

Active transport to school and the risk of obesity

Yvonne Kelly

January 2014

Abstract The relationships between markers of physical activity, including the ways children travel to school and the risk of unhealthy weight will be examined. To do this, data from the Millennium Cohort Study (MCS) when cohort members were aged 7 (and depending on data availability aged 11) are used. Obesity rates increase through the early childhood years, and social gradients become more apparent but the drivers of increased obesity rates are not well understood. The paper aims to explore the contribution of physical activity to the risk of obesity in early childhood. Initial analyses show that children from less well-off homes are more likely to walk or cycle to school but less likely to participate in out of school sports activities. The data also suggest that walking and/or cycling to school are linked to a lower risk of obesity.

Speaker Yvonne Kelly is Professor of Lifecourse Epidemiology at UCL and the Associate Director of ICLS. Her research interests include the causes and consequences of socioeconomic inequalities in childhood health and development.

Note: As this paper is based on research that has not yet been published (and therefore not peer reviewed) please do not cite or copy this paper without the author's permission.

ICLS OCCASIONAL PAPERS, SERIES 11

ACTIVE TRANSPORT AND HEALTH

ICLS hosted a policy seminar on Active Transportation and Health at UCL on 7 January 2014. The seminar was chaired by Richard Bartholomew, (former) Chief Research Officer, Children, Young People and Families Directorate, Department for Education and the presentations co-ordinated by Professor Amanda Sacker, ICLS Director. Transcripts from this event, including this paper, have been made available via the ICLS Occasional Paper Series. This series allows all (those who were or were not able to attend) to read an account of the presentation.

Policy Seminar Abstract

There are benefits from using our cars less - to our health and for the environment. Most people are aware that physical activity is good for you but they may be less familiar with advantages from using public transport. This seminar starts with three presentations on active transport at different stages in the lifespan. The first examines mode of travel to school and obesity and how their relationship is complicated by how well-off families are. The second presentation follows up on this theme by reporting on commuting mode, including public transport, and adiposity during the working years, while the third shows the effect that free bus passes can have on transport decisions and the health of older adults. The seminar rounds off with a presentation on the attitudes and willingness of people to change their travelling behaviour and get out of their cars. Together the four presentations give valuable insights to guide policy decisions.

Presentations and Speakers

OP 11.1 Active travel to school and the risk of obesity

Yvonne Kelly, Professor of Epidemiology and ICLS Associate Director

OP 11.2 Does active commuting predict healthy weight and body composition?

Ellen Flint, Research Fellow in Social Epidemiology at the LSHTM and former ICLS PhD student.

OP 11.3 Bus passes, active travel and health

Elizabeth Webb, ICLS Research Associate

OP 11.4 Attitudes to transport and willingness to change behavior

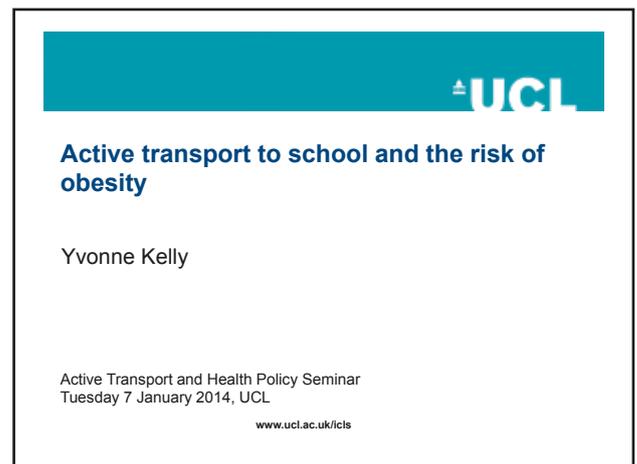
Eleanor Taylor, NatCen Social Research, Senior Researcher.

