

# The effects of the London 2012 Olympics and related urban regeneration on physical and mental health: the ORiEL mixed-methods evaluation of a natural experiment

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**Disclaimer:** This report contains transcripts of interviews conducted in the course of the research and contains language that may offend some readers.

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## Scientific summary

### Impact of Olympic-related urban regeneration on physical activity: ORiEL

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# Scientific summary

## Background

Despite continuing large-scale public investment in urban regeneration programmes, systematic reviews identify a dearth of evidence of the effectiveness of such programmes in improving health and well-being, and alleviating health inequalities. The evidence that does exist is weak, with mixed findings. In the UK, studies investigating the health impacts of urban regeneration are rare, and highly variable in terms of study quality and reported outcomes, and exist primarily in the grey literature. Although some studies have reported improvements in health, previous research also suggests the possibility of negative effects. Hosting the London 2012 Olympic and Paralympic Games provided an opportunity to establish a quasi-experimental study of the effects of urban regeneration associated with the 2012 Olympic Games on physical activity and psychological well-being, as well as a wider range of health outcomes and behaviours.

Components of the Olympic-related regeneration programme delivered in east London are common to the majority of urban regeneration programmes elsewhere (e.g. improvements in facilities, services, housing and built infrastructure). This presented an opportunity for wider learning about the range and nature of positive and negative impacts on health, and an exploration of the causal pathways between urban regeneration and health by linking specific individual components of regeneration to changes in specific outcomes and behaviours. Olympic-related urban regeneration under investigation in this study focused on east London, specifically the London boroughs of Hackney, Tower Hamlets, Newham, and Barking and Dagenham.

## Aims

The aim of this study, the Olympic Regeneration in East London (ORIEL) study, was to address the following primary research question:

1. What is the impact of urban regeneration on the social determinants of health (employment), health behaviours (physical activity) and health outcomes (mental health and well-being) of adolescents and their parents/carers?

We also aimed to answer the following secondary research questions:

1. How are any socioeconomic and health impacts distributed by age, sex and ethnicity?
2. What are the effects of specific components of the regeneration programme on physical activity and psychological well-being?
3. Are any socioeconomic and health impacts sustained over time?

It was not possible to investigate effects on a range of secondary outcomes (such as diet and obesity) within the time frame of the current grant. Further analyses of ORIEL data focusing on these areas are ongoing and we anticipate that findings will be published between 2018 and 2020.

## Methods

### Design

The ORIEL study is underpinned by a multilevel socioecological conceptual framework that recognises that both individual and environmental risk factors are important for health. The implication is that action to

improve health requires a focus not only on individual lifestyle and socioeconomic factors but also on the local environmental resources and opportunities available to those individuals.

Our main aim was to assess the impact of a multicomponent urban regeneration programme linked to the 2012 Olympic Games on the social determinants of health (employment), health behaviours (physical activity) and health outcomes (mental health and well-being) of adolescents and their parents or carers. The study was originally conceived as a natural quasi-experimental study of a school-based cohort of adolescents and their parents/carers living within four east London boroughs (Hackney, Tower Hamlets, Newham, and Barking and Dagenham), with a further in-depth qualitative study of a subsample of families enrolled in the cohort.

### Data collection

The overall study comprises two main elements.

1. A longitudinal controlled quasi-experimental quantitative study examining changes in health behaviour and health outcomes in a cohort of adolescent school pupils aged 11–12 years at baseline, and their parents or primary carers (parent/carer). Residents in the intervention area (Newham) receiving urban regeneration were compared with those who live in comparison areas (Hackney, Tower Hamlets, and Barking and Dagenham) not receiving urban regeneration of this magnitude. Adolescent and parent/carer survey data were collected in three waves (wave 1, baseline pre intervention, 2012; wave 2, 6 months post intervention, 2013; and wave 3, 18 months post intervention, 2014) in intervention and comparison areas. A cohort of 2254 adolescents were included in all three waves of data collection. In the case of adults, a repeat cross-sectional study was employed with 1245 at wave 1, 1023 at wave 2 and 995 at wave 3.
2. An in-depth longitudinal qualitative study of family experiences of, and attitudes towards, regeneration in the intervention area and influences on socioeconomic status, health behaviours and health outcomes. The initial investigation comprised a subgroup of approximately 20 families at baseline that reflected the diversity of the survey sample. This was supplemented by three school-based video focus groups. The qualitative study sample was drawn from wave 1 participants and was repeated at wave 2.

