



Professor Mike Lean – Minds and Bodies on the Move

Thank you very much to the organisers, Marilyn and this amazing team here for inviting us and putting this excellent meeting together.

Why is the World Cancer Research Fund interested in obesity? Well you've already heard some of the facts and the figures here and there is data, which show that the relative risk of death from cancer goes up with Body Mass Index (BMI). It's already beginning to go up within what is considered to be our normal backdrop, not in the obese range, if you take BMI 30 as the start of obesity. And you can then pin it down on which cancers are particularly related to obesity and this of course most of you are very familiar with. If you look at all cancers, the numbers are pretty small, men 3.4% of cancer can be attributed to overweight and obesity now there are big arguments about how attributable risk is calculated and these numbers could be modified, they are relatively small, but, the cancers – individual cancers which are clearly effected by obesity, overweight and obesity, breast, colon, endometrium, prostate, kidney, gall bladder, are very nasty cancers. So although the total number may be relatively small these figures are colossal, and these are very bad cancers to have, I speak as a doctor here, and I'm sure I don't need to tell you that.

Okay, how does it work? Well, again you heard a little bit about this earlier on, there are hormonal factors, which are altered when you gain weight, not when you become obese, but as people gain weight there are modifications of insulin, IGF, and the sex hormones androgen and oestrogen. They don't necessarily change DNA and make it abnormal but they modify the expression of the DNA. There is also the contribution from oxidative stress, free radicals are generated more in people who are becoming overweight, particularly if they are people who have a tendency to metabolic syndrome when they have more of their weight going onto their abdomens, they have more free radicals which are doing damage to DNA and to proteins. Contributing to this also is as people become overweight they are eating more calories, there is no obese person who is eating less calories, there is no obese person with a low metabolic rate, no they're eating more calories and to get them they actually crowd out the fruit and vegetables, so in relative terms their intake of antioxidants may actually fall, the balance is lost. There are inflammatory mediators generated in adipose tissue itself which are doing damage to DNA through inflammation around the whole body, and there are also a stack of unknown factors.

Today I'm going to talk a little bit about obesity in the UK, what causes it, what works and what doesn't. Will also tell you about Britain On The Move, a corruption or an adaptation of America On The Move and how that might fit in and do something useful.

I'm sure you've all learned about BMI, it's in all the WCRF literature. BMI is an awkward sort of thing. The cut off of obesity is conventionally a BMI of 30, but a BMI of 25 is a serious medical condition, it's considered an epidemic, it's part of our normal backdrop. Does it matter? Well it matters for a million reasons. The list, I could give you a lecture on each one of these, is colossal. The ones which I come through particularly are the metabolic factors leading to heart disease and stroke, but there are also hiding down here the cancers and this list is even a shorter one than, than we mentioned earlier. But there are, just pointing this out, a million other things which happen when people gain weight and become obese.

So if you focus on reducing obesity to cut down heart disease or to cut down cancer that is important part of the story, but you are doing a lot of other good as well. Including



psychological good, you probably noticed highlighted on the right there. Waist dimensions have been a focus of some of our research in recent years and actually is now taking over from BMI as not just as an alternative but a better a way of identifying people at risk of medical problems and we now use the waist circumference, which is the same for most purposes as the waist circumference on your trousers, and we've published a paper recently showing that, the risks of type two diabetes, cardiovascular risk, shortness of breath, poor physical functioning, chronic back pain etc. These are big costly problems, all of them increase as the waist goes up. Action level one means wake up and don't get any fatter. For men it's 37 inches, for women 32 inches, and action level two which means you've got a serious problem you need professional help, 40 inches for men, 35 inches for women. And these are sort of single numbers that people can remember, and these are simple ways of identifying people at major risk of a lot of problems, not specifically cancer, but it's just to highlight the fact that obesity is not affecting only one branch of medicine.

We now have the figure of 22% in the year 2002 with a BMI over 30. Scotland has actually made it up to very close to 25%, we're running a wee bit ahead of you now, and that projection we've just about reached ahead of target, and that target was set, was projected, two or three years ago for the UK. We now have close on two million people with type two diabetes diagnosed and probably another million undiagnosed who are running massive risks of vascular disease and we'll probably get up to three million by the year 2010. At the moment about 6% of all our health service budget is going on complications of diabetes alone, and the figure for obesity varies according to your calculations, but diabetes is a big part of it but it's quite a lot more than that.

