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ICLS Occasional Paper 7

The Boyd Orr Cohort : Influences on diet in early old age.

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Introduction:

Thank you everyone. Welcome. Thank you for coming along today. I've invited you here, to hear about the research being carried out on the Boyd Orr Cohort. The Boyd Orr Cohort is a historical cohort study based on the long term follow-up of around 5,000 children surveyed in pre-War Britain between 1937 and 1939. The survey itself was set up to investigate the long term impact of children's diet, growth, living conditions and health on adult cardiovascular disease, and is based on the 65 year follow-up of the Carnegie survey of diet and health. This is one of the first times that we have really engaged with this research and so I'm delighted to be able to introduce to you Professor David Blane from the ESRC's International Centre for Life Course Studies in Society and Health at Imperial College London, and also Dr Maria Maynard who is from the Medical Research Council and Chief Scientist Office for Scotland Social and Public Health Sciences Unit, to tell us more about the survey, the quantitative and qualitative results that are emerging from the research, and also looking at the study's future directions. There's going to be three quite distinct parts so do please ask any questions that you have as we go along. And also there will be a chance for a bit more of an open discussion at the end. Thank you very much.

Professor David Blane:

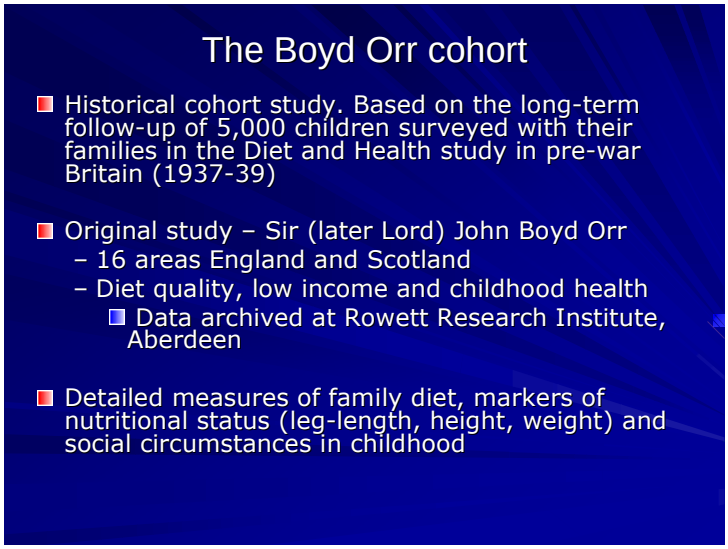
I just wanted to start off by saying how much we welcome this opportunity to have a discussion with policy makers. Because as academics you tend to live in your own little bunker and we used tax-payers funds to do this research so we hope that it will have some policy implications and we depend on the discussion with people like yourselves to find out what that is, so we take seriously this opportunity to discuss with you.

Dr Maria Maynard:

Thank you, David. Good afternoon and hello everyone. Thanks for coming. So as you've heard today's talk is going to be based on the Boyd Orr Cohort and I'm going to give you a little bit of background, a little about the cohort. We'll then go on to talk about the follow-up of the surviving members of the cohort and some work we've been doing on

looking at influences on diet in early old age. I'm going to tell you about the quantitative analyses, I'm going to tell you about the Healthy Diet Score that we've developed and applied. And then David is going to tell you about the qualitative work that we did on background influences. And I'm going to briefly touch on some future directions that we want to go in with our life course diet and health work just to finish off.

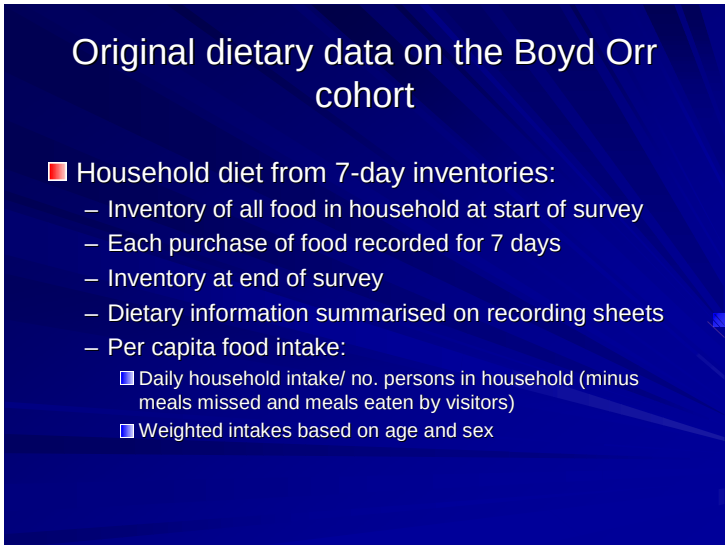
We didn't do this work alone so can I before I go on acknowledge Lucy Abraham who at the time was based with David at Imperial College in London and colleagues at the Department of Social Medicine in Bristol where I was based.



So as you've just been hearing the Boyd Orr Cohort is a historical cohort study and is based on a long term follow-up of about 5,000 children who together with their families just before the outbreak of the Second World War they took part in what was the first large diet and health study within the UK. The original study was run by John Boyd Orr who was at the time the director of the Rowett research institute in Aberdeen. The study took part in 16 areas in England and Scotland. And Boyd Orr was interested in the relationship between diet quality, low income and childhood health in particular. So not only have these data survived the Second World War but also the intervening decades. And all the information is archived in pristine condition at the Rowett Research Institute.

