LIVING TO 100 SYMPOSIUM*

Lake Buena Vista, FL
January 7-9, 2008

Session 5B: Prediction from Data Q&A

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COLIN RAINIER: To what extent have you taken into account the fact that right after those draft cards were completed, we had the Spanish Flu Pandemic? Because I mean one thing that springs to my mind is I'm sure farming and owning a farm is a good thing, but in the middle of an epidemic, particularly being in a rural area with an independent food source, seems like a really good idea.

NATALIA S. GAVRILOVA: Yeah this is a good question. Because there are two years, when this draft registration card was conducted one is 1917 and this was continued in 1918 which was the year of epidemics, this may be probable, But we are not sure that there is some selective effect according to body build and body height. We're now planning to use another draft registration, World War II, and probably somehow combine this data with WWI data because in World War II, there was also information about the height and we can also see in late adult age if there is there any effect. But this actually can be asked for any study which used old cohorts. The epidemics affected probably old cohorts which were born before. There are still some uncertainty here, whether this was selective or not for some variable.

COLIN RAINIER: Couldn't you check for that by cross referencing with the next census and seeing who had already been removed by the time of the next U.S. census?

NATALIE S. GAVRILOVA: Yeah this is a good idea. This is a possible because there was a census which was conducted in 1920 and it's also available on the internet and usually if people are interested in one data source, they are usually registered in another. So there's a good chance to find these people also in some census. There was also a census in 1930 so we have two censuses to search for these people.

LEONID A. GAVRILOV: Let me add a little bit to this question because we also work together. So, exactly, you are on the point. Farming is usually explained as one way to avoid infectious diseases, by isolation. So there were previous studies that found that those who are farmers have lower death rates at age 85. So basically we are replicating the study for age 100. But the idea is the same and the main explanation for this surprise

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is that it is good to be a farmer. The demographers believe that this is because in the past, there was extremely high infectious disease and the only way to avoid this was by isolation. And the way to have isolation was to be on the farm. So your question is right on target.

TIM ROZAR: Also the same question. Did you look at the proportion that actually served in World War I, maybe with military records in the control versus the sample? It would just be interesting to know whether that has an impact.

NATALIA GAVRILOVA: The proportion who served in the regular army was very small. It's about 1-2 percent and we could find them. I found several people. I think it was about 2 or 3 people who were really in the regular army during this time. But I believe there is a very small effect because the proportions were very small.

JAY SIEGEL: I think that, since you were dealing with a single cohort, what you have is a mixture of factors, some of which are transient and some of which have more permanency. In the case of farm status dealing with a cohort may get you in trouble. We need to recognize that cross-sectional data tell us that city life is healthier than country life today, although it was not true in the 19th century. But the more permanent features may have to do with your data that are proxies for early life nutrition, like height and the rate of growth. There is a problem in a sense in trying to evaluate the role of these factors if you go to as high an age as centenarians, when you are now dealing in part with the role of genetics, because there is such a body of evidence now that the reason people reach centenarian age, rather than say only 82, or only 78, is that they are part of a genetic heritage which is extremely favorable and selective. So there's a considerable kind of confusion, as it were, as to what is really accounting for this, and you wouldn't want to conclude, therefore, that people who are born in the country are genetically selected better than those in the city, because they live to 100.

NATALIA S. GAVRILOVA: It's a very good point that genetics is very important, the main problem is that it is very hard to get data. We're now trying to just get funding for a study which uses genealogies which are combined with census. This data could allow us to take into account, at least life span of longevity of parents for example, as a predictive variable. We know that centenarians have a very high proportion of parents who lived very long actually more than 80 years. The problem is, that most social scientist studies, do not takes into account this very important variable because it's very hard to get. And although there might be a hypothesis that people who are genetically predisposed to be leaner and not to be overweight and this may be one explanation, and so it probably has some relation to genetics because probably that's why they are more lean at age 30 and that they are genetically predisposed. They have some more genes and they're not overweight.

JASON GOLDSTEIN: Just wanted to know if it's frustrating to you, that you have all these advanced statistical techniques but the data is so primitive? Does it bother you that if we were to do this study 100 years from now, using the data that we have now, how much more accurate we can get? I mean is it frustrating at all?

