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SuPERU CHILDHOOD OBESITY SEMINAR: THE CHALLENGE OF POLICY DEVELOPMENT IN AREAS OF POST-NORMAL SCIENCE

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Sir Peter Gluckman: Co-Chair of the WHO Commission on Ending Childhood Obesity

There can be few subjects where everyone believes that she or he is an expert – but obesity may be one. We hear some saying its all about sugar or all about fat, others saying its all about the energy in–energy out equation and a large number of people saying it is all about voluntary lifestyle choices and it is “your fault” if you choose to exhibit the vices of sloth and gluttony. Yet the science might suggest much greater complexity.

And all this has policy implications. If it is an individual’s own choice, some might argue ‘why should the State be too involved?’ But others would still say or even demand the State takes a leading role and limit what we can eat or drink. This polarity expresses very different political ideologies and can expose vested interests, especially from the food and beverage sector. And there is an another enormous industry - the weight loss industry – 120,000 different weight loss and diet books on Amazon, craze diets appear and go, fill magazines and the lifestyle pages of newspapers.

But the simple fact remains while it is easy for an adult to loose weight it is very hard for many, barring obsessive behaviour, to keep the weight off. Here the biology and clinical science is clear – those with obesity who lose weight often end-up with appetite control drivers which drive them to have greater hunger sensations that those they had before they lost weight – this is related to how the hormones made by fat and out stomach affect appetite control centres in our brain.

Nearly everyone thinks they know what to do but not everyone agrees. Solving such an issue is not easy.

Yet obesity is a crisis. The number of obese and overweight people in the world is growing – more rapidly in the developing world and 9 of the 10 fattest countries on the planet are in the Pacific.

Further obesity is problem not just because it leads to bad joints and breathing problems but because of its association with diabetes, heart disease and stroke. And here the dice are not rolled even. For any body mass, Indians and Chinese and, I suspect, Polynesians have 2-3 times the risk of developing diabetes than do Europeans, and they do so at a younger age. This will create a time bomb for NZ in coming decades. Why is this the case – well it is certainly not behavioral – it has its basis in biology – a biology that is in part genetic but is also in part developmental. And when we come to children it is clear that obese children are more likely to have other issues – of learning and emotional disorders, of being bullied and stigmatized.

In 2013, the Director General of the WHO Margaret Chan decided to try and cut through these complex dimensions and focus on childhood obesity; the focus on children had several rationales. First there was a worrying rate of childhood obesity and overweight in developed countries and rapidly rising rates in developing countries, and even more children who were not yet obese where clearly on the pathway to develop obesity in early adulthood. Secondly there had been enormous progress on the underlying science of childhood obesity that has distinct aspects. Thirdly the argument that it is a child's "own fault" that she or he is obese is clearly not tenable. Fourthly there would be enormous spillover to adult obesity in developing a plan for childhood obesity.

Dr Chan then established a Commission of eminent persons, both scientific and lay, supported by two working groups on science and evidence and implementation monitoring and accountability. I was appointed co-chair of the Commission on Ending Childhood Obesity along with Dr Sania Nishtar from Pakistan. But the commission might be more accurately named the Commission for Ending Children *being on the pathway to developing* Obesity, as many children not yet obese are on the path to be obese as adults.

The Working Group on Science and Evidence did a phenomenal amount of work with a large number of detailed papers involving many global experts. After two draft reports and consultations next week in Geneva we will finalize the report, but the main recommendations have already been published

When the PM allowed me to co-chair the WHO Commission, it inevitably meant that NZ would need to establish a domestic plan; and while I have provided Commission

material to inform that plan and met officials and the Minister of Health, their recently announced plan is a result of their own deliberations.

While some have suggested there is a large divergence between these plans I would argue otherwise, but the challenge in both will be in implementation.

The very establishment of these two processes showed how quickly predetermined views emerged. Some even criticized the focus on childhood obesity saying it was taking the focus away from adult obesity. Others told us that if the report did not directly focus on fiscal measures, it would be attacked. Others argued that there could be no discussion with the private sector.

Scientists on the working groups also came with views to the table – those who thought it was all about marketing, those who were more focused on the biology and so forth and underneath all of this was the problem of the quality of the evidence. The reality is that while a lot of experimental work has been done, the amount of quality clinical work that allows interventions to go to national scale in different contexts is rather deficient; so much of the argument becomes normative. And normative arguments have to be carefully assessed – they can be wrong.