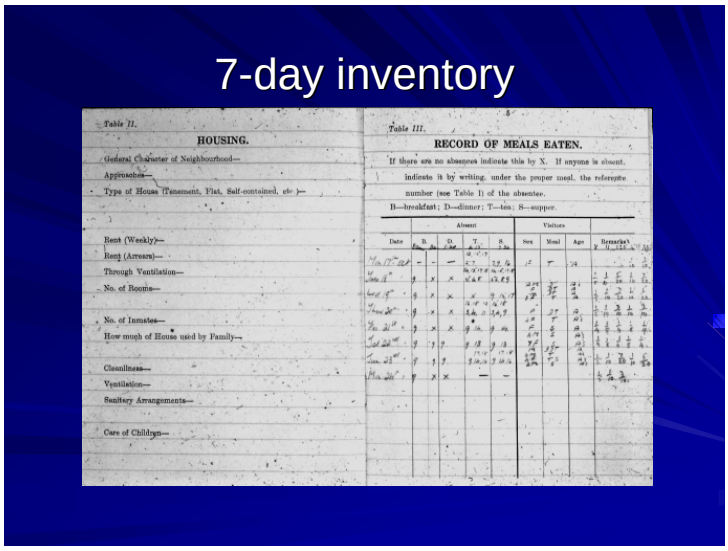
The original data includes really detailed measures of family diet and markers of nutritional status such as leg length, height, and weight, and of social circumstances in childhood.

Here is a photograph (checking permission to circulate) of one of the Boyd Orr families. Their picture was taken around 1938. A large family as you can see. And they lived in the East End of London so they were a more deprived family. Around the mid-1990s when these data were discovered the cohort was traced and about 88% of the individuals have been traced, and the children you see in the picture will be some of those traced. And their information was linked with routine data sources. So we get information on deaths and registrations for cancer. With this wealth of data, with this long-term follow-up, the Boyd Orr Cohort represents a unique resource for exploring early life and later health.

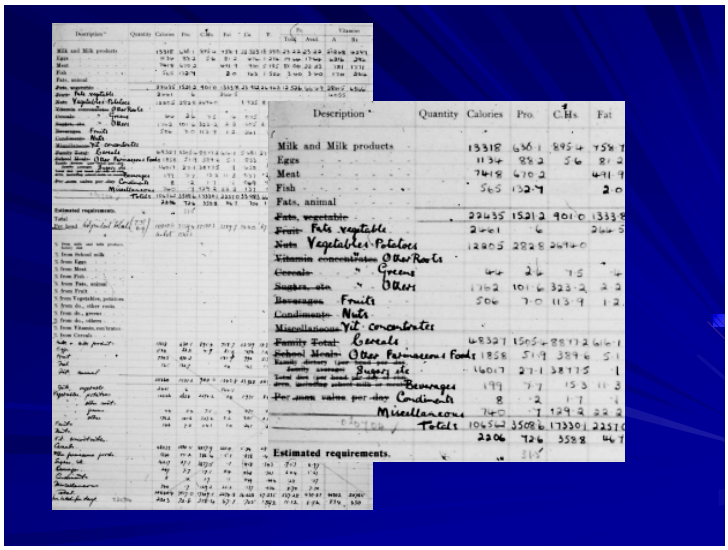


So a little more on the original dietary data: It's family based diet data from seven day inventories. An inventory of all food in the household was taken at the start of the survey, everything then purchased over the next seven days was recorded, and another inventory carried out at the end of the survey. The dietary information obtained was summarised on recording sheets and they calculated per capita food intake simply by dividing intake by number of people in the household; also they did weighted intakes based on age and sex.

This is one of the original inventories. You can just see that on the left hand side that's where the researchers wrote their subjective views on the conditions of the housing, how clean it was, how the children were cared for. And on the right hand side you can see the first day, the first page of the inventory where they recorded the number of meals eaten by each person in the household.



This is one of the original recording sheets. And you can just about see on the left hand side the food groups listed and then all the calculation of energy and nutrients across the page. So they code and analyse the same way we do now but obviously they didn't have the benefits of computers as we do, so a whole team of nutritionists with their slide rules would have hand-calculated all these amounts.



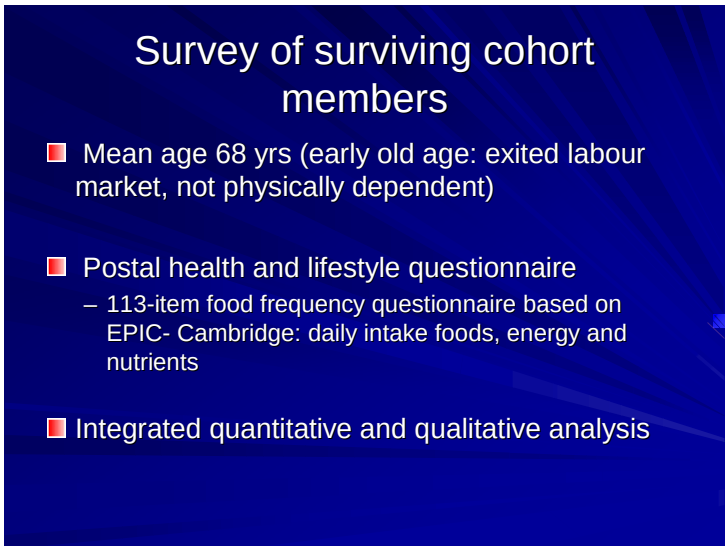
In the late 90's, early 2000's we recoded and reanalysed the data. A range of analyses have been carried out using the diet data, the anthropometry data, infant feeding, social circumstances, with a variety of health outcomes but mostly cancer and cardiovascular disease mortality and incidence. I'm not going to bombard you with lots of findings. But just to give a couple:

It was the first study to show in humans that increasing childhood energy intake was associated with increased risk of later mortality from all cancers. And the work that I did towards my PhD looking at childhood fruit intake and we showed that increasing childhood fruit intake was associated with reduced risk of cancer incidence.

As I say there's a range of analyses have been carried out. For those who want to know more you can go to the Boyd Orr website and see a full list of publications and so on there.

