

# **DEMOGRAPHIC DESTINIES**

## **Interviews with Presidents of the Population Association of America**

### **Interview with Kathleen Mullan Harris PAA President in 2009**



This series of interviews with Past PAA Presidents was initiated by Anders Lunde  
(PAA Historian, 1973 to 1982)

And continued by Jean van der Tak (PAA Historian, 1982 to 1994)

And then by John R. Weeks (PAA Historian, 1994 to present)

With the collaboration of the following members of the PAA History Committee:  
David Heer (2004 to 2007), Paul Demeny (2004 to 2012), Dennis Hodgson (2004 to  
present), Deborah McFarlane (2004 to 2018), Karen Hardee (2010 to present), Emily  
Merchant (2016 to present), and Win Brown (2018 to present)

## KATHLEEN MULLAN HARRIS

PAA President in 2009 (No. 72). On April 26th, 2022, we were able to have a Zoom interview with Dr. Harris. The members of the PAA History Committee participating in the interview included John Weeks, Dennis Hodgson, Karen Hardee, Emily Merchant and Win Brown.

**CAREER HIGHLIGHTS:** Kathleen (Kathie) Mullan Harris was born in 1950 in Maryland, but grew up in Philadelphia, Pennsylvania. She received her B.A. in Computer Science from Pennsylvania State University in 1972, her M.A. in Demography from the University of Pennsylvania in 1979, and her Ph.D. in Demography from the University of Pennsylvania in 1988. She spent the next two years as a Post-Doctoral Fellow at Penn's Population Studies Center, and in 1990 accepted a tenure-track Assistant Professorship in the Department of Sociology at the University of North Carolina, Chapel Hill, while also becoming a Fellow of the Carolina Population Center at Chapel Hill. Since 2008, Dr. Harris has been the James E. Haar Distinguished Professor of Sociology at UNC, Chapel Hill, and from 2010-2011 she was Director of the Carolina Population Center. She is most famous for her role from 2004-2021 as Director and Principal Investigator of the National Longitudinal Study of Adolescent Health (Add Health) at the Carolina Population Center. She had served as Deputy Director from 1998 to 2004--a year in which she received the PAA's Clifford C. Clogg Award for Early Career Achievement in Population Studies and Demography. She is an elected member of the National Academy of Sciences, and an elected Fellow of the American Association of Arts and Sciences (AAAS), among many prestigious awards and honors. She served as an elected member of the PAA Board of Directors from 1997-2000, as Deputy Editor of *Demography* from 1998-2001, as PAA Vice-President in 2005-2006, and then as PAA President in 2009.

### OUR INTERVIEW WITH DR. HARRIS:

WEEKS: Hi, Kathie, how are you doing today?

HARRIS: Good.

WEEKS: So, now are you on campus? Or you're at home this afternoon?

HARRIS: I'm at home, yeah. Thought about going in, but I go about half the week.

WEEKS: Okay, all right. And Win, it looks like you're in the office though, aren't you?

BROWN: No, John. This is my home office.

WEEKS: Oh, that's your home office. Okay. Oh, very good. All right.

BROWN: The Gates Foundation announced that Monday, April 25, was Going Back to Work Day.

WEEKS: Okay.

BROWN: Each of us is supposed to go back half-time, and no one quite knows what that means. So, we're still working it out.

WEEKS: Okay, all right.

BROWN: Good to see everyone.

WEEKS: Well, as you can see, I'm at my office too.

HARRIS: Is my picture looking weird? It looks weird to me. I mean, it probably doesn't matter.

BROWN: No. No, it's just right. Yeah. It's great.

WEEKS: There you are. Okay. And so, I think we are ready to get started with the PAA History Committee's interview of past PAA President, Kathleen Mullan Harris. President of the PAA in 2009. And thank you very, very much for taking the time to talk with us. We really do appreciate that.

And now, I don't know, I think you know all the members of the committee. But everybody introduce yourselves anyway, just to – so that we make it official. Because I'm recording this, of course.

HODGSON: Who should begin?

HARDEE: Why don't you go ahead, Dennis?

HODGSON: I'm Dennis Hodgson. I've been a member of the History Committee for a long time. Maybe 15 years even. And I'm a retired professor from Fairfield University.

WEEKS: All right, Karen, you're next on the seniority list.

HARDEE: All right. And I'm Karen Hardee. Yeah, I'm not quite sure how long I've been on the history committee. But it's one of the delights of being a PAA member, I have to say. And I work at the What Works Association. So, I do applied demography, planning reproductive health. I spent many years working at Family Health International, FHI, there in North Carolina.

WEEKS: Okay. Emily, you're next on the seniority list.

MERCHANT: Okay. I'm Emily Merchant. We know each other. And I've been on the PAA History Committee since, I think 2016 or 2017. I'm an Assistant Professor of Science and Technology Studies at UC Davis. But I just got tenure. So, July 1st, I'll be Associate Professor.

HARDEE: Woo-hoo!

WEEKS: All right. Congratulations!

HARRIS: Wow. Congratulations. That is great to hear.

WEEKS: And I assume that your work with us made the difference with the committee.

MERCHANT: Yeah. Yeah.

WEEKS: And then our youngest member in terms of seniority, Win Brown.

BROWN: Hi everyone. I'm Win Brown. I may be the youngest on the committee, but like Dennis, I'm trying to negotiate a retirement. It doesn't seem to be possible. But you say it certainly sounds like a good idea to me. I've been at the Bill and Melinda Gates Foundation, here in Seattle since January 2012. I'm on the Family Planning Team. We've just moved from the Global Development Division of the foundation to the Gender Division, which I think is probably a quite promising move. I make a lot of grants having to do with data, data analysis, statistical modeling. I've been on the history committee, I think just for about three years.

HARRIS: Cool.

WEEKS: And just so you know, Kathie, I call them the Cornell mafia. Because it turns out that Dennis, Karen, and Win all got their doctorates at Cornell.

HARRIS: Oh, that's amazing.

HODGSON: It is.

WEEKS: Right. And Emily is from Michigan and I'm Berkeley. So, we have to temper their attitudes.

HARRIS: My husband got his PhD at Duke.

HARDEE: Oh, okay. So, you're a mixed marriage. Yeah.

HARRIS: Yeah, yeah.

WEEKS: Okay. Well, thinking of your husband, let's talk about your personal demographics to get us started on this.

HARRIS: Okay. Yeah.

WEEKS: If I recall correctly, you were born in 1950.

HARRIS: Yeah.

WEEKS: And I'm guessing, but I don't know this for sure, that it was in Pennsylvania. Am I right?

HARRIS: So, I live – I was born in Maryland, but –

WEEKS: Oh okay.

HARRIS: – I did live most of my life, my younger life, in Pennsylvania. I guess, in my young adult life as well.

WEEKS: Okay. So, born in Maryland, but basically raised in Pennsylvania?

HARRIS: Right.

WEEKS: Whereabouts in Pennsylvania?

HARRIS: Baby boomer. Philadelphia. So, I'm from Philly.

WEEKS: Okay.

HARRIS: And you can tell by the way I say "water." At least that's what people tell me.

WEEKS: But you went west a little bit for your bachelor's degree at Penn State?

HARRIS: Yes, I went to Penn State.

WEEKS: But now, in computer science? What was that about?

HARRIS: Yeah. So, that's really interesting because that's what led me to demography. This was '68. I was good in math, and I loved logic. And so, my parents suggested, "Well, why don't you look into computer science? This new major and this new thing going on."

And so, yeah, I majored in computer science. I would be in the classroom with 300 engineers and maybe two other women. It was an interesting experience. And the computer science program at Penn State was actually quite a good one. But it was theoretical. So, it meant that it wasn't cool, like you would think it would have been, or it would be today. It was, we were learning how to program in every single language--Fortran, PL/1, machine language. But we would mainly allocate storage or figure out computing capacity, depending on what the project was.

And we never did anything that related to real life. With the exception of, I think we did a tax return. And so, I really didn't like it. I could do it. So, I was always sort of looking for something else. And I ran into a friend my senior year. And she said, "Well, you might like this course that I just took in demography. But it's a graduate level course. Why don't you talk to the professor and see if you can get into it?" So, I met with the professor. It was Dr. Gordon De Jong, who studies migration. And when he found out that I was a programmer, he said that if I would program his analysis of women in the labor force from the 1970 census, he'd let me in.

WEEKS: Oh, wow.

HARRIS: So, I said, "Done deal." It was pretty straightforward. Just programmed it in Fortran and took the course. It was fabulous. I'm there, "Okay, yes. Now I can

use my skills to study things that are really meaningful in life. Like fertility, and mortality, and population change."

So, that was the story. And I attribute it to him for me getting into demography. I really had no exposure before that. I hadn't taken even a social science course. I guess I had taken some psych--experimental psych. So, I was on a bit of a learning curve when I started the graduate program, in terms of sociology and really social science. But that's how I got involved in – that's what led me to demography.

WEEKS: Okay. But now, Penn State's had a very good demography program for a long time. But you decided to head back towards home?

HARRIS: Right. Because at that time, it was pretty small. I mean, I think it was Gordon De Jong and I don't know who else. And I was from Philly. So, I felt pretty isolated in State College. So, I couldn't imagine going back there for graduate school. I mean, I was in my 20s. And it really it was sort of relevant, in today's times, in terms of the difference between rural and urban areas. My parents were both college-educated and intellectuals. And I couldn't even get newspapers in State College that I was used to reading. And so, I applied to Berkeley and Penn. And then the Berkeley program closed down around that time. And so, I went to Penn. And I think, Berkeley, I was more like, I just wanted to go to California. But I probably couldn't really afford it. But I took some time off between undergrad and grad school, as well. About four years.

WEEKS: And what did you do with that time?

HARRIS: Yeah. So, that's another – that's kind of an interesting story. So, I grew up in a tennis playing family--my brother and I did. My parents played tennis at the local club. Just a small little tennis club. And my brother and I were playing on the swings. And next thing we knew, we were playing on the courts. And my parents said, "Oh, we'll put you in this tournament. See how you do." And so, we'd been playing for so long that we beat everybody. And so, we had this sort of tennis career. Again, this was a time when the sport wasn't really big. It wasn't anything like it is today.

My brother, who got mostly C's in high school, had tennis scholarships. He actually went to Berkeley on a tennis scholarship. But there were no tennis scholarships for women. Not until '72. So, it was an interesting story. In fact, I think any gender inequality that I experienced in my life has been mostly through sports. Not so much in academia. So, that's one example of what I was doing.

So, in between undergrad and grad, my brother and I worked as tennis professionals. I got a little job as a computer programmer briefly, for an insurance company. It was just horrible. And so, I joined my brother as a tennis pro. And then we applied to play the satellite tour, which is the tour that's right below big time. If you win enough tournaments and get your points, then you make it into the big time. Which I did not. My brother did a little better.

But I got accepted to that tour the same year that I applied for grad school. And I went and I met with Etienne van de Walle [PAA President in 1992]. I said, – "Gosh. I'm so excited about graduate school, but I just got into this tennis tour." And he said – I wish I had a good French accent--he said, "Oh, go play tennis. Go play tennis then. Come back and then you can do demography." So, that's one of my favorite stories. And I did. I played for that year, and then I came back, and went to grad school.

WEEKS: Right. Okay. And of course, I mean, thinking about Etienne, I think about all of the past PAA presidents who've been at Penn.

HARRIS: Yeah.

WEEKS: And with whom were you working most closely when you showed up there?

HARRIS: Yeah. So, my mentors were mainly Doug Massey [PAA President in 1996] and Phil Morgan [PAA President in 2003]. Doug had joined Penn. I mean, I think he's younger than me--a couple years younger [*editor's note—that is correct*]. Because now, some of my time had gone by. And so, I worked with him. And I worked with Frank Furstenberg, primarily on his Baltimore project on teenage childbearing. And then Phil Morgan, who came to Penn around the time that I was doing my dissertation. So, those were my main mentors.

Yeah. And I mean, I would add Sam Preston [PAA President in 1984] to that list. I didn't work with him. But I just really felt like that's from whom I learned demography. He was just such an incredible teacher.

WEEKS: From Sam Preston, you said?

HARRIS: Yeah, Sam. Yeah.

WEEKS: Well, the fact is, our most recent past PAA President interview before you was with Phil Morgan. And he talked about Sam, who, by the way, was a member of my dissertation committee at Berkeley. So, I mean, I know Sam real well.

HARRIS: Yeah.

WEEKS: But he talked about how Sam really kept the group organized.

HARRIS: Yeah, yeah. Yeah, Sam was – he was just really inspiring, you know?

WEEKS: Yeah.

HARRIS: As a teacher and just running ideas by him.

WEEKS: Right.

HARRIS: And Doug was amazing. Because I was a computer programmer, – I guess that story gets even more complex. So, when I finished tennis, I was married and thought that combining childbearing with graduate school would be a good idea. So, I actually entered my first year pregnant. And that was interesting. Because it's more common now than it was then. But I did go part-time my first year. So, I took two courses instead of four. So, it took me two years for the masters, which is normally attended as a one-year program.

But I worked so that I wasn't really funded by the Pop Center training program. But because I was a programmer, I was able to find many jobs. Because there weren't really statistical packages for programming. So, I was helping faculty on their various projects by programming in Fortran and whatnot.