Figures from the Health Survey of England in 2002 show men and women level pegging. Amongst the most obese there are more women, but amongst the overweight there are more men. So if you take a cut off of BMI of 25 there are more men, and if you take a cut off of 35, say, then there will be more women, so it's skewed towards must greater obesity amongst women in terms of level of BMI. In terms of the consequences though they are more evenly distributed and probably men have a bigger proportion of hazards because men are running greater risks of chronic disease anyway.

Some costs, roughly two billion a year cost of obesity on the total economy. We're getting fatter and one of the scary things is that there are countries which are not getting fatter at all, where obesity or BMI in the population is lying pretty well constant. And it's interesting France is right down there, Japan, these are countries where obesity is not romping ahead, and people can write expensive books on why the French aren't doing it, which I dispute but I'll come back to that another day. Up at the top you've got, and this is important, Samoa, Kuwait, United Kingdom, New Zealand. These are countries where obesity is increasing by more than half a per cent every year, and in some cases over 1% a year. And Samoa has already got 70%, we're on 22. Countries which are fattest are still getting fatter fastest, which means the epidemic isn't going to turn down. Samoa, Kuwait, these are countries that do not grow their own food, all their food is imported and where it's too hot or uncomfortable to take any exercise – the pattern is pretty obvious. Malta has rotten levels of fruit and vegetable consumption 'cause they don't grow any and they can't be bothered to import it, and they have colossal levels of obesity and diabetes as a consequence, they are running about 30-something per cent now, which is scary. A figure of 15% is the number at which WHO says we've got a nutritional epidemic and we need intervention at a population level, political intervention because trying to treat every individual person with obesity isn't going to solve



the problem, we need to get behind the scenes and do prevention. We exceeded that about 10 years ago now.

Cutting through a vast amount of research, the causes of obesity are mainly environmental, about 20% of the variance between individuals can be put down to genetic factors, there are very clear genetic factors. Obesity is recognised in families, there are twin studies, we have good figures on the genetic components on obesity. Everybody has a genetic predisposition to some weight gain in adulthood. Almost everybody. Virtually all of us are gaining some fat during our adult life, but some people a lot more. And it's the variation here, 20% is down to the genes, this is actually the genes of a condition called Prada-Willy Syndrome where it's exaggerated very early in life. But most of it happens, most of the variance is down to changes in our environment. It boils down to two factors: a high fat diet, and inactivity.

We have been corrupted in our thinking about obesity and we've had a problem with this paper, and I think Susan and Andrew will be quite happy for me to attack them because I've done it so many times that we know where we stand on this. What they did in this paper was to plot the rise of obesity, percentage in obesity between 1950 and 1990. They looked at indices of inactivity and lo and behold ownership of motor cars, television watching, all seem to mirror the increase of obesity, so they say that must be an important factor using just correlation analysis. Then they looked at food intake, mainly from the National Food Survey, which showed no correlation at all, in fact as people get fatter they start eating less, a miraculous thing, and this was of course picked up by large chunks of the food industry to say, oh obesity is nothing to do with eating. And there are many other studies, this is not a unique study. Harry Keen's Whitehall study published the most amazing phenomenon low – high throughput. He had the same phenomenon where you ask people what they eat and as they get fatter they say they eat less and less and less until they're almost eating nothing at all. And the problem here is, of course, a very familiar one. It's explained by under-reporting by the increasing numbers of obese people. So as people become more obese of course they say they eat less. They do that in whatever country of the world you care to survey them. So we've been a bit misled in some of our thinking about the causes of obesity.

If you look behind the scenes at what food is being produced and consumed, and this is Adam Drenowski's work which allowed for plate waste and what you feed to the dog and such like. It showed that whatever food group you look at, people are eating more of it between 1970 and 2000 as people are getting fatter. They say they're eating less but lo and behold more food is disappearing into their glove compartments and places and you can look at individual components of this in a lot of detail. And this, you know, doesn't come as a huge surprise. I mean the number of fast food outlets in Britain has increased substantially over the last 20 or 30 years, it's not because they're selling less food, I don't think.

