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Mark Masselli: This is Conversations on Health Care. I am Mark Masselli.

Margaret Flinter: And I am Margaret Flinter.

Mark Masselli: It's the dog days of August and Margaret and I are on vacation but we planned ahead and we are bringing you a brand new episode for your listening ears.

Margaret Flinter: Alright, Mark so let's jump right into today's show and introduce our guest. Today, we are speaking with Dr. Nicholas Christakis, who has gained national attention for his research on social networks. We will speak with Dr. Christakis about how social structures and socioeconomic variables profoundly influence health. We are delighted to welcome Dr. Christakis to our show today.

Mark Masselli: You can hear all of our shows on our website www.chcradio.com. You can subscribe to iTunes to get our show regularly downloaded or if you like to hang on to our every word and read a transcript of one of our shows, come visit us at www.chcradio.com. If you are a social media aficionado, you can become a fan of Conservations on Health Care on Facebook and also follow us on Twitter.

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Mark Masselli: Today, Margaret and I are speaking with Dr. Nicholas Christakis. Dr. Christakis is known for his research on the social factors that affect health, health care and longevity. He is a Professor of Medicine of Medical Sociology and of Sociology at Harvard University. Welcome, Dr. Christakis.

Dr. Nicholas Christakis: Thank you for having me.

Mark Masselli: Yes. You know your groundbreaking study in 2007 involving social networks and obesity made headlines with your findings that obesity is socially contagious. The study found that someone's likelihood of becoming obese went up by 57% if a friend was obese, 40% if a sibling was, and 37% if a spouse was, in the closest friendships the risk almost tripled. Can you pull the thread for us if you will of where did you get the idea for this study, how did you carry it out and what can we learn from it today?

Dr. Nicholas Christakis: I think what was happening around the time when my colleague James Fowler and I began thinking about this around 2002 was that there had been a lot of talk about the obesity epidemic and it was clear that obesity was epidemic in one meaning of the word which is that there is more of it than there used to be. Even in the last 10 years we have gone from about 20%

of Americans being obese to 30% and fully two-thirds of Americans are now overweight or obese. And James and I wondered whether we could understand obesity as an epidemic in the other meaning of the word not just that there is more of it but was it potentially something spreading from person to person, was there a literal contagion not just a metaphoric contagion. And so we wanted to see whether we could find and analyze kind of data that was not yet widely available at that time, the kind of data that showed people's social interactions how they were embedded in these face-to-face networks and the kind of data that also had information about their weight, and the data that included both changes in their weight and changes in their social interactions across time, and it was not easy to find data like this. We bumbled though across some paper records that had been kept at the Framingham Heart Study, a very famous study that's been ongoing since the 1940s and we computerized those paper records and were able to reconstruct the social ties among the participants of that study. And as a result, we could see who was whose friend, who was whose neighbor, who was whose spouse, who was whose coworker, who was whose sibling and map those interactions as they changed across time as people friended and befriended each other, the old fashion befriending like the real face-to-face befriending not the modern sort of befriending. And as they married and divorced each other and changed where they lived and so forth we had all that information and so as a result we were able to kind of tease out how does weight gain in one person how is it associated with weight gain in other people to whom you are connected. And we used a variety of statistical techniques because there are also a variety of complications here in developing confidence in this assessment. We found evidence that there was an association between your weight and the weight of your friends, your friend's friends and even your friend's friends' friends people you don't even know. So that was the first study we published in 2007 and then since then we have looked at a variety of other phenomena as well. I should say one of the things, actually two other things; first I should say that we found both weight gain and weight loss can spread and second, I should say that our work was intended to describe what was happening in the world, it wasn't intended to be normative. We were not trying to suggest prejudice against people of any one or another body size; we were just trying to understand what is a factor that might have been contributing to this epidemic in our country.

Margaret Flinter: Well Dr. Christakis, I think you are doing an amazing job of helping people to understand that and you have also written very compelling, far from creating prejudice, I think you have written very compellingly about just the impact that other factors gender, race, ethnicity, education, income level, marital status, all these variables have in health and also in disease. And I was so struck particularly by your writing and I am not sure I am quoting the exact numbers right but you talked about the hundreds of thousands of lives maybe 400,000 lives that could be saved each year if people didn't smoke cigarettes but you also talked about the 200,000 lives that might be saved if everyone achieved a high school education because education is so strongly associated with health and well being. How do you see the results of your research being used in public

policy beyond health care per se but really to influence the public policy as we look at things like education policy in this country?