So onto the work that David and I did together with others. And this was part of the Eating, Food and Health research programme funded by these various bodies with matched funding from Research into Ageing. They funded us to follow-up and trace surviving cohort members and look at influences on their diet. At the time of follow-up they were around 68 years old and we define this period as early old age; they've largely exited the labour market but they're not as yet physically dependent.

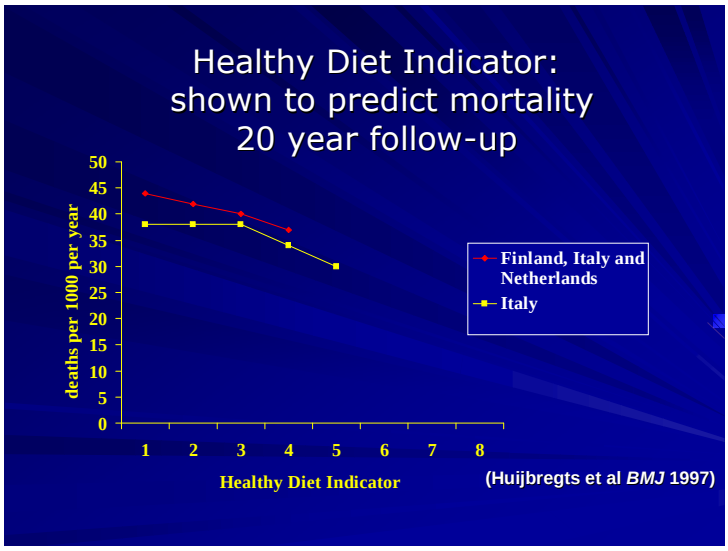
We sent them a health and lifestyle questionnaire. And part of the questionnaire was a food frequency questionnaire, and we based that on the one developed for the Cambridge arm of EPIC, and analysed daily intake of food and nutrients as usual. This was all part of integrated quantitative and qualitative analyses, so I'll leave David to tell you about the qualitative side and I'll tell you about what we did with the dietary data.



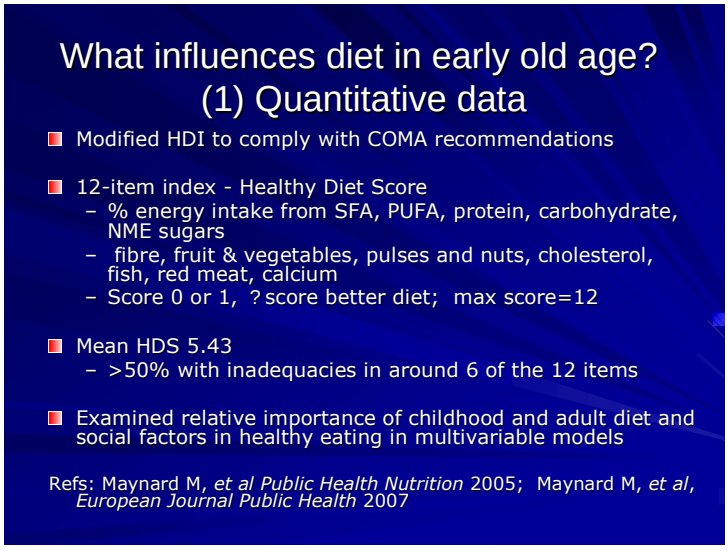
We wanted to take an approach which takes account of overall diet patterns to really complement the traditional kind of individual constituent disease methods which although useful we felt less useful for policy formulation. The use of this sort of approach is increasing and we're aware of FSA in Scotland in conjunction with Glasgow University doing a similar sort of thing and extending their surveillance data with looking at dietary patterns.

There are two main methods of doing this: data driven methods such as factor analysis, principal component analysis, or you can apply a scoring system. And we took the latter approach because we wanted a method which we could then perhaps apply to other studies.

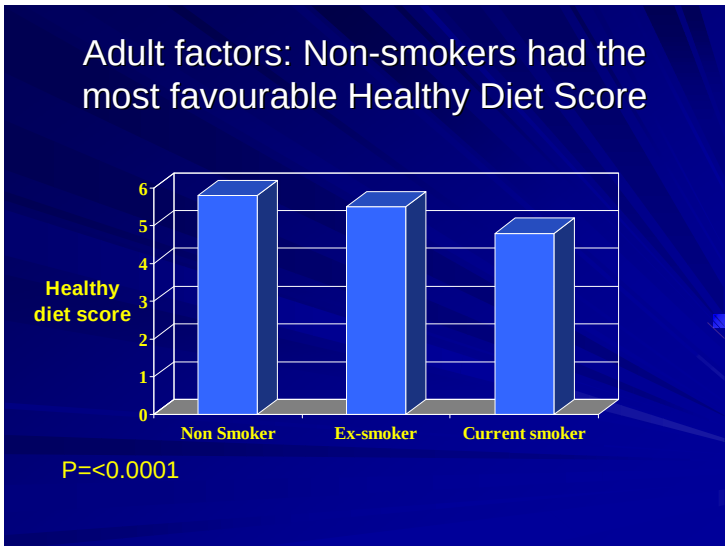
We ideally wanted to find an 'off-the-shelf' validated instrument based on healthy eating guidelines. And we identified the Healthy Diet indicator which pretty much met our needs. It was a nine item score based on WHO Guidelines and developed in Finland. And part of the reason why this appealed to us is that it had been shown to predict mortality after twenty years of follow-up. So here in this graph you can see mortality for men in various European countries, and as healthy diet score increases, as diet quality increases, mortality decreases.



So we took the score to look at what influences diet as determined by the Healthy Diet Index in early old age. We modified the index to comply with UK COMA recommendations. And that meant we added, I think, three foods and we altered the cut-off points of some of the items. That left us with a twelve item index which we renamed the Healthy Diet Score. And that comprised these various items. An individual scores 0 or 1, depending on whether they meet the criteria or not for each item. So an increasing score again means better diet and the maximum score is twelve.