And to pick up on some of the discussion earlier about socio-economic distinctions, I'm being very cynical here. A study from Kate Burns and colleagues in Australia, shows areas with the best social conditions have 7 fast food outlets per 100,000 of population; in the areas of most deprivation there are 17. So there is something we need to pick up on here, that the outlets of sort of high fat, fast food type things the industry has found that they can sell more of it to more deprived communities. Perhaps I won't dwell on Pepsi at that moment. Well, I could do. That was the link... Do you want me to dwell on Pepsi a minute? Okay we'll go back there. I'm probably going to be shot I should think if I'm not very careful. But all I'm doing is quoting what... this has been published elsewhere, that it was not mysterious that the vendors of sugary drinks thought that selling salty foods was a good idea. I'll leave it at that.



We have lots and lots of words in English for obesity, and each of you can make a list and they probably wouldn't cross over very much. Boyd Swinburn and Gary Egger said why don't we just deal with this like any other epidemic? What's so mysterious about obesity? We've got a host, that's you, you are susceptible, you are people who if you lie outside without a net on your head you will get bitten by a vector, which is a mosquito, because it lives in a swamp down the road, and you'll get malaria. So that's an epidemic of malaria. Well we've got a host here, you're all susceptible to weight gain, most of you are either controlling that by conscious efforts or giving in and becoming overweight. You are susceptible hosts, and nearly all human beings will do that, and your biology is driving you towards it because you like sitting around and you like eating. We all do.

We have vectors, ah here's a vector, this is a vector, it's not a mosquito okay? These are 'big ones'. This is something called Snickers, this is called Duo Big One, Big One not Big Two, this is not for sharing, and this one is a Twix extra king size. It doesn't say it's for sharing. They've got as many calories in them as a pretty decent meal for most people. And certainly for a child each of these is about a quarter of their daily calorie requirement. So you've got vectors out there, and you've also got other vectors. Nanette Mutrie showed you the escalatory data. Well, I think we ought to have little cards that we have to pay to use the escalators. Wouldn't that make sense? That would be environmentally sensitive as well, we could chip in our little bit, and that would make us think and then we'd use the stairs a bit more often. If you were disabled of course you can get a concessionary one! But we've got these motor cars and escalators and these kind of things. And then we have an environment, and the environment is the swamp, if you like, is our educational environment, it's our fiscal environment, it's our cultural environment, it's something which we've generated, we've contributed to generating, but most importantly what is making it our environment, the physical environment, the food environment, and physical activity environment are now dominated by and controlled by what industry is putting there. So if we're going to get behind the scenes we have got to do something about that. And we need to deal with the hosts, whether it's telling you to put a net on your head or to give this a by-pass, that's where education information transfer works, it's also where we hope that social marketing might work and behavioural change will affect. To change vectors of the disease you need technology. We've got technology, we're not doing that at the moment 'cause industry is still thinking it's a good idea to make them bigger and brighter. And then to affect the environment you need policy change, you've got to effect social change through policy change. So the politicians have to be in there to deal with any epidemic. This is not just obesity, it's not just malaria, it's any epidemic, you've got to drain the swamps.

Uncomfortable truths. We know that obesity is more frequent in the least educated people. Data from America shows that people who are the most uneducated or the most deprived are getting fatter as the years go by, the percent who are obese has increased – or the average BMI has increased. However the rate of increase is exactly the same in people who have been to college. The environment is affecting all of us more or less equally. So, okay, there's lots of social deprivation and things which is creating the difference at any time point, but our environment changes, and it's changing to affect all of us in more or less the same rate on average.

So, what is the evidence? There are two aims, one is to lose weight, one is maintain weight or prevent weight gain. To lose weight you need big changes. It's hard work, some of you have done it, it's hard work. It's hard work to lose a significant amount of weight. What is a



significant amount? Do you mean a stone, two stones? It's hard work, and you have to do it by diet. There are very rare individuals who can go mad with physical activity and apparently eat the same as they were doing before, most of them automatically start to eat more in order to do the activity. The keystone to losing weight is big changes in what you eat. Put the two together the effect of physical on your weight is not very great, the effect of physical activity on lots of other things, wellbeing and possibly sustainability, is very important, so I'm not knocking physical activity.