Dr. Nicholas Christakis: Well, I think the data that you are summarizing first of all to be clear is the work of other people that I was describing, that's not my own work. And I think there, what you are describing is a kind of shifting perspective so usually when we think about the causes of death in our country, you think about cardiovascular disease as the leading cause, then cancer, then you have a variety of other causes sort of neurologic diseases, pulmonary diseases, various infections, pneumonia I think is number five on the list and so forth. And you go down the list of top 10 causes, Alzheimer's I think is 10th on the list and you get some list of causes of death by disease. But actually you can think about causes in a completely different way. You can think about causes in terms of the underlying or root causes and here now we would emphasize things like tobacco exposure. Tobacco is the leading preventable cause of death in our society; about 400,000, 440,000 people die every year not just from lung cancer but from other cancers, from burning to death from inhaling second hand smoke of other people. Then you can go down the list alcohol exposure, sort of occupational injuries, environmental toxins and socioeconomic risk factors. It invites you to begin to think about different priorities for how we go about combating illness in our society which in turn will invite you to think about different ways of allocating resources. So instead of spending money let's say to do research on different kinds of cancers or neurologic diseases in that way, you might want to spend money understanding the behavioral determinants of your health. I think we spend less than 5% of our research as a country understanding or studying causes the second way I described you and 95% of our research dollars I am pretty sure are spent studying causes in the first way I described you of thinking about causes.

Mark Masselli: Dr. Christakis, while socioeconomic variables can play a role in disease, in health as you have demonstrated so can one's social network. You have also been able to shed some light on how social factors can positively impact health. Can you tell us about your work on how groups can drive down smoking rates as well as how happiness spreads socially?

Dr. Nicholas Christakis: Yeah. I think it's important to understand that I mean there are two ideas there buried in that question. One ideas is because people are connected, their health is connected and the reason we connect to each other is because the benefits of a connected life outweigh the cost. If I was violent towards you or made you miserably unhappy or infected you with bad germs or gave you bad health habits or give you misinformation, you would cut the ties to me and the network would disintegrate. Therefore the spread of good and desirable things like ideas, like information, like happiness, like kindness, like love even are required to sustain and nourish the network. So the reason people stay connected to each other, in fact the reason we as a species form networks is that the benefits of a connected life outweigh the cost.

So yes, we are harmed by our links to others but yes, even more we benefit from our links to others, and this has been shown in numerous ways with numerous study designs. And one summary thing to understand is that the more socially isolated you are, the higher your risk of death. So first of all on a very kind of 30,000 foot level being socially isolated is not so good for you. The second thing that you alluded to, which I am not losing the thread, how can you use these things. So there are number of ways that you can begin to think about exploiting the understanding of human connectedness to enhance or help and the simple-minded way would be just to realize that your isolation is not good for you but there are more sophisticated ways as well. So for example we know that group level interventions are more effective than isolated interventions.

So to pick a simplistic example imagine you have $100 and you are trying to get 10 smokers to quit smoking. You could bring them in one at a time and spend $10 on each of them and perhaps of the 10 one of them might quit or you could bring all 10 of them in together and put them in a group and you spend $100 on them at once and perhaps three of them might quit because now they can reinforce and support each other. So with the same 10 people, the same $100 you get three quitters instead of one quitter. This is an example of the ability of group level phenomena and social network phenomena to provide positive benefits and to be used in a kind of public policy way. And we have many examples of this now, both old examples things like Alcoholics Anonymous and Weight Watchers and so forth, which are kind of artificial social networks and much more sophisticated bigger and sort of more complex examples nowadays using different kinds of networks.

Margaret Flinter: So Dr. Christakis, I am going to maybe pull that thread a little further in 2010 TED Talk. You suggested that it isn't just what we are saying and doing that affects the people we are connected to in our social network but it's actually the very shape of that social network that has an effect on us. You talked about the differences between being at the edge of the network or at the center of the network with lots of connections and you can pair this, you make the analogy to the organization of carbon atoms that can produce both graphite and diamonds and you suggested that new properties actually emerge because of the structure of the network. Can you go into little more detail for our listeners about how this works and what it means?

Dr. Nicholas Christakis: Yeah. So when you think about our embeddedness in networks or interactions with others, there are two broad ways we are affected by this, one is what we call, what James Fowler, my colleague might call contagion and the other is what we call connection. And contagion is given the structure of a network what's flowing across the network, you know are germs flowing across the network, is information or gossip flowing across the network, how are we affected by things happening to other people to whom you are connected. When we think about connections on the other hand what we are focusing on now is

the actual structure of the ties. It's not what's flowing across those ties that might matter. So a simple example of this might be the difference between having two friends and four friends and ten friends. So it's not what those friends are doing that we are focused on it's how many friends you have. And the example we use to try to bring this point home is the difference between graphite and diamond; both of those have as their constituent elements carbon atoms, and the graphite is soft and dark and the diamond is hard and clear which properties you get depends on how you connect the carbon atoms to each other. And so something similar can happen with human beings, you can take the same people and connect them one way and they have one set of properties or connect them another way and they have a different set of properties. And this is what we mean by how connection can affect us; if you assemble human beings into particular networks or they naturally assemble themselves this way, they go on to display certain particular kinds of characteristics and the people within those networks can be affected by those characteristics.

