Institution: Liverpool John Moores University

Unit of Assessment: 26

Title of case study:

"School's In!": Promoting Children's Physical Activity and Health in Educational Settings

1. Summary of the impact:

High global and national prevalence levels of child obesity and physical inactivity carry a substantially increased health risk. Exposure to this risk is exacerbated in north-west England where health inequalities are large. Consequently, the prevention of physical inactivity and associated conditions such as obesity are vital at the local level. This case study summarises the impact of research within the Research Institute for Sports and Exercise Sciences (RISES) that has focused on children's physical activity and health promotion in educational settings in the North West of England. This research has been utilised by the Local Authorities that have partnered with RISES to develop and deliver; health and physical activity monitoring (SportsLinx); evidenced-based programmes of physical activity for schoolchildren (school-based interventions); and educational practice development (teacher training) that have demonstrably enhanced children's physical activity and health.

2. Underpinning research:

By way of context, our research has allowed for a better understanding of the health inequalities that prevail in Liverpool and Wigan, since both regions are designated as "Spearhead Areas" (i.e., local authorities with the worst health and deprivation indicators). Prevalence rates of child overweight and obesity in Liverpool (14.9% and 23.1%, respectively) and Wigan (16.2% and 19.5%, respectively) are higher than the national average. Furthermore, high levels of physical inactivity are evident in both authorities. In response to this, our progressive strategy was to complete linked research studies beginning with unique, large scale surveillance from which evidenced-based intervention programmes were implemented. These studies have resulted in positive behaviour change and health improvement.

RISES developed and led the Liverpool City-wide 'SportsLinx' longitudinal research project launched in 1996. SportsLinx has evolved into a range of education-based physical activity and healthy eating initiatives in Liverpool (e.g. Active Play). Research outputs from SportsLinx span 1998 to 2012 under the direction of Professor Gareth Stratton (1990-2011), Dr Allan Hackett (until 2011), and Dr Lynne Boddy (2004-present). The underpinning RISES research that describes Physical Education, Physical Activity and School Sport (PEPASS) and Children's Health, Activity and Nutrition: Get Educated (CHANGE!) spans 2009 to 2013. Professor Stuart Fairclough (2001-present) conceived and led both projects with support from Dr Lynne Boddy (2004-present).

Over 6000 children per year participate in the core SportsLinx Project and the total database now includes 70,000 Liverpool children since 1996. Specifically this work has highlighted the increase in prevalence of overweight and obesity from ~25% in 1998 to ~36% in 2011 (**Sec.3, Ref.1**). These data are significantly higher than the national average. Furthermore, relative to 1998 values this research demonstrated reductions in aerobic fitness of up to 5.6% in boys and 8.1% in girls, independent of weight and maturation status (**Sec.3, Ref.2**). Interestingly, the most recent SportsLinx data were among the first to demonstrate a plateauing of the year-on-year increase in the prevalence of child obesity, although absolute levels are still very high.

The SportsLinx project highlighted a need for physical activity interventions in young children, which directly resulted in the launch of the family-focused Active Play pre-school intervention programme in 2009. Two hundred and forty children from 77 Liverpool families were involved in the Active Play intervention to promote physically active play in the under 5s. Post-intervention, children engaged in 4.5% and 13.1% more daily physical activity than control group children during the week and at weekends, respectively (**Sec.3, Ref.3**).

Outcomes from the SportsLinx project also led directly to the development of the PEPASS project in 2008. PEPASS was part funded by Wigan Council between 2008 and 2010 during which time 550, 10-11 year olds participated in the programme. In a sample of over 1000 Wigan schoolchildren physical activity levels were demonstrated to be 20% lower than counterparts elsewhere in England, and that prevalence of overweight and obesity was ~4% higher than the England average (**Sec.3, Ref.4**). This research provided a robust evidence base that identified important areas for intervention. For example, children that had low activity levels during discretionary physical activity segments of the day were specifically targeted via structured afterschool physical activity programmes (**Sec. 3, Ref.4**). As a direct consequence of the PEPASS research the CHANGE! physical activity and healthy eating clustered randomised trial was commissioned and began in 2010 in 6 schools in partnership with Wigan Council. This intervention resulted in significant reductions in waist circumference (1.63 cm) and BMI z-score (-0.24), and a significant increase in light intensity physical activity of 26 minutes per day. Moreover, these effects were strongest among those children at greatest risk of poor health status (e.g., girls, and overweight/obese; **Sec 3, Ref.5**).