And so, I had a nine-month job with Doug Massey. And it was a project on really, sort of counting undocumented immigration at the time. And put together the data. And I said, "Now what?" And he said, "Well, we could probably write a couple papers. Why don't you go ahead and write this paper on such and such?"

I was a first-year student. I didn't know. So, I went and wrote a paper on it. And I literally remember, I wrote it out by hand and handed it to him. And I think he was probably pretty surprised. Not many students really would do that. And so, we got two papers in nine months out of that project.

WEEKS: Wow.

HARRIS: That was a really great experience. And Doug has been important, and so has Phil, just in terms of giving me advice at really crucial moments in my career. So, I really rely on them.

WEEKS: Okay.

HARRIS: Both of them.

WEEKS: Well, that's very good. You mentioned your being married and having kids. And you mentioned your husband before. I assume that he was not the tennis pro, but you met him in some other context?

HARRIS: Right, my husband wasn't a tennis pro.

WEEKS: Okay.

HODGSON: Were there any other grad students at Penn that you sort of got close to?

HARRIS: Good question. It's really interesting. Because the Penn program was, I guess, because of funding, it was a really large program on African demography. And it was also interesting, in the sense that the demography cohort was completely severed from the sociology grad students.



So, I never even met a sociology grad student until – I mean, I was practically a senior grad student, I think. And met them because I was on the softball department team. Which is really not good. And Penn has since changed their program to integrate that. But in my cohort of 12 people, there were only two Americans: Elsie Pamuk--I don't know if you remember her, she's actually passed away--and myself. And the rest were all from Africa. So, my best friend was from Kenya. And Francis Doodoo. I mean, I know a lot of the African demographers out of that program. I think it's definitely changed. But at that time that's what the program was like.

WEEKS: Now, in terms of mentors, you mentioned Frank Furstenberg.

HARRIS: Oh yeah.

WEEKS: Just going through your CV and not knowing exactly who was your mentor, I would have put my money on him, to be honest.

HARRIS: Yeah. Yeah. No, I feel bad that I didn't mention him first. I mean, Frank was really important to me because he helped me. I think he really taught me sociology and the approach to social science.

Frank had this really unique gift. He had his ear to the sidewalk. He kind of knew what was going on, what people were thinking about, and what mattered. And so, I really learned a lot from Frank. And he gave me that kind of perspective, which really rounded me out and made me marketable. Made me be able to get a job, I think, in academia. Because many of the students in the Penn program at that time were going back to their countries of origin and working in the government. Or just going into government work in the US. So, I was one of the first who really did go into academia. And I think it's because I had that sort of more well-rounded exposure to social science and where demography fit in that. So, I really would thank Frank for that.

A lot of the research that I did with Frank was really based on the Baltimore study. And he also was a family demographer. I mean, I consider myself a family demographer. Studying family structure, and father involvement, and mother involvement, and those sorts of topics. So, yeah. And Frank was a great supporter of me.

WEEKS: Well, that's very good. Now, if I'm correct, you really have only been at Chapel Hill, right?

HARRIS: Right.

WEEKS: You got your doctorate, and you've been there the rest of your life. Very successfully, I might say.

HARRIS: Exactly right. I mean, I did a postdoc with Frank after I got my degree. It worked for me because I had three children. I had all my kids in grad school. And so, that would be very difficult to move. And have a husband change a job

and then move again. It worked out well for me. It was just continuing sort of what I was doing.

Whereas, when I came to UNC, UNC and CPC [Carolina Population Center] had a large postdoc program. And I said, "Oh, okay. Now I see what a postdoc really should be." But that did allow me to move to UNC, Chapel Hill, get my kids all in three different schools, have them finish up high school here. And there just have been no push factors at UNC or CPC.

WEEKS: Right. Okay. And very early on then, you got involved with Dick Udry's [PAA President in 1994] project that he had gotten rolling. And that then became your project. And now you've essentially handed it off to Bob Hummer [PAA President in 2021]. And so, we've got three past PAA presidents who are famous, I guess you might say. In your case, the Add Health project has really consumed your professional life, has it not?

HARRIS: Yeah, I started my career really studying poverty. Early fertility, poverty, and policy. And when Dick Udry asked me to write a subproject proposal, that was really the focus of parenting effects on adolescents. So, it definitely fit my research agenda at that time. And I remember thinking, I remember walking across campus one day and thinking, "I don't know if this is a good idea to get involved in at all." And I thought, "Because I really love studying poverty and I feel like my work is so important." And I felt that, "Well, maybe if Add Health continues, I'll be able to study pathways into poverty, really help further our understanding along those lines."

WEEKS: And you were able to do that, right? I mean –

HARRIS: Kind of.

WEEKS: But it seemed like over time, with Add Health, you've added so many different components to that project.

HARRIS: Yeah.

WEEKS: I mean that's one of the reasons why it's so amazingly important, is that stuff has been added over time. And because of the longitudinal nature, you've been able to understand things that just weren't understood before.

HARRIS: Yeah. I mean, I have no regrets. Obviously, it made my career. But it was extremely demanding, I think, that I wish I'd had more sharing of some of the responsibility. I mean, I had R and Rs from *AJS* and *Social Forces* that I never even finished. And you just have to except that. I mean, sometimes I'd wake up in the middle of the night. Especially when it was a student coauthor on that paper.

But anyway. I mean, looking back, I have no regrets. When Dick Udry was the PI, I was doing a lot of the work as his deputy director. Which is fine. And I mean, I wish I had been able to maybe put together a larger team of other faculty

to share some of that. That might have been my only change.

WEEKS: Well, I was actually there in Chapel Hill, in 2006, at the Top of the Hill Restaurant on Franklin Street, interviewing Dick Udry as a Past PAA president. And he had just retired. And was telling me, the year before he had retired, that he had basically passed the baton on to you for the Add Health project. And you held on to that baton – well, until what? – this year? I mean –

HARRIS: Yeah.

WEEKS: – when Bob Hummer arrived. Now, he passed it on to you a year before he retired. Does your passing it on to Bob Hummer mean that you are about to retire?

HARRIS: Ah. Yeah, so, as my kids say, "You always say five more years. You always say five more years." I'd say, I really didn't want to step down from being director and retire. I wanted to end my career the way I started my career. Which is less administrative responsibility and do some of the research I wasn't able to do while I was director.

So, I'm looking at maybe three more years. I'd like to maybe retire in three more years. I was never able to take sabbatical because my kids were in school and my husband had a job. And so, I'm taking a sabbatical this fall in Denver. I'm going to apply for the Russell Sage year. So, that's what I'd like to do to kind of finish out.

And people – Glen Elder is always telling me I should write a book on Add Health, and sort of talk about the origins, and a lot of the interesting political things that happened, and just the development. And I've already got Chris Bachrach [PAA President in 2013] and Peter Bierman to agree to be coauthors. So, that's another thing I'd like to do.

WEEKS: Very good. Well, and if you do something at Russell Sage, you're going to go up to Manhattan. And Dennis, by the way, lives in Manhattan. So, he'll take you out to lunch.

HARRIS: Okay, great.

HODGSON: Now, I have a question. And it probably has to do with your longevity in two things. In both Add Health and UNC's Population Center. I can't think of anyone else who really has had your kind of experience. So, can you tell us anything about either one, in the sense of what's happened from the point of view of university population centers over time? You've been in the same one –

HARRIS: Yeah.

HODGSON: – with this rather expansive time period. And my Add Health question would have to do with funding. You've been in Add Health over time, through major tremendous upheavals in the context of government funding of research. So, any

kind of observations you can make about either one would be really helpful.

HARRIS:

Yeah. Now, that's a great question. I mean, it's a great perspective. So, I think with the Add Health longevity, I had not really intended to be the director for that long. And I started recruiting Bob Hummer. I just thought he would – I had a vision for Add Health, and I stuck to that vision. And I worked that vision through NIH, which you're asking about, and it takes time. So, I had to lay the groundwork down for many aspects. Bringing in the biology, bringing in the genetics, transitioning Add Health from NICHD to NIA.

I mean, I was talking to Richard Sussman about it for probably 10 years before it really happened. And he was fully supportive. But it was just a matter of the right timing. And I was recruiting Bob Hummer to come up and do that 10 years before he got here. And then when he got here, he really needed five years to figure out Add Health, because it had grown tremendously during that time.

So, I guess the one answer is, it takes time and I recognized that. It's not like things were just going along, going along, going along, and then there was this change. I was always trying to lay the groundwork for that.

The funding is a really interesting one. Dwayne Alexander was the director of NICHD, and he passed away recently. And I really wish I could have said more about how incredibly supportive he was of Add Health. And he just made the difference. When I took over Add Health, at Wave Four, he said... So, let me backtrack. Add Health was just supposed to be one five-year program project. Two waves of data in school. That was it. But then, toward the end of that, NICHD said to us – to Dick, "Aren't you going to follow them up? I mean, don't you want to know what adolescence means? Does it mean anything for later life?" And we said, "Well, we don't really. We just want to analyze the data. We just got the data."

But then NICHD was saying, "I think you ought to follow them up." So, we wrote the Wave Three application. And then for Wave Four, Dwayne Alexander said, "Look, if you're just going to come and say, 'Oh, now they're adults, they're getting jobs, or having kids. They're trying to figure all these things out. They're getting married and cohabitation', forget it. That's not interesting."

And so that's really when I said, "Okay, what would be interesting?" Add Health is across-NIH funded. So, we went to all the other institutes that fund Add Health and said, "What would be interesting?" and tried to talk to them. And they really sort of made fun of the way we measured health. And I thought, "Well, that's strange." But then I realized that they were right. That we're measuring health by asking people, "How do you feel? How's your health?" So, that's really when I started thinking that, "Okay, we've got to do a better job. This is a health study."

And that's when I started really bringing in the biology and trying to get more objective measures of health. And I took that back to Dwayne Alexander. And Chris Bachrach said he was so excited, he was like jumping up and down on his

chair. I said, "Okay, so am I."

So, there's the funding part. I think it's this push and shove and it's good. And even Richard Sussman was saying, "You can't study aging starting at age 50. You've got to start earlier." And he said to me, "Well, tell me what Add Health can tell me about aging." Or "Show me what Add Health can tell me about aging." And I really took that as a challenge. And I thought hard about it. And that's when I sort of came up with a framework that puts together different datasets from different life stages. It puts them all together, and studies the same process, and sees if we see the same thing across life stages.

But without Richard Sussman challenging me that way, I maybe wouldn't have gone that way. So, it was this kind of give and take. And I think the funders are doing the right thing by saying, "No, this isn't new. Come back to me with something new." So, I think that's what part of the longevity of the project is all about.

HODGSON: Yeah. It sounds like you need a lot of flexibility, really good political skills, and of course, great administrative skills.

HARRIS: Yeah, I hope so. I mean, I think that Add Health has been able to respond to what's going on. I mean, one of your questions had to do with what's important in demography. And I think it's really paralleled the development of Add Health. Health has just become a really incredible growing area of research. As well as public interest. The public is much more knowledgeable about health today as well. So, they desire more research on it.

In terms of the longevity at UNC, I think the Population Center, the CPC, is extraordinary. And it's really great for junior people. And so, it really solidified. I mean, I would never have had the career that I had, if it weren't for CPC. And I chose UNC over other places. Like Duke could have paid my children's college tuition. CPC is very collaborative and it's incredibly interdisciplinary. I mean, I think it may be the only place where a project like Add Health would've developed.

So, I think that's the longevity for me there. It's very nurturing as a junior person and supportive. And CPC just has incredible resources. I just remember the grants people telling me, "You don't need to worry about this. You don't need to worry about that. You don't need to – You just go in your office, and you work on your ideas."

HODGSON: Wow.

WEEKS: In fact, that's really what we heard from Phil Morgan, too. Because he came over from Duke to you guys after leaving Penn. And he was talking about how inclusive you were. And how everything was on the table. There was no small agenda. There was just a big agenda –

HARRIS: Yeah.

WEEKS: – to study demography.

HARRIS: Yeah, I think two things. First of all, CPC was built on the vision of Dick Udry. And that was his vision, this really broad, interdisciplinary center, where people walk down the halls and they run into people from economics, and medicine, and cardiology, and genetics, and talk about things. And it parallels the field of demography. Just incredibly inclusive and interdisciplinary.

And the annual meetings. I mean, you can walk into any session. And people will be speaking a similar language, but some parts will be different. And it'll be enough similarity that you can understand and then go along those different paths to learn something new. That's why I think demography is just such a great discipline.

WEEKS: Well, of course, it's not a coincidence that in our PAA past president interviews, three of the four most recent interviews have been from Chapel Hill.

HARRIS: Is that right? Three of the four?

WEEKS: Oh, yes.

HARRIS: Okay.

WEEKS: Barbara Entwisle, Phil Morgan, and you. In between was Sara McLanahan. We were very lucky to have been able to have a nice interview with her, not long before her very untimely death.

HARRIS: Yeah.

WEEKS: And the Fragile Families Project seemed like it really built on the things that you were doing with Add Health, am I right?

HARRIS: Yeah. Absolutely. Sara was a mentor for me. Because she was sort of ahead of me. She studied poverty, family structure, single mothers. And I think she probably wrote every letter for all my promotions. So, yeah. And then of course, we shared a lot in terms of Fragile Families and Add Health.