We found when we applied the score to the cohort that the mean Healthy Diet Score was only just over five, which means that at least half of the cohort had inadequacies in their diet on at least half of these twelve items. So there's some serious concerns about the diet of individuals in this age group.



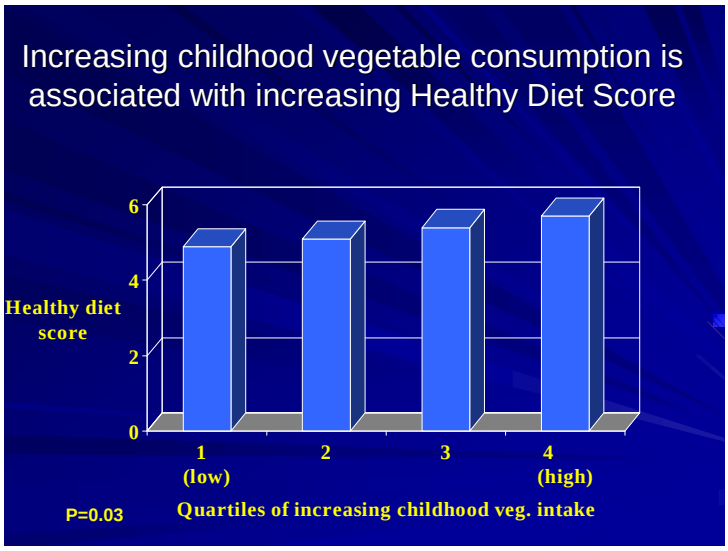
We then took the score to look at the relative importance of both childhood factors – remember that we have them in the Boyd Orr Cohort – and of adult diet and social factors in relation to Healthy Diet Scores in multi-variable regression models and that's a couple of references there.

Of the adult factors the factor which was most strongly associated with Healthy Diet Score was smoking. And so you can see the non-smokers on the left have the best scores, current smokers the worst scores. And this was independent from social circumstances. So it's not just that smoking and poor social circumstances were …

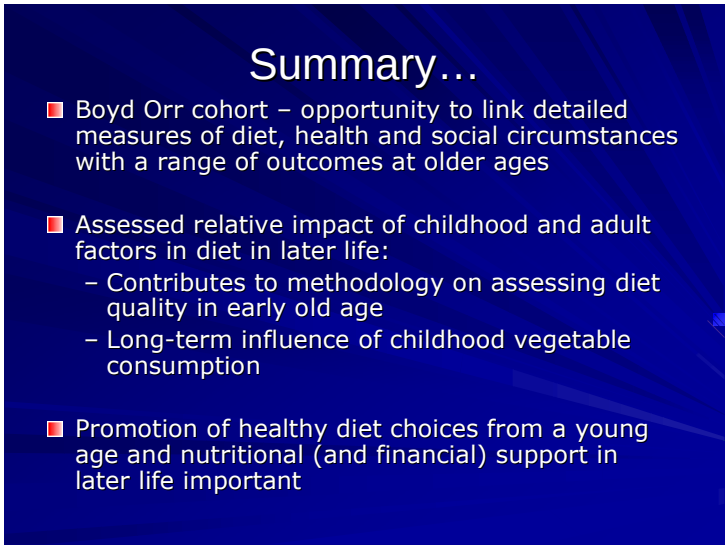
Q: Can I just ask you: Is that their current score?

That's their current Healthy Diet Score, yes. So yes, it's not just that they're smoking, a social pattern, so it's not just a marker of social status, it was independent of our measures of socio-economic status.

Far more interesting to us though is that we've been able to show for the first time prospectively that increasing childhood vegetable consumption is associated with increasing Healthy Diet Scores in early old age. You see there the small, but given the low scores overall a perhaps significant, important difference in scores between those with the lowest quartile of vegetable intake compared to those in the highest quartile who have the best scores.

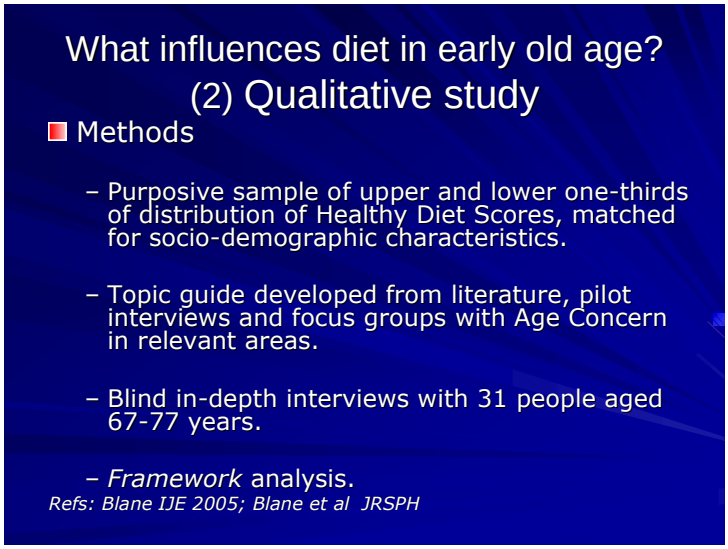


So just to summarise this section of the talk: the Boyd Orr Cohort is an opportunity to link really detailed measures of diet, health, and social circumstances with a range of outcomes at older ages. We've been able to assess the relative impact of childhood and adult factors in diet in later life. We've made a contribution to the methodology on assessing diet quality in early old age. And we've shown this unique finding of long-term influence of prospectively measured childhood vegetable consumption on healthy eating in later life.

