Conference Overview and Debate on the Impact of Prepregnancy Nutrition

Robert Murray, MD

I am a pediatrician who is interested in children's weight. My perspective is different from that of some of the other conference participants because my area of research is in schools. So I tend to look at children beyond their fetal and early childhood years.

One observation I am taking away from this meeting is the fact that parenthood is changing, pushed back from birth to conception, and to some extent, to preconception. In this sense, everything the pregnant woman does currently seems wrong. I talked about fetal origins to a group of school dietitians a while back, and one of them came up to me afterward and said, "Oh, good, now I have another thing to blame my mother for." She was thrilled.

I worry a bit about the conversation we are having in this country about obesity and child neglect. I wonder whether we put a great deal of pressure on the mother when we look retrospectively at the child who develops cognitive problems or bone problems or health problems. This programming places the burden of the child's future on the mother.

I will give you an example of what I have in mind. I was talking to someone recently who seriously thought that we should force all women to breastfeed unless they have an excuse from their doctor. I think this perspective is extreme, but this is not a maternal free-speech issue—the child pays the consequences.

I have worked in inner-city schools in Columbus, Ohio, that were urban and poor with a mixed population of whites, Hispanics, and African Americans. We screened students in kindergarten at age 5 years, in third grade at age 8 years, and again in fifth grade at age 10 years. We looked at body mass index (BMI) and blood pressure, and we looked for acanthosis nigricans, the darkening of the skin that signals early insulin resistance.

We found that about 30% of 5-year-olds were overweight. Their blood pressure was fine, and they did not show signs of acanthosis. By 8 years of age, 40% were overweight or obese, and of that group, 30% had prehypertension or hypertension and nearly 20% showed insulin changes, at least in terms of acanthosis nigricans.

By age 10 years, 50% were overweight or obese with the same mix of adverse metabolic findings.

I want you to think about the children you see. Think about an 8-year-old child who already has hypertension and who already has taken the first steps toward insulin resistance and, possibly, diabetes. In addition, extremely obese 8-year-old children are ostracized by their peers and often by their family. When we look at their quality of life as they get older, we see that this isolation does not go away. Here is a child who is 8 years old and has done nothing wrong, has made none of the important decisions, but is now hypertensive, prediabetic, and isolated by peers. The question is, is that the result of neglect? Are we putting a great deal of responsibility on parents for how that child lives the rest of his or her life?

What do the conference participants think? Is this a neglect issue if parents do not follow our direction? Should we, as David Ludwig at Harvard suggests, pull in children services to deal with people who do not take care of their children or with mothers who do not take care of themselves in pregnancy? Are we implying that what mothers do or have done to themselves represents serious, potentially life-long events that merit greater scrutiny?

Dr Abrams: I would say that this is the biggest argument for changing the environment, because you cannot blame the individual mother and you cannot blame the individual child. We are swimming in this environment that just invites us to eat, and sometimes the climate makes it difficult to get exercise. What pregnant woman is going to go out to exercise in summer heat or in ice and snow?

This leads me back to my passion about education. Can we find messages that help physicians and the women in our society understand that this is an emergency—messages that say that eating this bag of potato chips is not a good idea and that repeated inappropriate eating and lack of exercise may program one's child for the kind of suffering we have described? In my view, this needs to occur in the long run at a societal level, and in the short run, through the kind of trials we are doing and the kind of messages we are trying to get out.

Dr Godfrey: I would say this is not so much neglect as it is the level of science and health literacy of the parents. Quite strong literature about the importance of health and science literacy exists. In the school programs we are evaluating, the primary goal arguably is to increase science and health literacy in children and to make the information accessible in a way that they can act on it.

Dr Murray: I have thought about the statement about requiring women to breastfeed and how ironic it is. The man who made this statement is a Texas

conservative who generally would want the government off his back, but in this instance he wanted the government or society to insist that women breastfeed.

We have done a good job of educating pregnant women about fetal alcohol syndrome. Consequences of conditions such as that are a little more in your face than the consequences of obesity. If they drink, take cocaine, do heroine, or smoke, we know they will harm their child and they know they will harm the child. If a woman drinks alcohol to excess and causes harm to her baby knowingly, is that neglect?