WEEKS: Very good.

MERCHANT: A couple of questions that I think could fit right here. So, my first question is, what would you say are some of the most important findings or outcomes from Add Health? And then my second question is, you said that now that you've passed the baton on Add Health, you're going to do the research that you didn't get to do over the last, however long, 20 years. So, what is that research going to look like?

HARRIS: Yeah, great. So, I think some of the important findings from Add Health have to do with the – there's so many – with the role of the environment on health and

behavior. So, the Add Health design was unique in the sense that it had direct measures of the environment. Like the peer network, and the school environment, neighborhood, and family, and so on.

But because of the design, we're also able to sort of put aside other factors that are mixed up with the way that the environment affects individuals, like genes. And so, we had a sibling design that allowed us to – You could think about sort of controlling for any shared genes that siblings have with each other, or children have with their parents, for example. And so, since I studied the effects of family, and of family behavior, and parenting behavior, that was very important.

And one of the things that I would like to write – So, I'm kind of combining now both, with my answers together. But in various different types of projects, we can study things like the neighborhood disadvantage on health in young adulthood. And we can study neighborhood disadvantage in adolescence. In the early 20s, in your late 20s, and then maybe currently in your 30s.

And one of the things that we find is that--to get back to Dwayne Alexander's question – is that what young people experience in adolescence seems to be more important than what they experience in sort of young adulthood, in terms of neighborhood disadvantage. For example, in terms of exposure to different gender roles. We can study what people experience in their environments at different life stages. And a very consistent finding is that the adolescent period seemed to have these lasting effects.

And they're more important than in young adulthood. And I think young adulthood is this period where you're sort of exploring different environments, and different lifestyles. And you're trying to figure out what works for you, where you feel comfortable. So, it's a much more transient period. Once you get to the late 20s, and you're starting to settle down, then the environmental effects also become important.

So, I didn't give you a specific example. But I would love to put that research together and say, "Look, here's the study of four different environmental exposures. Socioeconomic disadvantage, exposure to gender roles." I'm trying to think of some of the many other things. Peer influence, structural racism. And something about adolescence seems to be quite important.

So, that's one, I think, general finding that we're coming up with. And then I think some of the other things are really what we're finding with biomarkers of health.

Oh, I know. I just thought of another one. Another example of environment exposure. And it has to do with social integration and sort of social isolation. So, it's especially relevant with COVID and our recent experience with the pandemic.

But when in the life course is social isolation important? And you would think in

adolescence, you're not socially isolated. Because you go to school every day, you're around your peers, same age, you're in a family. But again, we find that in adolescence, that being socially isolated – not being involved in as many curricular activities in the school, not being really well embedded in your family, including extended family – it seems to have these long-term health effects. So, it isn't just later in life. It's really pretty much across the life course and especially in adolescence.

So, what am I going to study? I'm going to keep studying that. And we now have some really interesting genomic data. I mean, as Emily knows, I've incorporated a lot of the new genetic data in Add Health to try to understand some gene/environment interactions. And I think that the fixed DNA is not that important. It's a nice way of controlling for some observed variation in your outcomes. But the epigenetic data is quite appealing and seems to work really well in social science models. And seems to be quite correlated with various environmental sort of experiences that people have over the early part of the life course. So, I'm going to spend some time digging into that.

BROWN: Can I quickly come in? John, I'm going to come in with a couple of questions. I think you may have answered the first one.

WEEKS: You had your hand raised. You step right in, Win.

BROWN: Yep, good. Going to lower the hand. The first one was about taking us back to when you were, let's just say, a really smart high school student. Really good in math. Back in the day – And I'm kind of part of this too. I think all of us are. Back in the day, when we didn't have a lot of software packages to help us do this statistical analysis that are so common now, we had to do a lot of things by hand. We had to do a regression manually by hand. And of course, that's not how students do things now.

I'd love to get your comments on the extent to which you think that a lot of students who are faced with writing papers and doing analysis, maybe don't quite understand what they're doing, or they sort of don't have that depth of statistical knowledge, and how you help to deal with that, if you do feel like that's a problem.

And the second question, I think Emily kind of helped you to answer it. It's kind of like, if you could wave a magic wand and get the type of study that you would really want, in terms of a design, – I'm thinking mainly of maybe it's a longitudinal panel survey – but what kind of a design would you want to see? And what kind of data would you most like to have from that type of a design that you don't have now? Thank you.

HARRIS: Great. Thanks. The first one is a real worry of mine. So, in the Population Training Program at CPC, for 10 years, I taught the first semester of the Introduction to Demography, which was fertility and mortality. But we combined substance with methods. And I had five assignments and they were all, I mean, by hand, in the sense that they were using an Excel spreadsheet and



had to know. So, doing decomposition and building a life table, that's kind of tedious. So, they understood every single column in the life table.

And toward the end of the time, I mean, I had a hard time getting students to do that. Why would they tediously build a life table and then have to interpret it? And even myself, I've never done structural equation modeling. But there became a new statistical package in SAS, and you could do it. And I remember thinking, "Oh, I can do it." And I did it. And I had no idea what it meant. So, that really worries me that students...

...I mean, I know that the students certainly aren't doing things by hand. We have a strong methodology program and they are understanding every step of the way. I have to sort of trust in that--that the students are trained that way. But I do think it is a major worry about the ease with which we can push a button, and run a statistical technique, and not really fully understand it.

But I have to say, though, I don't know – I think within the field of demography, I mean, many of your questions were asking about demography. And you made me think about it and how it's different. And I really think that there's a lot of vetting process that allows you to uncover misunderstanding or misinterpretation. And if it's a student doing it, that's fine. You're a student. You need to learn that's not the way you would interpret this interaction effect. Right? That once you add an interaction, then the main effect means something different.

And I just think that within demography, by the presentation of our results, both in terms of your masters, your dissertation, if you're lucky enough to present a paper at the PAA meetings, you get that kind of feedback. And so, I think that we're a very nurturing and instructive community. And so, I guess I have that to make me feel better. And I think all of us who really understand some of the techniques in more detail, always would comment and correct any error along those lines. So, that's where I put my faith going forward within the community. As well as just the training. Our own training programs.

And along with those lines, I know that within Add Health, and the research that's done there in the various teams, some students become quite strong methodologically. And I always send my students who don't know what they're doing, or learning a new method, to those students who also help mentor them. I think that's a good environment for that.

In terms of the study, wow, that's hard. I guess, right off the bat, I would say that I would prefer to have shorter periodicity in a longitudinal study. And especially for health. I think in early life, there's a lot of environmental change. And when we get to more of the middle years, there's less environmental change, but there's more change on the biological side. So, you could maybe stretch out the periodicity.

But, Add Health was supposed to be every five years. It wasn't so much that the funding was there, but then it was also the political climate, whether or not there

was a budget passed. And all that stretched out to six years, and then seven years, and sometimes 10 years. Because I had a hard time getting NICHD to agree to fund Wave Five. When they were 24 to 32, they said, "Why are we funding this?"

I think if there was a way that the funding could be done, so that you could collect data more often. And of course, there are studies that do that. I mean PSID [Panel Study of Income Dynamics] and NLSY [National Longitudinal Survey of Youth]. But I think for purposes of health and the importance of the environment for health, that would be valuable. That's really what strikes me the most.

I guess the other thing I might say is, it would be great if there was an easier way to collect data. So, the in-person data, the in-person interviews are so valuable. But I just don't know how possible our representative response rates are going to be going forward. So, I think that there's lots of things going on out there. Using the smartphones and web for collecting data, to make it more convenient. The in-person is just so nice because the respondent creates a rapport with the interviewer. And that's really helped us to get biological samples and so on. But I just don't know if that's going to be sustainable, especially after COVID. You don't like people coming in your home. And along with the distrust of science. So, I guess, I don't know what the answer is. But if I was earlier in my career, that's what I'd be racking my brain over.

HODGSON: I have a follow up question on that one. Now, you've been so involved in this panel study for all this time, I'm curious about what you make of generational change?

When I go back and look at the trends that pop out at me, I'm thinking like back in the 80s and 90s, it was unwed teenage parenthood. And then you look at the dramatic changes that have happened, say, in female African American adolescents, with tremendous declines in unwed teenage motherhood, and much more completion of high school. So, you got this thing where, what you pick up in a panel study is relevant for one generation.

HARRIS: Yeah. But if you try to read it generationally, you're probably misleading yourself that there seems to be something quite distinctive about the next generation and their experience of adolescence.

So, how do you sort of do that –?

HODGSON: – without a continual panel study set up for each next generation, to pick up the real generational changes that sort of pop out at people?

HARRIS: Yeah, that's what I mean, sort of picking up – You're right. Your question follows Win's, because I think one other response that I might have made to Win is launching another Add Health. Dick and I talked about that. It's so massive, I can't –

HODGSON: You can't imagine.

HARRIS: I can't imagine it. You would have to have cloned us. I mean, I think that would have gotten the generational stuff. And I think that would have been fantastic. I mean HRS [Health and Retirement Study] is sort of set up that way, where they keep bringing in new 50-year-old cohorts. So, I think that's brilliant in other studies. But I absolutely agree with you. Sometimes I'm surprised that we're getting – that people are still publishing on Add Health, talking about just looking at the adolescent period. I mean, that just isn't relevant today with social media. I mean, that alone is different.

So, I think the only way, there would have to be just this huge investment in collecting data. Maybe it doesn't have to be 20,000 adolescents. It doesn't have to be – have all the other complex design pieces of it. I mean, I think SIPP [Survey of Income and Program Participation] is sort of like that. So, I think that would be the only way to get that.

I know that part of my vision for Add Health, which is partially achieved, was an intergenerational study. So, we interviewed the parents at Wave One. And then, as a way of sort of getting in the door with NIA, we did a follow-up of the parents 20 years later. And we're still working on that. So, we've got a couple of interviews with the parents.

And then, of course, there are the children of Add Health. I mean, over the years, many, many people said, "Why aren't you following up the children?" And basically, that was because NICHD said, "If you even breathe a word of that, don't come near us."

HODGSON: But that would be so interesting.

HARRIS: I did collect birth certificates on the children. And that could create a database for a potential study in the future.

HODGSON: Interesting.

HARRIS: Yeah, there's lots of ways to look at it if we just had unlimited money.

WEEKS: Okay. Now, Karen, you actually had your hand up and Dennis used his seniority to jump in line ahead.

HODGSON: I didn't see your hand. I'm sorry, Karen. I apologize.

HARDEE: No, it's okay. And I sort of put it down because we've had some of this same discussion. I'm just wondering, with all of the talk now, particularly about the mental health crisis of adolescents, just wondering if you feel like that health study – I mean, obviously it's not relevant, as you said. But does it have enough about mental health do you think? Or is that something you would go back and maybe want to add more to? Or in your new work? This new study that you're going to launch, that Win was talking about? Maybe that's something you'd like

to be looking at.

HARRIS: Yeah, that's a great question. I don't think we do have enough about mental health. Because all we have is the CESD. That's our only measure. And that's just a measure of depressive symptoms. I mean, you can create a clinical measure based on it. We also have information on medication and diagnosis of depression. And I mean, I think one of the places that we really dropped the ball, was on the mental health of the parents. And I think that would have been extremely valuable as well.

We got a couple of health conditions, obesity, drinking. But we didn't get mental health. And that was a real missed opportunity. So, I think today, if I were to do it again today, I would get something more than the CESD depressive symptoms, and also some of those environmental stressors that affect mental health. More psychosocial sort of measures of just anxiety and relations with peers. And sort of really a lot of the sources, I think, of stress and mental illness in adolescence. Unfortunately, that isn't an area that I really can claim any expertise.

WEEKS: Now, can we move onto a topic really related to the Population Association more specifically? You're a member of a lot of organizations. You've been highly honored by a lot of organizations, including the National Academy of Sciences, AAAS, and so forth. And you've also been very, very involved in the PAA over the years. And we'd like to talk to you about that involvement and how you see the role of the PAA in the whole field of demography.

Could you talk a little bit about what you've done, not just as PAA President, but kind of overall in your involvement with PAA?

HARRIS: Yeah. So, I mean, I guess we don't need to say how much we love PAA. I can remember as a – I don't remember what year it was, but I think Sam Preston reminded me. The first PAA I ever went to was as a graduate student. It was in Philadelphia. And it's great memories. Small rooms where you saw all the giants. It's really impressive.

So, I guess, I have sort of two thoughts. One is, the one place where I think PAA really makes an impact is in the GPAC. So, the Government – what does that stand for? – Public Committee –

MERCHANT: Public Affairs Committee.

WEEKS: Yes.

HARRIS: Government and Public Affairs. That's right.

WEEKS: Thank you.

HARRIS: I really think their work is so important. Throughout all the years, I mean, even when I was just a junior person starting out. And just because they have the

expertise to show the researchers who are part of – and the practical people working the practical field as well, how what they do makes a difference. And so, through congressional briefings, and then also when they set up those congressional meetings, when you meet with your representatives or senators. You get to see that side of things, and they get to see our side of things.

And I think it's really made, from when I was president, it makes a huge difference in terms of funding for the Census Bureau, for the National Center of Health Statistics, and even language that helps Add Health. We could put into our grant applications that the Appropriations Committee said that this much money should be allocated.