3. References to the research:

Reference for the peer-reviewed outputs from the RISES research described in Section 2.

1. Boddy L.M., Hackett A.F., and Stratton G. (2009) Changes in BMI and prevalence of obesity and overweight in children in Liverpool, 1998-2006. *Perspectives in Public Health*.129:127-131. doi: 10.1177/1757913908094808.

2. Boddy, L.M., Fairclough, S.J., Hackett, A.F., and Stratton, G. (2012) Changes in cardiorespiratory fitness in 9-10.9yr old children controlling for maturation, deprivation and body mass index: SportsLinx 1998-2010. *Medicine and Science in Sports and Exercise.* 44: 481-486. doi: 10.1249/MSS.0b013e3182300267.

3. O'Dwyer, M.V., Fairclough, S.J., Knowles, Z., and Stratton, G. (2012) Effect of a family-focused active play intervention on sedentary time and physical activity in preschool children. *International Journal of Behavioral Nutrition and Physical Activity*. 9: 117. doi:10.1186/1479-5868-9-117.

4. Fairclough, S.J., Beighle, A., Erwin, H., and Ridgers, N.D. (2012) School week day segmented physical activity patterns of high and low active children. *BMC Public Health.* 12:406. doi:10.1186/1471-2458-12-406.

5. Fairclough, S.J., Stratton, G., Gobbi, R., Mackintosh, K.A., Warburton, G.L., Hackett, A.F., Davies, I.G., and Boddy, L.M. (2013) Promoting healthy weight in primary school children through physical activity and nutrition education. A pragmatic evaluation of the CHANGE! randomised intervention study. *BMC Public Health.* 13: 626. doi:10.1186/1471-2458-13-626.

The SportsLinx and Active Play outputs were the result of external grant funding from Liverpool City Council and Liverpool Primary Care Trust that totalled in excess of £1.2M. The PEPASS and CHANGE! outputs were the result of external funding from Wigan Council (~£ 20,000). In 2012 the CHANGE! project findings were presented by LJMU post-graduate student Kelly Mackintosh who won the Young Investigator Award at the International Convention on Science, Education, and Medicine in Sport.

4. Details of the impact:

Exposure to health risks linked to hypokinetic conditions is exacerbated in north-west England where health inequalities are present. Thus, prevention of physical inactivity and obesity are vital to local health. Our research in Liverpool and Wigan has directly led to the development of evidenced-based programmes and teacher professional development, which have significantly impacted on children's physical activity and health outcomes.

As part of a strategic and end-user engagement dissemination programme the SportsLinx research findings were presented annually from 1997 to 2012 to Liverpool City Council and Primary Care Trust. The significance of this research evidence is that increases in obesity prevalence **(Sec.3, Ref.1)** and low aerobic fitness **(Sec.3, Ref.2)** are associated with increased odds of children being at risk of cardio-metabolic pathologies. RISES research has made a significant contribution to the Healthy Weight Strategic Network Group responsible for recommending services and policies to address child weight-related health issues. As a consequence of SportsLinx data, key actions to achieve recommended child physical activity targets, deliver active play programmes, and better identify children with highest obesity risk, were identified in the 2008-11 action plan **(Sec.5, Source.A)**. SportsLinx clearly demonstrated the need for physical activity interventions in young children, which resulted in the Active Play pre-school intervention in 2009 throughout the Liverpool Sure Start network. This was the first children's centre-based physical activity behaviour change intervention in the UK **(Sec.3, Ref.3)**. The impact of research outcomes from SportsLinx, and the resulting change in health programmes available for children, are documented in the Liverpool Active City Strategy 2012-2017 **(Sec.5, Source.B)**. The significance and reach of the SportsLinx Project's contribution to obesity prevention was recognised by the presentation of the Louis Bonduelle Foundation Award from the European Childhood Obesity Group in 2011. Furthermore, the local impact of SportsLinx-related programmes, such as Active Play, is demonstrated by the fact that in 2009-10 alone there were 99,111 identified SportsLinx activity contacts with children, through initiatives such as the Fitness Fun Day, After-School Clubs, and Referral Schemes **(Sec.5, Source.D)**. Moreover, the Active Play resources developed by RISES in conjunction with Liverpool City Council were commercialised and 300 were sold by Liverpool City Council to local authorities elsewhere in the UK. To date sales have totalled £42,000 **(Sec.5, Source.E)**, demonstrating both the national relevance of the programme and economic benefit back to Liverpool City Council.