Mark Masselli: This is Conversations in Health Care. Today, we are speaking with Dr. Nicholas Christakis, who researches how social factors affect health, health care and longevity. We operate a community health center here in Connecticut and provide care to about 130,000 patients and provide that sort of traditional primary care services but we also run a dance hall and run community gardens and farmers markets and we find that such an incredible benefit of connecting our communities together. Based on your research, what sort of community building and community activities do you think cities across the country should be engaged in to have a greater impact in using social networks to promote health and do you have any examples of that?

Dr. Nicholas Christakis: Well, I think what you are highlighting now is the power and relevance of formal institutions to facilitate and foster social interaction. So suppose we realize that first of all human beings naturally form networks by and large, we are not just social animals we are actually network animals. But there are also ways in which the kinds of formal institutions we create whether they are community gardens or national governments, affect how we interact with each other and of course there is important role of culture, right. I mean some cultures in which people might reside are much more welcoming or sort of open or encourage more interaction and others are more suspicious and discourage interaction. Here I am speaking across societies across the world. So the kinds of formal institutions that you outlined are very important and valuable in the kind of creation of social types. The classic example of one of the most well-known scholars emphasizing this approach is of Putnam, the author of Bowling Alone, who talked a little about the classic example of the parent-teacher association and the role they played in our communities in connecting people to each other who had similar concerns, kids into similar age and how those ties because of the existence of those institutions, the PTAs were created and supported. And we can have other kinds of institutions in our society nowadays like the ones that you alluded to.

Margaret Flinter: Dr. Christakis, your work has been constantly evolving as has technology and also are ideas about social networks. And much of what you have been saying about social networks has been applied to personal face-to-face as you said old fashioned befriending, the real person in front of you; the network's still an enjoyable way to have friends. But more and more certainly when people hear the phrase "social network" they are thinking about the online social networks and there is a great deal of interest in using online social media as a way to track health, influence health, even track the spread of diseases. One of our recent guest Dr. Mostashari from the Office of National Coordinator spoke about monitoring public health using social media but beyond monitoring this also using it to influence and promote it. So as these social networks become more powerful what's the effect of that technology on us as another form of networking?

Dr. Nicholas Christakis: Well, most people when they think about sort of online network think of the risks or dangers of the mere use of these networks or worry that people ____ 16:32 face-to-face interactions or that people will become addicted to the Internet and so forth. But the question you are asking, it's important for people to understand it's different than that, the question you are asking is to what extent is the availability of this kind of data about where people are situated in the network and what's happening to them, how does that affect the ability of public health officials and others to monitor the population and track and follow and understand what's happening. And the answer is it's providing us tremendous new tools. You can get early warnings about epidemics for example. In the olden days, you just had to wait for people to go to the doctor's office then the doctor would do some test, those tests the results would be sent to some kind of central monitoring facility, weeks later we would know what's going on in terms of the health of the population. Whereas now, people could literally monitor what's happening online amongst millions of people that are updating their Facebook status for example and there is an enormous, enormous effort being made amongst scientists right now to figure out how valuable, how realistic, how quickly might we exploit information of this type. And I think over the coming years we are going to see many new tools that take advantage of online data that allow us to better meet the health needs of the public.

Mark Masselli: Dr. Christakis, talk to us a little bit about the next wave of your research in the area and are there folks engaged in translational research based on some of the work you have done and also give us little peek at maybe what some of your students are thinking about, or writing about and researching as well?

Dr. Nicholas Christakis: What my lab is doing along with my colleague James Fowler's lab, we are engaged in three sorts of major things right now. One thing is we are seeking to understand the biological origins and biological consequences of networks like why do human beings form networks in the first

place and we understand this from an evolutionary biology perspective are there sort of genetic foundations of human social interaction. The second set of work is doing experiments with networks and we think this is an important new area moving beyond observational studies and moving to do actual experiments where we can be a bit more confident about what's actually happening. And the third thing we are doing is we are trying to start applying some of these techniques, can we increase the likelihood that villagers in Uganda will use bednets to prevent malaria, can we find influential individuals in the network and influence their behavior in a way that gets more people to use bednets or we understand the resistance in communities in India to using certain neonatal health practices. Maybe there are pockets within the networth where people are resistant and if we understand how networks work, we can deliver these health care interventions in a more efficient and effective way.