So, that's one place where I think that the PAA makes an impact. I mean, the fact that PAA invests in GPAC and does this, is really important. So, I think if that went away, PAA would just be another sort of academic organization that wouldn't have the reach that it does. And then I just think it also really helps keep up the morale of all the individual members, in terms of making a difference.

So, I've been involved in a lot of GPAC things through Add Health. And like I said, I really enjoyed it. And I especially enjoy it when some of the junior people come along. They have all the energy, and interest, and excitement in their findings.

I just stepped down as chair of the Committee on Population at the National Academy. And I think that when I became chair, the committee was at risk of being canceled. I mean, sort of going away. Because it wasn't getting the funding that some of the other committees were.

And I think it was just a really important transition period for the field of demography and population study. And it was this where the core aspects of demography--fertility, mortality, and migration--were just not being funded. Or not really being picked up as critical areas of science that make a difference in our lives. And so a lot of the funding for sort of population growth and differentials in fertility had gone away. because it wasn't of as much interest.

What was becoming of interest had to do more with the ways in which population was intersecting with other areas, like climate change or forced migration due to political strife or war. And of course, the decline in life expectancy and rising mortality due to certain causes of death. Of course, that is related to a core area of population. But it was really more the societal changes and shifts that were going on, that was causing that.

So, I think that the field of demography has been making these shifts. It's reflected in the PAA. It's reflected in the annual meeting every year, in the sessions. It's reflected in its members and the members' areas of research, as well as their occupations, as well as their jobs.

And it's really broadened out and it's more like a social demography than it is

sort of the core demography. And there was this big shift in funding. We're interested in demography and population as it relates to these different sorts of social contexts. And not so much: what are the fertility trends this year? Is COVID going to affect fertility? Is there going to be a decline in fertility that will then rebound? I mean, of course that's interesting. But it's not fundable.

So, I guess that's my reflection on where we are right now. The Committee on Population of the National Academy did a review to see if stakeholders still felt that the topics that demographers were studying were relevant and important. The National Academy serves to provide advice and guidance to the government on trends as they relate to population change. Is that still important? And fortunately, the review came out and said "Yes, it's really important."

And so, the Committee on Population has really sort of tried to expand the diversity of the types of funders that they get for the topics that the committee comes up with. And I should say that it's now sort of thriving and sort of doing much better. But I use the Committee on Population as an example of what I think has happened within the field of demography. There's much less attention to the really core topics, and much more attention to what's going on in society today--how it has roots in population change and demographic behavior.

I'm not sure if that was a very clear answer.

WEEKS: No, no, it's a good answer. Because in fact, the reality is, that over the course of our lifetimes, demography has come into the mainstream. Everybody understands the term demographics. Or at least they think they do. And people talk about population growth and change all the time, without knowing very much about it. And that is why it is so important. Because demography is involved in everything out there. And we need to keep reminding people of that. And like you say, Kathie, keep getting the research done properly...

HARRIS: Right.

WEEKS: ...so that we actually do have good answers to those questions. Not just some answers, but actually good answers to the questions.

HARRIS: Yeah. And I think related, our training programs need to help us communicate the importance of our science. And I mean, another really good example is what happened in Georgia, in terms of the recent election.

WEEKS: Right.

HARRIS: For demographers, it really wasn't all that surprising perhaps that Georgia went red to blue, when you think of the migration of largely younger people. Especially in urban areas.

WEEKS: Right.

HARRIS: So, we need to keep making the point of, "Well, here's what demography has to

help you interpret and understand what's happening, and perhaps make a change, intervene."

WEEKS: Yeah. And what role do you see the PAA specifically playing in that? You mentioned the centers. And the centers do have their own organization now. But it's related to PAA. How does PAA really roll into that?

HARRIS: Yeah, good point. At the PAA annual meetings, I know that there are always sessions where you either bring in individuals who can help the researchers translate their findings into the sound bite, or the few sentences that a policymaker, or your local congressman, or even reporters can take away. That's one part that is missing, I think, in the training programs.

[Dog barks...] I'm sorry. That's my dog. It looks like a storm is coming here.

WEEKS: Oh, no. Oh, dear.

HARRIS: Yeah.

HODGSON: It's gotten dark. Yes.

HARDEE: Yeah. All of a sudden, your room got really dark.

BROWN: Wow.

HARDEE: Wow.

BROWN: Sounds like a like tornado coming your way or something.

WEEKS: Do you have a vest for your dog? For the Thunder? No, that really works for our German Shepherd.

HARRIS: That's right. Yeah.

HARRIS: I've heard those are great.

WEEKS: So, you got a storm coming. You've got to deal with your puppy there. And we have taken up more than an hour of your time. We promised an hour and we're not too far from that.

But let me ask if you have any questions that you thought we would ask and haven't? And also, if any of the other committee members have questions that they wanted to bring up and haven't had a chance yet, to do that.

So, Kathie, to you first. In terms of questions that we haven't asked, that you thought or hoped we would.

HARRIS: I read through the questions, and I was kind of bringing them up as I came along. And we talked a little bit about policy and global policies. But I mean, I

think we pretty much addressed those by saying here's what PAA can do.

I think the best part about PAA is it's a real community. The research is of high caliber. I hope we don't go away from our current format of always having discussions and always allowing for a lot of discussion time. The way some of the other organizations have gone.

WEEKS: Well, thinking of meetings, by the way, I wanted to mention to you how great I thought your introduction to Bob Hummer was. The fact is, I said to myself, "She's an honorary member of the PAA History Committee." I mean, you dug into his life in a way that the rest of us wouldn't have known without you telling us those stories. That was very nice.

HARRIS: Oh, thanks. I really enjoyed it. It was fun to do.

WEEKS: And of course, we do appreciate also, your participation in our webinar back in January. That was nice.

HARDEE: Yeah.

HARRIS: Yeah. I mean, what you're doing on this committee is great. If I wasn't three years away from retirement, I would say, "How do you get on the history committee?"

BROWN: Normally we look to John, who knows everyone's personal history in the field. And he's this walking sort of history committee. But I guarantee that John did not know about your tennis past.

HARRIS: Ah.

BROWN: And how that influenced your career.

WEEKS: I did not.

BROWN: And I wonder if – just talking about a sort of healthy aging. It's a bit frivolous of a question. But are you still playing tennis? And what have you learned from all your studies that you apply to being sort of in this space of really, what we call healthy aging?

HARRIS: Yeah, that's great. So, actually, I should say that Phil Morgan knew of course about my tennis. And he introduced me. And I think he mentioned something then.

But I play off and on. I had a little knee issue. I had to go to PT. And then, of course, I lost my regular partner. I'm very picky about my partners. But I plan to return to that. But I can remember when I'd be playing, I would look at the court next to me, and there would be some quite elderly people kind of barely getting to the ball. And I would say, "Please let that be me." So, that's a goal that I planned. It really is a sport of a lifetime.



And I think I learned a lot about myself playing tennis as a kid. And I was actually – I have to admit that I wasn't a very good sport. I just couldn't stand to lose. I was very competitive. And I could not stand to lose. And I would get upset and throw my racket. And my brother is the same. So, I actually blame my parents. Because if any of my kids had ever done that, I would have yanked them off the court. And my parents were just sitting there watching us throw our rackets.

But I think that all that experience really helped me in my career. And I mean, I would do almost anything to win, but I couldn't bring myself to cheat. I think that's an important thing to learn about yourself. I think my parents would have caught me on that one.

Yeah. I mean, I think one of the real difficulties of studying the life course and individual behavior, is just how so idiosyncratic things are. Different experiences. And if I hadn't run into my friend that day who told me about the demography course, I wouldn't be a demographer probably. And those idiosyncratic things make it hard to find patterning. But we still strive to do so.

But I do think tennis was an important part of who I am and who I became.

WEEKS: Okay. Very good. Okay. Good question, Win.

Anybody else have any other questions? Comments?

HARDEE: I don't think so.

HODGSON: Just thank you for such a great interview.

HARDEE: Yeah, yeah.

WEEKS: Yeah.

HODGSON: It was really – Exactly.

MERCHANT: Yeah. Thank you so much.

HARDEE: Yeah.

WEEKS: Thank you.

BROWN: It was thrilling for all of us. Thank you so much.

WEEKS: Yeah.

HARRIS: Ah. I could keep going. So enjoying this committee.

BROWN: Thank you so much.

HARRIS: All right. Well, have a good rest of the day. See you.

WEEKS: Okay.

BROWN: Bye everyone.

HARDEE: Bye.

WEEKS: You too. Good luck with the storm!

HARRIS: Thanks!

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Meeting was recorded on Zoom, and transcribed by GMR Transcription Services  
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Edited by John Weeks

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# AN INTEGRATIVE APPROACH TO HEALTH\*

KATHLEEN MULLAN HARRIS

*In this article, I make the case for using an integrative approach to health, broadly defined as social, emotional, mental, and physical well-being; for studying health among the young as an important marker for future health and well-being across the life course; and for understanding health disparities among the young as both causes and consequences of social stratification. An integrative approach bridges biomedical sciences with social and behavioral sciences by understanding the linkages between social, behavioral, psychological, and biological factors in health. It is furthermore vital that integration occur in all steps of the research process: in theory, design, data collection, and analysis. I use the National Longitudinal Study of Adolescent Health, or Add Health, as an example of an integrative approach to health and of the importance of adolescence and the transition to adulthood years for setting health trajectories into adulthood. Evidence is also presented on the linkages between health trajectories during adolescence and the transition to adulthood and social stratification in adulthood.*

**H**Health is and always has been a core area of population science. Although typically coupled with mortality and aging research, health is a key mechanism in reproduction, family planning, sexual behavior, birth outcomes, union formation, migration, education, and labor market behavior and outcomes. From one of the earliest demographic accounts by Louis Dublin, Alfred Lotka, and R.J. Horton in 1937 titled *Twenty-Five Years of Health Progress*, health remains central to the demographic processes, behaviors, and outcomes we study today.

One of the great strengths of population science is that it draws from diverse areas to solve puzzles of the time. Recently, there has been increasing scholarly interest in the puzzles of health. One indication of this is the increasing number of paper submissions to the Health and Mortality topic in the Call for Papers for the annual Population Association of America (PAA) meetings. Over the past seven years, submissions to Health and Mortality have increased by 50%—the largest growth in submissions across all topics of the PAA. What is this new interest in health, and how did it come about? I argue that it is due to five fairly recent trends: (1) more data on health; (2) increased funding for research on health; (3) a broadening of the definition of *health*; (4) rising research and political interest in health disparities; and (5) the aging of industrialized populations.

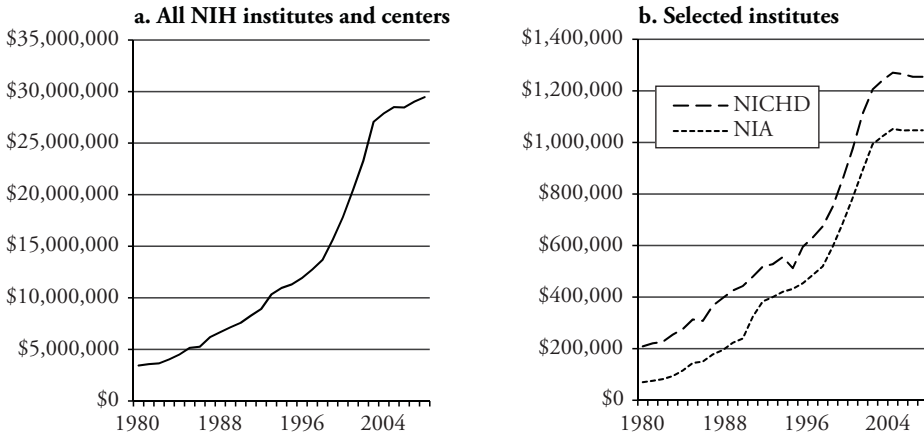
## DATA ON HEALTH

Beginning in the 1980s, but greatly expanding in the 1990s, several demographic and social surveys broadened collection of health data, including, for example, the Panel Study of Income Dynamics (PSID), the National Longitudinal Survey of Youth (NLSY79), the Indonesian Family Life Survey (IFLS), the Los Angeles Family and Neighborhood Survey (L.A.FANS), and at the older ages, the Health and Retirement Study (HRS), the Wisconsin Longitudinal Study (WLS), National Social Life, Health and Aging Project (NSHAP),

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\*Presidential Address to the Population Association of America, Detroit, MI, May 1, 2009. Please send all correspondence to Kathleen Mullan Harris, Carolina Population Center, CB# 8120, University Square, 123 W. Franklin Street, Chapel Hill, NC 27516; e-mail: kathie\_harris@unc.edu. I gratefully acknowledge research support from the National Institute of Child Health and Human Development through Grant P01 HD31921, the Add Health program project that I direct. This research uses data from Add Health, a program project designed by J. Richard Udry, Peter S. Bearman, and Kathleen Mullan Harris, and funded by Grant P01-HD31921 from the National Institute of Child Health and Human Development, with cooperative funding from 17 other agencies. Special acknowledgment is due Ronald R. Rindfuss and Barbara Entwisle for assistance in the original design.

**Figure 1. Congressional Appropriations to the National Institutes of Health (real dollars in thousands): 1980–2008**



Source: Office of Budget, National Institutes of Health.

