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NHS

National Institute for Health Research

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Deirdre M Harrington,[1]* Melanie J Davies,[1,2,3]
Danielle Bodicoat,[1,4] Joanna M Charles,[5]
Yogini V Chudasama,[1] Trish Gorely,[6]
Kamlesh Khunti,[1,3,4] Alex V Rowlands,[1,2,7]
Lauren B Sherar,[8] Rhiannon Tudor-Edwards,[5]
Thomas Yates[1,2] and Charlotte L Edwardson[1,2]

[1]Diabetes Research Centre, University of Leicester, Leicester, UK
[2]National Institute for Health Research Leicester Biomedical Research Centre, Leicester, UK
[3]Leicester Diabetes Centre, University Hospitals of Leicester, Leicester, UK
[4]Collaboration for Leadership in Applied Health Research and Care East Midlands, Leicester, UK
[5]Centre for Health Economics and Medicines Evaluation, Bangor University, Bangor, UK
[6]Department of Nursing, School of Health, Social Care and Life Sciences, University of the Highlands and Islands, Inverness, UK
[7]Sansom Institute for Health Research, University of South Australia, Adelaide, SA, Australia
[8]School of Sport, Exercise and Health Sciences, Loughborough University, Loughborough, UK

*Corresponding author

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This report

Abstract

A school-based intervention ('Girls Active') to increase physical activity levels among 11- to 14-year-old girls: cluster RCT

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[1]Diabetes Research Centre, University of Leicester, Leicester, UK
[2]National Institute for Health Research Leicester Biomedical Research Centre, Leicester, UK
[3]Leicester Diabetes Centre, University Hospitals of Leicester, Leicester, UK
[4]Collaboration for Leadership in Applied Health Research and Care East Midlands, Leicester, UK
[5]Centre for Health Economics and Medicines Evaluation, Bangor University, Bangor, UK
[6]Department of Nursing, School of Health, Social Care and Life Sciences, University of the Highlands and Islands, Inverness, UK
[7]Sansom Institute for Health Research, University of South Australia, Adelaide, SA, Australia
[8]School of Sport, Exercise and Health Sciences, Loughborough University, Loughborough, UK

*Corresponding author dh204@le.ac.uk

Background: Physical activity (PA) levels among adolescent girls in the UK are low. 'Girls Active', developed by the Youth Sport Trust (YST), has been designed to increase girls' PA levels.

Objective: To understand the effectiveness and cost-effectiveness of the Girls Active programme.

Design: A two-arm cluster randomised controlled trial.

Setting: State secondary schools in the Midlands, UK.

Participants: Girls aged between 11 and 14 years.

Intervention: Girls Active involves teachers reviewing PA, sport and physical education provision, culture and practices in their school; attending training; creating action plans; and effectively working with girls as peer leaders to influence decision-making and to promote PA to their peers. Support from a hub school and the YST is offered.

Main outcome measures: The change in objectively measured moderate to vigorous intensity PA (MVPA) levels at 14 months. Secondary outcomes included changes in overall PA level (mean acceleration), light PA levels, sedentary time, body composition and psychosocial outcomes. Cost-effectiveness and process evaluation (qualitative and quantitative) data were collected.

Results: Twenty schools and 1752 pupils were recruited; 1211 participants provided complete primary outcome data at 14 months. No difference was found in mean MVPA level between groups at 14 months [1.7 minutes/day, 95% confidence interval (CI) –0.8 to 4.3 minutes/day], but there was a small difference in mean MVPA level at 7 months (2.4 minutes/day, 95% CI 0.1 to 4.7 minutes/day). Significant differences

between groups were found at 7 months, but not at 14 months, in some of the objective secondary outcomes: overall PA level represented by average acceleration (1.39 m*g*, 95% CI 0.1 to 2.2 m*g*), after-school sedentary time (–4.7 minutes/day, 95% CI –8.9 to –0.6 minutes/day), overall light PA level (5.7 minutes/day, 95% CI 1.0 to 10.5 minutes/day) and light PA level on school days (4.5 minutes/day, 95% CI 0.25 to 8.75 minutes/day). Minor, yet statistically significant, differences in psychosocial measures at 7 months were found in favour of control schools. Significant differences in self-esteem and identified motivation in favour of intervention schools were found at 7 and 14 months, respectively. Subgroup analyses showed a significant effect of the intervention for those schools with higher numbers of pupils at 14 months. Girls Active was well received by teachers, and they reported that implemented strategies and activities were having a positive impact in schools. Barriers to implementation progress included lack of time, competing priorities and the programme flexibility. Implementation costs ranged from £2054 (£23/pupil) to £8545 (£95/pupil) per school. No differences were found between groups for health-related quality-of-life scores or frequencies, or for costs associated with general practitioner, school nurse and school counsellor use.

Conclusions: Girls Active may not have had an effect on the random 90 girls per school included in the evaluation. Although we included a diverse sample of schools, the results may not be generalisable to all schools. Girls Active was viewed positively but teachers did not implement as many aspects of the programme as they wanted. The intervention was unlikely to have a wide impact and did not have an impact on MVPA level at 14 months. Capitalising on the opportunities of a flexible programme like this, while also learning from the stated barriers to and challenges of long-term implementation that teachers face, is a priority for research and practice.

Trial registration: Current Controlled Trials ISRCTN10688342.

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List of abbreviations

APHV	age at peak height velocity
BME	black and minority ethnic
BMI	body mass index
CHU-9D	Child Health Utility – 9D
CI	confidence interval
CONSORT	Consolidated Standards of Reporting Trials
CSRI	client service receipt inventory
ENMO	Euclidean norm minus one
GBP	Great British pounds
GCSE	General Certificate of Secondary Education
GEE	generalised estimating equation
GP	general practitioner
ICC	intraclass correlation coefficient
IMD	Index of Multiple Deprivation
IQR	interquartile range
ITT	intention to treat
KS3	Key Stage 3
LLR	Leicester, Leicestershire and Rutland
MVPA	moderate to vigorous intensity physical activity
NICE	National Institute for Health and Care Excellence
NIHR	National Institute for Health Research
OFSTED	Office for Standards in Education, Children's Services and Skills
PA	physical activity
PA4E1	Physical Activity 4 Everyone
PAQ-A	Physical Activity Questionnaire for Adolescents
PE	physical education
RCT	randomised controlled trial
SCT	social cognitive theory
SD	standard deviation
SOP	standard operating procedure
TSC	Trial Steering Committee
YST	Youth Sport Trust

Plain English summary

Young people are not as active as they should be, and girls are less active than boys at all ages. The Girls Active programme has been created by the Youth Sport Trust to help schools to get girls to become more active. In this programme, teachers are given training, resources and support to make changes in their school and to identify and work with a group of female pupils to act as leaders and to encourage girls to be more active. To test whether or not Girls Active increases activity levels and is good value for money, we recruited 20 secondary schools (1752 girls aged 11–14 years) within the Midlands region of the UK; 10 schools used the Girls Active programme and 10 did not – these were used as a comparison group. We measured activity levels of girls using a wrist monitor and asked girls to complete questions about their feelings towards activity, sport and physical education and about the support they received from teachers, family and friends for taking part in physical activity. We also collected information on the amount of time and money that each school spent on Girls Active, which was used to calculate the cost of delivering the programme as part of the economic analysis. We spoke to the teachers and pupils to find out what they thought about Girls Active. There was a small difference in physical activity levels in the short term (7 months), but not in the longer term (14 months). The teachers enjoyed Girls Active but did not change as much as they wanted to in their school because of their workload; however, they felt that what they had done was making a positive difference. The peer leaders also enjoyed being involved and learned new skills. Teachers suggested that they needed more support straight after their training, guidance on timelines and help from other staff at their school in delivering Girls Active.

Scientific summary

Background

Physical activity (PA) levels in young people in the UK have been declining, with recent data showing that only 16% and 9% of girls aged 11 or 12 years and 13–15 years, respectively, are sufficiently active. In an effort to tackle the inactivity crisis, there have been calls to undertake school-based programmes. Robust evidence on school-based programmes targeting adolescents in the UK is lacking; much of the evidence comes from the USA or is based on programmes targeting younger children. The Girls Active school-based programme, previously developed and implemented by the Youth Sport Trust (YST) in the UK, aims to target adolescent girls' activity levels.

Objectives

The main aim was to investigate the effect of the Girls Active programme on adolescent girls' PA levels and to undertake a full economic analysis and process evaluation. The objectives were to:

- investigate whether or not Girls Active leads to higher levels of objectively measured moderate to vigorous intensity PA (MVPA) levels in adolescent girls compared with a control group at 14 months (primary outcome)
- investigate whether or not Girls Active has an impact on a range of exploratory secondary outcomes at 7 and 14 months (as listed in *Main outcome measures*)
- conduct a full economic analysis at 14 months, including calculating the costs of programme delivery
- conduct a full process evaluation.

Methods

Design
A two-arm cluster randomised controlled trial was conducted.

Setting
State secondary schools in the Midlands, UK.

Participants
Female pupils aged 11–14 years. Overall, 82 state secondary schools in the Midlands area that had pupils aged 11–14 years were invited to take part. Following written consent from the head teacher, all girls aged 11–14 years were provided with an information pack containing parent/guardian and participant information sheets and an opt-out consent form. Then, 90 girls [30 from each Key Stage 3 (KS3) year group] were randomly selected from those who did not return the opt-out consent form. Verbal assent was obtained from the girls before each of the measurement sessions.

Sample size
In order to detect a difference in MVPA between groups of 10 minutes per day [assuming a MVPA standard deviation (SD) of 18 minutes, a 90% power, a 0.05 level of statistical significance, a cluster size of 56 girls and an intraclass correlation of 0.1], the targeted sample size was 18 schools, increasing to 20 schools (10 schools per group) to allow for cluster attrition. To allow for a 30% loss to follow-up and non-compliance with accelerometer wear, a random sample of at least 80 girls per school were recruited.

Interventions

After all baseline measures were completed, the clusters (schools) were randomised to either receive Girls Active (the intervention) or to carry on with usual practice (the control). Randomisation (1 : 1) was stratified by school size (median number of pupils < 850 or ≥ 850) and proportion of non-white pupils (median < 20% or ≥ 20%).

Girls Active is an established programme, developed and implemented by the YST, that provides a support framework for schools to review and change their PA, physical education (PE) and school sport culture and practices. In order to do this, teachers complete a school self-review, attend initial training, receive resources, attend a peer review day to share knowledge of practice with other teachers, are offered in-person or telephone support through a hub school or from the YST and are provided with two instalments of capacity funding to coincide with the submission of two action plans. Lead teachers are asked to form a girls' leadership and peer marketing group to empower girls to influence PE, sport and PA in their school, increase their own participation, develop as role models and promote and market PE and sport to other girls. Schools randomised to the control arm were not given any specific guidance or advice and were assumed to carry on usual practice.

Main outcome measures

Data were collected at baseline, 7 and 14 months. The primary outcome measure was the change in MVPA level at 14 months, measured by the wrist-worn GENEActiv™ (Activinsights Ltd, Kimbolton, UK) accelerometer.

Secondary outcome measures were changes in:

1. overall PA level (average acceleration/day)
2. time spent on light PA
3. time spent sedentary
4. moderate to vigorous intensity PA level at 7 months
5. the proportion of girls meeting MVPA guidelines. Secondary outcomes 1–5 were measured objectively by an accelerometer
6. body mass index (BMI) *z*-score and body fat percentage
7. a range of psychosocial factors that may mediate changes in PA (including intentions and motivation to be active, attitudes, perceived family, peer and teacher social support for PA, perceptions of the school social and physical environment, PA self-efficacy and enjoyment, perceived importance of PA and physical self-perceptions), self-reported in a questionnaire.

The primary outcome analysis used the complete-case population. Sensitivity analyses were undertaken, in which different levels of accelerometer wear and the season in which data collection was carried out were considered. Prespecified subgroup analyses were also undertaken to investigate whether or not the programme had different effects depending on the baseline school (level of social deprivation and size) and pupil (ethnicity, estimated biological maturation stage and year group) characteristics.

Economic evaluation

Microcosting calculated the costs of delivering the programme over 1 school year from a local authority (school) perspective. A cost–consequences analysis was conducted from a public sector, multiagency perspective [community care, general practitioner (GP), local authority and school], which explored health-related quality of life and GP, school nurse and school counsellor use. Exploratory subgroup analyses assessed socioeconomic factors, such as age and the level of implementation.

Process evaluation

Qualitative and quantitative data were collected from training events and records. Interviews with lead teachers, control school teachers and programme staff were undertaken at 7 and 14 months. Focus groups with peer leaders and random subsamples of girls and boys were undertaken at 14 months at each Girls Active school.

Results

Recruitment

A total of 20 schools (10 randomised to the intervention arm and 10 to the control arm) and 1752 girls participated. Of these, 18 schools (including 10 in the intervention arm) agreed to be followed up at 7 months and 19 (including 10 in the intervention arm) agreed to be followed up at 14 months. Among the participating girls, the mean age was 12.8 years (range 11.4–14.7 years), 23.3% were of a non-white European ethnicity and the mean BMI z-score was 0.18 kg/m^2 (SD 1.3 kg/m^2). At baseline, 1708 participants (96.8%) provided at least 2 days of valid accelerometer data. Complete accelerometer data were available for 1211 participants (69.1%) for the primary outcome analysis at the 14-month follow-up.

Primary outcome

There were no significant differences between the intervention and control groups in time spent on MVPA at 14 months in the complete-case [1.7 minutes/day, 95% confidence interval (CI) –0.8 to 4.3 minutes/day; $p = 0.178$], intention-to-treat (ITT) (1.6 minutes/day, 95% CI –0.6 to 3.9 minutes/day; $p = 0.158$) or per-protocol (1.7 minutes/day, 95% CI –1.2 to 4.5 minutes/day; $p = 0.246$) analyses. At 7 months, a significant difference of 2.4 minutes per day (95% CI 0.1 to 4.7 minutes/day; $p = 0.039$) of MVPA was found between the groups in the complete-case analysis, with a difference of 2.3 minutes per day (95% CI 0.2 to 4.3 minutes/day; $p = 0.028$) being found in the ITT analysis and 3.1 minutes per day (95% CI 0.9 to 5.4 minutes/day; $p = 0.005$) being found in the per-protocol analysis.

Secondary outcomes

At 7 months, significant differences between the groups were found in mean acceleration (1.39 mg, 95% CI 0.1 to 2.2 mg; $p = 0.030$), sedentary time during the after-school period (–4.7 minutes/day, 95% CI –8.9 to –0.6 minutes/day; $p = 0.026$), overall light PA time (5.7 minutes/day, 95% CI 1.0 to 10.5 minutes/day; $p = 0.018$) and light PA time on school days (4.5 minutes/day, 95% CI 0.25 to 8.75 minutes/day; $p = 0.038$). No other significant differences between the groups were found in the other PA-related secondary outcome measures or in body composition at 7 or 14 months.

At 7 months, a significant difference between the intervention group and control group was found in the levels of perceived importance, in favour of the control group, and a difference was found in levels of self-esteem, in favour of the intervention group. At 14 months, there were significant differences between the groups in levels of intention to be active, in how participants perceived their school physical environment and in the levels of confidence to be active, in favour of the control group. There was also a significant difference in the level of identified motivation, in favour of the intervention group, at 14 months. No other significant differences between the groups were found in the psychosocial outcomes at 7 or 14 months.

Subgroup analysis

At 7 months, among the white European and 'early maturer' participants, there was a significant difference in MVPA levels between the randomised groups of 3.1 minutes per day ($p = 0.017$) and 5.1 minutes per day ($p = 0.003$), respectively, favouring the intervention arm. At 14 months, in the large schools (with ≥ 850 pupils), there was a significant difference in MVPA levels between the randomised groups of 4.9 minutes per day ($p = 0.001$), favouring the intervention arm.

Health economics

The costs of the programme ranged from £2054 per school (£23/pupil) to £8545 per school (£95/pupil), based on 90 pupils receiving the intervention per school, with the least costly option being to absorb Girls Active strictly within curriculum hours. Using complete cases, in which participants had data on costs and outcomes, no statistically significant differences were found between the groups for Child Health Utility-9D utility index scores or for frequencies or costs of service use at 14 months. However, factors, such as results at baseline, school size and percentage of BME pupils, did have an effect.

Process evaluation

Teachers indicated that they felt positive about the Girls Active programme and all schools except one had implemented some changes within their school. However, teachers acknowledged that they had not implemented as many strategies and activities within the 14-month evaluation period as they had outlined in their action plans. Teachers did feel that what they had done with their school had made a difference to some girls in terms of engagement, motivation and attendance. Peer leaders indicated that they had enjoyed being involved and had learned new skills, whereas other girls in KS3 reported during the focus groups that they had not fully understood the programme. The reported challenges of implementation included the flexible nature of the programme, the lack of time to dedicate to the programme, other commitments, different school priorities and a lack of support from other staff and/or the senior leadership team. Teachers suggested that they would have benefited from more support straight after their training and that some dedicated help from other school staff or someone external to their school in delivering Girls Active would have been useful. Owing to the flexible nature of Girls Active, some guidance on timelines would also have been beneficial.

Conclusions

At 7 months, there was less of a decline in mean MVPA levels in the intervention group than in the control group. However, these changes were not sustained at 14 months in the complete-case analysis (our primary measure of effectiveness). The cost data collected showed that simply incorporating Girls Active into curriculum time was the least financially costly option. The flexible nature of the programme often created uncertainty and, because of the lack of milestone dates and issues with competing priorities, teachers often found that they prioritised other tasks in their workload. Overall, the Girls Active programme was considered to be worthwhile by teachers, but they did not achieve everything they set out to do. Although teachers felt that what they had done within the 14-month evaluation period had made a positive impact on girls' motivation, engagement and attendance, this was not reflected in any changes in self-reported views from the random sample of participants who were evaluated.

The cluster design, the use of an objective method of assessing PA levels, the gathering of cost data from diaries and a log that was codesigned by teachers and the research team and the gathering of views from a wide range of pupils are marked strengths that should be included in future trials. However, a narrower or more targeted evaluation sample may have yielded different results. Future interventions should consider how flexibility within a programme can be appropriately combined with the support that teachers require for effective and sustainable implementation. The Girls Active programme was viewed positively by teachers and pupils. Although it was designed to be flexible, future implementation may need to provide teachers with more support regarding how to implement certain activities during the programme and by providing strategies for teachers to engage more senior staff and to delegate to peer leaders. Capitalising on the opportunities of a flexible programme like Girls Active while also learning from the barriers and challenges that teachers face in supporting girls' PA is a priority for research and practice.

Trial registration

This trial is registered as ISRCTN10688342.