For maintenance or prevention of weight gain, you only need small changes, and this is one of the keys to thinking we are in a much better position, in potential terms, to deal with prevention than treatment. You can do it by diet or by physical activity but if you put the two together, and there's quite a lot of evidence to this effect, you get a better affect. One nice piece of systematic review of this was done by Alison Avenell fairly recently and showed that if you add in exercise you get a better affect, and that's seen generally across all the studies, the well controlled studies that have been done in this field. So for weight loss the two together do help, but this is 12 months data, 12 months, 24 months, 36 months, 60 months. So most of what we're looking at here is not weight loss it's the maintenance up to the end point of the studies, and that's where this combination of exercise and diet really has great benefits.

We've learned a little thing or two in recent years about small changes and this is probably the most important study, it's affected my thinking in the last ten years, and it's the diabetes prevention programme in the United States. There was also the diabetes prevention study in Finland which produced almost identical results, uncannily identical results. And what they did in this study was to introduce drug treatment, which is metformin, which is a drug, used to treat diabetes, and the question is does it prevent diabetes? It actually produced a little weight loss of about two kilograms, it causes some malabsorption, not enough to be a clinical problem usually. They had a diet and exercise programme which lost about seven kilograms in weight, about a stone, on average, and then there was some weight re-gain over a four year period. It was a low fat diet with physical activity. This sort of result is what most dieticians during my career have said, well we can't cure obesity so why are we wasting time doing this sort of thing with our patients? Very few dieticians have actually carried out audits of their work but that is the sort of thing we get in the control arm of drug trials, for example, that's what our control with diet and exercise usually can do. That's quite a result, seven kilograms on average, re-gaining. If you'd done nothing, that's what would happen, because we know from many studies that people who have got a weight problem, who are obese, will continue to gain weight. These people are usually of an average age of about 40 or 50. They will continue to gain weight at about one or two kilograms a year if you do nothing about it. So one interesting thing is that this re-gain in weight after the first loss year is against the backdrop of a population which is gaining weight anyway at that age. So a good result. But many people are saying, you know, at the end of the day you're only three, four kilograms less is it worth all that effort? And it's a lot of effort. And the remarkable thing was, yes it was. The metformin produced a bit of a reduction in the amount of diabetes, about 30% less. But that diet and exercise programme, 30 minutes, five times a week, 30% energy from fat, cuts down diabetes by more than half. Diabetes is a very nasty disease, you don't want it, if you can reduce it by more than half you've done something pretty miraculous. And that has been in the grasp of most dieticians for quite a lot of their patients, so we have to kind of totally rethink what we thought was not a good result, what we might even have called a failure, and say hang on, but put it across the population and this is a really very, very good result.



So, we try and do it, and one of things that I've been involved with in the last 5 years, is the Counterweight Programme. We wrote the SIGN guideline which said, obesity has to be managed in the community, we can't deal with this sort of clinical problem in hospital, we don't have special tools, it needs to be done in primary care. So we said let's do it. Well where is the model? Where is the evidence base? There isn't one. There wasn't one. There was none at all. So nobody would buy into this. And so we have created one. And what we did in the course of the Counterweight Programme was a lot of baseline audit work. We then, with the help of, I can't remember how many practices, they're on here somewhere, about 70 primary care practices, we collected up 1,200 people and put them through a programme which is evidence founded, in other words every component of the programme was as best evidence based as we could match, so we thought this is the best bet, the whole programme was not evidence based but let's see how it goes. We don't want a control group, 'cause nobody wants to sit for two years with no treatment with this disease, so we will try and do something imaginative by running a programme, auditing it, bringing back what we've discovered to improve the programme and go into something which is called Continuous Improvement Methodology; which is apparently quite new in medicine, but well known in the motor industry! And what we got was, lo and behold, that about a third of our patients could lose 5% of their body weight. If they attended 3 times or, more 40%. And there was a very clear advantage in people who could attend more. About 70% avoided weight gain.

Applied across the population, this is liable to prevent an awful lot of diabetes which is otherwise going to corrupt our economy. And this was set up as an example of Continuous Improvement Methodology. We don't have an evidence base, okay so the traditional thing is we set up randomised control trials against competing programmes at enormous cost. And this is the example of how we won the war. There was no evidence base, we established a best bet programme with components which were founded in evidence, we put in central data collection, a closed lid audit and then we ran it within the service provision without additional resources to improve the programme.