National Study of Midlife Development in the United States (MIDUS), and the Social Environment and Biomarkers of Aging Study (SEBAS). And in the mid-1990s, a new study was launched by the name of “Add Health,” or the National Longitudinal Study of Adolescent Health, developed in response to a 1993 congressional mandate to the National Institutes of Health (NIH) to fund a study of adolescent health.

In addition to the increasing number of studies with health information, data collected were more diverse and comprehensive of health status and health behaviors. For example, in addition to reports of chronic illness, disease diagnoses, and disability, Add Health collected data on safe vehicle use, sun exposure, sleep, unintentional injury, body image, eating disorders, diet and nutrition, exercise and physical activity, TV and video watching, dental health, and height and weight, in addition to some of the standards on physical and mental health, smoking, drinking, drug use, violence, suicide, and sexually transmitted infections.

## FUNDING FOR RESEARCH ON HEALTH

Funding for health-related research increased dramatically during the 1990s and is partly responsible for the growth in health-related data. The left panel of Figure 1 shows the increase in NIH appropriations across all institutes and centers, rising from \$3.4 billion in 1980 to \$29.5 billion in 2008. Much of this funding is for biomedical research, but if we focus on the two main institutes that support population research, NICHD and NIA (shown in the right panel of Figure 1), we see a similar pattern of increasing funding, especially during the 1990s.

Other funding sources reflect similar increases in health-focused research. The Robert Wood Johnson Foundation is dedicated to improving the health and health care of all Americans and, in the 1990s, expanded its postdoctoral program to encourage interdisciplinary training of young scholars in the social and health sciences with their Health and Society and Health Policy Fellowship programs. The Hewlett and Gates Foundations have large population programs that focus on reproductive health and global health issues.

Although funding is not necessarily critical for health research, it certainly is needed to collect new and expanded data on health, to survey large representative samples to capture

the population prevalence of lesser-known health conditions and the emergence and patterns of potential health problems, and to provide evidence on the basis of which health and social policies can be developed—all strengths of the research designs that population science brings to knowledge about health. But what do we mean by *health*?

## DEFINITION OF HEALTH

An important change in the study of health has been a broadening of the definition of *health* for research and programmatic purposes. Within the social science research community in particular, the concept of health has broadened beyond the presence or absence of illness to incorporate the notion of well-being—including social, economic, and psychological well-being. This broad concept of health has roots in the World Health Organization's 1948 definition of *health*: "Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (WHO 1948). In 1975, Dr. Mahler, then Director-General of WHO, argued that we must consider health in the broader context of its contribution to social development and expanded the definition to include the ability to lead a socially and economically productive life (Mahler 1975). In 1990, Evans and Stoddart critiqued the various frameworks that identify the fundamental elements of health and inform health policy. They developed a framework that incorporated biological and environmental components into the definition of *health status*, but focused primarily on the adult ages. A 2004 National Research Council report that was centered on children's health proposed that child health is the extent to which individual children are able to develop and realize their potential, satisfy their needs, and develop the capacities that allow them to interact successfully with their biological, physical, and social environments.

Underlying this broadening conception of health is growing knowledge of the integral role that physical and mental health play in the causes and consequences of social and demographic behavior, social and emotional development, and social and economic status across the life course (e.g., Adler et al. 1993; Bongaarts and Potter 1983; Halfon and Hochstein 2002; Lindau et al. 2007; Palloni 2006; Waite 1995). The conceptualization of health has also expanded beyond the individual to represent the social contexts in which individuals live and social interactions within these contexts, such as healthy relationships, healthy families, healthy marriage, healthy workplace, and healthy neighborhoods (e.g., Dion 2005; Lavoie-Tremblay 2004; Sampson 2003; Smith and Christakis 2008; Waller and Swisher 2006). These applications of the notion of health to various levels of the social environment have helped identify the multiple potential sources of health disparities.

## HEALTH DISPARITIES

In tandem with increasing data on health, funding for health, and embracing a broad definition of health, was dramatic growth in research on health disparities. Health disparities refer to gaps in the quality of health and health care across racial, ethnic, and socioeconomic groups (U.S. Department of Health and Human Services 2000). More broadly, the Health Resources and Services Administration defines *health disparities* as "population-specific differences in the presence of disease, health outcomes, or access to health care" (Goldberg, Hayes, and Huntley 2004:3).

One will quickly recognize that throughout the history of demographic scholarship, population scholars have been studying "health disparities," focusing in particular on the most fundamental health outcome of all, death, with a rich and deep literature on mortality differentials. Indeed, Dublin et al.'s *Twenty-Five Years of Health Progress* (1937) analyzed deaths among the wage-earning population of the United States and Canada between the years 1911 and 1935 by cause of death, sex, age, and race. A wealth of demographic research has examined socioeconomic differentials—including income, educational, occupational, and social class differences—in mortality, and by extension morbidity and disability. And at the very origins of our discipline are life tables, and how life table parameters

vary by age, sex, race, ethnicity, and socioeconomic status (Glass 1973). So, what is so new about this concept of *health disparities*?

Growing research interest in health disparities is due to a number of recent trends beginning in the 1990s. As mentioned previously, there are now more data on health besides death. A second important trend has been the increasing diversity of the U.S. population, fueled by the massive waves of immigration from Latin America and Asia that exploded in the 1990s (Alba and Nee 2005), increasing racial and ethnic diversity and bringing attention to health disparities among the growing minority populations in the United States. Finally, during the 1990s, there was increasing political awareness of persistent disparities by race, ethnicity, gender, and socioeconomic status as a result of the previous two trends.

In the United States, large and persistent racial, ethnic, and socioeconomic disparities in health exist across the life course (Bergner 1993; Kington and Nickens 2001; National Center for Health Statistics 2002, 2009; Pamuk et al. 1998; Rogers 1992; Williams and Collins 1995). As more evidence of the scope and persistence of such disparities across an array of health and well-being indicators filtered into the public arena throughout the 1990s, the reduction and ultimate elimination of health disparities was identified as one of the major public health goals of the decade (Satcher and Higginbotham 2008).

In 1998, President Clinton articulated this goal in the “President’s Initiative on Race” when he committed federal funds to eliminate racial and ethnic disparities in health by the year 2010. The Department of Health and Human Services incorporated the President’s Initiative in *Healthy People 2010*, the nation’s promotion and disease prevention strategy for the first decade of the twenty-first century, with the goal to “eliminate health disparities that occur by gender, race or ethnicity, education or income, disability, living in rural localities, or sexual orientation” (U.S. Department of Health and Human Services 2000:11).

In response to the President’s Initiative, the NIH developed its own “Program of Action to Address Health Disparities Via Research,” and by 2000, all NIH institutes had developed a research program for addressing health disparities (U.S. Department of Health and Human Services 2002). At the end of 2000, President Clinton also signed into law the establishment of the National Center on Minority Health and Health Disparities to lead, coordinate, support, and assess the NIH effort to eliminate health disparities. These cultural and political events that brought attention to minority health and health disparities and that created an infrastructure for research support have energized research in this area.

While there has been a long tradition of research documenting sex, race, and socioeconomic disparities in health care, health, and risk behavior, and certainly within population science, mortality, morbidity, and disability differentials, public attention to health disparities and program support for understanding how to reduce them greatly increased since the President’s Initiative. For example, a literature search on PubMed found 29 articles on the topic of “health disparities” between 1990 and 1999 (none before 1990), but 1,818 between 2000 and 2009, reflecting the impact of the President’s Initiative in 1998.

One point to note about this burgeoning research on health disparities, and on health in general, is that most of this research focuses on adult health, health among the elderly (adults over age 50), and child health (infants and children under 10 years). Much of the focus on adults and the elderly reflects the well-documented aging of industrialized populations and its consequences (Uhlenberg 2009), the fifth trend behind rising research interest in health that I noted in the introduction.<sup>1</sup> Only about one-quarter of the articles on health disparities published in the past nine years in the PubMed search examined health among adolescents or during the transition to adulthood. The point in the life course when young people begin

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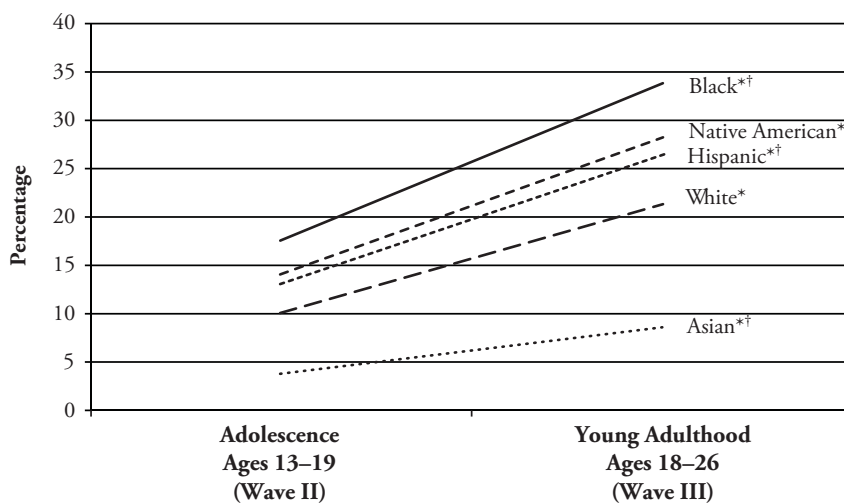
1. I do not elaborate on this trend here because it is has been so widely documented in population science over the past 40 years.

to make their own decisions about their health and health behavior during adolescence and early adulthood is a much less researched area and, I argue, is critical to understanding adult health and the development of social stratification trajectories across the life course.

With colleagues Udry, Gordon-Larsen, and Chantala, I published one such article in which we used data from Add Health to document trends in health disparities by race and ethnicity as young people made the transition from adolescence into young adulthood (Harris et al. 2006). We examined 20 leading health indicators identified in *Healthy People 2010* as most crucial to the healthy development of young people. We used repeated measures of health and health behavior on the same individuals across time, in adolescence when the sample was aged 12–19 in 1995–1996, and six years later in young adulthood when the sample was 18–26 years old. We fit longitudinal regression models to assess the developmental trends in health indicators among racial/ethnic groups, controlling for socioeconomic status at the individual and contextual levels. This research was unique in that the trends show changes in health for the same individuals in racial and ethnic groups over time, as young people age from adolescence into early adulthood, rather than snapshots of different cohorts at a point in time.

Here I show two of the more critical trends in health among young people that have important consequences for adult health. Figure 2 shows the trends in obesity among females. Obesity is measured similarly throughout this article using body mass index (BMI), calculated as measured weight in kilograms divided by measured height in meters squared. To handle the discrepant obesity definitions for adolescents and adults, the International Obesity Task Force reference is used. This reference links childhood and adolescent BMI centiles to the adult BMI cut point of 30 to determine obesity prevalence (Cole et al. 2000). In adolescence, black females have the highest rates of obesity, followed by Native American and Hispanic females, with whites and Asians having the lowest rates. As adolescents age

**Figure 2. Trends in Obesity From Adolescence to Young Adulthood for Females, by Race and Ethnicity ( $N = 5,719$ )**

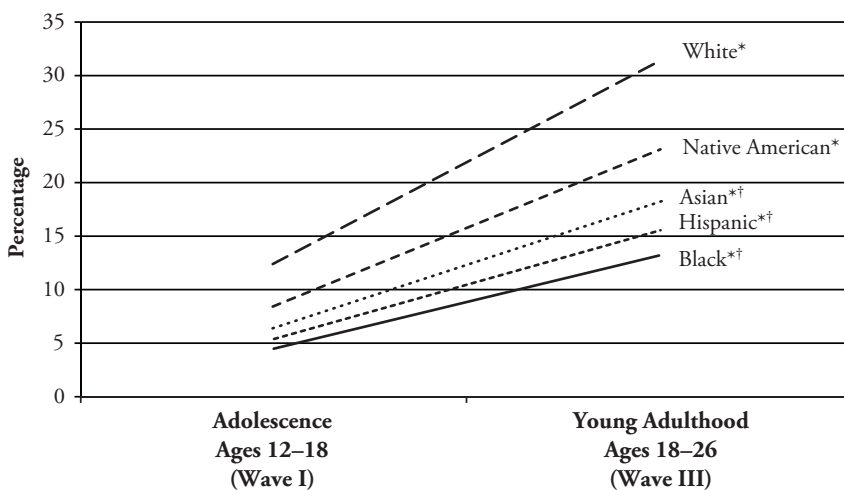


Source: Based on data from Harris et al. (2006).

\*The Wave III estimate is significantly different from the Wave II estimate ( $p < .05$ ).

†The change over time is significantly different from the change for whites ( $p < .05$ ).

**Figure 3. Trends in Regular Smoking From Adolescence to Young Adulthood for Males, by Race and Ethnicity ( $N = 6,725$ )**



Source: Based on data from Harris et al. (2006).

\*The Wave III estimate is significantly different from the Wave I estimate ( $p < .05$ ).

†The change over time is significantly different from the change for whites ( $p < .05$ ).

into young adulthood, obesity increases for all ethnic groups, but more so for black, Native American, and Hispanic females than for white and especially Asian females. In addition, the disparities increase during this transition as the lines fan out.