Funding

Chapter 1 Introduction and background

Background and rationale

Physical activity levels of young people

It is well known that participation in regular physical activity (PA) has numerous short- and long-term physiological, psychological and social benefits for young people.[1–3] For example, reviews[1,2] have shown that PA can improve blood pressure and bone mineral density, can lead to improvements in self-esteem and depression and, in the longer term, it can prevent chronic disease. Despite these benefits, a significant proportion of adolescents are not meeting the recommended guideline of participating in ≥ 60 minutes of moderate to vigorous intensity PA (MVPA) each day.[4] A recent review of pan-European studies[5] found that, across all countries, less than 30% of adolescents achieved the recommended levels of MVPA. Furthermore, data from two of the most comprehensive surveys (the Global School-based Student Health Survey[6] and the Health Behaviour in School-aged Children study[7]) showed that an even larger proportion of adolescents (80%) were not meeting the guideline levels of MVPA.[2] However, this proportion has been shown to be even higher when measured using accelerometers, with approximately 95% of 5- to 17-year-olds failing to meet the recommended level.[8] Data specific to the UK (collected in 2015) suggest that only 17% of 11- or 12-year-olds and 12% of 13- to 15-year-olds are sufficiently active.[9] Furthermore, it has been consistently shown that, as children get older, boys are more active than girls.[2,5,8,9] For example, data from the Health Survey for England 2015 showed that, while both boys and girls exhibit low levels of PA, only 16% and 9% of girls aged 11/12 years and 13–15 years, respectively, meet the guideline levels, compared with 15% of boys in each of the same age groups.[9] Worldwide data[2] reinforce these findings, with the proportion of adolescents not achieving ≥ 60 minutes of MVPA per day being ≥ 80% in 56 out of 105 countries (53%) for boys and in 100 out of 105 countries (95%) for girls. Girls have therefore been identified as a key target for behaviour change in an effort to increase PA levels and improve current and future population health.

Physical activity interventions in adolescents

A plethora of PA interventions aimed at young people have been conducted over the past two decades.[10–13] These interventions have been varied in their approaches to increasing PA levels but they can be grouped into interventions targeting changes in the school cultural or physical environment, interventions targeting changes in the school curriculum, interventions incorporating extra PA within the school day, education-only interventions, after-school interventions, and interventions with a community or family component. Published reviews[10,13] have found some evidence that interventions focused on increasing PA levels in adolescents can be effective, although only modest effects have been found. van Sluijs et al.[11] found that over half of the studies (n = 38, 67%) included in their review showed a positive intervention effect ranging from an increase of 2.6 minutes during physical education (PE) classes to a 42% increase in participation in regular PA and an increase of 83 minutes per week in MVPA, with multicomponent interventions providing the strongest evidence of an effect. A more recent review of interventions in older adolescents[13] reported more promising results, with 7 out of 10 studies showing a significant difference in PA levels between intervention and control groups. Effects were generally small and short term (no longer than 1 month post intervention). Two reviews[10,14] have been conducted that focus solely on the effectiveness of PA interventions aimed at adolescent girls. In a narrative review, Camacho-Miñano et al.[10] reported mixed results, with 10 out of 21 interventions showing a modest favourable intervention effect for PA levels. More recently, a meta-analysis quantifying the effectiveness of PA interventions among adolescent girls[14] concluded that PA interventions had 'small' but significant effects. Compared with girls receiving the control conditions, those who received the intervention participated in 13.7% more PA than those who did not. Subgroup analyses showed that multicomponent interventions, those focusing on both PA and sedentary behaviour, theory-based interventions and intervention designs of high quality showed small trends in effecting the primary

outcomes.[14] Furthermore, significant trends were found for interventions that were aimed at girls only, targeted at younger adolescent girls or delivered within school-based settings.[14]

These reviews[10–14] have consistently reported several major methodological limitations of previous research that have had an impact on the ability to draw robust conclusions. The vast majority of studies have suffered from weak methodological quality. This can be attributable to small sample sizes, which can lead to high rates of bias, and a reliance on PA outcomes that are assessed by self-report.[10,13,15] Furthermore, a high proportion of studies have been conducted in the USA.[10] For example, 18 of the 24 studies included in one review[11] were conducted in the USA. This makes generalisability to other countries difficult, particularly because of differences in school infrastructure, curriculum, policies and practices and culture. These reviews[10,13,15] have also noted a lack of long-term follow-up to evaluate the effectiveness of interventions in the longer term.

Importance of peers

Social support from parents, family and friends has been identified as a key determinant of young people's PA level.[16,17] However, it has been observed that, as children move into adolescence and spend more time with their peers, support for PA from peers is reported to be more important than support from other sources.[18] Furthermore, numerous reviews have demonstrated a positive link between peer support and PA levels,[19,20] and specifically for adolescent girls' PA levels.[21] A 2014 review[17] noted that peer support showed the greatest consistent association with PA level when compared with other sources of support. Greater social support from peers has also been associated with higher levels of self-efficacy, which, in turn, has been associated with higher PA levels.[16] Peers have been found to influence PA levels in a number of ways, including through the provision of encouragement and praise, joint participation in activity, the modelling of being active and by simply being present during PA.[17,19,20]

This evidence from previous studies suggests that interventions that incorporate the influence of peers might be a useful avenue for increasing adolescent PA levels. Despite this, very few interventions have used peers as an intervention strategy. One review[10] identified only two interventions that had focused on utilising the peer influence for promoting PA among adolescents and concluded that peer interventions showed promising evidence for being effective. More recently, further evidence has been published[22] that supports the effectiveness of peer inclusion in interventions. Spencer *et al.*[22] reported that training peers to act as mentors by promoting PA during lunchtimes was successful in increasing PA levels during the school day.[22]

The extensive amount of evidence highlighting the important role that peers play in adolescent PA and the limited intervention evidence conducted to date using the influence of peers highlights the need for future research to focus on the effectiveness of peer-focused interventions for increasing PA levels during adolescence.

Development of the Girls Active programme

The 'Girls Active' programme builds on more than 10 years of developmental work by the Youth Sport Trust (YST) (www.youthsporttrust.org; accessed 5 June 2018) on programmes specifically designed to engage girls in PA, sport and PE. The YST is the largest UK charity that is dedicated to the provision of school sport and high-quality PE for young people. Through partnerships and working with schools, the YST aims to create a brighter future for young people through programmes that increase opportunities for well-being, leadership and achievement. In 1998, Nike, Inc. (OR, USA) and the YST established the Nike Girls in Sport programme, which equipped PE teachers with the skills and ideas to develop girl-friendly PE. The Norwich Union Girls Active initiative (2006) built on this work, empowering teenage girls to enjoy PE and sport by having a stronger student voice and a greater choice of activities. However, despite the success of these initiatives and the excellent practices implemented in some schools, research[23] found that, although PE and school sport met the needs of 'sporty' girls, they often remained unattractive to those who were less active. The YST then undertook more research to establish how to make PA, PE and sport

relevant to all girls, to encourage them to participate more and to feel that being physically active is a positive part of who they are. As a result, and building on the earlier programmes, the YST worked with schools to create the Girls in PE and Sport initiative in 2012. This initiative underwent a pilot evaluation in 21 schools across England and Scotland. Questionnaires and interviews were conducted with a subsample of pupils and teachers ($n = 189$) at two time points during the initiative delivery period. The results demonstrated that the pilot was viewed very positively by school leads, pupils and peer leaders alike.[24] The school leads universally praised the training, support and resources for their clarity and usability and reported that this type of programme was sustainable in the long term. Suggestions for further support included school case studies, material to display in the schools and visits to schools to observe practice and share ideas. The girls involved in the pilot reported improvements in key determinants of behaviour change. For example, girls identified PA, sport and PE as fun, as an opportunity to be with friends, as feminine and as a part of who they are and what they do. Girls also reported feelings of confidence to take part and reported looking forward to PE, feeling positive about it and being more likely to want to take part in extracurricular PA. In addition, some important changes to self-reported PA participation were seen, including increases in the percentage of girls reporting walking to school and a decrease in the number reporting never achieving ≥ 60 minutes of PA. The peer leaders also reported positive experiences as a result of the pilot: they felt that the role had been fun and rewarding and they enjoyed having new responsibilities, encouraging other girls to be active and having an opportunity to influence PA delivery in the school. Following this successful pilot, the next logical step was for Girls Active to be formally evaluated through a cluster randomised controlled trial (RCT) with objective measures of PA levels. A cluster design was appropriate as the programme was delivered at the school, rather than at an individual, level.

Details of the Girls Active programme

Girls Active is a school-based intervention aimed at girls in Key Stage 3 (KS3). KS3 is the first three years of secondary school for pupils aged 11–14 years and includes year groups 7, 8 and 9. It has been designed to provide a support framework for schools to review PE, sport and PA culture and practices to ensure that they are relevant and attractive to their 11- to 14-year-old female pupils. It has been designed to use leadership and peer marketing to empower girls to influence PE, sport and PA in their school, increase their own participation, develop as role models and promote and market PA, PE and school sport to other girls. The process was underpinned by teachers and girls working together to understand the preferences and motivations of girls with regard to PA participation. The research team undertook a post-hoc mapping of the programme elements and identified that the activities within the Girls Active programme are guided by social cognitive theory (SCT).[25] The proposed logic model is presented in *Figure 1*. The literature on PA in young people suggests that addressing multiple levels of influence on behaviour are key during adolescence.[10] Levels of influence can be from the individual level to the environmental level, and can mean creating choice for pupils through increasing access and opportunities to be active and fostering social support through positive peer relationships or friends.[10] These constructs are all embedded within SCT and have been incorporated into the Girls Active programme. Other core constructs of SCT, such as observational learning and self-regulation, have the potential to be undertaken as part of the Girls Active activities within schools. Although the intervention is multicomponent and designed to be flexible in delivery, it does have several key components that schools were encouraged to engage with and implement as described in *Chapter 2, Intervention group: Girls Active programme*.

Aim and objectives

The main aim of the study was to evaluate the effectiveness and cost-effectiveness of the Girls Active programme in a multiethnic area of the UK.

Influential factors
- Local and national policy
- Other initiatives and campaigns (e.g. This Girl Can)
- Season and holidays

Resources
- Funding (YST)
- School resource packages
- Trainers
- Hub school

Activities
- Mission analysis
- Train school leads
- Peer leadership and marketing group
- Teacher–student collaboration (student voice)
- Support from health and well-being hub (mentoring to schools)
- Peer review day
- Capacity building funding

Theory
- Social cognitive theory
  - Create relevant and desirable behavioural choices
  - Create supportive social environment
  - Increase access and opportunities (physical environment)
  - Target individual barriers and motivators

Outputs
- Number of:
  - Completed mission analysis forms
  - School leads trained
  - Peer leaders per school
  - Peer leaders trained
  - Interactions with health and well-being hub
  - Attending peer review day
  - Applications for capacity funding

- Reactions to:
  - School lead training
  - Peer leader training
  - Peer review day

- Capacity funding spend
- Changes in school provision/environment

Changes in:
- Perceptions of the school environment (teacher and pupil)
- Psychological mediators of PA

Short- and long-term outcomes
- Increases in:
  - MVPA
  - Total PA
  - % of girls meeting PA guidelines

- Improvements in body composition

Programme goal
- Adoption of a physically active lifestyle

FIGURE 1 The proposed logic model for the Girls Active programme.

Primary objective

To investigate whether or not the Girls Active programme leads to higher levels of objectively measured MVPA in adolescent girls compared with the control group at 14 months after the baseline assessment.

Secondary objectives

- To investigate whether or not Girls Active results in changes in the following outcomes among adolescent girls in the intervention group compared with those in the control group at 7 and 14 months' follow-up:

    - objectively measured overall PA level (mean acceleration)
    - the proportion of girls meeting the recommended PA target of 60 minutes per day of MVPA
    - time spent on MVPA (at 7 months)
    - time spent sedentary (assessed objectively and via self-report)
    - measures of body composition
    - psychological factors that may mediate PA participation (health-related quality of life; PA self-efficacy; PA motivation; social support from peers, family and teachers; PA enjoyment; perceived importance of PA; and physical self-perceptions).

- To undertake a full economic analysis of the Girls Active programme, from a multiagency public sector perspective, at 14 months' follow-up.
- To conduct a mixed-methods process evaluation throughout the intervention implementation period (using qualitative and quantitative measures) with teachers, students and peer leaders and the YST to provide insights into the ways in which, and extent to which, the intervention was implemented and into participant experiences of the intervention.

Chapter 2 Study design and methods

Girls Active is a school-based cluster RCT. The trial was registered with the International Standard Randomised Controlled Trial Number registry prior to recruitment of schools or data collection (www.isrctn.com/ISRCTN10688342; accessed 5 June 2018). The trial protocol was published in 2015,[26] and is accessible online (www.journalslibrary.nihr.ac.uk/programmes/phr/139030; accessed 5 June 2018). A more detailed statistical analysis plan was subsequently signed off before any analysts had access to data. Documents related to the tools and methods described herein can be found at www.leicester diabetescentre.org.uk/Girls-Active (accessed 10 January 2019).

Ethics approval and research governance

Ethics approval for this research study was obtained from the University of Leicester College of Medicine and Biological Sciences research ethics representative prior to commencement of the study. The study was sponsored by the University of Leicester. All measurement team members were required to have a current enhanced Disclosure and Barring Service check. The measurement team leaders also completed the University Hospitals Leicester NHS Trust Safeguarding Children Policies and Procedures online training and were made familiar with the traffic light system for referrals to the University Hospitals Leicester safeguarding team.

School and participant recruitment

All state secondary schools in Leicester, Leicestershire and Rutland (LLR) with female pupils aged 11–14 years ($n = 56$ schools) were eligible and were invited to take part in the trial along with 26 other state secondary schools in Derbyshire, Nottinghamshire and Warwickshire. These schools were sent an initial letter outlining the Girls Active programme and evaluation and inviting them to a briefing event. At the briefing event, the school representatives received a detailed presentation about the Girls Active programme, the evaluation methods and the requirements of being involved. At the end of the briefing event, the school representative was given a written information pack for the head teacher, along with a school consent form. If schools were interested in being involved, they returned the consent form that had been signed by the head teacher. Following the recruitment of each school, a member of the research team contacted the designated lead teacher directly by e-mail. The school was then provided with an invitation pack for all eligible girls. Girls were eligible if they were in KS3 and between the ages of 11 and 14 years. The invitation pack contained an invitation letter to the parent(s)/guardian(s), a parent/guardian information sheet, an opt-out consent form for the parent(s)/guardian(s) (a signed opt-out consent form was required only if parents did not want their child to participate) and a participant information sheet for the girls. The parents/guardians had up to 2 weeks to return the opt-out consent form to the lead teacher. It was made clear to the parents/guardians and children that, even if they opted in at baseline, they were free to withdraw from the study at any time. At the end of the 2-week opt-out period, the lead teacher removed the names of any girl who returned the opt-out consent form or who told them that they did not want to participate from the list of participants. If > 90 girls were left as eligible (i.e. had not returned the opt-out consent or had not opted themselves out), 90 girls were randomly selected to take part using a computer-generated number system along with five back-up pupils. The lead teacher then invited these girls to attend the baseline measurement session.

At the beginning of the baseline measurement session, all methods were fully explained to the participants (girls aged 11–14 years) by a measurement team member who was suitably qualified and experienced and who was authorised to do so by the chief/principal investigator, as detailed on the delegation of authority and signature log for the study. Each participant then gave verbal assent if they were happy to participate.

Verbal assent was requested again at the start of each follow-up measurement session. All schools received a £500 payment following the final measurement session at 14 months.

Stakeholder involvement

Key stakeholders were involved in the study through the Trial Steering Committee (TSC), cost diaries and school reports.

Trial steering committee

There were two lay members in the TSC to ensure that at least one would be available for each meeting. One was a former PE teacher (who attended one out of four meetings) and the other was a member of the public health team at the local government level (who attended two out of four meetings, with an in-person and e-mail debrief supplied for the missed meetings). The lay members contributed valuable insights on the school/education landscape and the local policy context in which this research sits. Certain questions for the lead teacher interviews were added or modified based on the input of the TSC, including a question on the impact of Girls Active on boys. A focus group with boys was also included on their recommendation.

Cost diaries

The feedback from the lead teachers was instrumental in refining our research methods in relation to the cost diaries. Feedback from lead teachers that came via the YST and direct from the teachers themselves was that the Microsoft Excel® (Microsoft Corporation, Redmond, WA, USA) cost diaries were difficult to manage. The research team took this feedback on board and, at the peer leader event, cocreated a simpler version of the cost diary with the help of all teachers in attendance. The lead teachers who found the original Microsoft Excel diary usable gave advice to the other lead teachers, meaning they supported the data collection process by helping their peers to understand and navigate the diaries.

School reports

At the 7-month interviews, lead teachers were asked which variables and measure would be of most interest to them and their school. This allowed the research team to create a personalised report to give to each school; this report contained the school's baseline data, which was aggregated to school means (the reports were presented to schools in September 2016). Teachers felt that it was important to capitalise on the data and to use them within their schools to advocate for better or continuing provision of PA, PE and school sport.

Randomisation groups

Intervention group: Girls Active programme

Girls Active is a school-based programme aimed at girls in KS3. It has been designed to provide a support framework for schools to review their PE, sport and PA culture and practices to ensure that they are relevant and attractive to their 11- to 14-year-old female pupils. Although the intervention was multicomponent and designed to be flexible in delivery, it had several key components that were considered integral to the Girls Active process.

- Self-evaluation and mission analysis. Schools completed a mission analysis document, which helped them to review their existing culture and practice for girls' PA within the school and to set out an action plan tailored to their girls' needs. This process drew on review, planning and evaluation frameworks used by UK sporting associations internally to generate sporting success at the 2012 London Olympic and Paralympic Games. This analysis was an exercise that was carried out twice by lead teachers at their schools: the first time as a 'pre-course' task ahead of the initial training and again after the peer review day.

- Initial training for school leads. Lead teachers attended a 1-day face-to-face group training event at the hub school to introduce all school leads to the Girls Active programme. This event was facilitated by a YST national tutor. This training event had the following objectives:

  - to support teachers to explore their role and effectiveness in engaging girls in PE and sport in school
  - to challenge teachers to consider girls' motivations in relation to PE and sport
  - to help teachers look at how a marketing approach can increase girls' participation
  - to enable teachers to review a range of case studies and support resources
  - to provide teachers with the opportunity to share and develop practice with their peers
  - to challenge teachers to develop an action plan to support the Girls Active project with the support of other teachers and members of the senior leadership team.

The training objectives were covered in seven sessions during the training day, which involved a combination of presentations, discussions, practical activities and opportunities for teachers to share challenges, successes and ideas with each other and the tutors.

Figure 2 presents the Girls Active delivery model.

Package of resources for schools
At the face-to-face training day, schools received a package of resources from the YST, which was aimed at the teachers and the peer leadership and marketing group. This package contained resources such as marketing plans, an action planning guide, case studies, still and video images to stimulate discussion and a 'Making it Yours' branding toolkit for peer leaders, which included a CD (compact disc) with logos, graphics and designs that peer leaders and teachers could use in the campaign at their school.