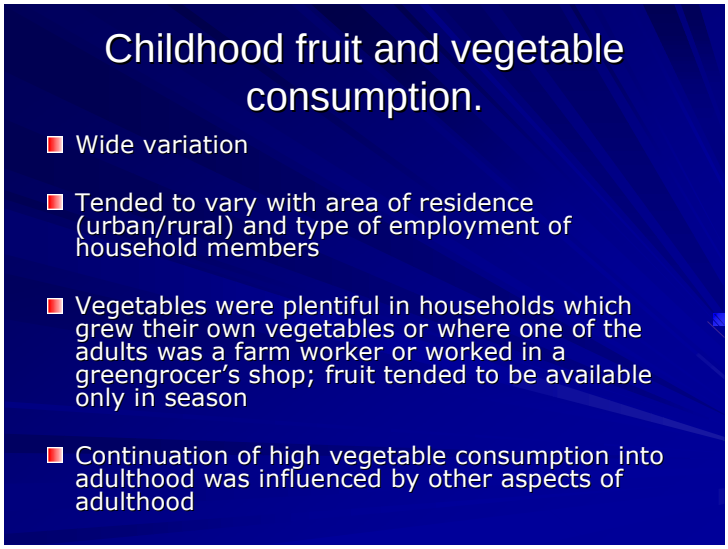


We feel that our findings suggest that the promotion of healthy diet choices from a young age is important. But given that we found such poor diets across the board at this age that nutritional support in later life is also necessary.

Professor David Blane:

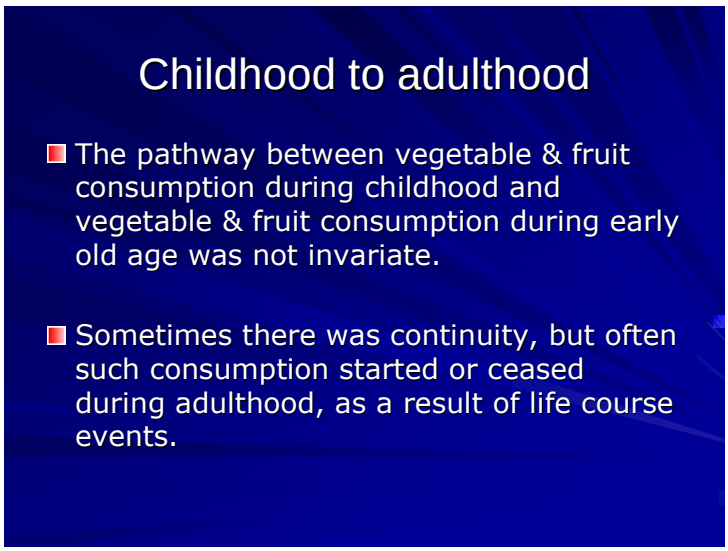


The interviews were the work of Lucy Abraham. What we were able to do was – because from Maria's food frequency questionnaire we knew the distribution of the Healthy Diet Scores (HDS) within our population - we were able to sample people selectively for interview from the the upper and lower thirds of the distribution of HDS scores. But being good methodologists we didn't tell Lucy which third people were coming from. So she interviewed people blind. And this was very interesting: as you'll see in a bit, there was no relationship between people's assessment of their diet and their objective Healthy Diet Score. And so it wasn't just that we interviewed a sample drawn from the two extremes of the distribution, we also were able to match them on socio- demographic characteristics: age, gender, social class and so forth. And Lucy did 31 interviews with people in this age group, and as I say the interviews were blind and in-depth.



When she got people to talk about their fruit and vegetable consumption during childhood there was a wide variety. By and large people in cities said that they hardly ever had vegetables. For everybody fruit was a very seasonal thing. But vegetables was more a rural, a characteristic of rural diets. People in the urban areas who ate much in the way of vegetables seemed to either have had a member of their family who had an allotment and grew their own, or worked in a greengrocer's shop. I don't

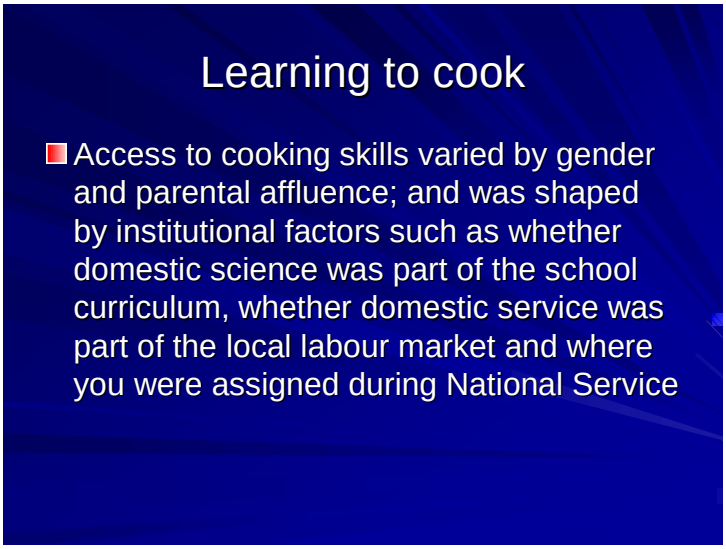
know if you've ever heard of this but it turns out there was an early version of a healthy nutrition shop formation called the *Wet and Dry*. Where the *Wet* was the fish shop and the fish shop was attached to the *Dry* which was the greengrocer's. And people who worked in a Wet and Dry had a very healthy diet because they took part of their wages in fish and part in fruit and vegetables. In terms of takeaway eaten foods there was almost none apart from people in urban areas described the phenomenon that often in a street there would be usually a widow who had a stove who at the weekend would cook a large roast and a great pot of vegetables, and houses in the street who had a bit of spare money that week would send a child down to the lady to get a big plate, dish full of roast meat and vegetables. And that, apart from fish & chips, was the only takeaway food that anybody was able to describe in pre-War Britain.