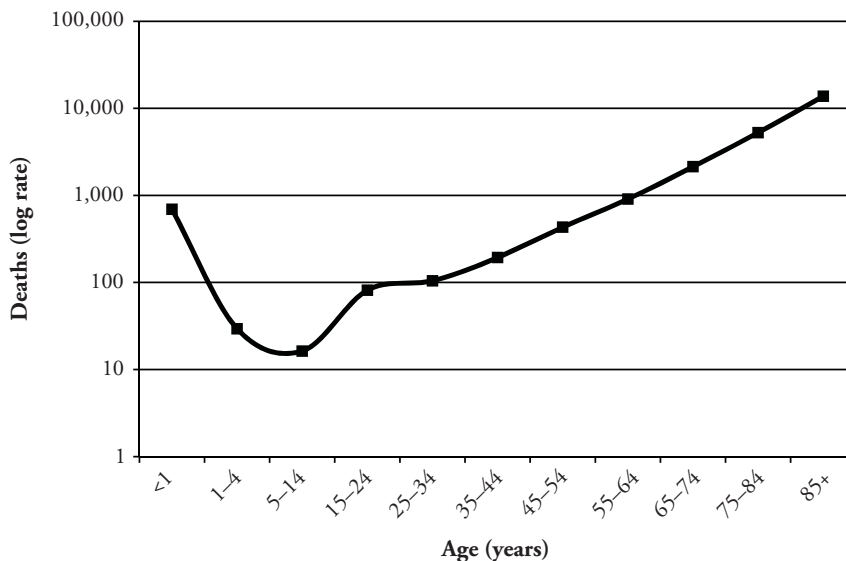
Trends in regular smoking, defined as smoking at least one whole cigarette daily during the past 30 days, are shown in Figure 3. The trends reveal a dramatic rise in smoking among young males as they transition from adolescence into young adulthood, but here white males have the highest level of smoking in adolescence, and their rate of smoking increases more so than that of the other racial and ethnic groups. Again, there is a widening of the disparities over time.

These findings are indicative of a general trend of worsening health during the transition to adulthood, a result we did not expect. On the positive side, we found levels of depression, suicidal thoughts, violence, and self-reports of poor health to decline between adolescence and young adulthood. The more dominant pattern, however, was declining health. As adolescents age into their early and mid-20s, they are less likely to eat breakfast; are more likely to eat fast food, exercise less, become obese, and have no health insurance; are more likely not to get regular physical check-up, dental check-ups, or health care when needed; and are more likely to have asthma, have STDs, smoke cigarettes, use marijuana, use hard drugs, and binge drink (Harris et al. 2006). We drew two conclusions from this research. First, the transition to adulthood may be an especially critical period for setting health trajectories for the adult life course. Second, increasing disparities during this period suggest that health may be a marker for social stratification as young people move into adulthood.

## HEALTH AMONG THE YOUNG

Much of health research focuses on health at the very beginning of life and the end of life, when health and mortality risks are greatest, shown in the familiar J-shaped mortality curve



**Figure 4. Total Number of Deaths, by Age: United States, 2005**

Source: National Vital Statistics System—Mortality, CDC/National Center for Health Statistics.

for all deaths in 2005 in Figure 4. This focus makes sense, but recent social, economic, developmental, and epidemiologic changes call for a better understanding of health at the point in life when young people begin to make their own decisions about their behavior and begin to choose their own environments, at the point when mortality begins to turn upward, after age 14 or so.

I want to make a case for the importance of the life stage of adolescence and the transition to adulthood for understanding health across the life course. Adolescence is a transitional stage of physical and mental human development that occurs between childhood and adulthood and is the point in the life course when young people begin to gain some autonomy to make decisions that impact their health. Adolescence is characterized by establishing independence from one's parents and family, exploring new lifestyles and environments, and developing new friendships and intimate relationships (Furstenberg 2000).

As parental monitoring loosens, adolescents gain more control over their environments and select their friends and friendship networks, romantic and sexual partners, school and community activities, cultural contexts, and educational tracks. They also begin to make behavioral choices involving schoolwork and studying and how to spend leisure time in both healthy (reading, exercise, arts, safe sex) and unhealthy ways (drugs, smoking, drinking, watching TV, eating junk food, risky sex). These developmental experiences are normative and help prepare the adolescent for adulthood. However, recent decades have witnessed a lengthening in the transition from adolescence to adulthood, with important implications for health.

Transitions that typically mark the onset of adulthood—leaving home, finishing school, starting work, getting married, and having children—have been occurring at later and later ages, and in a more diverse and disordered sequence (Rindfuss 1991; Settersten, Furstenberg, and Rumbaut 2005). As a result, the transition from adolescence to adulthood

has continued well into the third decade of life. As this transition has lengthened, so has the period of time during which young people continue to engage in health-risk behavior and expose themselves to health risks, with potential health consequences in adulthood (Bachman et al. 1997; Schulenberg, Maggs, and Hurrelmann 1997). Findings from our research on health disparities during the transition to adulthood provide substantial evidence of continuing and, in most cases, increased involvement in risk behavior and rising health risks as adolescents transition to adulthood (Harris et al. 2006).

At the same time that we observe these health patterns during the lengthening transition to adulthood, there is evidence that disease onset has shifted down the age spectrum into these young ages for a number of crucial health conditions. Diabetes has become more prevalent at younger and younger ages, reflecting the dramatic rise in obesity in the United States (Cook et al. 2003; Duncan 2006; Pinhas-Hamiel et al. 1996). In the past decade, diabetes has increased by 63% among 20- to 39-year-olds, compared with an increase of 22% for older ages (Centers for Disease Control and Prevention 2008; National Center for Health Statistics 2009). Hypertension and kidney disease, diseases typically associated with aging, are becoming more common among young people (Coresh et al. 2005; Muntner et al. 2004). In the past decade, hypertension increased by 30% among 20- to 34-year-old males, compared with 23% for older males; and poor kidney function increased by 49% for 20- to 39-year-olds, compared with no change for those in the adjacent 40–59 age group (National Center for Health Statistics 2009). Inactivity and lack of physical exercise historically increase with age. During the 1990s, however, the drop-off in physical exercise has migrated into the adolescent and young adult ages (Andersen et al. 1998). These changes in the social, behavioral, and epidemiologic contexts of young people's lives will have important implications for adult health and well-being, the focus of the remainder of this article.

## **AN INTEGRATIVE APPROACH TO HEALTH**

To understand health among the young and its implications for future health and well-being across the life course, I advocate for using an approach that bridges biomedical sciences with social and behavioral sciences by bringing together the disciplinary strengths of each. Biomedical scientists have monopolized the health field and much of the early research on health disparities because health outcomes were primarily disease-focused, with more emphasis on cure than on prevention (National Research Council 2001). As biomedical scientists began to identify some of the proximate causes of disease, there was a growing recognition of the importance of social and behavioral factors. Some examples are quite obvious: smoking increases one's risk of lung cancer, diet is related to diabetes, and stress is an underlying factor in heart disease. Missing from biomedical science, however, were the social, psychological, and behavioral factors that influence smoking, diet, and stress.

In parallel but separate spheres of research, social scientists were building an impressive literature on the role of social factors in health. Important findings about the roles of social support (House, Landis, and Umberson 1988), neighborhood and family disadvantage (Marmot and Wilkinson 2005; Williams and Collins 2001), education (Kimbrow et al. 2008), and discrimination (Williams, Neighbors, and Jackson 2003) on health outcomes demonstrate the fundamental import of the social world in health trajectories (House 2002; Marmot 2004; Williams and Jackson 2005). Missing in this research, however, are the biological mechanisms that social factors interact with or operate through to affect health.

There are always exceptions, especially in our field. Researchers who study aging, in particular, have been leaders in recognizing the importance of incorporating data and analysis of biological processes in models of aging (National Research Council 2000, 2008). But for the most part, researchers tend to work within the confines of their disciplinary theory, study designs, and data, even though the topics they study are studied by researchers in other disciplines with other but related theories and data. To break down these disciplinary barriers, we need an integrative approach, and here I acknowledge the National Academy

of Sciences monograph on *New Horizons in Health* (National Research Council 2001), edited by Burton Singer and Carol Ryff, that spells out the various themes and strategies for achieving an integrative approach.

To understand health, broadly defined, we must understand the linkages between social, behavioral, psychological, and biological factors in health. Within these domains, integration should also occur at multiple levels of influence, at both the individual and contextual levels. To achieve these goals requires integration of these factors in all steps of the research process: in theory, design, data collection, and analysis. Finally, integration needs to occur across the life course. That is, to understand adult health, we need to understand the origins of health trajectories in early life to map out predisease pathways—defined as the biological influences and related links to behavioral, psychological, and social influences that precede morbidity and mortality.

To make my case for using an integrative approach in theory, design, data, and analysis, I will use Add Health as an example of what can be achieved with an integrative approach and to illustrate the importance of studying health among the young to identify the origins of predisease pathways. Add Health is a national longitudinal study of more than 20,000 adolescents in grades 7–12 in 1995 who have been followed into young adulthood with three follow-up waves of interviews. Waves I and II occurred in 1995–1996, when the sample was in adolescence, the majority of whom were aged 12–19; Wave III occurred in 2001–2002, when the Add Health cohort was aged 18–26 and making their transition to adulthood. The recent Wave IV was completed in 2008, when the cohort was aged 24–32 and settling into adulthood. (For more details on the design of Add Health, see Harris et al. 2009.)

## **THEORY AND DESIGN FOUNDATIONS OF AN INTEGRATIVE APPROACH**

An integrative approach begins with theory and study design. The purpose of Add Health, as mandated by Congress, was to explore how the social contexts of adolescent life influence the health and health behavior of young people. Theory suggested that the social environment becomes especially important during adolescence as young people begin to choose their environments and spend more time outside the family setting (Furstenberg 2000; National Research Council 1993). The design of Add Health captured the theoretical sources of environmental influence by measuring key factors in the social contexts of adolescent life, including the family, peer, school, neighborhood, community, and romantic and sexual relationship. Unique to Add Health as a social and behavioral study is that it captured the social, psychological, and behavioral domains at these multiple levels, and it included the biological domain in its original design. The following sections provide a few illustrations of this integrative design.

### **Social**

Add Health measured social, demographic, economic, and cultural factors of the individual and his and her social environment, including the family, peer, romantic and sexual relationships, school, work, neighborhood, and government and policy contexts. Reflecting a strength of population science, the Add Health design obtained independent measures of characteristics of friends and peer networks, family, school, neighborhood, and the larger community by including these clusters as part of the sampling design and not depending on self-reports of the characteristics of these contexts.

### **Psychological**

Add Health captured the emotional, mental, and cognitive dimensions of individuals, and these factors can also be measured at the family, peer, school, and neighborhood levels. Examples of factors in the psychological domain are personality, temperament, verbal aptitude, affect, learning disabilities, future expectations, positive orientation, self-esteem, and self-efficacy.

## Behavioral

Add Health focused on health and attainment behaviors, beginning in adolescence and incorporating adult behaviors as the cohort aged. Coverage includes prosocial, healthy, and health-risk behaviors; educational achievement; and demographic behavior. Behavioral factors are also measured at multiple contextual levels of the family, school, peer network, and neighborhood.

## Biological

Because of the theoretical role that biology plays in health, the Add Health design included the biological domain from the start by embedding a genetic sample of over 3,000 pairs of adolescents with varying degrees of genetic resemblance, including identical and fraternal twins, full siblings, half siblings, cousins, and adolescents growing up in the same household with no biological relationship. Theory specifies that environmental effects, such as parenting or peer and neighborhood influences, on child outcomes are confounded with genetic effects because parents and children share genes, and there is increasing evidence that genes play a role in the selection of one's social environments (Khoury, Beaty, and Cohen 1993; Plomin et al. 2001). When only the environmental effect is measured, the genetic effect is included in the estimated environmental effect. The embedded genetic sample in Add Health, however, allows researchers to parse out environmental from genetic influence on health outcomes.

In adolescence, we also included standard indicators of physical development and height and weight, from which we have been able to track body mass index and obesity into adulthood. As the Add Health cohort aged, our design continued to incorporate the biological domain that was theoretically relevant to the developmental stage of the cohort, just as we did for factors in the social, psychological, and behavioral domains. At Wave III, when the cohort was aged 18–26, the ages of highest risk for sexually transmitted infections, we collected biospecimens to test for sexually transmitted infections (STIs) and HIV. To strengthen our genetic design, we collected buccal cell DNA for molecular analysis of genetic and gene-environment interaction effects in health and health behavior.

At Wave IV, we focused on the major health risks of the cohort at this time: health-risk behavior, obesity, and stress are the leading causes of present and future disease in persons aged 24–32. Certain biological processes play roles in these diseases, and specific biomarkers can be used to characterize these processes (Crimmins and Seeman 2000). Known methods offer feasible ways of measuring these biomarkers in large, nonclinical field settings such as Add Health, and we used these methods to greatly expand the biological domain at Wave IV to obtain objective measures of health status. For example, we obtained markers of metabolic function (e.g., waist circumference, cholesterol, and blood sugar), inflammation, immune function, and cardiovascular health (blood pressure and pulse rate). We expanded our DNA collection to the entire sample and collected information about prescription medications.