Peer leadership and marketing group
At their schools, lead teachers agreed to establish a peer leadership and marketing group consisting of KS3 girls. It was suggested that these girls should be those who are not necessarily already engaged in sporting and physical activities or particularly enthusiastic about participation, but girls who would be seen as leaders for non-sporting reasons and, thus, could have a positive influence on their peers. The purpose
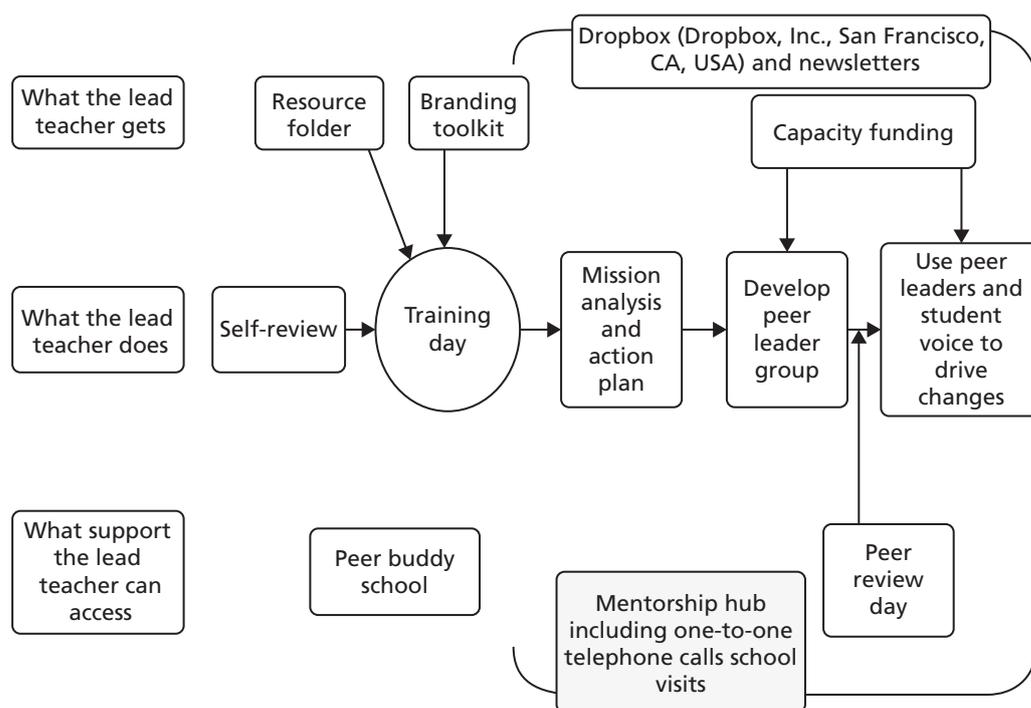
FIGURE 2 The Girls Active delivery model.

of this group was to influence decision-making in the school, enable girls to develop as role models, promote PA to other girls and run peer-led PA sessions and events.

Using the student 'voice' to develop and market ideas for change

Schools were encouraged to consider the 'voice' of the adolescent when making important decisions about PA, PE and sport in the school, including the provision of changing facilities, kit, activity content, programming, inclusion and imagery. Schools were encouraged to facilitate teachers and girls working together to come up with innovative and alternative physical activities and sports that the girls would like to participate in and that could be incorporated into PE and extracurricular activities. Schools were challenged to consider a 'different type' of student voice: one that has probably not been used before as it involves students who would not traditionally be involved in this type of provision.

Ongoing support and mentorship from the health and well-being school and the Youth Sport Trust

Ongoing support and mentorship was available to schools through the local health and well-being school in Leicester and the YST. This ongoing support consisted of telephone and e-mail support and one-to-one in-person visits. This provided the opportunity for schools to seek advice on implementing their action plan and to discuss ideas and solutions to overcome any barriers and challenges as a result of the implementation of Girls Active.

Peer review for teachers

All schools were invited to a face-to-face group peer review (half-day) event at the hub school to identify learning and share ideas. The peer review day was organised by the YST and run by a representative from the hub school (the school sport development manager) and a YST development coach. The objectives of the peer review event for teachers were to provide schools with the opportunity to learn about and share good practice, to share and celebrate success among the schools and for schools to receive peer-to-peer coaching. Following this review day, the schools were required to revise their mission analysis as necessary and submit it to the YST.

Funding for capacity building within schools

Schools were provided with a capacity payment of £1000, in two £500 instalments. These instalments were released on submission of the school's mission analysis action plan documentation to the YST. The schools chose what to spend the money on.

Control group: usual practice

Schools randomised to the control arm were not given any specific guidance or advice and were assumed to continue with usual practice. A questionnaire was administered at each of the measurement time points to capture the school environment, including what the schools offered to girls in KS3 outside the typical PE and school sports clubs. Locally organised activity days available to girls in Leicestershire schools and the This Girl Can campaign were mentioned.

Randomisation

Once participants had completed the baseline measurements, the schools (clusters) were randomised to one of the two groups in equal proportions (1 : 1). An independent senior statistician within the Leicester Diabetes Research Centre generated the random allocation sequence and randomly assigned schools to their group. The randomisation of clusters was stratified by school size (median < 850 or ≥ 850 pupils) and percentage of black and minority ethnic (BME) pupils (median < 20% or ≥ 20% of pupils). A folder with sequentially numbered sections was used to implement the group allocations. The investigator team were not aware of the sequence until after the school was randomly assigned to a group. In order to reduce bias at the follow-up measurement sessions, the research team members conducting measurement sessions within the schools were blinded to randomisation. The team lead for the measurement sessions was not blinded. The named trial statistician was not blinded. However, the statistical analysis plan was

published before data collection was completed. Any deviations from the statistical analysis plan are reported in *Chapter 3*, *Changes to the planned analysis*.

Sample size

This trial was designed to provide adequate power to detect a difference in objectively measured MVPA of 10 minutes per day between groups, a magnitude that has been associated with a meaningful difference in cardiometabolic risk factors for young people.[27] In order to detect a difference of 10 minutes per day between groups, assuming a standard deviation (SD) of 18 minutes of MVPA,[28] a power of 90%, a 0.05 level of statistical significance, a cluster size of 56 girls and an intraclass correlation of 0.1, the targeted sample size was 18 schools, increasing to 20 schools (10 schools per group) to allow for cluster attrition. To allow for 30% loss to follow-up and non-compliance with accelerometer wear, a random sample of 80 girls per cluster (1600 girls in total) was needed. This sample size was independently validated.

Incomplete follow-up

For each school, follow-up sessions were scheduled at 7 and 14 months post study baseline. If > 10% of pupils were absent from the school during the follow-up sessions, then a bespoke return visit was undertaken in order to obtain complete data for the evaluation of the primary and secondary end points. Follow-up was terminated only for any one of the following reasons:

- no assent was given
- the participant opted out at 7 months
- the participant opted out at 14 months
- the participant left school between baseline and 7 months
- the participant left school between 7 and 14 months
- the participant was absent or unavailable at 14 months
- we were unable to collect any data from the school.

Summary of outcome measures

The primary and secondary outcome measures detailed in the following sections were collected during the trial (*Table 1*). All data were collected in the participating schools during school hours by the measurement team that travelled to the schools. Each participant was assigned a unique participant identification (PID) number that was used throughout the trial.

TABLE 1 Processes and assessments at each measurement visit for pupils

Assessment	Time frame	Processes and assessments undertaken
Baseline	February 2015 to April 2015	• Overview of the methods, verbal assent • Accelerometer • Questionnaires • Anthropometric measurements
7-month follow-up	September 2015 to November 2015	• Overview of the methods, verbal assent • Accelerometer • Questionnaires • Anthropometric measurements
14-month follow-up	April 2016 to June 2016	• Overview of the methods, verbal assent • Accelerometer • Questionnaires • Anthropometric measurements • Exit survey • Additional questions

Primary outcome measure
The primary outcome measure was accelerometer-assessed mean number of minutes per day of MVPA at 14 months for participants.

Secondary outcome measures
Data for the following secondary outcome measures were collected from participants at 7 and 14 months:

1. accelerometer-assessed overall PA level represented by mean acceleration per day (overall and split by weekday and weekend day, and during school hours and after school hours)
2. accelerometer-assessed mean minutes per day of MVPA on weekdays and weekend days split, and during the school hours and during the after-school hours split
3. the proportion of girls meeting the recommended PA guideline level of 60 minutes per day of MVPA
4. time spent on MVPA at 7 months
5. accelerometer-assessed mean number of minutes per day of sedentary behaviour (overall and split by weekday and weekend day, and during school hours and after school hours)
6. self-reported (via a validated questionnaire) mean time spent in different types of sedentary behaviours
7. measures of body composition [i.e. body mass index (BMI) z-score and percentage of body fat]
8. psychological factors that may mediate PA participation (health-related quality of life; PA self-efficacy; PA motivation; social support from peers, family and teachers; enjoyment of PA; perceived importance of PA; and physical self-perceptions).

Detailed description of measures

Accelerometer measurements
Participants were asked by the measurement team to wear the wrist-worn GENEActiv™ (Activinsights Ltd, Kimbolton, UK) accelerometer on their non-dominant wrist continuously (i.e. 24 hours/day) for 7 days to assess PA and sedentary time. This lightweight research-grade device resembles a sports watch and is waterproof. Published cut-points are available to classify sedentary time and MVPA based on children's observations and indirect calorimeter data.[29,30] The GENEActiv accelerometer was selected for these advantages and, based on the team's previous experience and feedback from secondary school pupils at a patient and public involvement event, continuous wrist wear helps maximise compliance and reduce missing data in this age group. The GENEActiv devices were initialised with a sampling frequency of 100 Hz and were set to start recording at midnight on the first day of data collection and stop recording at midnight 7 days later. The accelerometers were distributed at the school measurement visit and collected from the school between 8 days and 3 weeks after the measurement visit. GENEActiv data were downloaded using GENEActiv software version 2.2 (Activinsights Ltd, Kimbolton, UK) and saved in a raw format as binary (.bin) files. Participants were given a £5 gift voucher as a thank you for providing full data. Data were included if participants had over 16 hours of wear time recorded during each 24-hour day.

Accelerometer data processing and analysis
The GENEActiv .bin files were analysed with GGIR version 1.2-11 [R Project; The R Foundation for Statistical Computing, Vienna, Austria; http://cran.r-project.org (accessed 5 June 2018)].[31,32] Signal processing in GGIR includes the following steps:

1. autocalibration using local gravity as a reference[31]
2. detection of sustained abnormally high values
3. detection of non-wear

4. calculation of the average magnitude of dynamic acceleration {i.e. the vector magnitude of acceleration corrected for gravity [Euclidean norm minus one (ENMO) g]} over 5-second epochs with negative values rounded up to zero as:

$$ENMO = \sum \sqrt{x^2 + y^2 + z^2} - g. \tag{1}$$

Files were excluded from all analyses if post-calibration error was greater than 0.02 g[33] or if less than 16 hours of wear time was recorded by either monitor during the 24-hour day of interest. Detection of non-wear has been described in detail in 'procedure for non-wear detection' in the supplementary document in van Hees *et al.*[32] In brief, non-wear is estimated based on the SD and value range of each axis, calculated for 60-minute windows with 15-minute moving increments. If, for at least two out of the three axes, the SD is less than 13 mg or the value range is less than 50 mg, the time window is classified as non-wear.

The average magnitude of dynamic wrist acceleration (ENMO), time accumulated in sedentary behaviour, light-intensity PA, MVPA and time spent sleeping were calculated over the entire 24-hour day. Thresholds for determining PA intensity categories were as follows: 0–40 mg for sedentary behaviour (minus sleep), 41–199 mg for light activity and ≥ 200 mg for MVPA.[29,30] Each school reported the start and end times of each school day. These times were then used to extract activity variables (sedentary time, light activity and MVPA) during and after school hours. The after-school period was until 21.00 hours.

In order to partition sleep from total daily sedentary time, sleep was determined using the nocturnal sleep detection algorithm incorporated in GGIR.[34] Periods of sustained inactivity are defined as no changes in arm angle of greater than 5° for ≥ 5 minutes during the 12-hour window, centred at the least active 5 hours of the 24-hour period. Individual nights were excluded from the sleep analyses if the sleep duration recorded for a night was < 6 hours or > 12 hours and if visual examination suggested non-wear or erroneous data. Variables extracted were time of sleep onset to wake (called 'time in bed' in the software output but actually time from sleep onset to wake and waking time determined from accelerometer data), sleep duration (total sleep duration determined from accelerometer data excluding detected waking episodes during the night) and sleep efficiency (sleep duration/time in bed × 100). Sleep variables were averaged for weekday nights (Sunday to Thursday) and weekend nights (Friday and Saturday).

The following accelerometer variables were calculated:

- average time spent in MVPA (overall and split by weekday and weekend day, and during school hours and after school hours)
- average time spent in sedentary and light PA (overall and split by weekday and weekend day, and during school hours and after school hours)
- overall PA level (average acceleration) for the whole measurement period and split by school days and weekend days.

School (cluster) characteristics

Free school meals eligibility
The proportion of full-time pupils eligible for free school meals was collected as a proxy indicator of school-level deprivation. These data were obtained from the January 2015 Department of Education census.[35] These data were used as a confounder in the primary and secondary analyses.

School size
Pupil numbers were reported by the teacher and these were verified by 2015 school census data.[35] This variable was used as a randomisation stratification factor and also included as a confounder in the primary and secondary outcome analyses.

School environment

Lead teachers completed a school environment questionnaire at the baseline, 7-month and 14-month follow-ups. Although this questionnaire was put together specifically for the study, it contained questions used in previous international school-based studies.[36] Lead teachers provided data on school PE, PA and sport staff (both full-time and part-time staff). Teachers provided an inventory of the PA opportunities at the school, both generally and specific to girls in KS3, which was adapted from the PE and Sport Survey.[37] The questionnaire also queried school provision for PA, including the availability of, opportunities for and access to PA and recreation facilities; whether or not PA, PE and sport policies and practices existed; and the structure of PE classes and clubs (e.g. split sex) similar to those in the International Study of Childhood Obesity, Lifestyle and the Environment school administrator questionnaire.[36] The questions had multiple-choice answers with free text space to allow the teachers to expand on their answers.

Participant demographic characteristics

Age

Participant age at each measurement visit (in months) was calculated from participants' self-reported date of birth.

Ethnic background

Participants self-reported their ethnic background in response to a question asked by the researcher. The participant was shown a list of 16 categories that aligned with the categories used in the 2011 UK census. Participants chose one category that best represented their ethnic background without assistance from the measurement staff member.

Index of Multiple Deprivation

The English Index of Multiple Deprivation (IMD) 2015[38] is the official measure of relative deprivation for English neighbourhoods. IMD scores based on participant postcode were used as an indicator of relative deprivation and participant socioeconomic status. IMD scores are publicly available continuous measures of compound social and material deprivation that are calculated using a variety of data including current income, employment, health, education and housing. As a postcode could be deemed a sensitive piece of information, a full description of why postcodes were being collected was given to participants, in addition to reassurance that postcodes would not be recorded or stored with any of their health-related information. These postcodes were uploaded to an online 'postcode lookup' tool (URL: http://imd-by-postcode.opendatacommunities.org/ accessed 29 August 2018), which outputted the corresponding IMD rank and decile. The IMD ranks every small area in England from 1 (the most deprived area) to 32,844 (the least deprived area), and the decile represents where the neighbourhood is positioned when IMD ranks are divided into 10 equal groups.

Anthropometric measurements

Owing to the relationship that PA has with adiposity, and the potential for school-based programmes to have an impact on the prevention of obesity,[39] assessment of height and weight was undertaken by the measurement team for the calculation of BMI. Sitting height was measured as it is used, in addition to height and weight, to predict age at peak height velocity (APHV) using a sex-specific multiple regression equation.[40] APHV is an indicator of physical maturity, reflecting the maximum growth rate in stature during adolescence. All anthropometric measurements were taken in a private, screened-off area, and only female research team members took the measurements. Weight was measured using scales with a covered remote display so that the participants did not see their own weight. The girls were reassured that all measurements were confidential and that research data would be linked only using a non-identifiable participant number. Participants removed their shoes, any large items of clothing, such as jumpers and any items from their pockets. In order to assess body composition via impedance, participants were asked to also remove socks or tights.

Standing height

Standing height was measured to the nearest 0.1 cm using a portable stadiometer (Seca 213; Seca, Birmingham, UK), with the participants standing fully erect with their arms by their sides and their head in the Frankfort plane. Measurements were taken twice, and an average of the two measurements was used.

Sitting height

Sitting height was measured to the nearest 0.1 cm using the portable stadiometer, with the participant sitting fully erect with their legs hanging freely while sitting on a high stool. Measurements were taken twice, and an average of the two measurements was used.

Body mass

Body mass was measured to the nearest 0.1 kg using an electronic scale with a remote display (Tanita SC-330ST; Tanita Europe BV, Middlesex, UK).

Body fat percentage

Body fat percentage was estimated via bioelectrical impedance using a body composition analyser specifically designed for young people (Tanita SC-330ST). Participants were asked whether or not they had a pacemaker or another implanted medical device prior to the measurement. If they reported that they did, then the basic weight function was chosen instead of the impedance function.

Body mass index *z*-score calculation and categorisation

Body mass index was calculated and converted to a BMI *z*-score based on UK reference data.[41] To calculate the BMI *z*-scores, the zanthro function in Stata® version 14.0 (StataCorp LP, College Station, TX, USA) was used[42] and *z*-scores were based on British 1990 growth reference data.[41] This is the same UK reference population as that used by Public Health England for the National Child Measurement Programme.[43] The variables required for the function are the participant's BMI [weight (kg)/height (metres)^2], age (in years) and sex (female was indicated as 1 using dummy variables). BMI *z*-scores were then categorised: scores of < -2 were categorised as underweight, scores ≥ -2 but < 1 were categorised as normal weight, scores > 1 but ≤ 2 were categorised as overweight and scores > 2 were categorised as obese.

Age at peak height velocity calculation and categorisation

A sex-specific multiple regression equation[40] was used. This technique estimates maturity status to within an error of $+1.14$ years for 95% of the time in girls[40] and has been utilised successfully in a number of studies.[44–46] Four variables were required: (1) chronological age (years), (2) standing height (cm), (3) sitting height (cm) and (4) body weight (kg). The leg length was estimated by subtracting the final sitting height from the final standing height. Interaction variables in the multiple regression equation included leg length and sitting height, age and leg length interaction, age and sitting height and age and weight. The ratio variable included weight divided by height multiplied by 100. The equation used to calculate years from APHV was:

$$
\begin{aligned}
\text{Years from APHV} = {} & -9.376 + 0.0001882 \times \text{leg length and sitting height interaction} \\
& + 0.0022 \times \text{age and leg length interaction} \\
& + 0.005841 \times \text{age and sitting height interaction} \\
& - 0.0.002658 \times \text{age and weight interaction} \\
& + 0.07693 \times \text{weight-by-height ratio.}
\end{aligned}
\tag{2}
$$

Subtracting the years from APHV from the participant's chronological decimal age provides a predicted APHV. Biological maturity categories were computed using the equation APHV $\pm$ 1 SD.[47] Girls with an APHV of < -1 SD were categorised as 'early maturing', whereas girls with an APHV of > 1 SD were categorised as 'late maturing'. Girls with an APHV that was within $\pm$ 1 SD were categorised as 'average maturing' or 'on time'.