Active travel to school and the risk of obesity

Yvonne Kelly

SLIDE 1

Today I will show you some initial findings and this work will be completed when we receive the next set of data from the Millennium Cohort Study when, the children who we're looking at today, are aged eleven years. We're all waiting with bated breath; we're hoping to get our hands on those data in the next few weeks or so. So I'll be showing you initial findings. I should also say at the beginning that what I'm going to show you today I'm greatly indebted to the endeavours of my colleagues, Alice Goisis, who isn't here today, analysed these data and prepared the slides, and my other colleagues working on this project, Amanda Sacker and



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Active transport to school and the risk of obesity

Yvonne Kelly

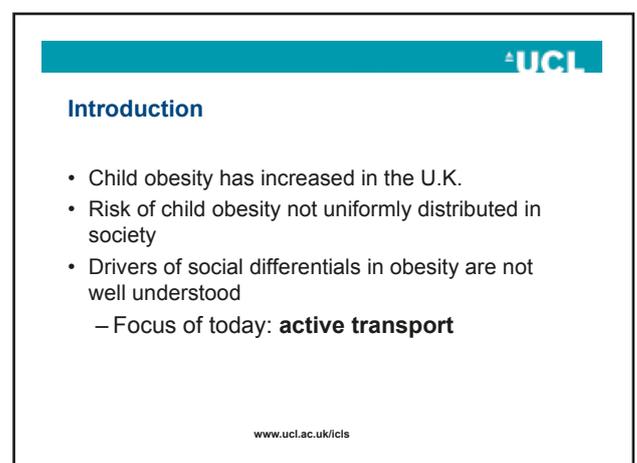
Active Transport and Health Policy Seminar
Tuesday 7 January 2014, UCL
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Elizabeth Webb are here today and Anne McMunn, their contribution to shaping this work has really been invaluable.

SLIDE 2

In thinking about the motivations for the work there are two main things: Firstly, we are all aware there's been dramatic increases in the prevalence of obesity in recent decades, both in the general population as well as amongst children. Most recent estimates are that over one fifth, around 22%, of children in the 2 to 10 year age bracket can be classified as overweight. Around 5 or 6% of children will be classified as obese in this particular age range. So obviously, we're all very aware of the risk factors, the health risk factors associated with obesity at all stages of the life course and indeed obesity and overweight in earlier parts of the life course track ahead and store up risk. A sort of ticking time bomb effect throughout life in terms of health risks associated with obesity.

The second motivation comes from the work we



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Introduction

- Child obesity has increased in the U.K.
- Risk of child obesity not uniformly distributed in society
- Drivers of social differentials in obesity are not well understood
 - Focus of today: **active transport**

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do on socioeconomic inequalities and health. Socioeconomic inequalities in overweight and obesity have been well documented. And there's quite a lot of evidence to show the emergence of socioeconomic inequalities in obesity and overweight during earlier parts of the life course and that's really some of the focus of this work.

SLIDE 2 ... continued

There is a lot of debate about interventions and which factors can be best intervened upon in order to reduce levels of obesity in populations, which elements of what we sometimes call the obesogenic environment are best targeted. And that in part depends on the aim of the intervention, I guess, whether we're trying to reduce obesity levels in the population overall or whether we're trying to reduce inequalities in rates of obesity, so to narrow the gap between

the worst off and the best off in society. Because the ways in which we intervene and the factors which we intervene upon might be quite different depending on what we're trying to do in terms of policy interventions. So that's a bit about the motivation. Of course a key part of this equation on the thinking about obesity is our physical activity, energy expenditure. And of course the focus of today's talks is on active transport.

SLIDE 3

In terms of the work done already looking at the links between active transport and active commuting in children in relation to the risk of obesity, there's really quite a mixed picture. There isn't any clear evidence that active commuting is linked to reductions in obesity in young children.

Also the literature is quite mixed when we look at the correlations as well between overall levels of physical activity and active commuting amongst children. However, a lot of this work has been done outside of the UK and we could clearly argue that work done in a different country context, different geographical context, might not be that helpful when we're thinking about interventions in the context of the UK. And a lot of the work has also been done on samples, highly selective samples of children. Samples which aren't thought to be generalisable in terms of how we extrapolate that information to the general population.

So we have chosen to look at data from the Millennium Cohort Study (MCS) to try and help fill this gap, make a contribution here. The MCS is of course a study of a large number of children born and living in the UK, and it's also generalisable so we can extrapolate findings from this research to the general population.



What is already known on this topic

- Few studies in the U.K.
- Evidence
 - Association between active transport and physical activity levels - **mixed**
 - Association between active transport and child obesity - **none**
- However..
 - Non representative samples
 - No investigation of social differences

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SLIDE 4

In terms of our research questions then they're very simple: I said that there was evidence that social gradients and social inequalities in obesity and overweight are emerging during childhood but we need to start by charting the size of that gradient. Also we don't know so much about the social distribution of physical activity and active transport, so that was our second research question. And thirdly we wanted to put those two things together to see whether physical activity or active transport was linked to a reduced risk of obesity and to see importantly whether that was uniformly distributed across different social groups. So there are three



Research questions

In 7-year-old children

- What is the magnitude of the social gradient in obesity?
- Are levels of physical activity socially patterned?
 - Does active transport matter for obesity across different social groups?