Some of you may have heard of a French sociologist called Pierre Bourdieu, who described how the two characteristics of childhood which tend to last longest into adulthood are food and music. And often in Boyd Orr children's vegetable habits and vegetable consumption lasted well into adult-hood. But this relation-ship was not invariate. Sometimes people who had a lot of vegetables in their childhood stopped as an adult. Other times people who didn't have much started to eat a lot. But there was a tendency for continuity. But there was a lot of room for variation and change in dietary patterns. And those are the things I want to look at next over the life course.

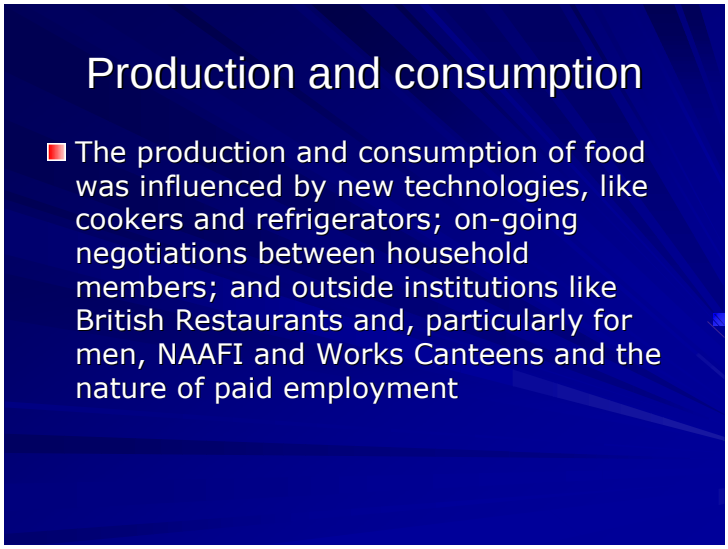
The first thing was learning to cook. One of the things that surprised us was the extent to which nobody knew how to cook when they married. Or just occasionally, in an affluent family, mothers would have taught their daughters how to cook. But in most working class families food was too scarce for mothers to risk ruining the family's food for that day.

And so women described invariably the nightmare first months of marriage as their husband's scarce wages were spent on food that they had no idea how to cook. If their mother lived in the next street it wasn't too bad. But for people whose parents lived a long way away the first months of married life were a nightmare as husbands threw inedible food at their wives.



Another big issue was whether cooking, domestic science, was part of the school curriculum. Where they were, working class girls learned to cook; but where they weren't, they were at the mercy of something much more improvised. Very few men in this generation learned to cook at all. The one exception was people who had been in the catering corps when they did their military service. Apparently when you went into military service you did a boot camp and then you got assigned to particular specialisms. If you'd been a butcher, even if you had only worked in a butcher's shop for a week or two, they put you in the catering corps and you learned how to cook. Even people who had not been butchers, if they ended up in the catering corps, they learned how to cook.

The second part of the life course influences which influenced how people's diet evolved over time was production and consumption. This was influenced by the new technologies that came along for cooking. A lot of people of this generation remember their mothers cooking on an open range, a grate, with very primitive cooking implements, very



few. Nowhere to store food. No refrigerators. So everything was either fresh or going rotten. And the evolution of the technology to produce food that this generation went through is really quite profound.

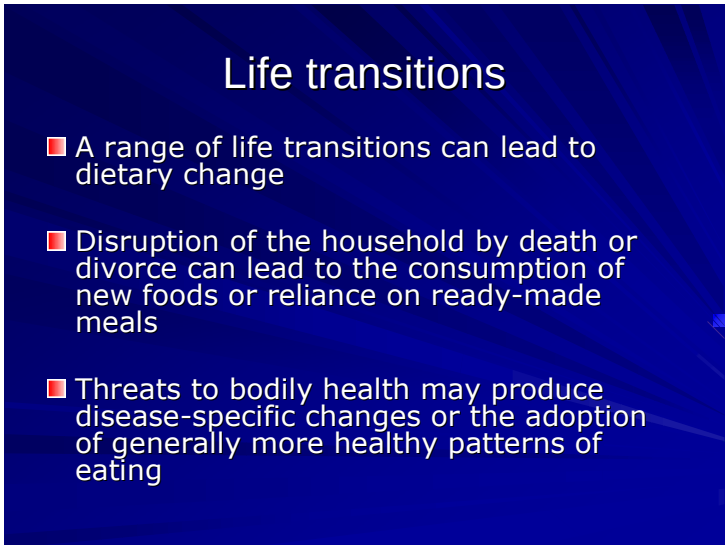
Also influencing people's dietary practices was institutional experiences. In the Second World War after Dunkirk, when total war was declared, a lot of domestic labour was socialised. And along with laundries were the British Restaurants where people could go and get cooked meals. So that had an influence on people; and the years of food rationing also. After the war, people's food tastes continued to be influenced by their experience of NAAFI food during military service; as well as works canteens. The underlying idea, certainly in the NAAFI canteens, was food as fuel - something you put in your body to give you energy to do things. Along the way, as far as I can make out, there was little consideration of the relationship between food and health (nutritional in-put to the wartime food ration was the main exception).

Also the nature of paid employment was influential, for example jobs involving shift working or night working without works canteens so that people relied on sandwiches or a quickly cooked meal when they got home in the middle of the night.

Another thing which influenced the evolution of people's dietary preferences was the presentation of self. In two senses: morally and physically. Morally because by the Seventies and Eighties people were becoming more conscious of nutrition; and eating fruit and vegetables became a moral category - a way of showing that you were a slightly superior person. People would talk about how their friends started to let themselves down when their spouses died because they were no longer eating fresh food. Physically because as people became more aware of body shape and fashion, more and more people started to go to keep fitness classes, slimming clubs, this sort of thing. This is a mass industry.