So in taking on this role I had walked into a complexity typical of ‘post-normal’ science – where the science is complex, the facts uncertain, the issue is urgent and of high public interest, there is a high values component and those values are in dispute.

First the Commission had to dissect out what we really know and what we do not know.

Childhood obesity has three causal domains – biological, behavioral and contextual but they are inter-dependent. For this reason alone, no single silver bullet will work and that in turn creates policy challenges.

The environmental component is perhaps the easiest to understand. In NZ, we all live in a world with more processed foods, particularly energy dense foods and at the same time, exercise is a less dominant feature of many of our lives. But not all energy ingested is the same – for example fructose which is part of the dominant form of sugar is less used for energy support than its partner glucose and for biochemical reasons is more likely to turn to fat. And what we eat is not what we absorb because of the role of bacteria in the gut that also consumes food and in some cases converts it. The food matrix changes how easily food is absorbed and we can have the same raw food with very different biological effects simply because of

how it is cooked or prepared. How we eat also has an effect – fast, slow, with chopsticks or utensils etc. Portion size matters, meal context matters. And exercise clearly helps our metabolism, promotes insulin sensitivity and prevents weight gain.

But there is also hype and over-claim on both aspects of diet and exercise and all this leads to confusion rather than understanding.

But there are also important cultural elements; food and social interactions are intimately linked in every society. Body size and social status are linked in some societies including some Polynesian ones. How many grandmothers think their grandchildren are too thin reflecting the very different circumstances of two generations ago and now?

The behavioral component may be part learned and part biological. Infant and children's eating behaviours are largely parent determined – we now know that how a child is weaned, and indeed what mother is eating during pregnancy and lactation affect the brain control systems for food preference and appetite control for life. Eating and exercise patterns for life are developed in infancy and childhood and are partially biologically determined and partially learnt from family and social exposures.

The biological component is more complex but much is based on comparative work. Humans evolved to prefer sweet and salty things in our diet and to store excess energy as fat as nutritional access was far more sporadic. We also tend to have a body weight set point and after dieting there are biological reasons we will tend back to that set point even if it is overweight. These set points probably emerge early in development.

The evidence is now unequivocal that the propensity to obesity starts from before conception. The conditions in which an embryo, fetus and infant develop change the ways its genes work, perhaps for life, in such a way to make an individual more or less sensitive to the obesogenic environment it subsequently faces. In other words development does not cause obesity, it just makes it more likely. Just like unstable foundations make a building more likely to collapse in an earthquake.

We now know that there are two basic ways this can occur. First if the mother is either undernourished or has just subtle unbalance in nutrition or perhaps if she is stressed, she sends signals to her fetus who ends up physiologically predicting a world of poor nutrition after birth – this induces major changes in the fetal metabolic control system so that after birth the offspring thinks it should put on fat when it can, because it expects a period of under-nutrition. Of course this does not generally happen, so the child just puts on more fat. This is a powerful mechanism

that was essential to our evolution in a past world where nutrition was more unpredictable and at a much lower level, but we are stuck with this evolved default mechanism. It would appear that many children in western countries are primed in this way and probably many more in developing countries.

Second if mother has obesity or gestational diabetes, then this leads to hormonal changes in the fetus which lead to more fat cells being formed. It is like having a bigger gas tank and when the child is born into the obesogenic world, a bigger tank will carry more fat. These changes also lead to lifelong changes in the way metabolism is regulated by caused modifications to gene function. The worrying thing is that gestational diabetes is on the rapid rise – in some populations now up to 25% or more of all pregnancies. Why is this the case? –much relates to what happened to prior generations and to the changed nature of the nutritional world we live in. And because many women with gestational diabetes will eventually get diabetes and because many of their children will become obese and also have a high chance of developing diabetes we have a terribly worrying feed-forward system

But it now looks increasingly likely that fat fathers also pass epigenetic changes on in their sperm to their children so we also need to think about the fathers-to-be as well.

So you see the complexities – biological development, learned behaviors and an environment that in many ways favors obesity. So any solution is neither simple nor monovalent. This was the challenge for the WHO Commission and its working groups. Clearly the most effective strategies on first principles are to firstly reduce the sensitivity of children to the obesogenic environment and secondly to reduce the impact of the obesogenic environment.

The WHO report combines these two approaches in a single implementable strategy – that is a life course approach is partnered with the more traditional focus on the obesogenic environment and I am pleased to see that this is also recognized in the NZ government's proposals.