Self-reported behaviours

A number of questionnaires were used to assess physical activities and sedentary behaviours that have proven relationships with current and future health outcomes and that may be affected by the Girls Active programme. These questionnaires were administered by the measurement team.

Sports and physical education participation

The Physical Activity Questionnaire for Adolescents (PAQ-A)[48] contains a set of questions that query individual activity participation. Participants were given a list of 27 common sports and activities and were asked whether or not they had participated in any of them within the previous 7 days. Five response options were available, ranging from 'none' to '7 times or more'. Participants were also asked how active they were in their PE classes over the previous 7 days, with five possible responses ranging from 'I don't do PE' to 'always'.

Psychosocial measures

A variety of psychosocial outcomes were assessed using existing questionnaires that have demonstrated reliability and validity for use with this age group, which were administered by the measurement team. A measure of internal consistency (Cronbach's alpha) for these questionnaires is reported for the Girls Active baseline questionnaire results, calculated using IBM SPSS Statistics version 20.0 (IBM Corporation, Armonk, NY, USA). Psychosocial outcomes were chosen as they could be included in a SCT-grounded logic model describing variables that could mediate any effects on the primary outcome. The words or terms in some of the questionnaires originating in the USA were adapted, when necessary, to make the wording more applicable in a UK setting. At each measurement visit, participants were given specific guidance on certain questions, words or phrases that had been identified in the pilot testing as being potential causes of difficulty for participants. A questionnaire standard operating procedure (SOP) was developed and each measurement team member was required to read it before the measurement session. This SOP contained a 'live' list of frequently asked questions, which came from the participants, and a set of standardised answers that the measurement team were instructed to give in order to avoid the measurement staff interpreting the questions in their own way.

Intention to be active

Participants were asked about their intention to be active for ≥ 60 minutes every day during the next month (three items on a seven-point Likert scale, with responses ranging from 'very unlikely' to 'very likely'), using statements that were used in a previous study[49] and rephrased so that the term 'physical activity' was used in place of 'sport or vigorous physical activities'. Reliability was good, with a Cronbach's alpha of 0.88. For the analysis, a mean score of the three statements was used.

Importance of physical activity

Participants were asked to rate how important it was for them to be physically active regularly. They marked one number on a scale from 1 to 10, with 1 being 'very unimportant' and 10 being 'very important'.

Attitudes to being active

The participants responded to six positive and eight negative statements regarding how they felt about being physically active.[50] The responses were on a five-point scale, ranging from 'disagree a lot' to 'agree a lot'. For the analysis, the mean of both the positive statements ($\alpha = 0.57$) and the negative statements ($\alpha = 0.81$) was used as two individual variables. In an effort to create one variable that represents attitudes, the negative scores were reversed and a mean of all 14 statements was used [listed as 'whole attitudes' in the results (see *Table 15*)]. Reliability for the 'whole attitude' score was questionable, with a Cronbach's alpha of 0.65.

Perceived physical activity social support from family

Participants responded to three statements on their perception of their family's support for PA.[51] Responses were on a four-point scale, ranging from 'strongly disagree' to 'strongly agree' ($\alpha = 0.69$). A mean of the three statements was used in the analysis.

Perceived physical activity social support from peers

Participants responded to five statements on their perception of their peers' PA. These five statements reflected peers being active together and participants' perceptions of their peers activity levels.[51] Responses were on a four-point scale, ranging from 'strongly disagree' to 'strongly agree' ($\alpha = 0.73$). A mean of the five statements was used in the analysis.

Perceptions of the school environment

Participants reported on their perceptions of the school PA social (eight items including teacher encouragement and feelings of safety) and physical (eight items including equipment, facility quality and programming) environment. The shortened version[52] of the Questionnaire Assessing School Physical Activity Environment was used. Answers were given on a five-point scale, ranging from 'strongly agree' to 'strongly disagree'. Reliability was good, with a Cronbach's alpha of 0.86. A mean for both the physical environment and the social environment was used in the analysis.

Perceived physical education teacher autonomy support

Participants responded to six items on the Sport Climate Questionnaire that was previously modified to specify PE for use with adolescents.[53] The items query whether or not participants feel that their PE teacher is supportive of their autonomy and choice. Responses were given on a seven-point scale, ranging from 'strongly disagree' to 'strongly agree' ($\alpha = 0.89$). A mean of all statements was used for the analysis.

Physical activity confidence (self-efficacy)

Participants responded to eight statements about their confidence in taking part in PA under a range of situations, for example 'even if I could watch TV or play video games instead' and 'I can ask a parent or other adult to do physically active things with me'.[54] Responses were given on a five-point scale, ranging from 'disagree a lot' to 'agree a lot' ($\alpha = 0.83$). A mean of all statements was used for the analysis.

Physical activity enjoyment

Participants responded to 16 statements, seven of which were negative statements about their feelings when they are being active.[55] Participants provided responses on a five-point scale, ranging from 'no, not at all' to 'yes, a lot', to items including 'I enjoy it' and 'it's no fun at all' ($\alpha = 0.89$). Scores for negative statements were reversed and a mean of all 16 statements was used for the analysis.

Physical activity motivation

The participants responded to 20 items about why they take part in PA, which were taken from work by Goudas *et al.*[56] This whole questionnaire consisted of five motivation subthemes. These were (1) extrinsic (motivated by external goals; $\alpha = 0.80$), (2) introjected (motivated by external pressures that need to be accepted; $\alpha = 0.73$), (3) identified (motivated by engaging in activities that are a means to an end; $\alpha = 0.82$), (4) intrinsic (motivated by engaging in autonomous activities for pleasure and fun; $\alpha = 0.86$) and (5) amotivation (neither intrinsically nor extrinsically motivated and may not value the activity; $\alpha = 0.78$).[57] The reliability score for all of the constructs together was acceptable, with a Cronbach's alpha of 0.73. Responses were on a five-point scale ranging from 'no, not at all' to 'yes, a lot'. The mean of each subtheme was used in the analysis.

Physical self-perception

Participants responded to a range of statements on physical self-perception subthemes: self-esteem, physical self-worth and body attractiveness (six statements each). The items from the physical self-perception profile questionnaire included two opposing statements[58] that were difficult to answer, and so these were adapted, similar to previous work in adults,[59] to represent a simple statement that participants responded to on a five-point Likert scale, with responses ranging from 'strongly disagree' to 'strongly agree'. Negative statements were reversed. Reliability was good, with a Cronbach's alpha of 0.92. A mean for each subtheme was used for the analysis.

Other health behaviours

Data on potential negative health behaviours that might develop over time were also collected by the measurement team in an effort to assess any potential unintended consequences of the Girls Active programme.

Smoking

Whether or not the participant had ever smoked traditional cigarettes was queried using two simple questions from the Health Survey for England.[60] Participants self-reported whether or not they had ever tried a cigarette and, if they responded 'yes', chose one of five options ranging from 'I have only smoked once or twice' to 'I smoke more than six cigarettes a week'. Electronic cigarettes were not included in these questions.

Alcoholic beverage consumption

Whether or not the participant had ever drunk an alcoholic beverage was queried using two simple questions that were also from the Health Survey for England.[60] Participants self-reported whether or not they had had a 'proper alcohol drink – a whole drink and not just a sip'. If they responded 'yes', they chose one of seven options ranging from 'almost every day' to 'I never drink alcohol'.

Health economics methods

The health economics research questions were:

- What is the cost of delivering the Girls Active programme in the intervention schools taking part in the trial?
- What was the effect of the programme on the primary outcome measure (minutes/day of MVPA at 14 months) in the sample of participants included in the economic analysis (i.e. in participants who had both MVPA data and service use data)? (This was conducted as confirmatory analysis using the subset of the main sample for economic purposes as per standard economic practice.[61,62])
- What was the effect of the programme on the secondary economic outcome measures of frequencies and costs of general practitioners (GPs), school nurse and school counsellor contact, and on health-related quality of life measured by the Child Health Utility – 9D (CHU-9D) at 14 months?[63]
- Were there any statistically significant differences between the intervention group and the control group for marginal mean number of minutes per day of MVPA, CHU-9D[63] utility index scores and frequencies and costs of service use at 14 months?
- Did year group and level of implementation affect the results (to be done as part of exploratory subgroup analysis)?

Microcosting methods

Microcosting methodology[64] was applied to calculate the costs of delivering the programme over one school year for the intervention schools taking part in the trial and to provide a mean cost per school and per pupil. In this economic analysis, we fully costed the delivery of the Girls Active programme and its constituent costs, such as teacher time, and the cost of other consumables and materials used. Costs were collected from a local authority (school) perspective, accounting for oncosts, and using the cost year 2015/16. Costs were measured in Great British pounds sterling (GBP).

A cost diary was administered by one member of the research team (JMC) to the school leads responsible for delivering Girls Active. The diary asked school leads to complete a record of the additional time, or displaced time, taken to offer the Girls Active programme, and they described activities undertaken and items purchased (e.g. sports equipment or sports clothing such as hoodies). The diary was developed with input from the wider Girls Active research team and the YST, which was responsible for training and supporting teachers to deliver the trial. Three versions of the diary were used throughout the programme implementation. The diary was originally sent to teachers by e-mail as a Microsoft Excel file, with rows for

each activity and a space for 'other' activity and costs that were not covered by the other rows. The diary was sent with instructions and an example of a completed sheet to provide the respondents with the information and level of detail required when competing the diary. We asked the teachers to complete the diary weekly. A member of the research team requested the Microsoft Excel diary at 2-month intervals while the intervention was being implemented (April 2015 until May 2016). Any queries regarding the information that was provided were e-mailed to staff, and researcher contact details were provided in e-mails. After receiving the final Microsoft Excel diary, any final queries were sent by e-mail.

The research team received feedback that some teachers were struggling to keep the Microsoft Excel diary and were not comfortable with the format. In response, we created a paper logbook with sections to complete for activities and costs. These logbooks were printed and administered by the Girls Active research team. It was requested that teachers keep these logbooks with them in their own diaries and that they note activity and costs related to Girls Active as and when they happened. As a final method to ensure that we had information from Girls Active lead teachers, a survey was produced and administered during a peer review day that was organised by the research team and the YST. The survey used fields from the Microsoft Excel diary and the logbook and was followed up with a telephone call from the researcher responsible for the microcosting to provide context for the responses. Each of the three methods (Microsoft Excel diary, survey and logbook) requested demographic information about the teacher completing the diary, such as school name, job title and salary band.

The salary band information was used to calculate teacher costs in the microcosting, using the National Union of Teachers pay structure for qualified classroom teachers in England and Wales (from 1 September 2015 for cost year 2015/16).[65] A school year consisting of 39 weeks was used to calculate the teacher costs per hour, taking into account sickness, continuing professional development and annual leave. Salary calculations were inclusive of employers' oncosts. Oncosts include National Insurance and pension charges, as well as costs for annual increments and allowances.

When collating information from the diaries, any costs relating to research (e.g. time to complete diary or measurements or to undertake interviews) were not included in the final microcosting calculations. These were considered as research costs. This decision was made in order to provide local authorities with information pertinent for future rollout (training and delivery costs), rather than costs specific to conducting a research trial.

Cost–consequences methods

Perspective
Cost–consequences analysis is a form of health economic evaluation in which all costs and outcomes are listed in a disaggregated format. From a public sector multiagency perspective (community care, GP, local authority and school), we conducted a cost–consequences analysis of the Girls Active programme, using minutes of MVPA and health-related quality of life (CHU-9D),[63] as the outcome effects, and primary care (GP) and school-based services (school nurse and school counsellor), as the measure of costs.

Time horizon
Data were gathered at baseline, 7 months post baseline and 14 months post baseline. As the intervention follow-up period was more than 1 year, costs at 14 months post baseline were discounted at the base rate of 3.5% [National Institute for Health and Care Excellence (NICE) 2013[66]] as part of the sensitivity analyses.

Costs
The costs of the programme were calculated from a local authority (school) perspective using microcosting techniques.[64] As variation was found in the implementation of the programme across the schools, three costing scenarios were produced to reflect the different levels or dose of delivery activity.

Client service receipt inventory

The client service receipt inventory (CSRI)[67] is a questionnaire for collecting retrospective information about trial participants' use of health and social care services. The CSRI was administered at baseline, 7-month follow-up and 14-month follow-up, each time asking the participant to recall service use over the previous 7 months. This information was combined with national sources of reference unit costs[68] in order to calculate a mean cost of service use per participant per arm for the cost–consequences analysis. *Table 2* outlines the published unit costs, and their sources, used in this cost–consequences analysis. The cost year of 2015/16 was applied for all costs, and costs were given in GBP.

Consequences

The CHU-9D is a paediatric generic preference-based measure of health-related quality of life. It consists of nine dimensions (worried, sad, pain, tired, annoyed, school work/homework, sleep, daily routine and ability to join in activities) that take physiological, psychological and daily routine aspects into account. Participants have the choice of five responses for each dimension, ranging from 'I have no problems with [given dimension] today' to 'I can't do [given dimension] today'. The tool has been validated with children aged 11–17 years as a self-report measure.[63] The scores from each domain have a weighting applied and all domain weightings are summed together to produce a utility index.

Analysis

In order to analyse clustered data appropriately and in line with the main outcomes analysis, the main statistical analysis plan and methods as described in *Chapter 3*, *Analysis of the primary outcome*, were used for this cost-consequences analysis'. The generalised estimating equation (GEE) model was used to determine the difference in mean number of minutes per day of MVPA, CHU-9D utility index scores and service use frequencies and costs between pupils from schools allocated to the intervention group and those from schools allocated to the control group, taking account of clustering in the trial design. The variables included in the analysis and the GEE model specification were the same as those outlined in *Chapter 3*, *Analysis of the primary outcome*. For service use frequency and cost models, generalised linear model diagnostic tests were conducted because the models failed to converge using the GEE model structure. From the results of the diagnostic tests, the family was amended from Gaussian to gamma and the link was amended from identity to power –1. After changing these specific parameters, the models achieved convergence and these models were used for the variables of service use frequencies and costs in the xtgee models.

For the analysis of the CHU-9D, the utility index score was calculated using the syntax provided by the questionnaire developers.[70] We calculated the differences in marginal mean CHU-9D utility index scores between the groups and produced 95% confidence intervals (CIs) around these differences with 1000 bootstrapped replications. The change in marginal mean number of minutes per day of MVPA for the intervention group and the control group and the differences between the groups were calculated and 95% CIs around these differences with 1000 bootstrapped replications were produced.

TABLE 2 Unit costs of service use in GBP for cost year 2015/16: primary health care and community services

Health-care resource	Unit	Unit cost (£)	Details and source[a]
GP (clinic)	Visit	36	Per surgery consultation lasting 9.22 minutes, including direct care staff costs and with qualifications[b]
School nurse or specialist nurse	Visit	44	Per consultation lasting 30 minutes[c]
District nurse	Visit	42	Per 1 working hour with qualifications (band 6 Counsellor)[b]

a NHS costs to nearest £1, including salary, employers' costs, overheads and capital costs.
b From Curtis and Burns, 2016.[68]
c From Bywater *et al.*[69] and inflated to cost year 2015/16 using Hospital Pay and Prices Inflation Indices from Curtis and Burns, 2016.[68]

Sensitivity analysis

As the intervention follow-up period was > 1 year, as part of the sensitivity analysis service use costs at 14 months post baseline were discounted at 3.5% (the base rate recommended by NICE, 2013[66]), and the model was re-run with these discounted costs.

Missing data for mean number of minutes per day of MVPA, total frequencies of service use and total costs of service use were imputed as part of the sensitivity analysis, following the methods employed in the main analysis. The CHU-9D utility index scores were not imputed as the developers of the measure state that utility values cannot be calculated when questions have missing answers.[63] The developers advise that only observations with complete data should be included; therefore, in line with these recommendations, imputation was not conducted on the CHU-9D scores.

Exploratory subgroup analysis

As part of an exploratory subgroup analysis, the effects of year group and level of implementation, which were based on the levels described in the microcosting, were tested on mean number of minutes per day of MVPA, CHU-9D utility index scores and frequencies and costs of service use for the complete-case sample, by including them in the xtgee model run in the main analysis.

Analysis of costs

We compared the frequencies and costs of health care and school-based service use over 14 months between the intervention group and the control group. We calculated the marginal mean total service use for the intervention group and the control group. We went on to calculate the differences in marginal mean total service use between the groups, and produced 95% CIs around these differences with 1000 bootstrapped replications. Marginal means are presented throughout; this reports the mean following the xtgee model and takes account of clustering in the trial design.

Process evaluation methods

The process evaluation for Girls Active involved collecting data and information from a variety of sources over the course of the evaluation time frame. Information on process evaluation, data collection and timings is outlined in *Table 3*, based on the published plan around the level of implementation, reach, impact and sustainability. Although prespecified themes were included in the original process evaluation plan, other themes were added to the teacher and focus group question schedule (see *Appendices 1–3*) based on advice from the lay members of the TSC. Data were anonymised and any comments on observations that could allow individuals or schools to be recognised were removed.

Training resources

All resources used at the training events were collected. These included tutor notes, Microsoft PowerPoint® (Microsoft Corporation, Redmond, WA, USA) presentations, the event schedule and any sessional or post-training resources that were circulated. This was to help understand what training was delivered to lead teachers. An observer from the research team attended the peer review day and took notes in an effort to explore what was delivered to teachers compared with what was planned and how the teachers responded to what was delivered. A copy of the resource folder given to each intervention school was also obtained.

Feedback forms

At the end of the initial training day, peer review day and peer leaders event, participants completed evaluation forms that included questions on content, perceived learning, delivery and venue. These forms were designed and utilised by the YST for these types of programmes. Attendance records and feedback forms from the lead teachers and peer leaders were also collected.

TABLE 3 Summary of process evaluation data collection and analysis

Type of data	Collected from	Timing
School details	Self-reported by teacher, from school's own records and from the Department of Education's school census	School details reported at baseline, 7 months and 14 months; data from the 2015 census[71] are used herein
Training event resources	Documents used at the training (i.e. timetable, presentation and handouts)	During the training event
Training attendance and evaluation forms	Lead teachers at training	Following the initial training day and peer review day
	Peer leaders	After the peer leader event
Notes from training events	Observer	During the training event
Interviews	Lead teachers	7 and 14 months
	YST staff members	7 and 14 months
	The hub and development coach	7 and 14 months
Focus groups	Peer leaders	14 months
	Subgroups of evaluation sample	14 months
	A sample of boys	14 months
Exit survey	Girls in original sample in all intervention schools	14 months

Exit survey

All participants in the intervention schools were asked to complete an exit survey at the end of the 14-month measurement visit. This survey queried what the participants understood about Girls Active, whether or not they took part in any Girls Active activities, what their most and least favourite parts of Girls Active were and what their feelings and views were on a number of statements related to the programme.

School environment

Lead teachers completed a school environment questionnaire at baseline and the 7-month and 14-month follow-ups, as described in *School (cluster) characteristics*. This questionnaire captured any changes in the school physical and social environment that may have an impact on the delivery of Girls Active.