This integrative approach continues to capture the key theoretical social, behavioral, psychological, and biological processes represented in the major health issues for the ages of the Add Health cohort as they progress into adulthood. Moreover, the integrative approach in theory and design allows for the integration of data to improve measurement—two aspects we care a lot about in population research. Table 1 shows prevalence estimates of hypertension and diabetes based on preliminary data collected in Wave IV of Add Health, when the sample was 24–32 years old. By combining self-reports with objective biological measures and pharmacologic data, we obtain a more valid estimate of prevalence.

Self-reports of hypertension indicate that 10.6% of this adult population reported receiving a diagnosis of hypertension. When we combine this report with medication use

**Table 1. Prevalence Estimates of Selected Health Conditions Using Survey, Biomarker, and Pharmacologic Data: Young Adults Aged 24–32**

Health Condition	Percentage
Hypertension	
Use medication	3.4
Self-reported	10.6
Use medication or self-reported	11.4
Use medication, self-reported, SBP $\geq$ 160 or DBP $\geq$ 100 <sup>a</sup>	13.3
Use medication, self-reported, SBP $\geq$ 140 or DBP $\geq$ 90 <sup>a</sup>	24.8
Diabetes	
Use medication	1.4
Self-reported	2.9
Use medication or self-reported	3.2
Use medication, self-reported, or glucose $\geq$ 200 <sup>b</sup>	3.9
Use medication, self-reported, glucose $\geq$ 200, or HbA1c $\geq$ 6.5 <sup>b</sup>	6.4

*Source:* National Longitudinal Study of Adolescent Health (Wave IV).

*Note:* Estimates are based on preliminary unweighted Wave IV data ( $N$  ranges from 200 to 15,000).

<sup>a</sup>Stage 2 hypertension is classified as SBP  $\geq$  160 or DBP  $\geq$  100; stage 1 hypertension is classified as SBP  $\geq$  140 or DBP  $\geq$  90 (Aram et al. 2003).

<sup>b</sup>Random (nonfasting) glucose values  $\geq$  200mg/dL and HbA1c values  $\geq$  6.5% are cutoffs for classification of diabetes (American Diabetes Association 2007).

for high blood pressure, prevalence rises slightly to 11.4%. When we combine these survey measures with objective biological measures from blood pressure (BP) readings and use standard BP cutoffs recommended by the American Heart Association, the prevalence of stage 2 hypertension rises to 13.3%; and those with stage 1 hypertension are almost one-quarter of young people aged 24–32. We see similar gains in measuring all cases with diabetes. Based on self-reports and medication use for diabetes, 3.2% are diabetic. Combining the survey data with objective biological measures of diabetes risk from glucose and glycosylated hemoglobin (HbA1c) assays on a blood drop from a finger stick, the percentage with diabetes doubles to 6.4% in the 24- to 32-year-old population.

Self-reports severely underestimate the prevalence of these serious and growing health conditions within the young adult population. Moreover, these health conditions lead to future chronic illness and disease, and with an integrative design, we have the ability to identify the social, psychological, behavioral, and biological precursors that make up pre-disease pathways. In the next section, I show some glimpses of these early pathways with preliminary data from Wave IV in Add Health.

## PREDISEASE PATHWAYS AMONG THE YOUNG

Recent analyses of the causes of deaths in the United States indicate that the single greatest opportunity to improve health and reduce premature deaths lies in personal behavior (McGinnis and Foege 1993; Mokdad et al. 2004, 2005). Unhealthy behaviors account for 40% of premature deaths in the United States, with obesity, physical inactivity, and smoking singled out as the most prevalent behavioral causes (Mokdad et al. 2004, 2005). I now return to health during adolescence and young adulthood and focus on these particular behaviors—smoking, physical inactivity, and obesity—among young people because of their significant consequences for adult health and premature death.

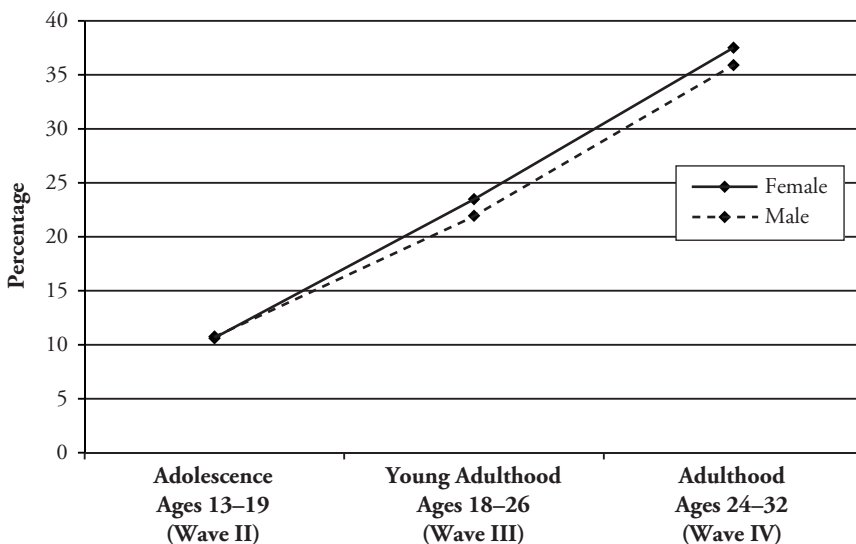
Earlier, I argued that greater involvement in health-risk behavior during the prolongation of the transition to adulthood, and the creeping of health problems into the young ages, have consequences for adulthood health in two ways. First, there is substantial evidence that health tracks across the life course (Halfon and Hochstein 2002). Recall the worsening trends in health status, behavior, and health care during the transition to adulthood that I summarized earlier from our health disparities research (Harris et al. 2006). Health patterns during the transition to adulthood may set health trajectories into adulthood. Second, health during the transition to adulthood has important consequences for key social and economic outcomes, including marriage, fertility, education, occupation, and income. Health in young adulthood may increasingly become an important marker of social stratification. Below, I show some hints of these two important consequences.

### HEALTH TRACKS ACROSS THE LIFE COURSE

The next set of figures presents evidence of how health tracks across the life course. Figure 5 extends the trajectory of obesity that I showed earlier for the adolescent and young adulthood ages by adding the next point in adulthood at ages 24–32 for males and females in Add Health. From adolescence into young adulthood, obesity doubled from 11% to 22% for both sexes. Over the next six years, the trajectory continued its upward climb into adulthood, where obesity rose to 36% for males and 38% for females, with a slightly growing and statistically significant sex gap. These aggregate patterns are the result of both individual stability and increasing rates of entry into obesity. For example, compared with those not obese, obese adolescents are nine times more likely to be obese adults, and the rate of becoming obese increases 42% across these ages.

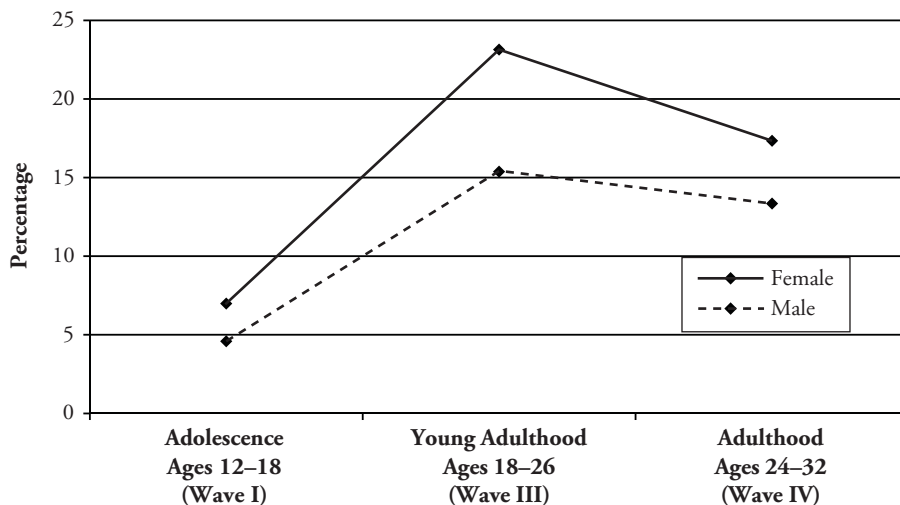
Figure 6 shows the cohort trajectory for levels of no bouts of physical activity from adolescence into adulthood by sex. Physical activity is measured using a standard physical activity behavior recall (Anderson et al. 1998). Lack of exercise, or no physical activity, is

**Figure 5. Trends in Obesity From Adolescence to Adulthood, by Sex\***



Source: Add Health data ( $N \sim 14,000$ – $15,000$  at each wave; preliminary Wave IV data).

\*The sex difference in the obesity trend is significant at  $p < .05$ .

**Figure 6. Trends in No Bouts of Physical Activity From Adolescence to Adulthood, by Sex\***

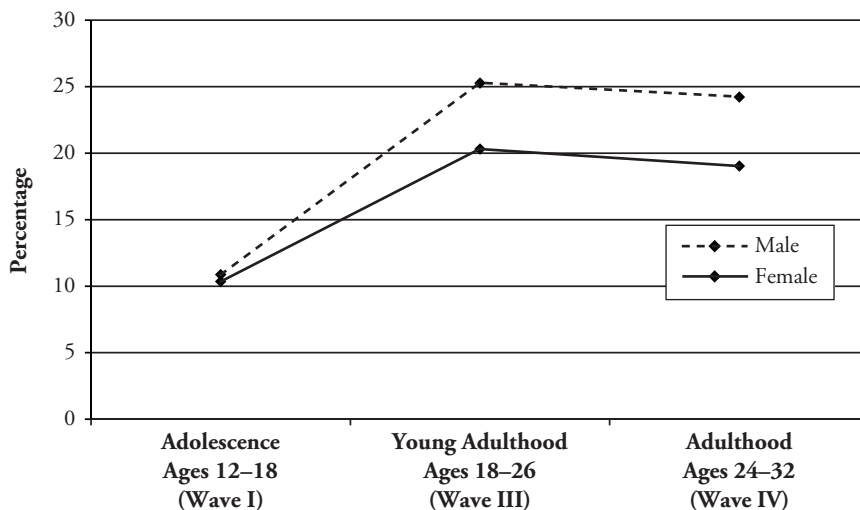
Source: Add Health data ( $N \sim 14,000$ – $15,000$  at each wave; preliminary Wave IV data).

\*The sex difference in the physical inactivity trend is significant at  $p < .05$ .

defined by self-reports of no bouts of moderate to vigorous physical activity (5–8 metabolic equivalents) per week. There is a dramatic drop-off in physical activity during the transition to young adulthood, when the percentage who get no exercise increases from 7% to 23% for females and from 5% to 15% for males. Physical activity levels improve slightly in adulthood, and the sex gap narrows somewhat but remains significant. More importantly, the relatively high levels of no exercise are set coming out of adolescence. Figure 7 presents the trends for regular smoking. Again, we see that the prevalence of smoking levels off in adulthood, but the levels are set and the significant sex disparity emerges in the transition from adolescence into young adulthood.

Two important findings come out of these data. First, the largest increase in poor health—as indicated by obesity, smoking, and lack of physical activity—occurred during the transition from adolescence into young adulthood. As young people settle into adulthood, levels of poor health behavior stabilize, with the exception of obesity, but that level is set coming out of adolescence, a vulnerable time for health in early life. Second, disparities by sex grow with age, and there is evidence of widening disparities in these health behaviors across age for other population characteristics, such as race, ethnicity, and socioeconomic status (Harris et al. 2006, 2009; Lee, Harris, and Gordon-Larsen 2009).

I have provided evidence that adolescence and the transition to adulthood can set health trajectories into adulthood, but do these patterns matter for general health and disease risk given that young people are generally healthy, with low prevalence of disease or chronic illness? I now turn to whether health trajectories from adolescence into young adulthood are related to health outcomes in adulthood to further explore how health tracks across the life course. In Figure 8, I examine the relationship between the obesity trajectory from adolescence into young adulthood and markers of future disease in adulthood to begin to map predisease pathways. Markers of future disease are measured in Wave IV, when the Add Health sample was 24–32 years old, by indicators of (1) diabetes, (2) hypertension, (3) high cholesterol, and (4) sleep problems. Diabetes is indicated by

**Figure 7. Trends in Regular Smoking From Adolescence to Adulthood, by Sex\***

Source: Add Health data ( $N \sim 14,000$ – $15,000$  at each wave; preliminary Wave IV data).

\*The sex difference in the regular smoking trend is significant at  $p < .05$ .