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research questions and the results that follow are from the age 7 sweep of the MCS.

SLIDE 5

We're looking at obesity. We've also, based on BMI points, looked at overweight, we've looked at per cent body fat, and waist circumference as other markers of adiposity. I'm not going to present those data today but I can say a bit about that later if time does allow. So we're focusing on obesity. Our three markers of physical activity: Firstly active transport to school. As shown earlier (OP11.0) the vast majority of the children who are actively commuting to or from school are walking. Only a very few are cycling to or from school at this particular age. The second marker is sports participation and we're using that term quite loosely. That could cover anything from going to football to dancing lessons, swimming lessons, horse riding - the whole range of physical activities and organised pursuits that children might do. And the third marker of physical activity we had available to us was active play with parents and carers and the frequency of that.

There are available data from actograph readings on physical activity for children in the MCS at this age. We haven't used those as we're unsure about the quality of those data. Again we could talk about that if anybody has any specific questions later. So we're not using those data.



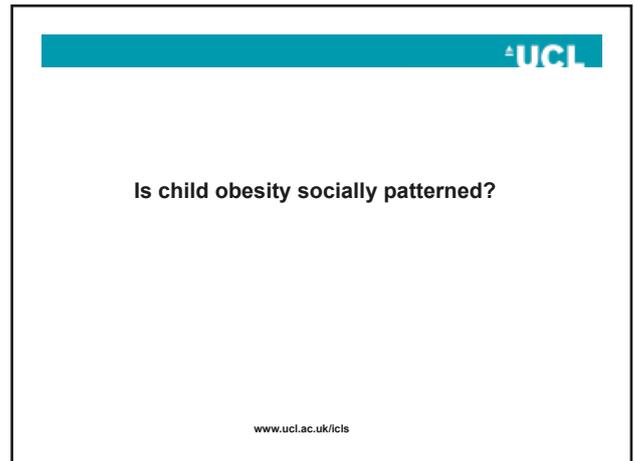
Variables

- **Obesity** at age 7 based on BMI
- **Physical activity**
 - Active transport to school: walking or cycling
 - Sport: less than weekly, 1-2 times a week, 3 times or more
 - Active playing with parents: less than weekly, 1-2 times a week, 3 times or more
- **Social gradients**
 - Area level deprivation based on Index of Multiple Deprivation

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SLIDE 6

Our marker of social circumstance is based on the index of multiple deprivations which is chopped into deciles and we've then aggregated those deciles into four broad groups spanning the most disadvantaged through to the most advantaged. That's based on the areas in which the children were living at age seven.



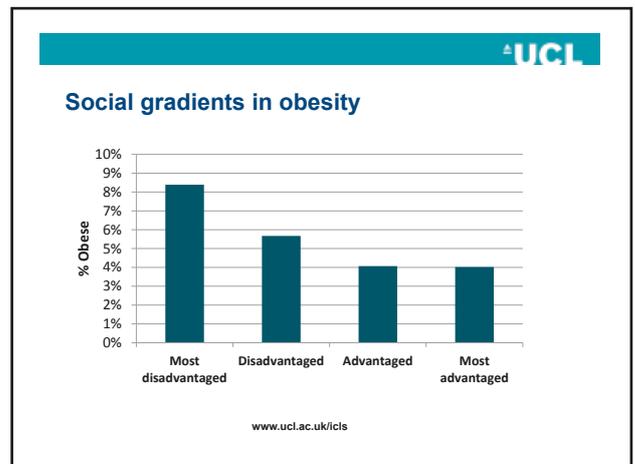
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Is child obesity socially patterned?