We have spent 40 years on tobacco education, but 3000 teens take up smoking every day. It is not because they do not know what we have told them, it is because they do not care.

Dr Godfrey: That is the societal norm.

Dr Shamir: Not breastfeeding is not neglect. I think now we are moving this discussion to a different place, where I am not sure it should go. We are not talking about smoking, which is lethal. We want to improve our children's health, and it is our responsibility to provide the best nutrition that will give fetuses, and later newborns, the best start in life that we can. However, if we fail, the result is not lethal. We have to put this in perspective, so I think that a slightly lower level of passion about breastfeeding—the flame—is needed.

Dr Murray: We are having this conversation about soda taxes, too. Doing public policy with this sledgehammer approach is complicated.

Dr Sherry: Out of all the data that we have seen at this conference showing that if we put a black box over the "why," would we still look at the negative outcomes and how they coincide with health quality and mortality? We are doing that to our children. When we see fetal alcohol syndrome and undernutrition in children, we call in social services. In extreme cases, we have interventions for parents who put their children in this situation, regardless of why or how. In extreme cases in which parents do not know or care about nutrition and their 8-year-old children are overweight, the children did not make any choices; their parents chose for them.

Dr Murray: I always felt uncomfortable with the child-neglect issue when I worked in the hospital weight management center, because I felt that we physicians—and society in general—have not always done what we were supposed to do. The parents alone are not to blame. They live in this cornucopia of other factors that drive obesity.

Conference attendee: As a nutrition company, what can Abbott do to help you? At what life stage can we help break this cycle? Most of you would recommend intervening during pregnancy, but would you recommend the early trimester or later trimester?

Dr Murray: At what points do you think we could intervene? We are at Abbott Nutrition, one of the great nutrition think tanks in the world. What can Abbott do, and what is the capacity of industry for intervening to change the outcome?

Dr Marriage: This conference has focused on pregnancy, but I feel strongly that we need to look at childhood nutrition. I think as with public policy, as a nutrition company, we need to look at the entire lifecycle.

Dr Murray: That is where the opportunity is.

Dr Rueda: I think it is not a question of one or the other. I think it is a question of working together. We need to figure out what to do in the future together to accomplish some goals.

Dr Murray: For industry to work with public health.

Dr Rueda: Yes. Industry should work with key opinion leaders, policy makers, regulatory bodies, government, and education systems.

Conference attendee: A number of you have said that you would love to do research in some additional lifecycle stages, but resources are limited. From a scientific perspective, as you look across the continuum of life, where is the best opportunity to make the greatest impact on overall health outcomes?

Dr Campoy: I strongly support the idea presented earlier that we need to begin with the nutritional and lifestyle education of pregnant women. Why? Not only because this is the beginning of the offspring life, but also because when we educate pregnant women, we have the opportunity at the same time to educate the family and then surely the children. If pregnant women are educated in nutrition and lifestyle at that special moment, and they understand the importance of these habits to become the healthiest they can, they will pass these ideas on to their children. In my country, we have programs to improve childhood nutrition, but we do not have nutrition education for pregnant women. I think that this is a very good opportunity for change.

Dr Koletzko: I agree, but I would add that we should not focus only on the mother. In the study we did on breastfeeding success in Bavaria, the strongest predictor of

breastfeeding success was the father's support. An unsupportive father increased the risk of not breastfeeding. I think we should follow the lifecycle approach and push on early life as a window of opportunity to intervene, from before pregnancy through early childhood, addressing the whole family and not just the woman.

Dr Murray: Here is a question I grappled with yesterday and particularly this morning as we talked about India, South America, and China—should we focus on weight or diet? I ask that because weight is difficult to change, but you can improve diet, and it can improve incrementally. You also can improve activity incrementally. As long as we do not call activity "sports" or "exercise," we can get people to change. We are very weight conscious here in the United States, and maybe we should move to the United Kingdom model in which the focus is on nutrition intake, daily activity, and behavioral changes.

