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The Life and Legacy of Greg Alexander

MICHAEL KOGAN, PhD: Well I met Greg in 1987. I was a drooling graduate student working at the Massachusetts Department of Public Health attending my first American Public Health Association conference in New Orleans. Already at that conference I had had a water drop a poor boy sandwich in my lap, immediately ran back to the kitchen to get a towel and start wiping my lap with it. I grabbed the towel and said I'll take it from here, thanks very much. So I knew it was going to be a rough conference.

I was giving my first presentation there. It was in a panel on prenatal care utilization. I was giving a paper on racial disparities and late prenatal care visits. And on the same panel was Milt Kotelchuck. He was presenting on his index on prenatal care utilization on how to describe it and another presentation on its relationship with birth outcomes.

Milt was already a big hoo-hah professor at Harvard and chances are most people were there to hear him. So we all gave our presentations and at the end of it there was this great sucking sound. It was like the MCH equivalent of when the Beatles came to America. Everybody rushed up to see Milt. Milt of course was ready by that time. He had changed into a long leather coat. He had his

sunglasses on. He had a cigarette dangling from a long cigarette holder. One of his personal assistants was doing his nails. The other one was giving him a backrub like this.

And I was there over on the side and I was about re-attach my drool bag and leave when somebody came up to me and it was Greg. And he came up and he said--we started talking about how his interests were looking at racial disparities, how his interests were looking at prenatal care utilization, how he was interested in the relationship between prenatal care and birth outcomes. So we talked for a while and I thought, oh here's a kindred spirit.

And he started to walk away and he turned and he said, oh one more thing, do you know Dr. Kotelchuck? Well he was the coauthor of my paper and I said why yes I do. He said, do you think you could introduce me to him? And so a long friendship was born, a long three way friendship with Milt. And we worked on a number of papers. We were all concerned with the same issues.

Prenatal care is one of our most common health services in this country, probably the fourth or fifth most common health service provided and yet we knew very little about what went into it. Why would it be related to birth outcomes? What part of it? Is it the physical exam? Is it the advice you get? It was unknown at the time. Why would there be disparities? Is it driven by access? There were a number of questions to look at. Does it in fact--do we in fact have

better birth outcomes? At the time prenatal care was viewed as a panacea. If everybody had more prenatal care there'd be better birth outcomes. That's where we were at that time.

And we undertook to explore a number of analysis. And this is analysis that is a preliminary analysis. Greg and I were working on this when he passed. It's the association between the distribution of obstetricians and birth outcomes in the U.S. between 1992 and 2002. Now everybody here in this room knows that we've invested a fair amount of money to reduce preterm birth and low birth weight in this country. Yet, as we all know, they've increased since the 1980s.

Looking at since 1990 and this is for 2006 it's preliminary data from the National Center for Health Statistics that came out last week. Prenatal care has increased about 20% since 1990. Low birth weight has increased about the same amount. Now at the same time as there's been a rise in these rates there's also been an increase in obstetric interventions at the time of delivery. You see the rate of induction has gone from oh about 9 1/2% to over 20% in that time. The rate of cesarean sections had gone from about 25% and had dipped slightly in--and had gone down in 1996 to around 22% but since then there's been a phenomenal rise in that up to 31.1% in the preliminary data for 2006.

Now, does that mean that the prenatal care rise and low birth weight rise has been driven by an increase of obstetric interventions? Who here says yes? Raise

your hands. Just Milt. No. A few people. Does this prove that it does? No, of course not, of course not.

We're looking at correlation analysis at this point, right, because if you look--look at other phenomenon since 1996. Look at the number of cell phones purchased at that time. Is that related to--is that related to pre-term birth? No. How about the number of plastic surgeries? No. How about the number of web hits for Paris Hilton, Lindsey Lohan, and Britney Spears, are they related to pre-term birth? Possibly the latter.

Now in an earlier paper by Greg, Milt, I, Martin and others we looked at the trends in prenatal care utilization over 20 years and found that there had been a marked increase in intensive prenatal care utilization as Martha talked about. Michael Kramer this year's award winner for advancing knowledge wrote a paper in 1988 and he had suggested different reasons for the rise in pre-term birth. Among the reasons were an increase in multiple births, an increase in the use of ultrasound, changes in the limits of fetal viability and more aggressive management of high risk pregnancies.

Now under the theory that if you don't cite your own work nobody else is going to and the twin theory that you can't cite your own work often enough I'm going to draw on a paper that we did--that myself, Greg and Milt had. We looked at twin births and intensive prenatal care utilization. What we found is--I don't think

there's a pointer here--but you see that the rate of pre-term birth among twins increased the most for those who received intensive prenatal care utilization.

We also showed that intensive prenatal care utilization increased the most in the 32 to 36 week range from 1981 to 1997. And at the same time generally that the overall c-section rate was going down, you see that there was an increasing number of twins who were delivered by c-section from 20% to 24% in 1995 to '97.