Lead teacher interviews

Interviews with all teachers were undertaken at the 7-month and 14-month follow-ups. *Appendices 1* and *3* provide the questions for the intervention school teacher interviews at 7 months and 14 months, respectively. A series of questions was mapped out to serve as an opening question. Probes were provided to the interviewer to help allow the participant to expand on the topic. The aim of these interviews was to understand what was delivered, whether or not there were any changes in the school and PE department that might have had an impact on delivery and to understand the barriers, facilitators, challenges and opportunities that the teachers encountered throughout their Girls Active programme journey. These interviews also provided an opportunity to get further feedback about training days, resources and support. *Appendix 3* contains the questions for the control school lead teacher interviews. The aim of these interviews was to get a brief understanding of what had been going on at the school and to see whether or not anything had changed in terms of PA, PE and sport provision for girls. Teachers were given a participant information sheet ahead of the interview and they signed a consent form.

Youth Sport Trust and hub school staff interviews

Interviews with intervention delivery staff (i.e. staff from the YST and the hub school and the development coach) were undertaken at 7 and 14 months. The aim of these interviews was to understand what was delivered to teachers by the YST and what support was given to schools by the hub school and by the development coach. We were interested in understanding what support was given, in knowing whether the school lead initiated the request for support and how the interactions between the teachers and the available support worked in practice. It was relevant to understand the barriers, facilitators, challenges and opportunities that were faced by the intervention delivery staff. Staff were given a participant information sheet ahead of the interviews and signed a consent form. The questions used in these interviews can be found in *Appendix 4*. The opening questions were followed by probes to prompt the participant to expand on the topic, if necessary. All interviews were audio-recorded and transcribed verbatim.

Focus groups

Peer leaders

One focus group session per school was undertaken with the peer leaders at 14 months. The aim of these focus groups was to explore what the peer leaders understood about Girls Active, to explore their feelings about being a peer leader, to understand what went on at their school from their perspective (including recruitment of peer leaders and activities undertaken) and to understand any barriers, facilitators, challenges and opportunities from the peer leader perspective. As these girls may not necessarily have been among the 90 girls included in the RCT, peer leaders were given a participant information sheet and a parent/guardian information sheet 2 weeks prior to the focus groups by the lead teacher. They were asked to return the signed parent/guardian opt-out consent form only if they did not want to take part. Participants then signed an assent form prior to the focus group. Focus groups lasted between 30 and 60 minutes, and timings were often constrained by the duration of the class that they were excused from. The questions used in these focus groups can be found in *Appendix 5*. The opening questions were followed by probes to allow participants to expand on the topic. Some of the questions were explored using flipcharts and sticky notes. For example, when asking the peer leaders what they did, each peer leader wrote every activity they could think of on single sticky notes and then all peer leaders plotted the activities (everything from peer leader group inception up to the present day) along a timeline. Questions to explore likes, dislikes, barriers and facilitators were then asked based on the timeline. The non-written portions of the focus groups were audio-recorded and transcribed verbatim.

Subgroup of intervention school girls

One focus group session per school was undertaken with a subgroup of girls from the evaluation at 14 months (see *Appendix 6*). Each lead teacher chose a group of girls (between five and eight girls) from the pupils who were already part of the evaluation cohort to be part of the focus group. For practical reasons, the lead teacher was told that the girls chosen should exhibit a range of activity from 'inactive' to 'active', but all should be willing to speak up on behalf of their class. As these girls were already consented as part of the main programme, only verbal assent was obtained before the focus groups began. The aim of these focus groups was to see whether or not the girls knew about the Girls Active programme at their school (i.e. if they had they heard about it and, if they had, what had they heard and seen), to explore what they understood about the aims of Girls Active and what went on at their school and to explore their feelings about what was delivered (e.g. the peer leaders and any activities).

Group of intervention school boys

One focus group session per school was also undertaken with a group of boys across all KS3 year groups at 14 months (see *Appendix 7*). Each lead teacher choose a group of boys (between three and eight boys) from KS3 to be part of the focus group. The teacher was given instruction, to choose boys that would be considered 'inactive' as well as 'active' and that any boy chosen should be willing to speak up on behalf of their class. Boys were given an information pack to take home to their parents/guardians, which contained a parent/guardian information letter, a participant information letter and an opt-out consent form. Written assent was obtained from all boys before the focus group began. The aim of these focus groups was to

see whether or not the boys knew about the Girls Active programme at their school (i.e. if had they heard about it and, if they had, what had they heard and seen), to explore what they understood about the aims of Girls Active and what went on at their school, to explore whether or not what was delivered (i.e. the peer leaders and any activities) had an impact on them in any way, either positively or negatively.

Process evaluation analysis

Interviews and focus groups

All interviews and focus groups were recorded, transcribed verbatim and then analysed using the framework analysis approach. This approach develops a hierarchical thematic framework that is used to classify and organise data according to key themes, concepts and emergent categories. It was used to explore, compare and contrast key themes arising from the data, using the elements of the interview/focus group topic guide as a starting point. Analysis was undertaken by two researchers from the evaluation team who read and reread each transcript to identify the themes. Each group of interviews or focus groups was analysed separately and the emergent themes from each data source (e.g. teachers, peer leaders, boys, etc.) were triangulated to build up a picture of what happened in each school and across schools. School summaries for each intervention school were developed and these summarise how peer leaders were selected, the activities implemented in the school, perceptions of impact, challenges to implementation, facilitators of implementation and any contextual factors that might have influenced Girls Active.

Chapter 3 Statistical analysis

A statistical analysis plan described the planned analysis and reporting for the trial and was signed off by the principal investigator, a senior statistician, a trial statistician and a co-investigator. All data manipulations, tables, figures and analyses were performed using Stata version 14.0. The study has been conducted, analysed and reported according to the Consolidated Standards of Reporting Trials (CONSORT) statement for cluster RCTs.[72]

Changes to the planned analysis

The following amendments have been made to the statistical information included in the published trial protocol:[26]

- The statistician and team lead were not blinded to schools' allocated groups.
- Additional subgroup analyses were recommended by the TSC and the investigator team, which were included in the final analyses; these include year group, school size and biological maturity.
- There was only one single-sex school; therefore, the type of school (single-sex schools vs. mixed-sex schools) has been removed from the originally planned subgroup analyses.
- The plan to undertake a subgroup analysis of non-active versus active participants was not undertaken as so few participants met the definition of meeting the recommended PA guidelines of ≥ 60 minutes of MVPA per day at baseline.
- The definitions of minimum accelerometer wear and number of valid days were clarified.
- Sensitivity analyses of the effect of seasonal changes, as recommended by the TSC, and the effect of the number of valid days the accelerometer was worn, which is standard in PA measurement literature, were added.
- All secondary objective activity (accelerometer) variables undertaken were analysed using all days, school days, weekends, during school hours and after school hours.
- Confounders of the percentage of pupils eligible for free school meals and year group were added to the primary outcome analysis and secondary analyses. These have been added as there is evidence in the literature of a relationship between socioeconomic status (represented by percentage of pupils eligible for free school meals) and PA levels and a negative relationship between year group and MVPA (as adolescents enter higher year groups, their MVPA decreases).

General considerations

Results from the final analyses were reviewed by the TSC at the final TSC meeting in January 2017 and prior to submission of the final report to the funder. Any post-hoc exploratory analyses that were performed to support the planned analyses but that were not stated in this statistical analysis plan, or the changes mentioned above, have been stated in *Chapter 4*.

The individual-level (pupil) and cluster-level (school) demographic and baseline characteristics for those pupils who did and did not drop out were compared. This was done to determine whether or not the two groups differed statistically and was done using the two-sample *t*-test, the chi-squared test or the Wilcoxon rank-sum test. The primary outcome for evaluating the Girls Active programme is the change in mean minutes per day of MVPA from baseline at 14 months, objectively measured by the GENEActiv accelerometer. The secondary end points were measured at 7 and 14 months, as specified in *Chapter 2*, *Secondary outcome measures*. All analyses were adjusted for the two stratification factors (school size: median number of pupils < 850 or ≥ 850 and percentage of BME pupils: median < 20% or $\geq 20\%$) as potential confounders at the school level. Adjustments were also made for participant year group and baseline MVPA and school percentage of pupils eligible for free school meals. All tests and reported

p-values were two-sided, where a *p*-value of < 0.05 was considered to be statistically significant. Estimates are presented with 95% CIs. There was no formal adjustment for multiple significance testing.

The MVPA and all other PA data come only from pupils who wore the accelerometer with a minimum valid wear time of 16 hours per day[33] on 2 days out of the expected 7 days, including at least 1 school day. This maximises the number of participants included in the analysis while still taking into account the variation in activity between a weekday and a weekend day. Schools with no pupils completing the 14-month accelerometer assessment were excluded, and pupils with any missing outcome or variable data required for analysis at either baseline or 14 months were excluded from the primary analysis. Therefore, a complete-case population was used. The same approach was used for the secondary outcomes. Schools and pupils were analysed in the group to which they were randomly allocated.

For the presentation of the results, the number of pupils within each randomised group is stated, the intraclass (school) correlation coefficient (ICC) is presented to assess the strength of the clustering effect and, finally, the results from the GEE model is for the main effect of the intervention; therefore, the coefficient (95% CI) and significance of the intervention term in the model is presented.

Analysis of the primary outcome

The primary outcome for evaluating the Girls Active programme is the mean difference in MVPA (objectively measured by the GENEActiv accelerometer) change at 14 months between intervention groups. In order to appropriately analyse clustered data, GEEs were used by the xtgee command in Stata.[73] Previous research[74,75] recommends that the minimum number of clusters should be between 20 and 40 for a GEE to be appropriate; therefore, the use of GEE is suitable for this trial with 20 clusters. The GEE model will determine the difference in mean minutes per day of MVPA between pupils from schools allocated to the intervention group and those from schools allocated to the control group, taking account of clustering (non-independence) among pupils from the same school. The analysis included levels to indicate the clustering of pupils (level 1) within schools (level 2) and a binary indicator for randomisation group (control schools as the reference group) as the explanatory variable. School size (median number of pupils < 850 or ≥ 850), percentage of BME pupils (median < 20% or ≥ 20%), baseline measure of the outcome, school percentage of pupils eligible for free school meals and pupil year group were added as confounders. The GEE model specification included an identity link function relating the mean response to the regression equation, Gaussian family distribution assumed for the response, an exchangeable correlation structure that specifies the within-group correlation structure and robust standard errors to provide consistent (i.e. asymptotically unbiased) parameter and standard error estimates.

Subgroup analysis

The main analysis for each subgroup used the same analytical principles as the primary analysis but stratified by the subgroup to estimate the mean difference in MVPA compared with the control group. Further subgroup analyses investigated the interaction effects between the randomised group and subgroup by adding the subgroup × randomized group interaction term to the model. Subgroup results are graphically presented as forest plots, which include the estimated difference in MVPA between randomised groups and 95% CI for the interaction. No missing data were imputed. The subgroups defined at baseline were:

1. ethnic group, categorised as white European or BME
2. the degree of social deprivation for the school, defined as below or above the median percentage of pupils eligible for free school meals value at baseline (low vs. high)
3. physical activity status was defined as whether girls did or did not engage in a mean of at least 60 minutes per day of MVPA over the measurement period
4. school size, defined as below or above the median number of pupils (850) (small vs. large)

5. year group at baseline, categorised as Year 7, Year 8 or Year 9
6. biological maturity based on APHV ± 1 SD, which is consistent with longitudinal studies based on APHV in European and North American youth.[47] Girls with an APHV of < 1 SD are classified as 'early', whereas girls with an APHV of > 1 SD are classified as 'late'; girls with an APHV of between −1 SD and +1 SD (inclusive) are classified as 'average' or 'on time'.

Sensitivity analysis

Per-protocol population
The per-protocol population comprises those participants who engaged with the key components of the programme over 14 months and for whom complete data were available for the analysis of concern on a 'by analysis' basis. In the control arm, the per-protocol population includes all schools/pupils randomised to that arm. In the intervention arm, the per-protocol population was defined as schools that engaged with ≥ 70% of the programme. All pupils within these schools were included in the per-protocol population. There are 10 key components of Girls Active, of which seven are considered core components (*Table 4*). A school that engaged with any five out of these seven components (i.e. ≈70%) is considered to have met the minimum criteria of the programme. The per-protocol analysis adhered to the same steps as the primary analysis.

Intention-to-treat population/full analysis set
The intention-to-treat (ITT) analysis involved all of the randomised schools and the recruited pupils in these schools. Schools and pupils were analysed in the group to which they were randomly allocated, regardless of whether or not they received the assigned intervention and regardless of any protocol deviations. Missing data were imputed using multiple imputation. To allow for ITT analysis, missing data were imputed using a multiple imputation procedure that substitutes predicted values from a regression equation. The imputation was carried out by the MI (multiple imputation) command in Stata.[76] MI replaces missing values with multiple sets of simulated values to complete the data, performs standard analysis on each completed data set and adjusts the obtained parameter estimates for missing data uncertainty using Rubin's rules to combine estimates.[77] The following procedures were followed:

- The multiple imputation was set up as wide.
- The multiple imputation registered imputation of the MVPA at 14 months and MVPA at baseline.
- A regression method was used, in which the registered variables were individually adjusted for the randomisation stratification categories (school size and percentage of BME pupils), with 100 imputations to avoid biased estimates, rseed (2232) and the force option.
- The multiple imputation estimate provided the final results using the same GEE model as the primary analysis and covariate adjustments.

Effects of the number of valid days
Five separate models were run regarding valid wear time, including participants who wore the accelerometer (with a minimum valid wear time of 16 hours each day) and who had a usable file at baseline and 14 months: (1) at least any 1 day, (2) any 2 days or more, (3) any 3 days or more, (4) any 4 days or more and (5) 3 weekdays + 1 weekend day.

Seasonal adjustment
Seasonal data were obtained retrospectively[78] and matched to individual participant data. The season was based on which season the majority of days fell in when the accelerometer was worn during the assessment period. Seasons in 2015 were defined as:

- spring – 20 March to 20 June
- summer – 21 June to 22 September
- autumn – 23 September to 21 December
- winter – 22 December to 19 March.

TABLE 4 Key components of the Girls Active programme

Component	How was this captured?	Core component?
Submit Girls Active self-review and action plan 1	From the YST records	Yes
Attendance at training day for school leads	From training day records	Yes
Use of package of resources (or sought an alternative)	This was captured in the final interview. Teachers were asked to choose one of four options: 1. I have not referred to the resources (folder and memory card) since the training day and have not sought alternatives 2. I have not referred to the resources (folder and memory card) since the training day but have developed my own/utilised other resources/sought an alternative 3. I have used the resources 'occasionally' 4. I have used the resources 'frequently' If answering with responses 2, 3 or 4, then they met the criterion	Yes
Engagement with/of young people in the programme	This was captured in the final interview when teachers were asked if the following had taken place: 1. setting up a peer leadership and marketing group 2. the peer group trying to do/actually doing something 3. working with peer leaders 4. using the student 'voice' to develop, promote and market ideas for change 5. conscious decision to not do the above but strong rationale for why this would not have worked at their school and an alternative provided If answering with two out of the first four responses (or answering with response 5) then they met the criterion	Yes
Engagement with ongoing support and mentorship from the Girls Active hub school and/or the YST	This was captured in the final interview when teachers were asked whether or not they had: 1. had telephone calls, e-mail support or visit from a coach/hub/YST 2. made a conscious decision not to utilise this support but sought support elsewhere 3. not utilised any of the support from the hub or the YST If answering with responses 1 or 2 then they met the criterion	Yes
Attendance at peer review day	From training day records	Yes
Submit Girls Active self-review and action plan 2	From the YST records	Yes
Received funding for capacity building within the school	This is a reward for taking part in the programme	No
Use of funding	This was captured in the final interview when teachers were asked about their: 1. use of funding on Girls Active 2. conscious decision not to use the funding on Girls Active to allow for sustainability (i.e. saving money for the future) 3. alternatives to spending money (i.e. offering freebie) used instead	No
Attendance at peer leaders event	This was a 'nice to do' rather than a core part of Girls Active	No

For the 2016 assessment dates, seasons were defined as:

- spring – 20 March to 19 June
- summer – 20 June to 21 September
- autumn – 22 September to 20 December
- winter – 21 December to 19 March.

They were coded as dummy variables 1–4 and added to the GEE model.

Secondary outcomes analyses

All secondary outcomes, including questionnaires, were summarised by intervention group and follow-up time point using means, SDs, median and interquartile range (IQR) for continuous variables. Statistical tests for the range of secondary outcomes were performed using the same strategy as the primary outcome analysis. Subgroup analyses were not conducted on the secondary outcomes.

Chapter 4 Results

School recruitment

Overall, 82 schools were contacted about this study. Initially, all eligible schools in LLR ($n = 56$) were invited to the briefing event. Of these, 25 expressed an interest in attending the briefing event. Representatives from 15 schools attended the briefing event and, of these, head teachers from 14 schools provided written consent for their school to participate. In tandem, 26 schools from just outside the LLR area, along the M1 corridor (as specified in the online trial protocol[26]), were contacted as a contingency to ensure that the target recruitment of schools was reached. Of these 26 schools, seven expressed an interest and six of these consented to be part of the study.

It is of interest to know whether or not the schools in the trial were actually similar to the rest of the region (Leicestershire and Rutland were chosen for the comparison as the majority of schools in the trial were from these areas) and also the rest of England. *Table 5* compares the 20 Girls Active schools to other state secondary schools. The Girls Active schools compare well to LLR in terms of percentage of non-white pupils and percentage of pupils eligible for free school meals. The Girls Active schools were, on average, slightly larger than the LLR average but smaller than the English average. There was a higher proportion of Girls Active schools with $\geq$ 850 pupils than in LLR and England. Girls Active schools had slightly more non-white pupils than the English average and the percentage of pupils eligible for free school meals was lower than the English average.

School and participant flow through the study

Overall, from the 20 secondary schools that provided consent, 1753 girls provided assent at baseline. One participant withdrew assent at the end of the baseline measurement session at her school, resulting in a final sample of 1752 participants from 20 schools. Of these, 10 schools were randomised to the control arm and 10 were randomised to the intervention arm. The CONSORT flow diagram in *Figure 3* outlines the numbers of schools and participants at recruitment phases and then separately for baseline and the 7- and 14-month follow-ups. At baseline, an average of 88 pupils (range 83–90 pupils) participated from each school. As the participants were randomly selected from each school and the intervention could target the whole school, the participant numbers in *Figure 3* represent the participants who were assessed at each measurement visit rather than those who did/did not receive the intervention.