NATALIA S. GAVRILOVA: Yeah, we just try to get what we have. What's interesting is now there are many more studies which were started after World War II, that are collecting more information about mortality. Probably they are under used. Of course, there are people encouraging researchers to use this data, but in fact, they are under used and there is a lot of information there. For example, the Framingham study now has very old people. This cohort is almost extinct who started, not extinct, but already have very high mortality which can be studied now. There are some other studies. But probably in the next ten years, we will get more of a clearer picture of what's going on.

GARY MOONEY: I'm pretty fascinated by your 17th century cohort and I'm wondering if you have done a more comprehensive study of that group beyond just the old age?

ROBERT BOURBEAU: This data comes from a study by one of the coauthors Bertrand Desjardins, who works on the reconstitution of all the French Canadian population. We can do that in Quebec from the beginning of the population in the 17th century. So this study can be consulted. I can give you the publication. I would like also to thank the discussant for his comments. Of course, the idea behind our study is to try to avoid using models. We try to let the data speak for themselves. But the data are not without problems of overestimation at age at death. So we try to do that. But of course, it's a very long and fastidious work. Can we work with the data without validation and the answer is yes, if we limit our study to the French Canadian in terms of Quebec. We would like to work on data for all Canada, but in Canada, we have problems of confidentiality and it's very difficult to get the data for other provinces. In Quebec, because of the parish register, we can get this information. But I'm aware that the fact that we regroup the 25 generation, we missed the fact that mortality has decreased during this period. We will try to make some analysis to take into account this effect.

BRYN DOUDS: One of the earlier questioners had mentioned the Spanish Flu. Somebody pointed out that the Spanish Flu really affected people under age 30 and you were dealing with people that were age 30 so it might not have been quite as key affect. I was also curious how you decided on 240 for your number of people?

NATALIA S. GAVRILOVA: Why we selected this birth cohort?

BRYN DOUDS: You started with 240 records.

NATALIA S. GAVRILOVA: Actually because it was initially a pilot study, we decided to have 100 people in this pilot study. We started with 120 because I felt that probably because of non-matched records, we will lose some records and we'll get 100 in the end. But we actually had less and we decided to duplicate this number and again add 120 and that is why we started with 240. Eventually we ended with 171 and now we think probably we need to increase the size a little bit and maybe as the discussant suggested, to get the whole birth cohort. Eventually it is 2000 and actually 2500 men

were born in 1887 so we can cover the whole cohort, but of course it requires some support.

BRYN DOUDS: I was also curious about what you had mentioned that having a large number of children seemed to be an indicator of future long life. With the changes in society, I would think that might not be as strong of an indicator going forward since people have fewer children. I was wondering if you had any thoughts on that?

NATALIA S. GAVRILOVA: Actually in the past, having a large number of children probably was a factor in favor of longevity, because children provided support for older people or for older parents and now if Social Security goes down probably it will be again important. So our explanation is that children provided more support and one that works.

FROM THE FLOOR: But long since the advent of modern birth control, rural families have had more children than urban families. So what you may be actually seeing is your farmer effect reflected in the number of children. They have more children and they have them younger, at younger ages because you were counting the number of children at a particular age.

NATALIA S. GAVRILOVA: Yeah, but the controls are both for occupation and for number of children so they were in the equation.

JEAN-MARIE ROBINE: Natalia, you don't think that at the species level, maybe we can have this trade off between fertility, and longevity but when we are moving from the species to a specific population and when we're looking at the population level, and I think this was also shown in the Quebec data presented by Robert Bourbeau, the people who are living longer are also the most fertile.

NATALIA S. GAVRILOV: I agree. I forgot simply mention this. Another hypothesis is actually market of rigor or biological health or something like this, because if men are able to have many children at this age, probably this also tells something about their health. They are healthier on average and this is another explanation. I know there are different studies, some supported one hypothesis and some supported another. There is also an explanation found about longevity and fertility. People, who are poor, have many children and this is a bad factor for their longevity and they live shorter. There are several historical studies which found this. On the other hand, there are other studies which showed quite the opposite, so this still needs to be studied.