Now we had begun a paper last year and so again, let me emphasize this is preliminary work. We then began to speculate, what if the rates of pre-term birth and low birth weight are also being influenced by the distribution of providers? Why did we think that? Well low birth weight has been shown to vary by regions. There's also been a strong correlation shown between within state declines and fertility and within state increases in c-sections, implying a kind of induced demand. Also it's been shown that neonatal intensive care capacity is not located in regions of the greatest newborn need as measure by low birth weight rates.

So our research question was after controlling for social, behavioral and obstetric factors is there an association between the distribution of obstetrician/gynecologists and birth outcomes? In 1992 and 2002 we used two data sources, one is the vital records for those years and we merged them to the area resource files from HRSA which collects information on a number of health

service factors and we were able to use the county level files from MCHS and merge those and to the county level data for number of obstetricians per 1,000 women in 1990 and 2001.

We looked at number of dependent variables. I'm not going to go into them all in the interest of time. Our main independent variable of interest was the number of obstetrician gynecologists by newborn service area in 1990 and 2001 and you see the factors that we controlled for. Now our analysis, we looked at the distribution of OB/GYNs both as a continuous variable and divided into quartiles in relation to the outcome variables.

Here in this analysis I'm only going to get the results when I divide--when we divide it into quartiles. We stratified the analysis--well when we looked at stratified analysis it indicated disparities by race ethnicity. So I'm going to show results divided into whites and non-whites. We used multilevel analysis using both logistic and multilevel modeling methods.

Now here's the distribution of obstetrician/gynecologists in 1990. Now you see that those areas colored in dark blue are the highest quartile. Here's the distribution in 2002. Now there's been an overall increase in the number of obstetrician/gynecologists of about 10% in that time. And in addition it looks like there may have been some shifting more towards the coasts.

Now in terms of birth outcomes, in our basic analysis, we looked at birth outcomes by the number of obstetrician gynecologists and you see that there appears to be a trend for 1992. If you look at the percent low birth weight, the percent low birth weight increases with increasing number of obstetrician gynecologists. You see the same factors for low birth weight, pre-term birth, very pre-term birth, moderate pre-term birth, mild and SGA.

When you look at it for 2002 you see the same trend for low birth weight, pre-term. You see actually a change in the pattern. You see an increase for very pre-term, for mild pre-term and percent SGA. Now when we looked at the unadjusted odds ratios, you find what you'd find in the stratified analysis comparing women who were in counties with the least--with the most obstetrician/gynecologists compared to women in counties where there were the least number of obstetrician/gynecologists. They were about 10% more likely to deliver a low birth weight infant and about 30% more likely to have a very low birth weight infant. You see increases for pre-term birth and moderate pre-term birth as you'd expect. Now you see some association in 1992, surprisingly not as strong.

Now in the adjusted multilevel models, once we controlled for all the individual level factors in 1992 there was a very small increase looking at the column on the left, a slight increase as you do for many multilevel analysis you see--you might see, you know, not overly strong associations but there might be an added effect at that level for a small for gestational age and low birth weight.

Now for 2002 once you controlled again you see an association for low birth weight, no association for pre-term birth and association for small for gestational age. Now where you do see--when we looked at it for non-whites you see an association for low birth weight and moderate pre-term birth. Looking at non-whites for 2002 you actually see a stronger association, actually a fairly strong association for low birth weight, very low birth weight and very pre-term and small for gestational age with an increased risk in--an elevated risk of about 20-30%.

Now summarizing these preliminary findings in both 1992 and 2002 the bivaried analysis indicated an association between the numbers of OB/GYNs and birth outcomes. In the multilevel analysis adjusting for sociodemographic, behavioral and medical risk factors as well as obstetric procedure attenuated the associations. It appears that the findings may differ when you stratify them by race ethnicity. While the overall associations remain similar for all women and non-white women in 1992 the associations were stronger for non-white women in 2002 compared to the overall population.

As I mentioned, we need to do more analysis on this. We need to look at family physicians. We need to look at the rate of cesarean sections by the number OBs and counties. So the findings at this point suggest that the increasing rates of some birth outcomes may be influenced by some populations by the distributions of obstetrician/gynecologists. In a way this was an evolution of our work going

beyond birth certificates, going beyond survey data to try to link data to look at these questions.

And so this session is dedicated to Greg. Now what I lost when Greg passed was a great friend, a great collaborator, a confident, a drinking buddy and somebody to play double solitaire with when we were sitting in the back of the most excruciatingly boring MCH business sections at APHA.

Now what we lost as a field when Greg passed, we lost someone who cared passionately about the health status of mothers and children. We lost someone who cared passionately about finding the roots of health disparities. We lost someone who cared passionately about a strong and well trained MCH workforce. We lost someone who cared passionately about guiding students and young professionals. And we lost someone with an endlessly inventive mind who saw new ways to address old problems. Thank you very much.