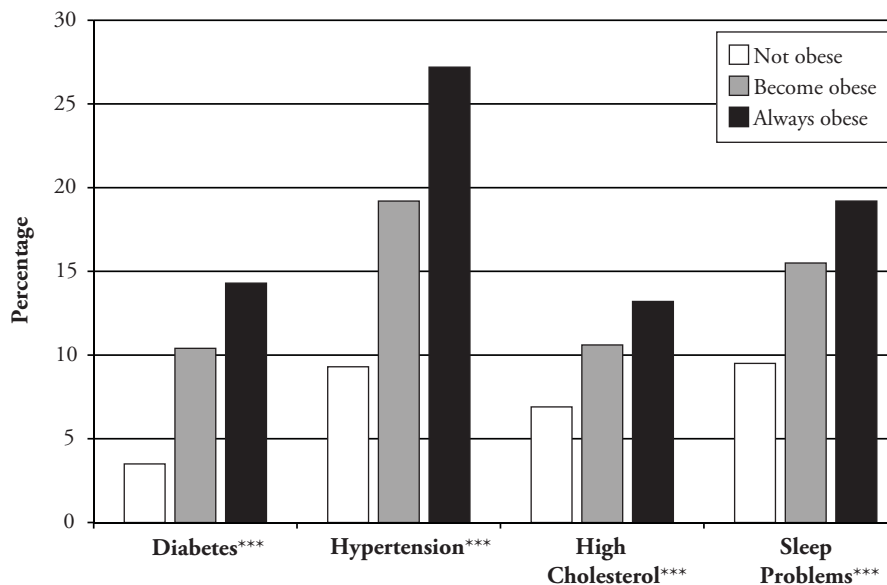
whether the respondent self-reported diabetes diagnosis, is taking medication for diabetes, had a random glucose assay result of 200 or greater, or had a glycosylated hemoglobin (HbA1c) assay result of 6.5 or greater (see Table 1). Hypertension is measured by self-report of hypertension diagnosis, using medication for hypertension, having a systolic blood pressure (SBP) reading greater than or equal to 160, or having a diastolic blood pressure (DBP) reading of 100 or greater (i.e., stage 2 hypertension, see Table 1). Cholesterol is measured by self-report only.<sup>2</sup> Sleep problems are based on three questions that asked respondents whether they have trouble falling asleep once per week or more; whether they have trouble staying asleep through the night once per week or more; and whether they snore or stop breathing during sleep. Severe sleep problems are indicated by those who have all three of these problems (11%). Individual obesity trajectories from adolescence (when the Add Health cohort was aged 13–19 in Wave II) to young adulthood (when they were aged 18–26 at Wave III) are categorized into three groups: not obese (those who were never obese or lost weight, 82%); become obese (those who became obese during the transition to young adulthood, 10%); or always obese (those who were obese throughout adolescence and young adulthood, 8%).

The results in Figure 8 generally show an increasing percentage that have diabetes, hypertension, high cholesterol, and sleep problems, with increasing time obese in adolescence and young adulthood. Poor metabolic function, represented by high cholesterol and diabetes, is generally uncommon for young people aged 24–32, but those who are obese as they enter adulthood, and especially those who begin their obesity trajectory in adolescence, face much higher risks of these metabolic disorders in early adulthood. The increase in hypertension is particularly dramatic among those in obese trajectories, doubling the

2. Blood spots were collected for assay of lipids in Add Health Wave IV, but these results were not available at the time this article was prepared.



**Figure 8. Obesity Trajectory From Adolescence to Young Adulthood Is Associated With Markers of Future Disease in Adulthood ( $N \sim 11,600$ )**



Source: Add Health data (diabetes, hypertension, cholesterol, and sleep problems based on preliminary Wave IV data).

\*\*\*The change in health outcome by obesity trajectory is significant at  $p < .001$ .

percentage of 9.2% for those not obese to 19.2% for those becoming obese in young adulthood, and tripling the percentage to 27.2% for those obese throughout adolescence and young adulthood. The impact of obesity on quality of life and general health is furthermore seen by the increase in severe sleep problems with longer obese trajectories.

Evidence indicates that cigarette smoking and sleep problems characterize predisease pathways for cardiovascular disease risk (Young et al. 2002). Indeed, I find that smoking during adolescence and the transition to adulthood and sleep problems in adulthood are associated with hypertension in adulthood. Stage 1 hypertension (SBP  $\geq 140$  or DBP  $\geq 90$ ) is higher in adulthood for those who smoked regularly during adolescence and young adulthood (25.2%) and higher for those who had sleep problems (29.7%) compared with those who neither smoked nor had sleep problems (22.9%); but hypertension is highest for those who both smoked throughout the transition from adolescence into young adulthood and report sleep problems in adulthood (37.2%) (results not shown, but available on request). These descriptive relationships between health trajectories in adolescence and the transition to adulthood and markers of future disease at such an early age in adulthood forebode profound implications for future morbidity and chronic illness throughout adulthood, as well as substantial medical care costs for the individual and society as a whole.

### HEALTH IS A MARKER OF SOCIAL STRATIFICATION

Finally, I end with some hints of how health trajectories from adolescence into young adulthood are associated with demographic outcomes and markers of social stratification in adulthood. Table 2 provides descriptive data on the relationships among the three behavioral

**Table 2. Health Trajectories From Adolescence Into Young Adulthood and Associated Markers of Social Stratification in Adulthood**

Health Trajectory, Wave I–Wave III	Wave IV Socioeconomic Status (%)				Wave IV Income Indicators (mean \$)		
	Attended College	Finished College	Ever Married	Own Home	Household Income	Personal Earnings	Household Assets
Obesity							
Not obese	69.3***	37.1***	48.7***	41.2***	65,894***	41,484***	93,615***
Always obese	57.4	20.2	42.2	31.7	54,064	34,525	68,916
Physical Activity							
Active	68.5***	34.8***	49.3	41.3***	64,237***	40,987***	90,551***
Never active	51.0	20.2	51.8	35.6	52,899	34,179	68,274
Smoking							
Not regular smoker	71.4***	39.4***	48.5***	41.1***	64,992***	41,561***	91,899***
Always regular smoker	45.5	8.5	55.7	44.0	54,899	33,696	72,212
Overall Health							
Good <sup>a</sup>	76.4***	46.5***	48.4	43.3**	69,270	44,146	101,833***
Poor <sup>b</sup>	58.0	21.8	48.9	37.6	57,519	35,863	74,398
<i>N</i>	11,445	11,445	11,432	11,427	10,714	9,029	10,285

Source: National Longitudinal Study of Adolescent Health (Waves I–III, preliminary Wave IV data).

<sup>a</sup>None of the following characteristics throughout adolescence and into young adulthood: obese, not physically active, or regular smoker.

<sup>b</sup>One or more of the following characteristics throughout adolescence and into young adulthood: obese, not physically active, or regular smoker.

\*\*Significant difference at  $p < .01$ ; \*\*\*significant difference at  $p < .001$ .

trajectories of obesity, physical activity, and regular smoking from adolescence to young adulthood, with indicators of socioeconomic status and income at Wave IV in adulthood. In this table, I contrast trajectories of good or improving health<sup>3</sup> (not obese, physically active, and not a regular smoker) with poor health (always obese, never physically active, and always a regular smoker) throughout adolescence and young adulthood. The rows for overall health in Table 2 combine these three health behavior trajectories to characterize a “good health” trajectory as having none of these health behaviors throughout adolescence and into young adulthood (representing about one-half of the sample) compared with a “poor health” trajectory with some or all of these behaviors. Social stratification measures are binary indicators of ever attended college, finished college, ever married, and home ownership, all measured at Wave IV. Income measures are presented as household income (respondent income and income of everyone in the household who contributes to the household budget), personal earnings (of those employed), and household assets (total value of respondent assets and assets of everyone in the household who contributes to the household budget).

The overall findings show a strong and significant relationship between longitudinal poor health trajectories in adolescence and through the transition to young adulthood and social and economic outcomes in adulthood. For example, compared with those who were

3. An improving health trajectory includes those who have poor health in adolescence but better health by young adulthood (e.g., obese in adolescence but not obese in young adulthood). This trajectory is relatively uncommon.

not obese, young people who were obese during adolescence and the transition to adulthood were significantly less likely to attend college (57.4% vs. 69.3%), finish college (20.2% vs. 37.1%), ever marry (42.2% vs. 48.7%), and own their own home (31.7% vs. 41.2%) in the adulthood ages 24–32. Obesity is also associated with lower income; those who were obese from adolescence into young adulthood had lower average household income (\$54,064 vs. \$65,894) and personal earnings (\$34,525 vs. \$41,484), and substantially lower total household assets than those not obese.

Never engaging in physical activity from adolescence and into adulthood was also associated with a lower likelihood of attending college, finishing college, and owning a home, as well as lower average household income, personal earnings, and total assets compared with those who were physically active in adolescence and young adulthood. Adolescent to young adulthood trajectories of regular smoking show the same negative relationship with college attendance, college completion, and income indicators in adulthood, but have a slightly positive association with ever married and home ownership compared with the trajectory for not being a regular smoker.

Finally, longitudinal patterns of overall health based on the combination of these three health trajectories shown in the rows for overall health in the table indicate higher social status (with the exception of ever married) and income among those with “good” health trajectories (i.e., those who were not obese, were physically active, and never smoked regularly throughout adolescence and the transition to young adulthood), compared with those who experienced any of these poor health behaviors during this life stage. The overall consistency and strength of these descriptive results suggest the importance of health among the young as a marker for social stratification early in the adult life course.

## CONCLUSION

I have tried to make the case for using an integrative approach to health, broadly defined as social, emotional, mental, and physical well-being; for studying health among the young as an important marker for future health and well-being across the life course; and for understanding health disparities among the young as both causes and consequences of social stratification.

I want to encourage population scientists to embrace an integrative approach in their research because population scientists bring strengths to this approach that other disciplines do not. Population training and research is inherently transdisciplinary, so these barriers are less of a problem in our field. We bring strengths in study design, measurement, data collection, and analytic tools that are required to achieve an integrative approach.

Population scientists are ideally positioned to show that behavioral and social processes have broader significance and are fundamental to a comprehensive understanding of disease etiology as well as the promotion of health and well-being. When behavioral and social sciences are implicated in health, understanding becomes less disease-focused and emphasizes the importance of “upstream” determinants of health and the opportunity to intervene, modify risk factors, and foster prevention to promote health and well-being. Incorporating the biological dimensions of health improves our understanding of the social and behavioral dimensions of health and lends credibility to our findings that biomedical scientists cannot ignore. But an integrative approach involves more than sticking biological measures in with social, psychological, and behavioral measures in our models; it is more than collecting biomarker data just because we can. An integrative approach brings together biological sciences with social and behavioral sciences in its theory and design, data collection, measurement, and analysis.

Many demographers have written about and conduct research that brings biology into our models of social and behavioral phenomena, and there are two monographs on the collection of biological data in social surveys (National Research Council 2000, 2008). In

this article, I have tried to articulate this integration as a research process and to advocate for this integration in the study of health among the young. Research from Add Health suggests that an especially critical time that sets health trajectories into adulthood occurs during the transition from adolescence into young adulthood, when young people exercise more control over the selection of their social environments and make behavioral choices regarding their health. With an integrative foundation in theory and design, we will better understand the social, psychological, behavioral, and biological origins and tracking of predisease pathways that offer the promise of reducing future disease and chronic illness, as well as social and economic inequalities.

The empirical examples I have used in this article primarily focus on individual health trajectories over time and highlight the biological measures expanded in Wave IV of Add Health. Other empirical evidence from Add Health illustrates the theoretical importance of the social contexts for health trajectories that are facilitated in an integrative design. Research has documented associations with obesity for peer networks (e.g., Cohen-Cole and Fletcher 2008; Trogdon, Nonnemaker, and Pais 2008) and school context (e.g., Richmond and Subramanian 2008). Health-risk behavior is associated with peers (e.g., Cleveland and Wiebe 2003; Duncan, Harris and Boisjoly 2001), school context (Guilamo-Ramos et al. 2005), and neighborhood context (e.g., Nowlin and Colder 2007); and neighborhood effects are related to sexual behavior (Cubbin et al. 2005). Moreover, exploration of the genetic data in Add Health uncovered a gene-environment interaction of the dopamine transporter gene, DAT1, with the proportion of the high school population who had had sex by age 16 in relation to the number of lifetime sex partners (Guo, Tong, and Cai 2008). Such evidence of the role that peer, school, and neighborhood contexts play in health and health behavior early in the life course emphasizes the need to track health trajectories as young people move into and through adulthood in order to understand the enduring influence of social context as a key element of the integrative approach to health.

Add Health is not the only study with an integrative approach, and it is not the only study that allows population scholars to bridge biomedical and social sciences in their research. I mentioned just a few of the rich and innovative studies breaking ground in this area at the beginning of this article. Add Health is not the only study that begins to examine health early in the life; the recent launching of the National Children's Study is a good example. The antecedents of predisease pathways likely begin before adolescence, in childhood, at birth, in the womb, and in the health behavior and genetic profiles of parents. To the extent that social, behavioral, psychological, and biological data can be collected retrospectively or during these critical life stages, these rich data sources will further the development and knowledge to be gained from an integrative approach for understanding health trajectories of children. Inter- and intragenerational data from the biological and extended family of origin (e.g., parents, siblings, children) will further add to the value of the integrative design, and these data are possible in Add Health and other studies. These and other exciting research opportunities are becoming available, and I expect population scholars will become the leaders in this new scientific frontier.

To quote then President-Elect Obama in a 2008 address on his goals for his science team, "The highest purpose of science is the search for knowledge, truth and a greater understanding of the world around us" (Science Team Rollout Radio Address, Chicago, IL, December 17, 2008). Bringing it all together isn't easy. Think big, but start small and build. Putting the pieces together in an integrative approach from theory to design to data and analysis will contribute more to science than the sum of its parts; it will advance knowledge about the world around us and change the future for health research, politics, and policy.

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