TABLE 5 Comparison of Girls Active school characteristics with regional and national data

School characteristics	Schools		
	Girls Active ($N = 20$)	Leicestershire and Rutland ($N = 77$)	England ($N = 3381$)
Full-time pupils, n (%)	918 (305)	823 (392)	941 (416)
School size (%)			
< 850 pupils	30.0	53.2	42.2
$\geq$ 850 pupils	70.0	46.8	57.8
Percentage of non-white pupils, mean (SD)	23.5 (30.5)	23.8 (29.1)	20.9 (25.2)
Percentage of pupils eligible for free school meals, mean (SD)	11.5 (6.1)	11.1 (7.8)	14.8 (10.7)
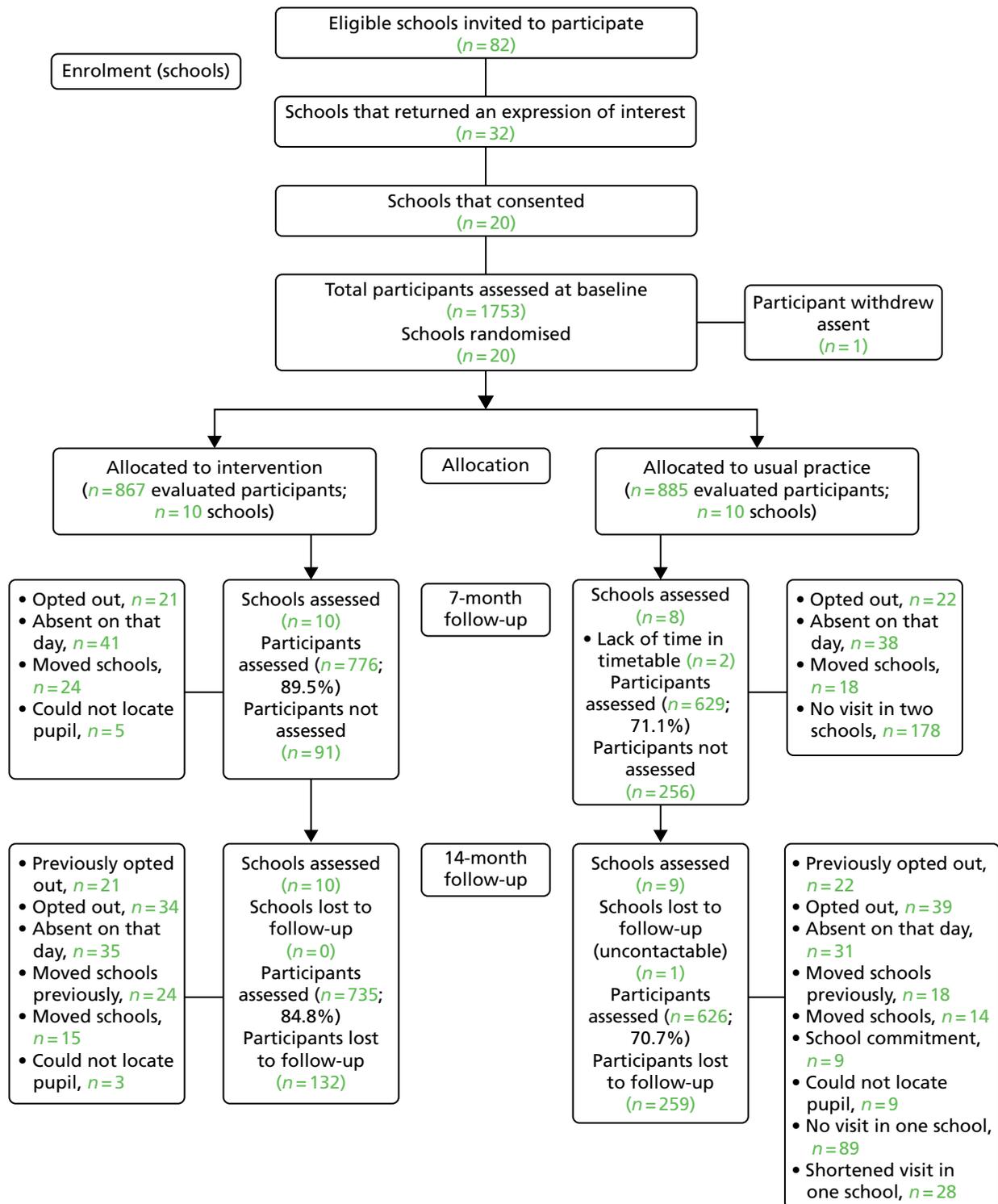
FIGURE 3 Consolidated Standards of Reporting Trials flow chart.

All 10 intervention schools participated in the 7- and 14-month follow-up sessions. Two control schools (5 and 9) were not available for the 7-month follow-up visits; both schools cited a lack of time within their school timetable to accommodate the measurement visit. At the 14-month follow-up, the school lead for one of these schools (school 9) did not respond to numerous e-mails and telephone calls, which resulted in 89 participants from one school not being available for follow-up from that school. One further school (school 5) agreed to a 'slimmed-down' version of the measurement session at 14 months. This resulted in 52 pupils providing a minimum number of data and, further 28 pupils not attending that measurement visit at all. No serious adverse events/reactions were reported in this study.

Baseline characteristics of schools

Table 6 tabulates the overall characteristics of the 20 schools involved in the trial. Overall, 14 schools were located in LLR, three were in Northamptonshire, two were in Warwickshire and one was in Derbyshire. The mean number of full-time pupils per school was 918 (range 330–1495 pupils) and the percentage of pupils from non-white ethnic backgrounds was 20.3% (range 1.4–82.6%). Indicators of deprivation at the school level indicated that 11.5% of pupils (range 3.8–26.5%) were eligible for free school meals.

Baseline characteristics of participants

Table 7 provides the characteristics of the participants who took part in the trial. A total of 1752 participants provided assent and completed the baseline assessments. The mean age of participants was 12.8 years (range 11.4–14.7 years). A total of 11.7% of participants reported being South Asian and 11.6% of participants were categorised as being of non-white European ethnicity. The mean BMI z-score was 0.18 kg/m^2 (SD 1.3 kg/m^2). Overall, 5.0% of participants (85/1718 participants) were classed as underweight, 19.5% of participants (335/1718 participants) as overweight and 8.7% of participants (150/1718 participants) as obese.

TABLE 6 Baseline characteristics of each school (cluster) by randomised group: usual practice (control) or the Girls Active programme (intervention)

Characteristics	Trial arm		Total ($N = 20$)
	Control ($N = 10$)	Intervention ($N = 10$)	
Cluster level			
Number of participants, mean (SD)	89 (2)	87 (3)	88 (2)
Percentage of non-white participants, mean (SD)	21.3 (27.7)	19.3 (24.1)	20.3 (25.3)
School characteristics			
Number of full-time pupils, mean (SD)	977 (199)	859 (386)	918 (305)
School size, *n* (%)			
< 850 pupils	2 (20.0)	4 (40.0)	6 (30.0)
≥ 850 pupils	8 (80.0)	6 (60.0)	14 (70.0)
Percentage of non-white pupils, mean (SD)	25.4 (34.2)	21.6 (28.0)	23.5 (30.5)
Percentage of pupils eligible for free school meals, mean (SD)	9.7 (6.2)	13.3 (5.6)	11.5 (6.1)
IMD decile score,[a] mean (SD)	7.2 (2.3)	6.1 (2.5)	6.7 (2.4)
IMD rank score, mean (SD)	21,840 (8013)	18,949 (7860)	20,395 (7866)

a IMD 2015 decile scores range from 1 to 10: 1 is the least deprived and 10 is the most deprived.

TABLE 7 Baseline characteristics of participants by randomised group: usual practice (control) or the Girls Active programme (intervention)

Individual-level characteristics	Trial arm		Total (N = 1752)
	Control (N = 885)	Intervention (N = 867)	
Age (years), mean (SD)	12.8 (0.8)	12.8 (0.8)	12.8 (0.8)
School year group of participants, n (%)			
Year 7	356 (40)	318 (37)	674 (38)
Year 8	355 (40)	365 (42)	720 (41)
Year 9	174 (20)	184 (21)	358 (20)
Ethnic origin of participants, n (%)			
White European	669 (75.9)	673 (77.1)	1342 (76.8)
South Asian	123 (14.0)	81 (9.4)	204 (11.7)
Other	90 (10.2)	112 (12.9)	202 (11.6)
IMD decile score,[a] mean (SD)	6.5 (2.8)	5.1 (2.7)	5.8 (2.8)
IMD rank score, mean (SD)	19,649 (9395)	15,322 (8840)	17,505.8 (9375)
Biometric measurements			
Standing height (cm), mean (SD)	156.1 (7.9)	155.8 (7.8)	156.0 (7.9)
Sitting height (cm), mean (SD)	81.5 (4.6)	81.1 (4.6)	81.3 (4.6)
Body mass (kg), mean (SD)	48.7 (12.4)	48.9 (12.4)	48.8 (12.4)
BMI z-score (kg/m^2), mean (SD)	0.14 (1.3)	0.22 (1.3)	0.18 (1.3)
BMI categories, n (%)			
Underweight	44 (5.1)	41 (4.8)	85 (5.0)
Normal weight	589 (67.9)	559 (65.8)	1148 (66.8)
Overweight	165 (19.0)	170 (20.0)	335 (19.5)
Obese	70 (8.1)	80 (9.4)	150 (8.7)
Body fat percentage, mean (SD)	23.9 (7.6)	24.2 (7.8)	24.1 (7.7)
APHV (years), mean (SD)	12.1 (0.5)	12.1 (0.5)	12.1 (0.5)
Biological maturity categories, n (%)			
Early	139 (16.4)	125 (15.0)	264 (15.7)
Average	576 (68.0)	570 (68.5)	1146 (68.3)
Late	132 (15.6)	137 (16.5)	269 (16.0)
Accelerometer variables			
MVPA (minutes/day), median (IQR)	43.9 (30.6–58.0)	41.8 (29.2–56.1)	42.6 (29.9–57.0)
Light PA (minutes/day), median (IQR)	279.5 (247.8–307.0)	272.5 (244.5–302.7)	275.8 (246.1–305.0)
Sedentary (minutes/day), median (IQR)	549.4 (508.5–592.1)	552.6 (516.0–594.3)	550.6 (511.7–593.5)
Accelerometer (ENMO, m*g*), mean (SD)	36.7 (8.9)	35.7 (8.8)	36.2 (8.9)
Pupils achieving ≥ 60 minutes of MVPA on every valid day, n (%)	20 (2.3)	20 (2.4)	40 (2.3)
Valid days, mean (SD)	6.6 (1.1)	6.8 (0.9)	6.7 (1.0)

a IMD 2015 decile scores range from 1 to 10; 1 is the least deprived and 10 is the most deprived.
Note
Missing data: age, n = 2; ethnicity, n = 4; pupil social deprivation score, n = 123; standing height, n = 30; sitting height, n = 50; body weight, n = 7; BMI, n = 34; body fat percentage, n = 33; APHV, biological maturity, n = 73; MVPA, light PA, n = 44; pupil's meeting PA guidelines, number of valid days, n = 46; sedentary, n = 58; and all other variables, n = 0.

A total of 1708 participants (96.8%) provided ≥ 2 days of valid accelerometer data at baseline (*Table 8*). The average accelerometer wear time was 22.9 (± 2.8) hours per day at baseline, 22.3 (± 2.4) hours per day at 7 months and 21.7 (± 4.0) hours per day at 14 months. On average, participants spent 42.6 minutes (IQR 29.9–57.0 minutes) in MVPA, 275.8 minutes (IQR 246.1 to –305.0 minutes) in light PA and 551 minutes (IQR 512–593 minutes) being sedentary per day. The overall PA represented by average acceleration for the sample was 36.2 m*g* (ENMO 8.9 m*g*). In our sample, 2.5% of participants engaged in ≥ 60 minutes per day of MVPA. Although there were 390 non-completers (22.3%), the completers' analysis was undertaken only on participants whose school was involved in the 14-month follow-up as these are participants who did not actively reassent or who were absent from schools that were followed up. On average, participants who did not complete the 14-month assessment (*n* = 301) were older (*p* < 0.001), had a higher BMI *z*-score (*p* = 0.021) and body fat percentage (*p* = 0.015) and provided 0.2 days less of accelerometer data (*p* < 0.001) at baseline (*Table 9*).

TABLE 8 Accelerometer data provision at each time point, by trial arm

Number of valid days	Trial arm, *n* (%)		Total, *n* (%)
	Control	Intervention	
Baseline only	**N = 885**	**N = 867**	**N = 1752**
0	27 (3.1)	17 (2.0)	44 (2.5)
1	8 (0.9)	5 (0.6)	13 (0.7)
2	13 (1.5)	10 (1.2)	23 (1.3)
3	16 (1.8)	6 (0.7)	22 (1.3)
4	10 (1.1)	8 (0.9)	18 (1.0)
5	18 (2.0)	19 (2.2)	37 (2.1)
6	106 (12)	45 (5.2)	151 (8.6)
7	687 (77.6)	757 (87.3)	1444 (82.4)
7 months only	**N = 629**	**N = 776**	**N = 1405**
0	27 (4.3)	29 (3.7)	56 (4.0)
1	8 (1.3)	7 (0.9)	15 (1.1)
2	11 (1.8)	17 (2.2)	28 (2.0)
3	11 (1.8)	17 (2.2)	28 (2.0)
4	25 (4.0)	19 (2.5)	44 (3.1)
5	27 (4.3)	26 (3.4)	53 (3.8)
6	50 (8.0)	62 (8.0)	112 (8.0)
7	470 (74.7)	599 (77.2)	1069 (76.1)
14 months only	**N = 626**	**N = 735**	**N = 1361**
0	48 (7.7)	41 (5.6)	89 (6.5)
1	19 (3.0)	10 (1.4)	29 (2.1)
2	20 (3.2)	18 (2.5)	38 (2.8)
3	30 (4.8)	18 (2.5)	48 (3.5)
4	26 (4.2)	16 (2.2)	42 (3.1)
5	45 (7.2)	31 (4.2)	76 (5.6)
6	62 (9.9)	79 (10.8)	141 (10.4)
7	376 (60.1)	522 (71.0)	898 (66.0)

TABLE 9 Baseline characteristics of completers and non-completers at 14 months

Characteristics	Completion status		p-value[a]
	Completers (*N* = 1361)	Non-completers (*N* = 301)	
Age (years), mean (SD)	12.8 (0.8)	13.1 (0.8)	< 0.001
Year group of participants, *n* (%)			
Year 7	571 (41.9)	73 (24.2)	
Year 8	544 (39.9)	147 (48.8)	
Year 9	247 (18.1)	81 (26.9)	< 0.001
Ethnic origin of participants, *n* (%)			
White European	1014 (74.6)	244 (81.1)	
South Asian	175 (12.9)	28 (9.3)	
Other	170 (12.5)	29 (9.6)	0.060
IMD decile score,[b] mean (SD)	5.8 (2.8)	5.8 (3.0)	0.678
Biometric measurements			
Standing height (cm), mean (SD)	155.6 (7.9)	157.8 (7.0)	< 0.001
Sitting height (cm), mean (SD)	81.1 (4.6)	82.2 (4.1)	< 0.001
Body mass (kg), mean (SD)	48.1 (12.2)	51.3 (12.7)	< 0.001
BMI *z*-score (kg/m²), mean (SD)	0.13 (1.3)	0.33 (1.3)	0.021
BMI categories, *n* (%)			
Underweight	69 (5.2)	12 (4.1)	
Normal weight	913 (68.3)	180 (61.6)	
Overweight	2444 (18.2)	71 (24.3)	
Obese	111 (8.3)	29 (9.9)	0.060
Body fat percentage, mean (SD)	23.8 (7.4)	25.0 (7.9)	0.015
APHV (years), mean (SD)	12.1 (0.5)	12.1 (0.5)	0.60
Accelerometer variables			
MVPA (minutes/day), median (IQR)	42.5 (30.2–55.6)	40.8 (30.1–60.2)	0.598
Light PA (minutes/day), median (IQR)	275.4 (246.4–305.0)	274.9 (245.6–304.5)	0.634
Sedentary (minutes/day), median (IQR)	550.2 (511.3–592.7)	550.7 (514.2–595.4)	0.600
Pupils achieving ≥ 60 minutes of MVPA on every valid day, *n* (%)	32 (2.4)	5 (1.7)	0.597
Valid days, mean (SD)	6.7 (0.9)	6.5 (1.2)	< 0.001

a *p*-values test for the difference between completers and non-completers; estimated using either two sample *t*-test one, chi-squared test or Wilcoxon rank-sum test.
b IMD 2015 decile scores range from 1 to 10; 1 is the least deprived and 10 is the most deprived.
Notes
Missing data: age, *n* = 2; ethnicity, *n* = 2; pupil social deprivation score, *n* = 110; standing height, *n* = 29; sitting height, *n* = 50; body weight, *n* = 6; BMI, BMI categories, *n* = 33; body fat percentage, *n* = 56; APHV, *n* = 72; MVPA, *n* = 41; light PA, *n* = 41; pupils meeting PA guidelines, *n* = 43; number of valid days, *n* = 41; sedentary, *n* = 52; and all other variables, *n* = 0.
Completers included all those who assented at the 14-month visit from all 18 completing schools and the one school with the modified 14-month visit. Non-completers included all those who did not provide assent at the 14-month visit from all 18 completing schools and the one school with the modified 14-month visit. Participants from one school who were lost to follow-up were not included in either group.

Primary outcome analysis

Main complete-case analysis

Overall, 1361 participants (77.7%) were seen at baseline and the 14-month follow-up. Of these, 1211 participants (69.1%) completed the accelerometer assessment with a minimum of 2 valid days, including at least 1 school day at baseline and the 14-month follow-up. This group represents the analytical sample for the primary outcome analysis. In the complete-case analysis at the 14-month follow-up (primary outcome), the fully adjusted model showed a non-significant difference of 1.7 minutes per day (95% CI –0.8 to 4.3 minutes per day; $p = 0.178$) between groups. At the 7-month follow-up, a significant difference in MVPA change of 2.4 minutes per day (95% CI 0.1 to 4.7 minutes per day; $p = 0.039$) between groups was found. Both of these results are presented in *Table 10*.