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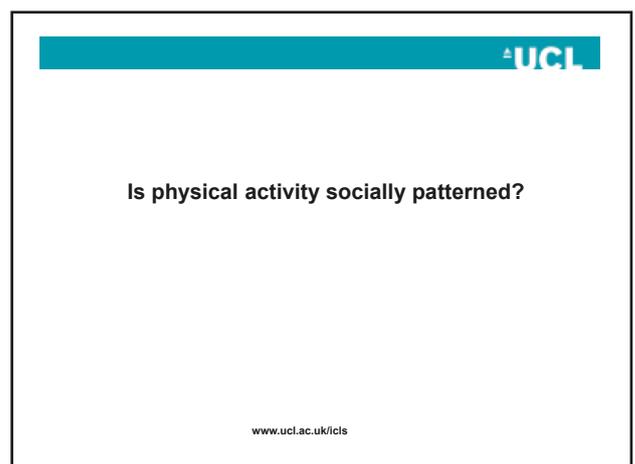
SLIDE 7

So our first question: Is obesity socially patterned? Well, it is. And this slide shows you the rates for the most disadvantaged through to the most advantaged. You can see that there's about a doubling in the risk of obesity for children living in the most disadvantaged residential areas at around 8.5%, and then reducing down to children living in advantaged and the most advantaged residential areas at around 4%. So a clear social gradient with a doubling in the risk as we move from the most advantaged to the most disadvantaged residential areas.



SLIDE 8

How about these markers of physical activity? Are they socially patterned?



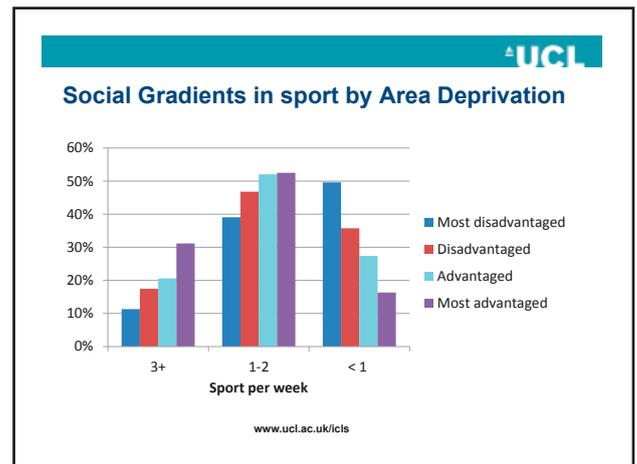
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Is physical activity socially patterned?

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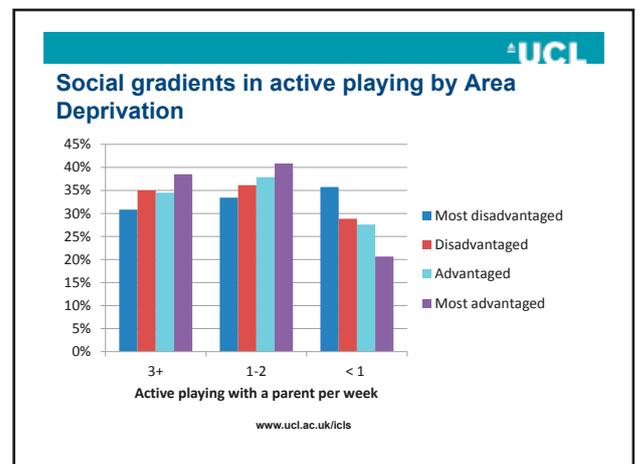
SLIDE 9

Well, first off sports participation -you can see here a very stark social gradient. So for example, for children in the most disadvantaged areas about half of those will do organised sports activities less than weekly, compared to about only one in six of children in the most advantaged areas. So there are huge differences there. Only about 10% of children in the most disadvantaged areas will participate in sports activities three times or more per week, compared to about a third of children in the most advantaged areas. So a very stark social patterning there for that marker of physical activity.



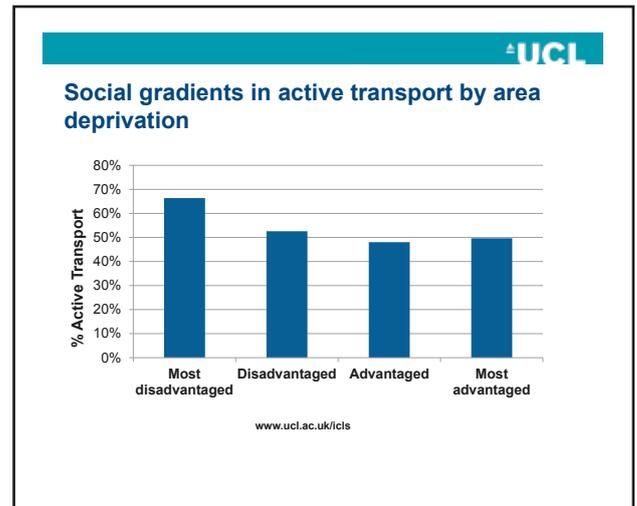
SLIDE 10

In terms of playing with parents and carers, again we see a fairly reasonably marked social distribution but not as stark as that for sports participation but still indicating that children in the most disadvantaged residential areas are less likely to play with parents and carers as frequently as those from more advantaged areas.