There is no model for preventing obesity and the best known study is the Minnesota Heart Health Program, where a vast amount of expenses were spent achieving ultimately nothing. However much you present it and argue it really they got nowhere. So something new is required. One of the issues here is that we already have healthy eating strategies and physical activity strategies. We may aim to get a sustainable change of 10% in both... 20% uptake in fruit and vegetables is a fantastic result. I think you did very well, if you could do that at population level fantastic. I think any healthy eating strategy that gets 10% to be able to make the desired changes will be doing well.

The problem is to prevent obesity and weight gain you've got to do both. So if you have these wonderful programmes and 10% do this and 10% do that, then those who are doing both is 10% of 10% which is 1%. Which is why, one reason why, possibly our healthy eating programmes and our physical activity programmes independently are not dealing with obesity, we are still getting fatter. And the aim of the On The Move programme, America On The Move, was to put that together, aim to get the 20% sustainable change in the people who are susceptible, which is most of you who are going to take it up, and thereby increasing what might be 1% to what might be 20%. And the focus is on actually naming obesity, naming the demon that is here and attacking it. On average Americans are gaining about a kilogram a year, for those becoming obese it's about two kilograms a year, you can calculate that that means they're eating about 50 or 60 calories a day extra. It's about an eighth of one of these, or perhaps it's a tenth of one of these big chocolate bars. And the calculation,



because there's a variance about this, that weight gain in 90% of Americans could be prevented by modifying energy bars by only 100 calories a day. Now that I know is only calories and behavioural change isn't as easy as that, but that is what you need to achieve, however you do your behavioural change, that's what you're trying to achieve to knock out obesity.

And there's no doubt that if people could do this, if we can make them increase physical activity to that level, which is walking two thousand steps a day burns you up 100 calories, or cutting out 100 calories, if you're going to eat one of these things then chop off the last – that's it. But you need to address both sides of the energy balance equation, and that's where the problem has lain.

The aim of this programme was to stop weight gain, the behavioural goal for individuals to make just two small changes, increase activity by two thousand steps. There's a lot of mythology here. It has to be sustainable and Nanette Mutrie is quite right about that, she showed the slide which I think is going to be picked up in the NICE report on physical activity which suggested that this is not sustainable. Her starting point on that slide, isn't that still here? No. The starting point was ten thousand steps a day. These were very unusual people who don't need to walk anymore and for whom increasing physical activity is unlikely to be sustainable. Most of us Brits are walking somewhere round about six thousand steps a day and amongst the people who I see as obese patients, who say I'm never off my feet the average is around about three or four thousand steps a day. So we're way off, and increasing by two thousand, that only takes me, you know, 15 minutes but is actually quite hard work so you may need to do even that in small steps. But to choose one way of doing this each day. And I've added this. To make this whole exercise sustainable, the only way we're going to shift that environment and to change the vectors of obesity is by engaging with industry, to make industry feel responsible, to feel that they have a part to play. Difficult one. I think there's a way of doing it but we are nowhere near it yet. Does it work? Well Nanette's shown you, you can make people walk more, you can do it in workplaces or in churches. Yes, of course you can. Does it help people prevent weight gain? Well, this is a Families on the Move programme and yes it does. The full paper is going to be published next month. You can look at it in terms of how much weight they gain, and they still gain weight. These are 11-year-old girls who are gaining weight anyway, they gain less weight if they do these things. Their BMI doesn't increase, their percentile, BMI percentile, actually they come down through the percentiles of BMI and that's the best way of showing the effect of this type of programme in children. Their mothers actually lost weight, they weren't asked to but by doing this a lot of them are quite sort of tubby, they actually lost weight. This programme seemed to work better for the girls than for the boys, and the fathers were off the map as far one can tell. The final results haven't been – are coming out next month.

But these results were very much in keeping with what see in people who have lost weight. People have got a weight problem who've lost weight and have managed to battle it and keep their weight down. And there's a thing in the States called the National Weight Control Registry, which again is based in Denver, and these are people who have voluntarily put themselves through some weight loss programme and then said right I'm going to hold it there. Some of them do, some of them don't. The ones who are able to keep to their weight stable were the ones who were taking more physical activity, and they were walking two thousand steps a day more than the ones whose weights were going were up. They were at the top end, so they were nearly at or above ten thousand steps a day. So this was quite an active... they had to be quite active to do it. They were also people who ate less high fat



foods. They all had low fat diets. The ones who were on the Atkins diet, interestingly, were the ones who gained weight. But these were the only two differences between people who managed to maintain their weight and avoid weight gain and this tallies very much with the really quite important study that Jan Westrator did and was published now ten years ago, where following people who were given low fat foods compared with people given ordinary foods in the supermarket avoided weight gain. They didn't lose weight but they stopped gaining weight.