The WHO commission worked iteratively with the working group reports – it had the further challenge that ultimately its report is for the World Health Assembly which comprises 194 countries - so it needs to consider the context of both developed and developing countries. Once it had a first draft, it then engaged in both regional and open consultation, then has issued a draft of its final report for a further round of consultation– which is to be finalized in two weeks time. While that is not yet final my comments will flow from the published draft.

Essentially there are four main groups of recommendations:

First: The WHO draft report points out that this is a whole of society and a whole-of-government issue, not just a health issue and therefore governments must take the lead. It emphasizes this is not simply a matter within a child's own control; but rather is a complex issue of biology and contextual entrapment. Within this statement may be the most important recommendation but one I fear could be lost in the noise: the absolute obligation of governments to make nutritional knowledge accessible and interpretable to every member of society.

I defy anybody to make sense of a nutritional label – the move to a nutritional star rating in NZ is a move in the right direction but first and foremost people need nutritional literacy than allows them to understand the rating and to deal with the many foods and ingredients that will never have a rating from raw vegetables to imported cheeses. The reality is that nutritional literacy is almost non-existent and is inhibited and confused by the morass of competing nutritional 'advice' in the mass media and magazines, the obtuse nature of food labeling and the rush, often commercially driven, to latest fashions in dietary advice. Simply put governments must take the lead in ensuring appropriate, simple, clear and accessible nutritional information for parents, children and indeed everyone. And given our societal mix, the loss of intergenerational knowledge and migration-associated changes in food availability, transculturally accessible information about low cost healthy and eating options is important. Government, the private sector and NGOs all have a role; but government must be the conductor.

Secondly the Commission report points out the importance of a life course approach starting before conception. It approaches that specifically in addressing matters of maternal nutrition and education, breast-feeding, infant nutrition and nutritional education for parents to be. It points out the need to aggressively focus on gestational diabetes.

Thirdly the report points out the need to use the compulsory school years for pedagogically driven and embedded nutritional education and for regular and inclusive physical exercise. I say inclusive because school physical exercise has often become dominated by the search for elite sports people and is often not gender sensitive. The report points out the need to make for healthy school environments. It emphasizes the need for pedagogically driven rather than well-meaning health-professional provided nutritional and physical education. Too much that has been done in the school years has not been pedagogically informed or aligned and the need for education systems to embed this in their thinking is critical.

Children are plastic individuals and if ambiguity exists learning is not embedded. The failure to keep school environments coherent and reinforcing of the learnt message is an example of avoidable ambiguity; but the public reaction to the perception of nanny-statism constrains some political options.

Fourthly, we come to the macro or obesogenic environment. The starting point must be what I talked about earlier: accessible, sensible, clear nutritional information for all. Public health messaging should be clear.

There is no doubt that direct and indirect marketing to children and their parents is a major factor. The challenge is how to address it. The WHO Commission and the working groups spent much time on this. It is not easy. The food system from production to sale is complex and there are many players; big and small. Marketing is also very complex in a world of social media and the trans-national internet. Some marketing restrictions might seem easy but there are often ways around them. What works for multinationals may not work in the same market for artisan producers. On top of that the reality is that governments across the world find it harder and harder to regulate in the market place. For the last 5 years there has been WHA recommendations on limiting of the marketing of food and beverages to children but despite its approval by member states, we were concerned that no State has put them fully into practice. These things are easy to say – hard to do. And what do you limit – is it the product, the brand, the amount of the product (ie portion size) – how do you nutritionally profile foods in a society with multiple food cultures?

While there is certainly a place for regulation, as we do now over cigarettes and alcohol, for the most egregious products during children's television programming, the Commission came to the view that a feasible starting point is to encourage voluntary agreements between food companies and retailers. But we were also not naïve – voluntary agreements means little if they are not independently audited by appropriate agencies or NGOs such as GAIN and preferably have the governments as stakeholders. Voluntary accords of this nature then can work if naming and shaming by independent auditors is part of the schema.

The other point the Commission makes is that we cannot treat the relevant private sectors and the food industry, in particular, like the tobacco industry. Yes they are part of the problem but they are also essential to the solution. There has been a tendency to marginalize them from the discussion because of their obvious interests in certain outcomes but there is growing evidence that the sector can respond (for example in lowering salt and sugar levels), and can make changes. We have already seen overseas some private sector initiatives such as the changed placement of

products in UK supermarkets and thus this needs to be encouraged. The issue that we continue to reflect upon is how can we use a combination of incentives and disincentives to continue the move towards a healthier range of products and marketing approaches.