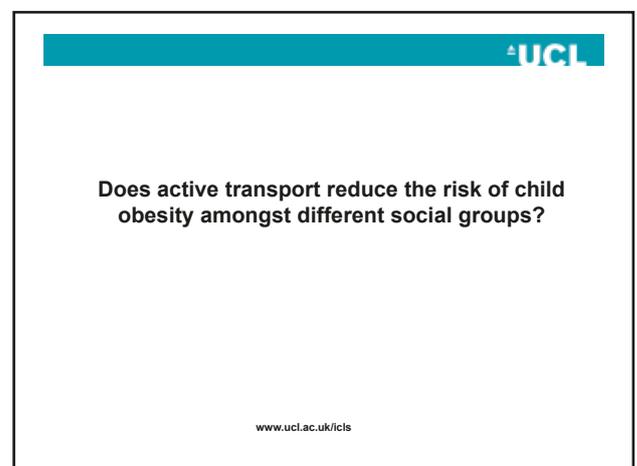
SLIDE 11

Thinking about the active commute, our variable of interest, the journey to or from school, that's socially patterned too. But here we see interestingly the reverse in the gradients. So you can see that two thirds of children from the most disadvantaged areas are actively commuting to or from school, compared with about half of those from the most advantaged areas. So I think that's quite interesting really in terms of that reverse swing in the social gradient.



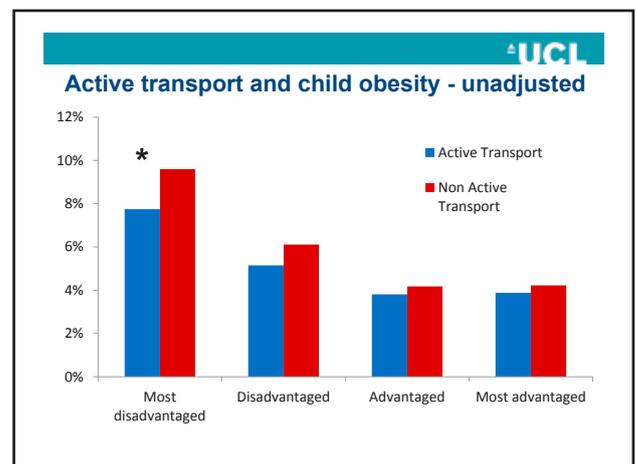
SLIDE 12

Our third question asks whether active commuting is associated with a reduced risk of obesity.



SLIDE 13

And this next slide shows the rates, the prevalence rates of obesity stratified so contingent on whether the child commutes actively or not to or from school. So as you can see for children in the most disadvantaged areas around 8.5% of the children can be classified as obese, fewer of them, a lower per cent of them are obese when they actively commute, so about 7.5% versus 9.5% of those who don't actively commute are obese. So a modest but definite difference there for children in the most disadvantaged residential areas. We see less of a difference for children who are living in slightly less disadvantaged circumstances, 5% versus 6%. And then no difference at all for children living in the more advantaged residential areas,

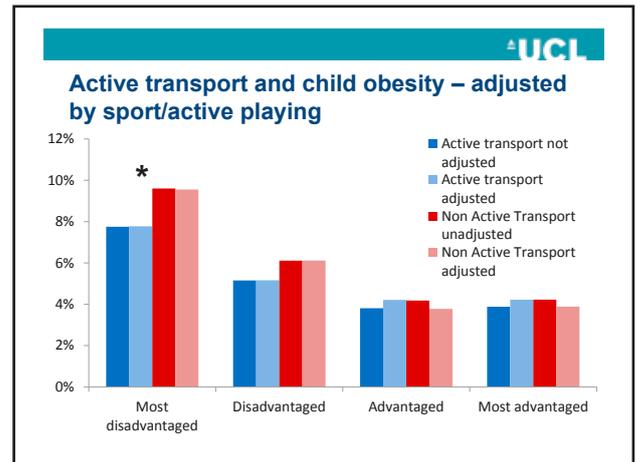


regardless of whether they actively commute to school or not.