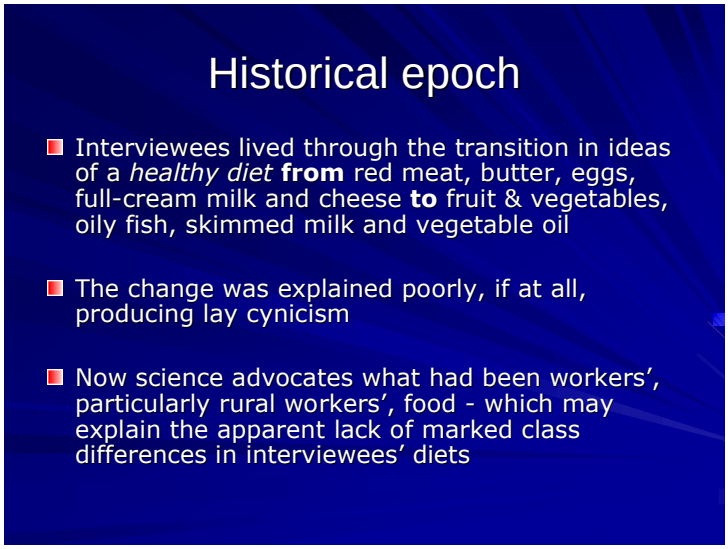
One of the things that slimming clubs do is give people a lot of dietary advice. And I don't think anybody monitors the quality of dietary advice given by slimming clubs but, from what we picked up from interviewees who were receiving such advice, it was pretty awful. For example: some people were going to slimming clubs where on one day they could only eat protein and

then on the next day they could only eat carbohydrates and so on. Insane advice.



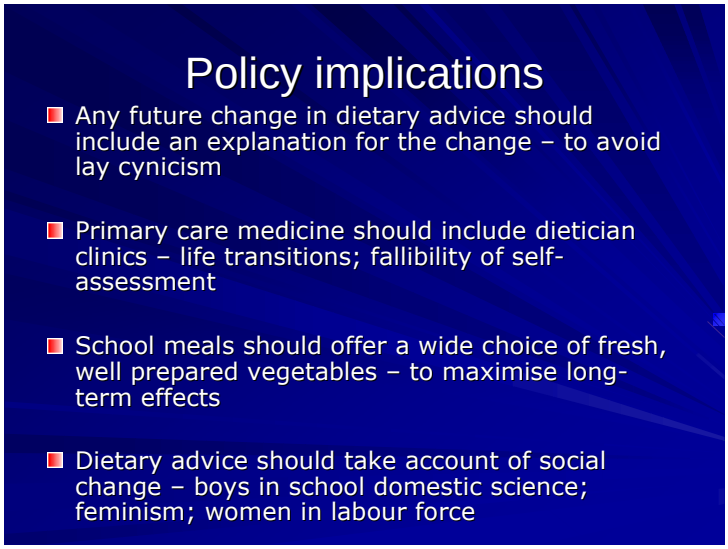
Other influences on people's nutrition were life changes and transitions. One of these was the disruption of households that came with the death of a spouse or a divorce. If the wife died the husband often was left helpless: eating tinned foods, with fresh food only when someone invited them for a meal. If the husband died often it was a liberation for the wife because she had prepared only foods that the husband preferred. Lucy got used to women saying: *Oh, well, you know, my husband liked traditional meat and two veg but I like to try different types of food and salads and the sort of thing he wouldn't eat. But now, God rest his soul, he's dead, I can eat what I like*.

Another big life change was the onset of chronic disease. Sometimes as with diabetes dietary change is required; other times as with osteoarthritis of the hip or knee joints weight loss minimises pain. Often these were times when people's diets changed.



I think it's important, when you are thinking about dietary advice and policy interventions, to be sensitive to the characteristics of each generation's life trajectory and the historical epochs through which they passed. What is characteristic of the Boyd Orr generation is they lived through a transition in what counted as a healthy diet. When they were children what counted as a healthy diet was full cream milk, butter, cheese, red meat; and what we now think of as a healthy diet was essentially

rural workers' food, of low social status and prestige. When you talk with people about war-time food rationing, hardly anyone missed what would now be considered as healthy foods. What people missed was red meat, butter, full cream milk and so forth.



And importantly for the way this generation reacted to the changes in dietary advice, nobody explained the reason for the change. All people knew is that one minute the experts were telling them to eat one thing and then a few years later they were telling them to eat something else. So what Lucy found was widespread cynicism about dietary advice: *They tell you one thing, then they tell you another …It changes from day to day ..Why should I …* And a lot of people would say: *Well, you know, I've got to seventy, my diet can't be that bad*.

Such cynicism may explain why there was no relationship between how people assessed the quality of their diet and their Healthy Diet Score.

So some of the things that seemed relevant to us. First, if dietary advice does change, make sure to explain why, not just give the punch line. Second, that one effective way to intervene in diet is to recognise that life changes can provide an opportunity. An obvious way to do this is through primary care. The onset of chronic disease, death of a spouse, psychological problems associated with divorce and so forth, often bring people to their general practitioner, increasing the chance that appropriately timed advice, perhaps via a primary care nutritionist, will be effective. Third, remember the importance of the institutional things: The quality of school meals. Whether domestic science is part of the school curriculum. Who monitors the quality of the food provided in works canteens. Who monitors the quality of advice given by slimming clubs. And so forth.