Dr Poston: Weight is obviously important because it is associated with increased morbidities and mortality, but I think if we focus on diet, weight will follow. Too much emphasis is placed on weight and dieting. Pregnant women we talk to say they have tried all of the diets, so they do not want us to talk about diet. We then just suggest that they swap one food for another to influence their glycemic load. Ultimately, these substitutions will lower calories, and less weight gain may occur.

I heard that a high-fat diet alone can have deleterious effects in programming. Several animal studies have suggested an impact of a high-fat diet as opposed to the obesity. Both are probably detrimental, but diet itself and switching from a high-fat to low-fat diet can have effects that are independent of weight. I agree that we should switch the emphasis a bit.

Dr Murray: I was thinking of resistance training. Exercise can have an impact on insulin resistance without necessarily changing weight much.

Dr Abrams: I agree. I learned earlier in my career from my epidemiological research that weight gain in pregnancy is enormously variable. I think that is one reason that health care providers in the United Kingdom decided not to focus on it. Someone wrote a paper that argued that we could not use weight in pregnancy as a screening tool for low birth weight or preeclampsia, and that is true. The sensitivity, specificity, and predictive value of weight are terrible. Apparently, human beings have developed a wide variety of responses to pregnancy.

One benefit of weight is that it is easy to measure, and it is a starting point. However, just measuring weight does nothing. We must sit down with the patients, do an assessment, and find out what is going on. I have worked with women who

gained 60 pounds in pregnancy but had an excellent diet. They were incredulous this was happening to them, but I left them alone because they were doing OK. Without fail, those women had normal, healthy babies and did not have long-term obesity problem after birth. Some women also do not gain much weight during pregnancy, but their diet is excellent, so I agree that we are weight-obsessed in this country and that it is not productive unless we do something with it.

Dr Poston: I always have had a problem with variability in weight gain in pregnancy. The weight of the fetus is variable. The weight of the placenta is variable, and the fat mass is variable, so when we measure weight in pregnancy we are not necessarily measuring fat. This is a plain physiological fact that most people do not appreciate. Gestational weight gain is associated with weight increase, with fat-mass increase, but it also is associated with variability, and that is why the Institute of Medicine guideline ranges are so wide.

Dr Abrams: I would suggest wider guidelines.

Dr Poston: But what weight range do you recommend to a woman when differences are in kilograms? It does not help them.

Dr Chen: I think industry can do something for the nutrition of pregnant women in a developing country like China. In China, a difference is seen in nutrition between rural and urban areas, but it is not easy to educate pregnant women about a good diet anywhere. In urban areas, families have paid too much concern to the diet of pregnant women, and it usually makes the diet unbalanced. In rural areas, a cultural barrier to improving a pregnant woman's diet exists as well. In remote areas, culturally a pregnant woman cannot eat better food than her mother-in-law. When I asked a woman whether she has better nutrition during pregnancy, she said "No, I do not, because I have a mother-in-law, and I cannot eat better than she does."

Beyond education, we can provide food. In rural areas, it is not easy to educate people to give good complementary food to young children because of their poor economic situation. So, we provide a daily nutrient-dense supplement food for complementary feeding of young children between the ages of 6 and 24 months, which has proven effective in reducing undernutrition and anemia prevalence and providing higher intelligence potential for children until 6 years of age.

Dr Murray: This is where industry can help.

Dr Chen: Simple food. It may help to have a special supplement food for pregnant women in the rural areas, but first, we should solve the problem of micronutrient deficiency to have healthier babies.

Dr Murray: Maybe programming represents a positive cost-to-benefit.

I am intrigued by the concept of preconception, because preconception actually may extend into the 1st trimester of pregnancy if a woman then discovers that she is pregnant. Healthy behaviors are a lifecycle issue, as Dr Marriage suggested. The behaviors that we know may lead to trouble in pregnancy begin around 9 or 10 years of age among girls in this country. Even though they are only 9 or 10 years old, in my opinion, they are preconceptional. At that age, girls begin to become deficient in folic acid, vitamin D, vitamin A, vitamin C, and iron—deficiencies that then appear in adolescence.

Can we do an intervention at that point to keep those young girls healthy, so that later in life when they get pregnant, they will have good outcomes?