SLIDE 14

But of course just doing a kind of two by two, a very simple cross tabulation in that way doesn't tell us the whole story. So we wanted to try to adjust for, in a statistical sense, a number of factors linked to the other elements of the obeseogenic environment, including physical activity, other markers of physical activity, dietary markers, and so on, to see whether this association held up when we made those statistical adjustments. The next slide shows when we adjust for participation and sports and active play with parents there is really no difference. We still see this reduced prevalence of obesity for children in the most disadvantaged areas who are actively commuting to or from school.

We see the same estimates as well when we adjust for a range of dietary markers that we have available to us. So things like skipping breakfast, the types of snack foods children have, their fruit and vegetable consumption, the



sorts of things they drink, whether the family eat together, you know, whether the child eats as part of a family setting. So a whole range of dietary and cultural factors around food. And we factored those into the analysis, again we end up with the same estimates. So it looks like there might be something going on in terms of the link between active commuting to or from school and the risk of obesity for children in the most disadvantaged areas.

SLIDE 15

So our initial tentative conclusions from this first small part of the work we've completed confirmed the social gradients in obesity. We see these interestingly different patterns, social patterning of markers of physical activity, sports participation being less common for children living in disadvantaged areas, which isn't a huge surprise, compared to those in more advantaged areas. But then more children in disadvantaged areas are likely to actively commute to school compared to those living in advantaged areas. And we see that there does appear to be a link, an initial sort of – quite tentative about this – the link between reduced risk of obesity for children who are actively commuting in the most disadvantaged areas. It might be that in the absence of other types of physical activity that

Conclusions

- Obesity socially patterned
- Markers of physical activity socially patterned – But in opposite directions
- Some evidence that active transport might reduce risk of child obesity amongst most disadvantaged children

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we really do see some kind of benefit there for children who are actively commuting if they're not being physically active in terms of sports participation and other elements of physical activity.

SLIDE 16

So in terms of the policy implications of this, well, small, modest, you know, the 'effect' appears to be small and modest. But it appears to be quite stubborn as well when we throw a range of statistical controls at this association. It might be that because of the differential pattern we see according to social circumstances that targeting some social groups or some particular residential areas may reap most benefits if this were built into interventions. In terms of thinking about social circumstances we see very similar relationships when we use different social markers. So if we look at these same data and we run the analysis for family income or parents' education or parental occupation we see very similar relationships with



Policy implications

This is an area of intervention that could be targeted towards specific groups as potential benefits are socially patterned

- benefits might be modest but still worth pursuing
- benefits may become more apparent over time
- sets poorer children up to good physical activity standards now and possibly later in life

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children from the most disadvantaged groupings appearing to have reduced risk of obesity if they're actively commuting to school. So there might be something there to exploit in terms of targeting an intervention around this.

SLIDE 17

And thinking about the life course we know that continuity is in lots of behaviours associated with health. So for example, some dietary patterns that occur early in life carry on throughout the life course. In later childhood and early adolescence things like the uptake of drinking and smoking cigarettes carries on. There are continuities in these behaviours throughout the life course. And there's reason to believe that there are continuities in aspects of physical activity as well throughout the life course. It's quite complicated because an individual's engagement with physical activity tends to change through different parts of life with dips in adolescence and so on and so forth. But it might be that getting children into particularly good habits early on in life might pay dividends in terms of their longer life health trajectories.

I said these are initial findings. We will hopefully get the age eleven data in the next few weeks and our next steps will be to try to replicate these findings. We might see the same association when children are aged eleven. We might see something entirely different and see



To be continued..

- MCS age 11 data released in January 2014 provides us with information on duration of commute
 - Test association more rigorously
 - Investigate if children who actively commute in primary school might walk/cycle (longer distances) in secondary school

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different patterns of commuting. About half of the children at age eleven in the MCS will have started secondary school and half of them will still be in primary school. So we'll see probably very different and interesting patterns there depending on whether they've transitioned or not to the secondary school setting. In those data there's also information about the duration of the commute to and from school as well as the mode of commuting. So it will be good to be able to build in information around the length of the journey into this modelling to see what happens there.

We'll be able to look longitudinally of course.

SLIDE 17 ... continued

Is what happens at age seven influential in terms of what children and young people do later? So if children are actively commuting when they're seven are they more or less likely to actively commute four years on. Are there continuities. And do the active commuting habits and activities from age seven have longer term impacts on the risk of obesity at age eleven?

There's a lot of questions to ask and a lot to be gained, when we get the data for when these children are aged eleven. This is a work in progress. We would very much welcome any comments that people have for further developing this work.

Okay, I'll finish there. Thanks.

SLIDE 18