TABLE 10 Sensitivity analyses: the effect of the number of valid days of accelerometer wear on the change in MVPA at follow-up times for participants randomised to usual practice (control) compared with participants randomised to the Girls Active programme (intervention)

Valid days of accelerometer wear	Number of schools | number of pupils		Mean change in minutes of MVPA from baseline (95% CI)		Marginal mean at follow-up[a]		
	Control	Intervention	Control	Intervention	Coefficient (95% CI)	*p*-value	ICC
Any 1 day or more							
7 months	8 | 585	10 | 737	–6.07 (–7.26 to –4.89)	–2.43 (–3.49 to –1.36)	2.38 (0.13 to 4.62)	0.038	0.03
14 months	9 | 562	10 | 683	–3.67 (–5.17 to –2.17)	–2.06 (–3.24 to –0.88)	1.82 (–0.74 to 4.38)	0.164	0.01
Any 2 days or more							
7 months	8 | 573	10 | 730	–6.16 (–7.29 to –5.04)	–2.45 (–3.50 to –1.41)	2.42 (0.12 to 4.72)	0.039	0.03
14 months	9 | 540	10 | 672	–3.47 (–4.90 to –2.03)	–2.09 (–3.27 to –0.90)	1.76 (–0.79 to 4.30)	0.176	0.02
Any 3 days or more							
7 months	8 | 557	10 | 706	–6.02 (–7.15 to –4.89)	–2.46 (–3.51 to –1.40)	2.36 (0.02 to 4.70)	0.048	0.04
14 months	9 | 517	10 | 649	–3.66 (–5.07 to –2.25)	–2.02 (–3.18 to –0.85)	1.94 (–0.64 to 4.52)	0.140	0.02
Any 4 days or more							
7 months	8 | 542	10 | 687	–5.90 (–7.04 to –4.77)	–2.33 (–3.39 to –1.27)	2.33 (–0.03 to 4.69)	0.053	0.04
14 months	9 | 484	10 | 628	–3.77 (–5.16 to –2.38)	–1.92 (–3.09 to –0.75)	1.82 (–0.77 to 4.40)	0.169	0.02
3 weekdays + 1 weekend day or more							
7 months	8 | 519	10 | 664	–5.82 (–6.97 to –4.68)	–2.37 (–3.44 to –1.29)	2.19 (–0.24 to 4.63)	0.078	0.04
14 months	9 | 453	10 | 605	–3.44 (–4.80 to –2.08)	–1.88 (–3.04 to –0.73)	1.32 (–1.09 to 3.72)	0.284	0.01

a Adjusted difference in the mean MVPA at follow-up between randomised groups with 95% CI, *p*-value and ICC for schools, adjusted for cluster effect, baseline MVPA value, participant year group, percentage of pupils eligible for free school meals and stratification categories (school size and percentage of non-white pupils).
Note
Based on a complete-case analysis.

Intention-to-treat analysis

The ITT analysis presented in *Table 11* was consistent with the main analysis. When all participants and schools were considered, there was no significant difference in change in MVPA between groups at 14 months. However, at the 7-month follow-up, a significant difference in MVPA change of 2.3 minutes per day (95% CI 0.2 to 4.3 minutes per day; $p = 0.028$) between the intervention group and the control group was found.

Per-protocol analysis

The per-protocol analysis (see *Table 11*) at 14 months' follow-up showed no significant difference in MVPA change between groups ($p = 0.246$). A significant difference in MVPA change of 3.1 minutes per day (marginal mean number; 95% CI 0.93 to 5.35 minutes per day; $p = 0.005$) between the intervention group and the control group was found at 7 months. This suggests that when schools followed the core components of the Girls Active programme (as defined in *Table 4*), it resulted in a difference in MVPA at the 7-month time point only. When observing the mean change in MVPA from baseline values, it would seem that the Girls Active programme prevented a significant decline in MVPA (i.e. the control schools had a decline of 6.2 minutes/day, whereas the intervention schools had a decline of 1.9 minutes/day, between baseline and 7 months).

TABLE 11 Changes in MVPA at 7 months' and 14 months' (primary outcome) follow-up for participants randomised to usual practice (control) compared with participants randomised to the Girls Active programme (intervention)

Analysis	Number of schools | number of pupils		Mean change in minutes of MVPA from baseline (95% CI)		Marginal mean at follow-up[a]		
	Control	Intervention	Control	Intervention	Coefficient (95% CI)	*p*-value	ICC
Complete case[b]							
7 months	8 | 572	10 | 730	−6.18 (−7.30 to −5.06)	−2.45 (−3.50 to −1.41)	2.42 (0.13 to 4.72)	0.039	0.03
14 months	9 | 539	10 | 672	−3.47 (−4.91 to −2.03)	−2.09 (−3.27 to −0.90)	1.75 (−0.80 to 4.29)	0.178	0.02
Per protocol[c,d]							
7 months	8 | 572	8 | 586	−6.18 (−7.30 to −5.06)	−1.91 (−3.11 to −0.72)	3.14 (0.93 to 5.35)	0.005	0.02
14 months	9 | 539	8 | 549	−3.47 (−4.91 to −2.03)	−1.46 (−2.74 to −0.18)	1.67 (−1.15 to 4.48)	0.246	0.02
ITT[d]							
7 months	10 | 885	10 | 867	−5.92 (−7.05 to −4.78)	−2.50 (−3.57 to −1.44)	2.30 (0.25 to 4.35)	0.028	N/A
14 months	10 | 885	10 | 867	−3.63 (−5.03 to −2.23)	−2.01 (−3.20 to −0.81)	1.65 (−0.64 to 3.94)	0.158	N/A

N/A, not applicable.
a Adjusted difference in the mean MVPA at follow-up between randomised groups with 95% CI, *p*-value and ICC for schools, adjusted for cluster effect, baseline MVPA value, participant year group, percentage of pupils eligible for free school meals and stratification categories (school size and percentage of non-white pupils).
b Those with missing outcome data or missing variables required for the model adjustment are excluded.
c Schools that did not engage with ≥ 70% of the programme have been excluded from this analysis.
d Missing data imputed using multiple imputation.
Note
This analysis includes pupils who wore the accelerometer for a minimum of 2 valid days, with at least 1 school day between baseline and 7 months and at least 1 school day between baseline and 14 months.

Sensitivity analysis

Number of valid accelerometer days

In order to assess whether or not the number of valid days of accelerometer wear had an effect on the results, the primary outcome analysis was re-run to include only those participants with specific days of valid accelerometer data. These results are presented in *Table 10*. Similar to the results seen at 14 months in the main analysis, there were no significant differences between groups when using any different level of provision. When the analysis was re-run to include any 1 day or more (difference in MVPA change 2.4 minutes/day, 95% CI 0.13 to 4.62 minutes/day; $p = 0.038$), any 2 days or more (difference in MVPA change 2.4 minutes/day, 95% CI 0.12 to 4.72 minutes/day; $p = 0.039$) and any 3 days or more (difference in MVPA change 2.4 minutes/day, 95% CI 0.02 to 4.70 minutes/day; $p = 0.048$), significant differences of a similar magnitude to the main outcomes analysis, reported *Main complete-case analysis*, were found. However, when participants with any 4 or more days (difference in MVPA change 2.3 minutes/day, 95% CI –0.03 to 4.69 minutes/day; $p = 0.053$) or any three weekdays plus 1 weekend day or more (difference in MVPA change 2.2 minutes/day, 95% CI –0.24 to 4.63 minutes/day; $p = 0.078$) are included in the analysis, the significant differences between groups found at 7 months in the main analysis were not found.

Season

In order to assess whether or not the season of data collection had an effect on the results, the analysis was re-run to include a season variable. At baseline, eight intervention and six control schools were assessed in winter and two intervention and four control schools were assessed in the spring. At 7 months, nine intervention schools were assessed in autumn and one was assessed in winter. All eight control schools that completed the 7-month follow-up visit were assessed in autumn. At 14 months, all 10 intervention schools were assessed in spring, and six and three control schools were assessed in the spring and summer, respectively.

Table 12 presents the results of the sensitivity analysis. When just the baseline season of data collection was included in the model, there was a significant difference in MVPA change at 14 months of only

TABLE 12 Sensitivity analyses: difference in MVPA when additionally adjusted for seasonal effect at follow-up times between participants randomised to usual practice (control) and participants randomised to the Girls Active programme (intervention)

| Model additionally adjusted by | Marginal mean at follow-up[a] | | |
	Coefficient (95% CI)	*p*-value	ICC
Baseline season			
7 months	1.82 (–0.58 to 4.23)	0.137	0.03
14 months	0.83 (1.21 to 3.45)	0.027	0.02
Follow-up season			
7 months	2.79 (0.44 to 5.13)	0.020	0.02
14 months	0.94 (–1.90 to 3.77)	0.518	0.01
Baseline and follow-up season			
7 months	2.08 (–0.30 to 4.47)	0.086	0.01
14 months	1.07 (–1.13 to 3.27)	0.342	0.01

a Adjusted difference in the mean MVPA at follow-up between randomised groups with 95% CI, *p*-value and ICC for schools, adjusted for cluster effect, baseline MVPA value, participant year group, percentage of pupils eligible for free school meals, stratification categories (school size and percentage of non-white pupils) and seasonal effect.

Note
Based on a complete-case analysis, including pupils who wore the accelerometer for a minimum of 2 valid days, with at least 1 school day between baseline and 7 months (8 control and 10 intervention schools, $n = 1302$) and between baseline and 14 months (9 control and 10 intervention schools, $n = 1211$).

0.8 minutes per day (95% CI 1.21 to 3.45 minutes per day; $p = 0.027$), but there was not a significant difference at 7 months (1.8 minutes per day, 95% CI –0.58 to 4.23 minutes per day; $p = 0.137$). When follow-up season was included in the model, there was a significant difference in MVPA change of 2.8 minutes per day (95% CI 0.44 to 5.13 minutes per day; $p = 0.020$) at 7 months, as per the main analysis. Including both seasons at baseline and follow-up resulted in the significant difference found in the main analysis at 7 months also disappearing.

Secondary outcomes analysis

A number of variables from the GENEActiv device were included as secondary outcomes in this study. In an effort to investigate if any significant changes took place on certain days or at certain times of the day, these variables are presented for school days, weekend days, school hours and after school hours at both 7 and 14 months (*Table 13*).

TABLE 13 Comparison of objectively measured activity variables at follow-up for participants randomised to usual practice (control) and participants randomised to the Girls Active programme (intervention)

| Time point | Number of schools \| number of pupils | | Median [IQR] or *n* (%) | | Marginal mean at follow-up[a] | | |
	Control	Intervention	Control	Intervention	Coefficient (95% CI)	*p*-value	ICC
MVPA (minutes/day)							
School days							
Baseline	10 | 854	10 | 850	45.5 [32.0–60.2]	44.3 [31.5–58.7]			
7 months	8 | 602	10 | 746	40.0 [28.4–54.3]	41.6 [29.8–56.8]	1.84 (–0.52 to 4.20)	0.126	0.02
14 months	9 | 578	10 | 693	40.8 [29.2–54.3]	41.5 [29.9–56.8]	1.79 (–1.27 to 4.85)	0.251	0.02
Weekend							
Baseline	10 | 828	10 | 827	35.9 [21.7–54.3]	33.3 [20.5–50.6]			
7 months	8 | 561	10 | 702	27.2 [17.5–42.1]	28 [18.0–44.9]	2.78 (–2.37 to 7.92)	0.290	0.04
14 months	9 | 503	10 | 637	32.8 [18.9–52.3]	30.4 [18.3–49.2]	0.99 (–3.54 to 5.51)	0.669	0.02
During school hours							
Baseline	10 | 855	10 | 850	19.3 [13.8–25.5]	18.2 [13.3–25.8]			
7 months	8 | 602	10 | 746	17.3 [12.1–23.7]	17.9 [12.4–25.1]	0.73 (–0.84 to 2.30)	0.360	0.05
14 months	9 | 578	10 | 693	16.2 [11.2–22.0]	16.4 [11.6–22.9]	0.84 (–0.50 to 2.18)	0.218	0.02

TABLE 13 Comparison of objectively measured activity variables at follow-up for participants randomised to usual practice (control) and participants randomised to the Girls Active programme (intervention) (*continued*)

| Time point | Number of schools \| number of pupils | | Median [IQR] or *n* (%) | | Marginal mean at follow-up[a] | | |
	Control	Intervention	Control	Intervention	Coefficient (95% CI)	*p*-value	ICC
After-school hours							
Baseline	10 | 855	10 | 850	17.1 [10.6–25.2]	16.5 [10.6–24.4]			
7 months	8 | 602	10 | 746	14.8 [9.1–21.0]	14.9 [9.8–21.6]	0.51 (–0.79 to 1.78)	0.443	0.02
14 months	9 | 578	10 | 693	15.7 [9.6–24.1]	15.8 [10.2–24.6]	0.39 (–1.61 to 2.39)	0.701	0.03
Average acceleration [ENMO; mg/day)							
All days							
Baseline	10 | 858	10 | 850	36.0 [30.9–42.2]	34.7 [29.6–40.2]			
7 months	8 | 602	10 | 747	33.0 [28.3–38.6]	33.8 [28.6–39.1]	1.39 (0.09 to 2.18)	0.033	0.03
14 months	9 | 578	10 | 694	34.3 [29.1–39.7]	34.0 [28.8–39.5]	0.66 (–0.62 to 1.95)	0.314	0.02
School days							
Baseline	10 | 854	10 | 850	37.6 [32.1–43.4]	36.5 [31.2–41.9]			
7 months	8 | 602	10 | 747	34.7 [29.7–40.5]	35.7 [30.6–41.1]	0.89 (–0.18 to 1.95)	0.102	0.03
14 months	9 | 578	10 | 693	35.2 [29.9–41.0]	35.4 [30.2–41.0]	0.46 (–0.91 to 2.02)	0.460	0.03
Weekend							
Baseline	10 | 828	10 | 827	31.8 [25.2–39.0]	29.7 [24.2–37.1]			
7 months	8 | 559	10 | 702	27.5 [22.5–34.1]	28.3 [22.7–35.0]	1.39 (–1.13 to 3.92)	0.280	0.05
14 months	9 | 503	10 | 637	30.5 [23.0–38.3]	28.9 [23.0–37.0]	0.51 (–1.49 to 2.51)	0.619	0.02
Sedentary time (minutes/day)							
All days							
Baseline	10 | 848	10 | 846	549.4 [508.5–592.1]	552.6 [516.0–594.3]			
7 months	8 | 588	10 | 732	564.6 [524.4–606.3]	563.4 [518.3–600.0]	–5.76 (–12.90 to 1.38)	0.114	0.01
14 months	9 | 565	10 | 680	557.8 [516.0–608.5]	559.6 [518.0–602.0]	–2.64 (–13.03 to 7.75)	0.618	0.01

TABLE 13 Comparison of objectively measured activity variables at follow-up for participants randomised to usual practice (control) and participants randomised to the Girls Active programme (intervention) (*continued*)

| Time point | Number of schools \| number of pupils | | Median [IQR] or *n* (%) | | Marginal mean at follow-up[a] | | |
	Control	Intervention	Control	Intervention	Coefficient (95% CI)	*p*-value	ICC
School days							
Baseline	10 | 840	10 | 844	543.5 [501.6–585.5]	548.7 [503.0–590.2]			
7 months	8 | 586	10 | 726	560.2 [518.9–602.9]	557.7 [512.1–597.8]	–4.17 (–10.74 to 2.40)	0.213	0.01
14 months	9 | 559	10 | 676	556.9 [510.7–605.7]	555.4 [516.4–605.7]	–0.08 (–12.72 to 12.55)	0.990	0.02
Weekends							
Baseline	10 | 815	10 | 806	567.8 [509.3–623.2]	572.9 [522.8–625.9]			
7 months	8 | 553	10 | 680	583.6 [533.6–637.9]	578.6 [518.2–633.1]	–9.73 (–27.41 to 7.95)	0.281	0.02
14 months	9 | 485	10 | 619	565.7 [510.5–627.4]	574.3 [514.8–631.6]	–10.27 (–20.63 to 0.10)	0.052	< 0.001
During school hours							
Baseline	10 | 855	10 | 850	246.4 [227.7–264.9]	254.2 [234.6–270.1]			
7 months	8 | 602	10 | 746	251.2 [231.6–270.7]	255.9 [236.9 –274.5]	3.83 (–4.13 to 11.78)	0.356	0.08
14 months	9 | 578	10 | 693	254.4 [235.7–273.1]	258.4 [240.8–279.2]	2.49 (–4.84 to 9.81)	0.506	0.06
After school hours							
Baseline	10 | 855	10 | 850	233.3 [210.7–256.5]	234.7 [213.3–254.5]			
7 months	8 | 602	10 | 746	241.4 [222.1–262.6]	238.0 [217.2–256.8]	–4.72 (–8.89 to –0.56)	0.026	0.02
14 months	9 | 578	10 | 693	234.8 [209.7–257.8]	236.1 [213.5–256.7]	–1.38 (–6.68 to 3.92)	0.610	0.02
Time spent in light PA (minutes/day)							
All days							
Baseline	10 | 858	10 | 850	279.5 [247.8–307.0]	272.5 [244.5–302.7]			
7 months	8 | 602	10 | 747	268.6 [241.1–298.0]	271.8 [238.6–302.0]	5.71 (0.96 to 10.46)	0.018	0.01
14 months	9 | 578	10 | 694	273.2 [239.9–305.4]	270.3 [239.7–299.7]	1.50 (–5.93 to 8.94)	0.692	0.01

TABLE 13 Comparison of objectively measured activity variables at follow-up for participants randomised to usual practice (control) and participants randomised to the Girls Active programme (intervention) (*continued*)

	Number of schools | number of pupils		Median [IQR] or *n* (%)		Marginal mean at follow-up[a]		
Time point	Control	Intervention	Control	Intervention	Coefficient (95% CI)	*p*-value	ICC
School days							
Baseline	10 | 854	10 | 850	290.3 [260.2–318.9]	284.1 [254.7–316.2]			
7 months	8 | 602	10 | 746	281.2 [249.1–309.1]	283.9 [254.4–313.9]	4.50 (0.25 to 8.75)	0.038	< 0.01
14 months	9 | 578	10 | 694	273.2 [239.9–305.4]	270.3 [239.7–299.7]	0.30 (–8.49 to 9.09)	0.947	0.03
Weekends							
Baseline	10 | 828	10 | 827	247.6 [212.1–289.3]	244.1 [202.4–288.3]			
7 months	8 | 561	10 | 702	235.3 [195.8–279.4]	239.0 [195.4–285.7]	8.85 (–5.52 to 23.22)	0.227	0.05
14 months	9 | 503	10 | 637	244.1 [195.3–293.6]	238.9 [194.9–285.2]	3.21 (–6.90 to 13.32)	0.534	0.001
During school hours							
Baseline	10 | 855	10 | 850	123.5 [108.0–140.8]	122.3 [108.6–137.2]			
7 months	8 | 602	10 | 746	118.7 [104.5–133.0]	119.5 [105.8–133.7]	5.38 (–10.01 to 20.77)	0.493	0.65
14 months	9 | 578	10 | 693	118.8 [103.7–132.1]	118.3 [101.6–132.5]	4.08 (–7.55 to 15.72)	0.492	0.54
After school hours							
Baseline	10 | 855	10 | 850	98.6 [82.0–115.7]	96.8 [82.2–111.6]			
7 months	8 | 602	10 | 746	94.4 [78.3–109.4]	94.5 [79.0–110.2]	1.70 (–1.30 to 4.69)	0.268	0.01
14 months	9 | 578	10 | 693	96.9 [80.3–114.8]	95.3 [79.3–111.7]	0.07 (–4.70 to 4.85)	0.976	0.03
Proportion achieving ≥ 60 minutes/day of MVPA							
All days							
Baseline	10 | 857	10 | 849	20 (2.3)	20 (2.4)			
7 months	8 | 594	10 | 742	11 (1.9)	11 (1.5)	0.78 (0.23 to 2.65)	0.688	< 0.001
14 months	9 | 573	10 | 686	17 (3.0)	17 (2.5)	0.65 (0.23 to 1.85)	0.420	0.01

a Adjusted difference at follow-up between randomised groups with 95% CI, *p*-value and ICC for schools, adjusted for cluster effect, baseline value, participant year group, percentage of pupils eligible for free school meals and stratification categories (school size and percentage of non-white pupils).
Note
Based on a complete-case analysis.