## Main findings

### Impacts on physical activity

At 6 months after the Games had finished, adolescents who became inactive were less likely to come from the intervention borough (Newham) than from the comparison boroughs [risk ratio (RR) = 0.69, 95% confidence interval (CI) 0.51 to 0.93]. Among those who remained inactive or became active, no statistically significant differences between control and intervention boroughs were observed. For screen time, a marker of sedentary behaviour, no differences in physical activity transitions were observed between intervention and comparison boroughs. No interactions between gender or free school meal status and either outcome were observed.

Compared with those who were active at both waves, those with low engagement with the Games were more likely to remain inactive (RR 1.79, 95% CI 1.20 to 2.66), more likely to become inactive (RR 1.52, 95% CI 1.05 to 2.19) and more likely to become active (RR 1.95, 95% CI 1.31 to 2.91). In fully adjusted gender-stratified models, low levels of engagement among males were associated with a higher likelihood of becoming active (RR 2.19, 95% CI 1.24 to 3.87) and of becoming inactive (RR 1.77, 95% CI 1.07 to 2.94). For females, low levels of engagement were associated with remaining inactive (RR 1.77, 95% CI 1.02 to 3.06). For screen time, those with low levels of engagement with the Games were more likely to become sedentary (RR 1.70, 95% CI 1.00 to 2.87) than those who were not sedentary at both baseline and at the 6-month follow-up.

At 18 months, there were no statistically significant differences between intervention and comparison boroughs for all adolescent physical activity and screen-time transitions. However, of those who were active at both baseline and 18-month follow-up, those who visited the Olympic Park more than once a month were the least likely to remain inactive (RR 0.11, 95% CI 0.02 to 0.48) and the least likely to become inactive (RR 0.38, 95% CI 0.24 to 0.60) of those who were active at both baseline and at the 18-month follow-up. However, study respondents were also less likely to become active if they visited the Olympic Park more than once a month (RR 0.52, 95% CI 0.30 to 0.90) than the always active group. In gender-stratified models, males who visited the park more than once a month were less likely to remain inactive (RR 0.11, 95% CI 0.02 to 0.48) and less likely to become inactive (RR 0.42, 95% CI 0.23 to 0.76) than those who did not. For females, associations were observed for all three physical activity transitions, with respondents less likely to remain inactive (RR 0.31, 95% CI 0.13 to 0.74), less likely to become inactive (RR 0.36, 95% CI 0.18 to 0.73) and less likely to become active (RR 0.24, 95% CI 0.08 to 0.74) than the always active group.

For sedentary behaviour, females who visited the Olympic Park less than once per month were less likely to become less sedentary (RR 0.39, 95% CI 0.21 to 0.73). No other significant associations for sedentary behaviour were observed.

No significant effects were observed for adult physical activity at either 6 or 18 months.

### **Impacts on psychological health and well-being**

Adolescents who were 'no longer depressed' at the 6-month follow-up (RR 1.53, 95% CI 1.07 to 2.20) or 'remained depressed' at the 6-month follow-up (RR 1.78, 95% CI 1.12 to 2.83) were more likely to be from the intervention borough than from the comparison boroughs, compared with those who were not depressed at baseline and the 6-month follow-up. For well-being, there was no association between borough and change in well-being between baseline and the 6-month follow-up. No interactions were observed between borough and gender, or between borough and free school meals, in relation to change in well-being ( $p > 0.05$ ).