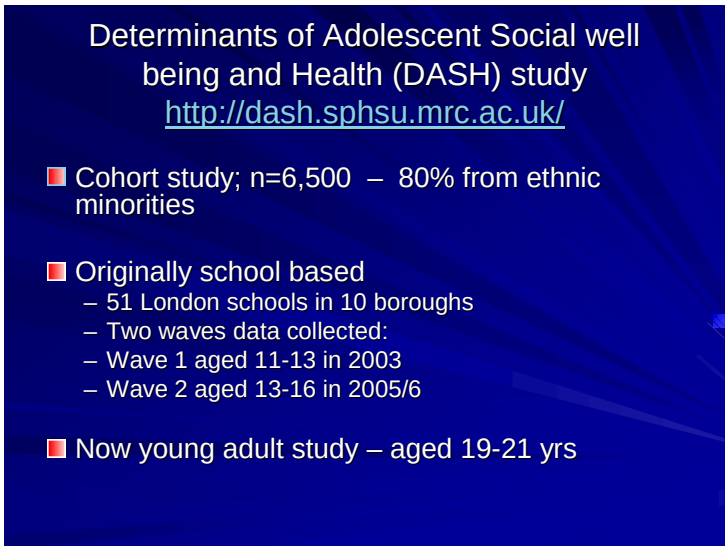
In terms of future change, the great challenge is how to make the provision of fresh food compatible with the increasing feminisation of the workforce. The growing proportion of all women who are in fulltime paid employment leaves a big hole in conventional social arrangements for preparing healthy food.

Dr Maria Maynard:

I'll keep this last section brief. I just want to say a little bit about what we're thinking about for the future. And in order to look at diet and the life course actually there aren't that many opportunities to do so, there aren't that many studies. And there certainly is a scarcity of studies which take account of cultural and ethnic group diversity. So I just want to tell you about a couple of ways that we're going to try and address this gap:

Recently I was very fortunate to attend a workshop in Beijing as part of the New Dynamics of Ageing programme which is a cross research council programme and the idea is that it affords Chinese and UK collaborations. Lots of great discussion. I found it fascinating to find out about the enormous social and economic change which is impacting on diet and other areas of life in China. And so we're going to perhaps work towards applying the sort of diet quality measures that we've done on Boyd Orr to Chinese cohorts. And David in his centre already has links with a large cohort study there. So that's one idea that we have.

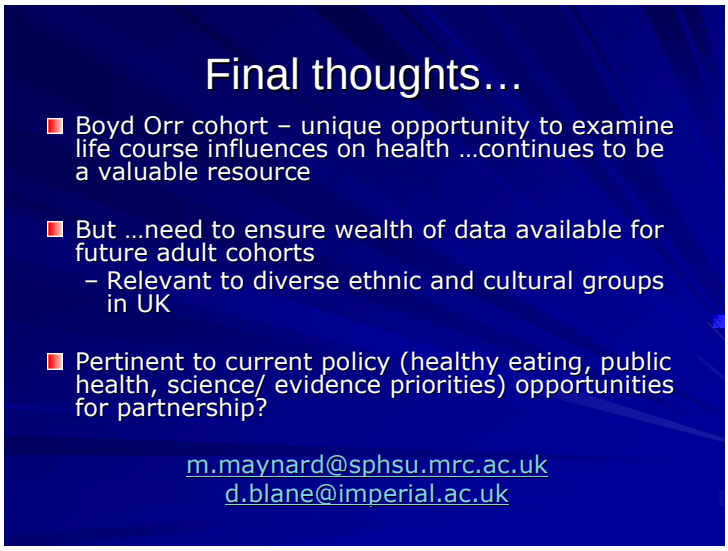
There was a UK and a Chinese contingent at this workshop but just talking amongst the UK participants we realised we're not seizing the opportunity to work together in a way that we should, we're all doing our different things. So we've come up with the idea with Janet Cade of following up the UK women's cohort study. So that's a huge 30,000 or so participants in that who were recruited in the early Nineties. and we want to follow them up and their adult daughters. But we also want to include an ethnic minority boost to the sample. We won't have early life data on the members of this but at least we will increase the diversity of the cohort. And there's been a call for proposals on this score which came out last week.



The other thing I want to mention briefly is our DASH study. And when it started it was Determinants of Adolescent Social Well-Being and Health Study. This is our website. And that's a cohort of about 6,500 young people - 80% of them are from ethnic minorities. And so we've been using this cohort to look at a variety of health outcomes. It was originally a school based study. 51 schools took part across London. And we collected two waves of data, first when they were 11-13 and a couple of years later. But now time has moved on and they're now 19-21 and we want to use this opportunity to explore diet and nutrition further. What do we know about this crowd so far? We've got objective measures of their body size and body composition. And as with other studies we've seen a greater vulnerability to overweight and obesity in some of the ethnic groups, particularly in Black Caribbean and Black African girls.

We've got some limited information about their diets and these groups are in fact also likely to skip breakfast and consume more sugary drinks and less fruit and vegetables. In the frenzy of the 51 school study we couldn't really do an in-depth study of diet but we want to attempt to do that in our next follow-up. They're in early adulthood now as I said and we want to measure their diet. In addition to that and why we want to talk to organisations such as yourselves is that we really need to do more developmental work, particularly on portion size by different ethnic groups. And the database that we use to analyse food and nutrients to make sure that they encompass the kind of food that minority ethnic groups consume. I know you're involved in some of this work. And just as an aside we're also moving

into intervention work. We've just finished an exploratory phase of an obesity prevention research, a study involving minority ethnic groups.



So just bringing this whole thing together: The Boyd Orr Cohort is a unique opportunity to examine life course influences on health and it continues to be an invaluable resource. But we need to ensure that there's a wealth of data available for future adult cohorts and it needs to be relevant to the diverse ethnic and cultural groups that we have in the UK. We do feel our work is pertinent to current policy and indeed we hope to your strategies for healthy eating and wider public health in your science and evidence priorities. And we're hoping that we'll be able to raise some opportunities for partnership with policy workers. So if you agree do please get in touch and let's have more conversations. Thank you very much.

[Questions invited]