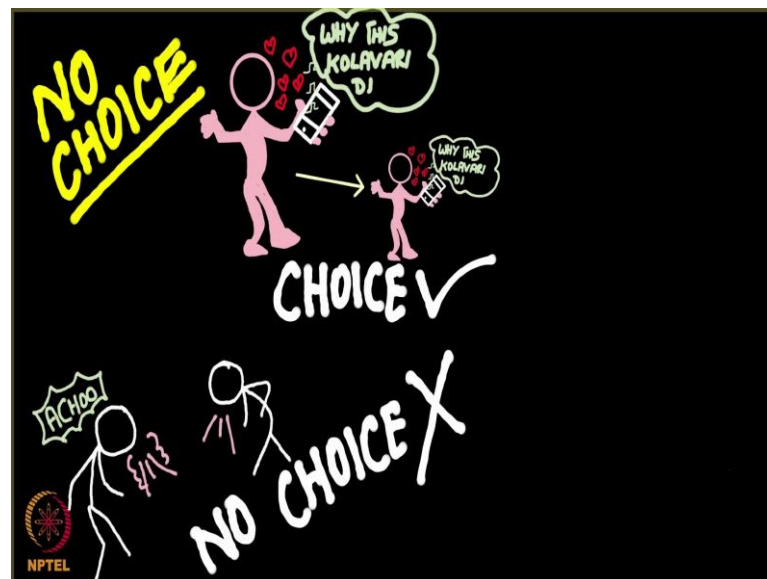
The answer is like anything this contagious diseases they spread on a network. So, as you can see, here I have a network and here is this one node and this node can infect this node which can infect this node and so on.

So, our world can be modeled like this network and our contagious disease is actually spreading on this network which is shown here. So, let us see a contagious disease starts spreading from here. So, this person gets infected the first and then it makes its way through this network. But wait now, does not do you notice something; is not it exactly like this spread of an idea? An idea also spreads the similar way.

There is a node from where a new idea starts and then it looks at its neighbors and some of its neighbors adopts this idea and similarly, this idea travels or rather diffuses through this network. So, it seems like spreading of a diseases and spreading of an idea they are the same things; looks like spreading of an idea is same as the spread of a disease.

But the answer is no, they are two different processes. Why two different processes?

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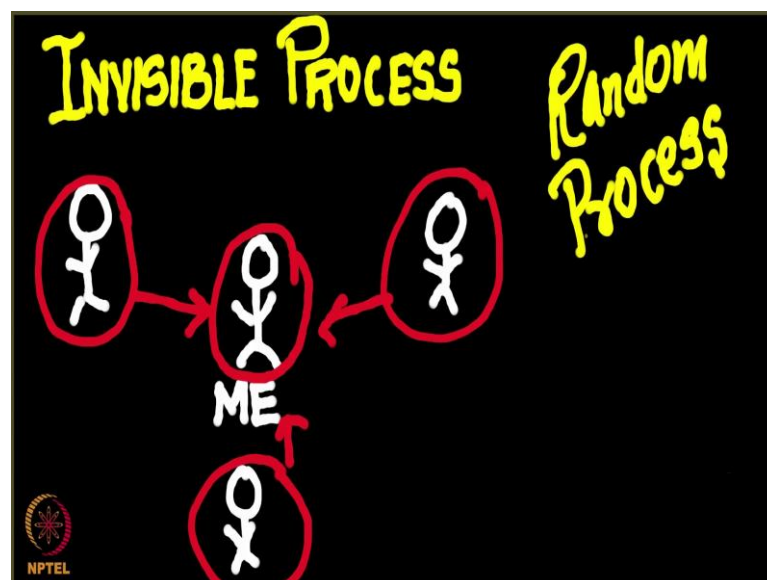


The first reason is no choice. When we talk about an idea which is spreading; let us say there is a song and my friend hear this song why this Kolavari Di and he likes it very much. And next day he tells me about it, I also listen to the song like it very much, I adopt the song do you see there is a choice hear my friend told me about this song I like this song and I adopted this song.

So, well there is a choice when we talk about the spreading of an idea. But, let us I am talking about the spreading of a disease. This time instead of a song my friend has come to me with a flu. So, he has this flu and he is sneezes on my face and now flu virus come and its entering my body. Can I first of all I notes know this virus is entering in my body? But still, let us say I know this. So, can I say that I do not like this flu virus, I am not going to take it?

While in the case of a song, you have the choice to say this is a bad song, I do not like it, but you are you cannot, you cannot do the do this in the case of a disease. So, there is no choice. If the disease has to infective, it will infective there is no way out. So, you have less of a control over the spreading of a disease as compared to the spreading of an idea.

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This second difference is the invisibility of the process. What is invisibility of the process? I will tell you a small anecdote; this was when I was in my fourth standard. So, here is me and I am in my fourth standard and there are three people in my family; my mom, my dad and my brother and all of these three people they suffered from eye flu. So, eye flu was spreading that time and all of these three family members of mine they suffered from this eye flu.

And now, I can catch flu from any of these three right and the very next day I also catch eye flu. So, I have got this eye flu here. But I do not know which is the person out of these three who has infected me with it eye flu; till today, I do not know. So, the

spreading of a disease is quite an invisible process as compared to the spreading of an idea where you might have a very clear clue of which is the person from whom you have adopted the idea from, but it is very difficult to say which is the person from, whom you have adopted a disease.

Hence, we need a different model for the spreading of an idea, which we have looked at before and now we need a different model when we want to talk about the spreading of a disease because the spreading of a disease is more of a random process as compared to the spreading of an idea and will explore it further.