RISES research provided physical activity and health data that directly led to impact on childrens physical activity and health by the development and implementation of new programmes and initiatives in Wigan Borough. The PEPASS findings **(Sec.3, Ref.4)** were adopted as the evidence base from which to develop borough-wide school and community initiatives that addressed concerns about children's physical health. The relationships between these research findings and proposed programmes were articulated in the 2010 PEPASS Annual Report **(Sec.5, Source.F)**, and the 2011 Wigan Joint Strategic Needs Assessment **(Sec.5, Source.G)**. In the former, direct reference was made to the research that the Council claimed enabled it to be at the "cutting edge of research and impact identification" which ensured that its actions and programmes were "based on robust evidence". For the first time in Wigan, research evidence identified important areas for intervention and this led directly to the CHANGE! trial. The findings from CHANGE! demonstrated clinically meaningful, positive changes in body size and physical activity in one hundred 9-10 year old children **(Sec.3, Ref.5).** In the context of Wigan Borough, a reduction in BMI z-scores is associated with reduced cardio-metabolic risk at a local population level that will have an immediate positive health impact that could extend into significant future health benefits. These findings were disseminated to local Council officials, and all Wigan primary school Head Teachers at a practitioner conference and through a project report. Furthermore, an article in the Wigan Evening Post **(Sec.5, Source.H)**, which is distributed across the 118 square mile area of Wigan borough, increased the reach of this research-based impact by accessing the wider community and by raising awareness of the health issues linking physical activity to obesity. Since the end of the CHANGE! Wigan Council has decided to invest in a Borough-wide teacher training program and roll-out of the project's curriculum resource to all primary schools at the end of 2013 **(Sec.5, Source.I)**. Whilst the initial CHANGE! research involved over 300 children from 12 schools, the impact of a full borough program roll-out would mean CHANGE! healthy lifestyle messages would reach, and impact upon, the physical activity patterns and health status in approximately 3,300 children across 110 schools.

5. Sources to corroborate the impact:

External Source to Corroborate Impact	Nature of Evidence
A) 2008-11 Liverpool Healthy Weight Strategy (PDF	SportsLinx research findings and their

available)	impact on council services and programmes
B) Liverpool Active City Strategy 2012-2017 http://www.ljmu.ac.uk/Faculties/SCS/SCS_Docs/ActiveCityStratFinal.pdf (PDF available)	SportsLinx research findings and their impact on council services and programmes
C) Principal Health and Physical Activity Officer, Liverpool City Council	Impact of SportsLinx and Active Play research on local programmes and initiatives
D) SportsLinx Business Case 2011(PDF available)	Evidence of the reach of SportsLinx programmes in terms of participant numbers
E) Letter confirming sales of Active Play resources (PDF available)	Impact of economic benefit of Active Play programme to Liverpool City Council
F) PEPASS 2010 Annual Report (PDF available)	PEPASS research findings and their impact on Council services and programmes
G) Wigan Joint Strategic Needs Assessment 2011, p. 11 http://wisdom.wiganlife.com/resource/view?resourceId=67 (PDF available)	PEPASS and CHANGE! research findings and their impact on council services and programmes
H) Wigan Evening Post article about the CHANGE! project (PDF available)	Evidence of the reach of the research impact on the wider community
I) Emails from the Former Strategic Lead for Physical Activity in Wigan informing RISES that the CHANGE! project resources would be rolled out to all primary schools in the Borough and that a programme of teacher professional development would be funded (emails available)	Evidence of the impact of the project on local educational policy and practice
J) Former Strategic Lead for Physical Activity in Schools, Wigan Council	Impact of PEPASS and CHANGE! research on local policies and practice