And America On The Move you can look at the website and you look at it, and you'll see there's lots of things going on here. You can log on and get all sorts of information, like your own list of a hundred ways to cut a hundred calories, some of which I would argue with, and you can argue with, but at least there's a big list to choose from. It started in Colorado because it's the least obese state in America. Why? Because it's full of people with mountain bikes and they go up hills and that sort of thing. But it's spread all over the shop now. Well supported elsewhere. They've done imaginative things in schools. Changing menus in school meals so that the kids don't notice it but they get a hundred calories less. And the focus is always in cutting a hundred calories and that can be done in a lot of different ways. They've even done this in Texas, where the problem is greater than in many places.

We are in a good state in the United Kingdom because our government has said, our government's plural, have said that obesity is an important thing. The white paper last year was seminal in having put obesity right at the top of the priority list and declaring the wish to support a national partnership for obesity. There is currently no coherent obesity programme or agency responsible for pulling the whole thing together and I think this is one of the things I've learned in the States is that we actually need to name it, we need to put it up front, we have to have an agency responsible in this area. It wouldn't do major things, it would make small changes and the small changes will make big differences. And also there is currently no process to engage with industry. There's a great deal of scepticism about engagement with industry, but there are ways of doing this.

The aim for what I've been doing is to make way for a programme which we are provisionally calling, there are lots of things called Britain On The Move, it's not unique, it's not an owned name or anything, to combat obesity, set up a national partnership which will be a source of information evidence, which will have a lobbying role but also help individuals to make informed choice with all the things which our white paper has directed us towards, including personalisation and partnerships and supporting the NHS measures to deal with the obesogenic environment. And that has to engage with what the Food Standards Agency (FSA) is currently doing in signposting in relation to food but of course this is not just food, the obesogenic environment is our physical environment as well.

At the moment we have – well to do anything in obesity we need research, we need education, we need to treat, we need to prevent. With this notional partnership in the middle, we have a number of agencies which are out there, the Association for the Study of Obesity does oversee some research, the industry looks into this as well, the National Obesity Forum is a primary care based organisation for treatment now, complemented with what Counterweight is doing, and the government is now paid into this substantially in Scotland and Primary Care Trusts are paying into this in England. Education is actually not well supervised or attended in obesity. FSA has some role. The food and leisure industries themselves are actually doing a lot of the educating. Prevention there's been really no organisation, so this is where a Britain on the Move type of organisation might fit in, with the



aim of helping people move a little more, eat a little less and achieve energy balance. And that goes down an education route as well as perhaps looking at the claims and endorsements which are made for products and the things which, well they won't be found on these particular products, but on others which are aiming to help people against this battle to provide some sort of informed backdrop and an expert base to give some surety to the public that if they are following advice given by industry that is actually evidence based then it will actually help. Because at the moment a lot of the claims made on foods are either illegal or just incorrect and misleading.

To prevent obesity we have two strategies, one is to help individuals negotiate a currently obesogenic environment, the other is to change that environment to one that is less obesogenic. This is ultimately unsustainable, in my view. This is potentially sustainable and what I'm proposing is that we should do something which tackles both diet and physical activity. We need a dedicated agency, we have certain advantages, and what we might consider doing is something... we don't have an evidence base, there is no proven method. So when the Department of Health shambles around saying we haven't got a model to follow that's true, but what we can do now is perhaps do what we did with Counterweight for prevention using continuous improvement methodology. We don't have an evidence based model for best practice for primary prevention of obesity, what we can do, and there's plenty of evidence from which to base small change programme with components which are evidence based, put the programme together, to run it with central data collection, just like we've done for weight loss and then to improve that service by using audit data. And that way you don't have to run expensive clinical trials, you don't have to commit a whole generation of patients to no treatment or delayed treatment. Thank you.