Margaret Flinter: Dr. Christakis, this also builds off of that a little bit. On the show we don't usually dive too deep into the science but I think you have laid out some just brilliant descriptions of how we move from our essential genetic makeup, our genotypes to how we express our genetic makeup our phenotypes to how we might ultimately not in a day but overtime influence the genetic makeup of others in our community or be influenced by them. Can you maybe share with our listeners an example of that or just turn that into kind of everyday language for our listeners?

Dr. Nicholas Christakis: Well to be clear, I didn't just say that your behavior affects other people's genotypes. It's not like your behavior will affect someone else's gene at least not in real-time. We have been exploring that idea over beyond that is to say over tens of thousands of years can we find evidence that people's social interaction is affecting the actual genetic constitution of human beings. And there are a bunch of scientists working on related topics right now and the answer to that seems to be yes that a culture can affect our genes and one of my favorite examples of this is the persistence of lactase in adults, the ability to adjust lactose in adults that is a valuable ability and that's a mutation, that's a valuable ability only once human being has evolved a capacity to domesticate milk producing animals. And what's been found is that over the last 3000 to 9000 years there have been several cases in which human beings have domesticated milk producing animals and then that seems to have led to a selection pressure whereby the people who take advantage of this milk grew in number compared to people who could not. And so this is one of my favorite examples of how culture can change our genes. What we do to the world can feed back and affect us at a very deep level. But your other sort of the broader way that you asked the question was to what extent can we connect everything from the microscopic biological level to the macroscopic policy level. And I think that's an aspiration that many scientists hold is that with better understanding at every level we can integrate across levels and really understand not only what is happening but understand how best to intervene in the world to make it better.

Mark Masselli: Dr. Christakis, we like to ask our guests this final question. When you look around the country in the world what do you see in terms of innovation and who should our listeners at Conversations be keeping an eye on?

Dr. Nicholas Christakis: My goodness, there are lots of people doing very cool things. There is a guy at NYU right now Sinan Aral who is doing some very cool things looking at online networks. There are some people, Nathan Wolfe at the Global-Viral Forecasting Initiative in California and his group are doing some very cool things. There are just so many scholars that are doing what I would consider to be very exciting work, it's hard for me to pick those. I am sure I am neglecting all my other friends because I wasn't expecting that question. Those are just two people that popped into my mind right now.

Margaret Flinter: Well we expect everybody in your social network to be fascinating people so I am sure there is lots of opportunities to focus on them. Today, we have been speaking with Dr. Nicholas Christakis known for his research on social networks and the social factors that affect health and health care and longevity. Dr. Christakis, thank you so much for joining us today on Conversations on Health Care.

Dr. Nicholas Christakis: Thank you for having me.

Mark Masselli: Each week Conversations highlights a bright idea about how to make wellness a part of our communities and everyday lives.

This week's bright idea comes to us from Kansas City where urban farmers are thriving because of an unusual partnership between refugees and local farm programs. In Kansas, several refugee families from Africa and Asia live in a public housing project called Juniper Gardens. When the refugee women from the community began asking Catholic Charities of Northeast Kansas City for garden, an opportunity arose. Catholic Charities quickly partnered with the Kansas City Center for Urban Agriculture to start the new roots for refugee farm. The program has been operating for over 5 years. The farmers receive a quarter acre plot after a commitment of at least one year with the community garden. Everything is paid for including seeds, tools, and water; in the winter, farmers take courses in planting, production and marketing. For many in the participating refugee community, farming is what they know and what they are good at. In a new and unfamiliar place it not only offers them a sense of self determination but healthy food for their families, extra income, a way to settle into their new community. The Health Care Foundation of Greater Kansas City which provides some of the programs financial support interviewed one woman who used to be a farmer in her homeland of Burundi.

Voice: This garden is everything I have. This is the only thing I know in America so if I don't have my farming or my gardening I don't know what I will do.

Mark Masselli: Gradually the farmers take on more responsibility and ownership of the land. Then they go on to run independent farm stands in the community which enhance the local food system. Helping refugees establish a new way of life that's healthy, sustainable, and connected, now that's a bright idea.

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Margaret Flinter: This is Conversations on Health Care. I am Margaret Flinter.

Mark Masselli: And I am Mark Masselli, peace and health.

Conversations on Health Care, broadcast from the campus of Wesleyan University at WESU, streaming live at www.wesufm.org and brought to you by the Community Health Center.