Compared with those who were not depressed at baseline and at the 18-month follow-up, adolescents who 'remained depressed' at the 18-month follow-up (RR 1.93, 95% CI 1.01 to 3.70) were more likely to be from the intervention borough than from the comparison boroughs. No interactions were observed between borough and gender or borough and free school meals in relation to change in depressive symptoms between baseline and the 18-month follow-up ( $p > 0.05$ ). No associations were observed for well-being at the 18-month follow-up.

Among parents/carers, levels of well-being were higher in the urban regeneration area at wave 1, but this was no longer the case by wave 3. Low levels of well-being did not differ between the urban regeneration area and the other areas across the three waves. At follow-up, in wave 3, there were higher levels of anxiety and depressive symptoms in the urban regeneration area than in the other areas. In general, there was a fairly consistent pattern of associations of indicators of social disadvantage, marital breakdown, long-term illness and poor neighbourhood conditions, with low levels of well-being and higher scores on anxiety and depressive symptoms.

### **Lived experiences of the Olympic Games**

Residents generally welcomed the unexpected chance to live in a cleaner, safer and more unified environment during 'Games-time'. The findings suggest that the Olympics served to temporarily reduce and alleviate certain stressors in the social and physical environment, facilitating potentially positive impacts on health and well-being. Olympic preparations provided a small window of respite from some of the stresses and pressures of daily life in a relatively deprived area: an area residents felt to be run-down, fragmented and unsafe. The Games offered opportunities to use the built environment and mix with other residents that were not normally possible. Overall, it served to lessen participants' sense of social exclusion and seemed to generate a sense of inclusion and respite, even if this was only temporary. However, it did not address the most dominant and emphatically articulated local need: housing.

## Conclusions

Studies that evaluate the health impacts of sporting mega-events are rare, with inconsistent findings. This study provided the highest quality data to date on the short- and medium-term social and health impacts of sporting mega-events. In addition to investigating short-term demonstration effects, we used event-related urban regeneration as the vehicle to examine the impacts of medium-term physical legacy. Overall, we find limited evidence that the London 2012 Olympic and Paralympic Games had a positive effect on adolescent or parental/carer physical activity, mental health or well-being.

Against a backdrop of a general secular decline in physical activity in adolescents, we found no evidence for demonstration effects at 6 months or legacy effects at 18 months in either males or females in the intervention borough compared with the control boroughs. However, at 18 months, at the time when hypothesised legacy effects would begin, we observed that male and female adolescents were less likely to become inactive or remain inactive if they visited the Olympic Park more than once a month. However, there was no significant increase in the proportion of adolescents reaching minimum recommended physical activity levels.

Urban regeneration associated with the London 2012 Olympic Games had little positive influence on changes in adolescent or parental mental health in terms of depressive symptoms or well-being. For adolescents, attending school in the Olympic host borough was associated with becoming 'no longer depressed' in the shorter term (at 6 months); this was the only positive impact observed and this association was not sustained at the 18-month follow-up.

### Implications for future research

There is a need for future research to seek to replicate the findings reported here, with larger and more representative adult longitudinal data. In addition, we would recommend the collection of objective physical activity data through accelerometers, something that we were unable to do because of cost considerations. We were also unable to explore whether or not effects were distributed equitably as much as we had anticipated as the sample was relatively homogeneously deprived. This is as a consequence of the relatively disadvantaged nature of east London. Further evaluative research should therefore ensure that the underlying sample is more socioeconomically diverse, although this may be challenging as Games with a legacy element typically target relatively disadvantaged communities. Finally, natural experiments such as this require flexibility from both funders and researchers. In this study the final form and nature of the Olympic Park was not known at the time of application (August 2010); thus we had to be sensitive to the final composition of the legacy elements of the Olympic Park in our analyses and redesign elements of the study in order to boost recruitment of parent/carer participants.

Given the level of public expenditure on such events, further evaluations of the demonstration and legacy health effects are required to improve generalisability and to strengthen causal inference in an area of research that still relies on a very limited evidence base.

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