I have left to last the issue of food taxes. In part because the measures above are, in my view, far more urgent in dealing with childhood obesity even though they might not sound so dramatic. We all know cigarette taxes work but they work only because the tax is very high and is associated with demonization of the companies that make them and stigmatization of those that smoke. But food is different – we have to eat, although there are foods and certainly beverages, especially sugar sweetened beverages (SSBs) that are totally unnecessary in a nutritional sense.

The sugar taxes being proposed are rather low – in the range of 5-20% and a number of countries have introduced them. But whether or not they are effective in dealing with childhood obesity is unclear – as yet there are no specific data.

The best data comes from Mexico and the effect there is only reported in terms of whole population effects – an apparent reduction in consumption of SSBs of 5-17%. When that is converted to what percentage of total caloric intake a child typically takes, then the total effect is in the order of 1-3% of intakes. All this assumes there is no substitution with alternate calories - that again is unknown. A true 1-3% reduction in caloric intake may sound small but it would be valuable – it would amount in an older child to perhaps 20-40 calories per day and that does accumulate over a year to have real effect in a growing child. Hence the Commission was supportive even though the data are limited.

But then the question is if a SSB tax has an effect, is that due to its fiscal effect; is a 10% rate a real impediment to purchase? This issue of price elasticity is real and leads to the question: is the SSB tax a very effective way of government saying SSBs are bad for you; (which they are). So we come back to the policy dilemma. The real politic is not easy and the evidence base not that clear – the Commission supports SSB taxes but certainly does not see them as a magic bullet for childhood obesity, but as a potentially effective part of public health messaging for the whole population.

The Commission report contains many other details and other considerations but in my final few minutes let's look at the NZ situation.

The Ministry of Health had its own advisory group and the Minister released his strategy on a few days ago. If one looks at the solution pyramid it put forward, it

contains many of the same elements as in the WHO report but, as yet, much detail is lacking.

That a government has an integrated and holistic strategy is to be applauded – relatively few countries do. And the issue in my mind is not the mix in the NZ strategy – it acknowledges that Government has responsibility, it covers the life course with its focus on mothers to be, gestational diabetes and infant feeding, it addresses the obesogenic environment, it hints at nutritional literacy and the role of the compulsory school years both in terms of nutrition and particularly physical exercise, both of which I must add the Minister of Education and her department are keen willing to engage with. But the challenge will be; can the Health Promotion Agency and the Ministry produce meaningful nutritional information in a way that is accessible to all in the population. We have the health star rating which is going to be placed on most foods. The announcement mentions the development of an industry accord but it will need a robust structure – this is yet to be worked through.

I would like to have seen a decision on sustaining a healthy school environment but the politics of that are perhaps understandable - but again with good public health messaging, school boards who have the direct authority and responsibility can be encouraged into doing what is needed. But it is hard – one principal told me of the difficulties they have with a healthy canteen policy, with policing the kids from going out of school in the lunch hour to the neighboring fast food stores. Could we regulate them –it is complicated?

So what about the lack of SSB taxes – perhaps not the most critical part of the package compared to the much deeper issues I have discussed above – and the focus must now be on making effective what the government has committed to.

So let me pull this altogether and come back to the title of this address. Science advice to policy making does not work unless it is aware of the policy and political landscape. Science advice in the areas of post-normal science such as obesity also needs to navigate the diverse views of scientists and others, many of whom can be advocates for particular positions. Science advice in such situations lacking a strong evidential base has to use normative approaches. In childhood obesity we have a situation where there are multiple causative factors, this means multiple interventions, many of which have weak evidence in isolation.

But this is not an area where formal intervention science is easily applied. The context of obesity varies enormously by country, society, age and culture. Yet the approaches to prevention must be largely population-wide. Implementation science is needed but primarily around questions which have not been particularly ‘sexy’ –

how to message men and women of reproductive age, how to deeply embed nutritional information, when do exercise habits get engrained, how should children be weaned in a society where many women work and intergenerational traditions have been lost and so forth. The Commission sees the need for much research in such areas.

But in the end the key is to implement properly what is proposed and do monitor and be prepared to look again if progress is not satisfactory. I suspect there is enough to make a difference if properly implemented but that is not a simple task.