Objective GENEActiv variables

No significant differences in MVPA change between groups were found for school days (95% CI –0.5 to 4.2 minutes/day; $p = 0.126$), weekend days (95% CI –2.4 to 7.92 minutes/day; $p = 0.290$), during school hours (95% CI –0.8 to 2.3 minutes/day; $p = 0.360$) or after school hours (95% CI –0.8 to 1.9 minutes/day; $p = 0.443$) at 7 months' follow-up, as shown in *Table 13*. Similarly, at 14 months, no significant differences in MVPA change between groups were found for school days (95% CI –1.3 to 4.8 minutes/day; $p = 0.251$), weekend days (95% CI –3.5 to 5.5 minutes/day; $p = 0.669$), during school hours (95% CI –0.5 to 2.2 minutes/day; $p = 0.218$) or after school hours (95% CI –1.6 to 2.4 minutes/day; $p = 0.701$).

The mean acceleration recorded by the accelerometer (ENMO) was also investigated. There was a significant difference in ENMO between groups at 7 months (1.39 m*g*, 95% CI 0.1 to 2.2 m*g*; $p = 0.030$) but not at 14 months (0.66m*g*, 95% CI –0.6 to 1.9 of 1.39 m*g*; $p = 0.31$). There were no significant differences in ENMO when the measurement period was broken down into school days and weekend days at either 7 or 14 months ($p > 0.05$).

No significant differences in change in sedentary time (minutes/day) were found overall or on weekdays, weekend days or during school hours at either 7 or 14 months' follow-up. However, at 7 months, a significant difference in change in sedentary time of –4.7 minutes per day was found during the after-school period (95% CI –8.9 to –0.6 minutes per day; $p = 0.026$), whereby the intervention schools' sedentary time increased less than the control groups' sedentary time between baseline and 7 months.

A significant difference in time spent in light PA was found between groups for all monitoring days at 7 months (5.7 minutes/day, 95% CI 1.0 to 10.5 minutes/day; $p = 0.018$), but this was not seen at 14 months (1.5 minutes/day, 95% CI –5.9 to 8.9 minutes/day; $p = 0.692$). The median values indicated that, although light PA decreased in both groups, it decreased less in the intervention group. A significant difference was found on school days at 7 months (4.5 minutes/day, 95% CI 0.25 to 8.75 minutes/day; $p = 0.038$) but not at 14 months (0.3 minutes/day, 95% CI –8.49 to 9.09 minutes/day; $p = 0.947$). No differences were seen on weekend days at either 7 or 14 months. No significant differences in light PA were found during school or in after-school periods at 7 or 14 months (all $p > 0.05$).

Finally, the proportion of participants who achieved ≥ 60 minutes per day of MVPA on every day of the measurement period was investigated. To see whether or not this could have been affected by the number of valid days that the participants contributed, we also report the number of valid days provided at each time point for those who met the 60-minute target. This was 5.2 days and 6.2 days for the control group and the intervention group, respectively, at baseline; 5.0 days and 5.9 days for the control group and the intervention group, respectively, at 7 months; and 4.0 days and 5.1 days for the control group and the intervention group, respectively, at 14 months. The proportion in the control group who achieved ≥ 60 minutes per day of MVPA on every day of the measurement period was 2.3% at baseline, 1.9% at 7 months and 3.0% at follow-up. A similar pattern was observed in the intervention group. No significant differences were found between the groups in terms of meeting the guidelines at either 7 or 14 months.

Anthropometric measurements

Table 14 presents the results of the analysis for the obesity-related variables. The mean BMI *z*-score at baseline was within the normal range (i.e. < 1 SD) for both groups. No differences between the groups were seen for BMI *z*-score at either 7 (95% CI –0.06 to 0.07; $p = 0.908$) or 14 months (95% CI –0.06 to 0.09; $p = 0.636$). Similarly, no differences between the groups were seen for body fat percentage at either 7 (95% CI –0.83% to 0.52%; $p = 0.656$) or 14 months (95% CI –0.68% to 1.17%; $p = 0.600$). The mean change was in the positive direction for both groups.

Self-reported and psychosocial outcomes

Participants reported on their PA levels using eight questions from the PAQ-A tool. No differences in self-reported PA were seen at either 7 (95% CI –0.11 to 0.02; $p = 0.141$) or 14 (95% CI –0.15 to 0.05; $p = 0.318$) months (*Table 14*). Participants also answered questions on a range of outcomes with known associations with PA levels; these results are included in *Table 15*.

TABLE 14 Comparison of changes in anthropometric measurements and self-reported PA at follow-up for participants randomised to usual practice (control) and participants randomised to the Girls Active programme (intervention)

Anthropometric measurement	Number of schools | number of pupils		Mean change from baseline (95% CI)		Marginal mean at follow-up[a]		
	Control	Intervention	Control	Intervention	Coefficient (95% CI)	*p*-value	ICC
BMI z-score (kg/m^2)							
7 months	8 | 611	10 | 760	0.08 (0.06 to 0.11)	0.11 (0.08 to 0.14)	0.003 (−0.06 to 0.07)	0.908	0.003
14 months	9 | 611	10 | 721	0.19 (0.15 to 0.23)	0.22 (0.18 to 0.26)	0.02 (−0.06 to 0.09)	0.636	0.01
Body fat percentage							
7 months	8 | 606	10 | 732	0.71 (0.54 to 0.89)	0.74 (0.57 to 0.90)	−0.15 (−0.83 to 0.52)	0.656	0.09
14 months	9 | 606	10 | 705	1.21 (0.97 to 1.45)	1.55 (1.33 to 1.77)	0.25 (−0.68 to 1.17)	0.600	0.07
PAQ-A score							
7 months	8 | 626	10 | 773	−0.13 (−0.18 to −0.09)	−0.14 (−0.18 to −0.10)	−0.05 (−0.11 to 0.02)	0.141	0.003
14 months	8 | 652	10 | 805	−0.19 (−0.24 to −0.14)	−0.19 (−0.24 to −0.15)	−0.05 (−0.15 to 0.05)	0.318	0.01

a Adjusted difference at follow-up between randomised groups with 95% CI, *p*-value and ICC for schools, adjusted for cluster effect, baseline value, participant year group, percentage of pupils eligible for free school meals and stratification categories (school size and percentage of non-white pupils).
Note
Based on a complete-case analysis.

TABLE 15 Comparison of scores for psychosocial measures at follow-up for participants randomised to usual practice (control) and participants randomised to the Girls Active programme (intervention)

Psychosocial measure	Number of schools | number of pupils		Median (IQR)		Marginal mean at follow-up[a]		
	Control	Intervention	Control	Intervention	Coefficient (95% CI)	*p*-value	ICC
Intentions to be physically active[b]							
Baseline	10 | 871	10 | 842	5.0 (4.0–6.0)	4.7 (4.0–6.0)			
7 months	8 | 623	10 | 776	4.7 (3.7–6.0)	4.7 (3.7–5.7)	−0.15 (−0.33 to 0.03)	0.094	< 0.001
14 months	9 | 569	10 | 734	4.7 (3.7–5.6)	4.3 (3.0–5.7)	−0.21 (−0.37 to −0.05)	0.012	< 0.001
Perceived importance of PA[c]							
Baseline	10 | 849	10 | 828	8.0 (6.0–9.0)	8.0 (6.0–9.0)			
7 months	8 | 621	10 | 768	8.0 (6.0–9.0)	7.0 (5.0–9.0)	−0.42 (−0.66 to −0.18)	< 0.001	< 0.001
14 months	9 | 557	10 | 729	7.0 (6.0–9.0)	7.0 (5.0–9.0)	−0.13 (−0.41 to 0.15)	0.350	< 0.001

TABLE 15 Comparison of scores for psychosocial measures at follow-up for participants randomised to usual practice (control) and participants randomised to the Girls Active programme (intervention) (*continued*)

| Psychosocial measure | Number of schools \| number of pupils | | Median (IQR) | | Marginal mean at follow-up[a] | | |
	Control	Intervention	Control	Intervention	Coefficient (95% CI)	*p*-value	ICC
Attitudes towards being physically active[d]							
Positive							
Baseline	10 | 877	10 | 863	3.5 (3.2–4)	3.5 (3.2–3.8)			
7 months	8 | 626	10 | 775	3.7 (3.2–4)	3.5 (3.2–3.8)	–0.02 (–0.13 to 0.09)	0.775	0.01
14 months	9 | 573	10 | 737	3.5 (3.2–3.8)	3.5 (3–3.8)	–0.03 (–0.07 to 0.02)	0.250	< 0.001
Negative							
Baseline	10 | 877	10 | 863	2.6 (2.1–3)	2.5 (2.1–2.9)			
7 months	8 | 627	10 | 775	2.8 (2.3–3.1)	2.7 (2.3–3.1)	0.01 (–0.05 to 0.08)	0.661	0.003
14 months	9 | 573	10 | 737	2.7 (2.3–3.3)	2.8 (2.3–3.3)	0.04 (–0.04 to 0.11)	0.359	0.001
Whole							
Baseline	10 | 877	10 | 863	3.5 (3.2–3.8)	3.5 (3.2–3.8)			
7 months	8 | 627	10 | 775	3.4 (3.1–3.7)	3.4 (3.1–3.7)	–0.02 (–0.10 to 0.06)	0.667	0.01
14 months	9 | 573	10 | 737	3.4 (3–3.6)	3.4 (3–3.6)	–0.03 (–0.08 to 0.02)	0.267	< 0.001
Social support for PA from family[e]							
Baseline	10 | 876	10 | 863	2.7 (2.3–3)	2.7 (2–3)			
7 months	8 | 626	10 | 774	2.3 (2–3)	2.7 (2–3)	0.03 (–0.05 to 0.12)	0.445	< 0.001
14 months	9 | 571	10 | 735	2.7 (2–3)	2.3 (2–2.7)	–0.05 (–0.11 to 0.01)	0.105	< 0.001
Social support for PA received from peers[e]							
Baseline	10 | 874	10 | 863	2.8 (2.4–3)	2.8 (2.4–3)			
7 months	8 | 626	10 | 773	2.8 (2.4–3)	2.6 (2.4–3)	–0.01 (–0.12 to 0.10)	0.880	0.01
14 months	9 | 567	10 | 734	2.6 (2.2–3)	2.6 (2.2–3)	0.01 (–0.07 to 0.09)	0.762	0.01
School-based social support for PA							
Physical environment[e]							
Baseline	10 | 878	10 | 862	3.9 (3.6–4.3)	3.9 (3.6–4.3)			
7 months	8 | 627	10 | 773	3.8 (3.4–4.1)	3.8 (3.4–4.1)	0.03 (–0.10 to 0.15)	0.684	0.03
14 months	9 | 571	10 | 734	3.8 (3.3–4)	3.6 (3.1–3.9)	–0.13 (–0.24 to –0.01)	0.032	0.04

TABLE 15 Comparison of scores for psychosocial measures at follow-up for participants randomised to usual practice (control) and participants randomised to the Girls Active programme (intervention) (*continued*)

Psychosocial measure	Number of schools | number of pupils		Median (IQR)		Marginal mean at follow-up[a]		
	Control	Intervention	Control	Intervention	Coefficient (95% CI)	*p*-value	ICC
Social environment[e]							
Baseline	10 | 878	10 | 861	3.8 (3.3–4.1)	3.6 (3.3–4)			
7 months	8 | 626	10 | 773	3.5 (3.1–3.9)	3.5 (3.1–3.9)	–0.01 (–0.10 to 0.07)	0.758	0.026
14 months	9 | 570	10 | 734	3.5 (3–3.9)	3.5 (3–3.9)	–0.07 (–0.15 to 0.01)	0.080	0.009
PE teachers[f]							
Baseline	10 | 874	10 | 859	4.5 (3.3–5.3)	4.7 (3.7–5.5)			
7 months	8 | 624	10 | 774	4.2 (3.1–5.2)	4.3 (3.3–5.2)	–0.03 (–0.23 to 0.16)	0.733	0.026
14 months	9 | 567	10 | 731	4.2 (3.2–5)	4 (3–4.8)	–0.21 (–0.45 to 0.02)	0.074	0.018
Confidence to take part in PA (self-efficacy)[d]							
Baseline	10 | 879	10 | 853	3.6 (3.7–4)	3.5 (3.1–4)			
7 months	8 | 625	10 | 774	3.5 (3–3.9)	3.4 (2.9–3.8)	–0.02 (–0.09 to 0.04)	0.472	< 0.001
14 months	9 | 568	10 | 733	3.5 (3–3.9)	3.4 (2.9–3.8)	–0.08 (–0.14 to –0.02)	0.013	< 0.001
Enjoyment of PA[g]							
Baseline	10 | 876	10 | 851	3 (2.8–3.2)	3 (2.8–3.2)			
7 months	8 | 625	10 | 772	3 (2.8–3.3)	3 (2.8–3.2)	–0.03 (–0.14 to 0.08)	0.592	0.140
14 months	9 | 566	10 | 731	3 (2.8–3.2)	2.9 (2.7–3.1)	–0.04 (–0.12 to 0.04)	0.361	< 0.001
Motivation to take part in PA[g]							
Extrinsic							
Baseline	10 | 877	10 | 842	2 (1.5–2.8)	2 (1.5–2.8)			
7 months	8 | 626	10 | 771	2.2 (1.5–3.3)	2 (1.5–3)	–0.02 (–0.11 to 0.07)	0.680	< 0.001
14 months	9 | 568	10 | 735	2.3 (1.5–3)	2 (1.5–3)	–0.01 (–0.15 to 0.13)	0.919	0.009
Introjected							
Baseline	10 | 878	10 | 842	2.3 (1.8–3.0)	2.3 (1.8–3.0)			
7 months	8 | 626	10 | 771	2.5 (1.8–3.0)	2.3 (1.8–3.0)	–0.05 (–0.11 to 0.02)	0.143	< 0.001
14 months	9 | 568	10 | 735	2.5 (1.8–3.0)	2.3 (1.8–3.0)	–0.05 (–0.14 to 0.04)	0.260	< 0.001

continued

TABLE 15 Comparison of scores for psychosocial measures at follow-up for participants randomised to usual practice (control) and participants randomised to the Girls Active programme (intervention) (*continued*)

Psychosocial measure	Number of schools | number of pupils		Median (IQR)		Marginal mean at follow-up[a]		
	Control	Intervention	Control	Intervention	Coefficient (95% CI)	*p*-value	ICC
Identified							
Baseline	10 | 878	10 | 842	4 (3.5–4.8)	4 (3.5–4.8)			
7 months	8 | 626	10 | 771	4 (3.3–4.5)	4 (3.3–4.5)	−0.02 (−0.15 to 0.10)	0.700	0.020
14 months	9 | 568	10 | 735	3.8 (3–4.3)	3.8 (3–4)	−0.09 (−0.18 to −0.01)	0.032	< 0.001
Intrinsic							
Baseline	10 | 878	10 | 842	4 (3.3–4.8)	4 (3.3–4.5)			
7 months	8 | 626	10 | 771	4 (3–4.5)	4 (3–4.5)	−0.01 (−0.18 to 0.18)	0.990	0.028
14 months	9 | 568	10 | 735	3.8 (3–4.3)	3.5 (2.8–4.3)	−0.06 (−0.16 to −0.04)	0.243	0.002
Amotivation							
Baseline	10 | 877	10 | 841	2 (1.3–2.8)	2 (1.3–2.5)			
7 months	8 | 626	10 | 771	2 (1.3–2.8)	2 (1.3–2.8)	−0.03 (−0.15 to 0.09)	0.578	0.007
14 months	9 | 568	10 | 735	2 (1.3–2.8)	2 (1.3–3)	−0.02 (−0.14 to 0.09)	0.684	0.002
Physical self-perception[e]							
Self-esteem							
Baseline	10 | 760	10 | 700	3.5 (2.8–4.2)	3.5 (2.2–4.2)			
7 months	8 | 622	10 | 769	3.4 (2.8–4.0)	3.5 (2.8–4.0)	0.06 (0.01 to 0.11)	0.025	< 0.001
14 months	9 | 535	10 | 730	3.3 (2.8–4.0)	3.3 (2.7–4.0)	−0.06 (−0.13 to 0.01)	0.086	< 0.001
Physical self-worth							
Baseline	10 | 760	10 | 699	3.3 (2.8–3.7)	3.3 (2.8–3.7)			
7 months	8 | 622	10 | 769	3.2 (2.8–3.7)	3.2 (2.8–3.5)	−0.01 (−0.07 to 0.05)	0.742	0.007
14 months	9 | 535	10 | 730	3 (2.7–3.5)	3 (2.7–3.3)	−0.03 (−0.09 to 0.03)	0.322	0.006
Body attractiveness							
Baseline	10 | 760	10 | 699	2.8 (2.2–3.5)	2.7 (2.2–3.3)			
7 months	8 | 622	10 | 769	2.8 (2.2–3.3)	2.7 (2–3.2)	−0.05 (−0.12 to 0.03)	0.195	< 0.001
14 months	9 | 535	10 | 730	2.7 (2.2–3.2)	2.7 (2.0–3.2)	0.02 (−0.05 to 0.08)	0.630	< 0.001

a Adjusted difference at follow-up between randomised groups with 95% CI, *p*-value and ICC for schools, adjusted for cluster effect, baseline value, participant year group, percentage of pupils eligible for free school meals and stratification categories (school size and percentage of non-white pupils).
b Scores range from 1 ('very unlikely') to 7 ('very likely').
c Scales range from 1 ('very unimportant') to 10 ('very important').
d Scores range from 1 ('disagree a lot') to 5 ('agree a lot').
e Scores range from 1 ('strongly disagree') to 5 ('strongly agree').
f Scores range from 1 ('strongly disagree') to 7 ('strongly agree').
g Scores range from 1 ('no not at all') to 5 ('yes a lot').

Overall, participants in both groups scored their intentions to being active as 'likely' with a mean of 5.0 out of 7.0 and 4.7 out of 7.0 for the control and intervention group, respectively. At 7 months, there was no difference in intentions to being active (95% CI –0.33 to 0.03; $p = 0.094$). However, at 14 months there was a significant difference (–0.21, 95% CI –0.37 to –0.05; $p = 0.012$) in participants' intentions to be active, with the intervention group seeing a drop in their intention score of 0.4 (unadjusted) out of 7.0.

At baseline, participants rated regular PA as being important, with both groups scoring a mean rating of 8.0 out of 10. At 7 months, there was a significant difference in perceived importance (–0.42, 95% CI –0.66 to –0.18; $p < 0.001$), with the intervention group dropping by 1 (unadjusted) out of 10. At 14 months, there was no significant difference between groups (95% CI –0.41 to 0.15; $p = 0.350$) as by then both groups had dropped by 1 (unadjusted).

At both 7 months and 14 months, there was no difference in positive attitudes to being active (i.e. participants did not have stronger feelings about the positive aspects of PA as they were between 'neither agree nor disagree' and 'agree' at all time points). At both 7 months and 14 months, there were no differences in participants' disagreement with the negative attitudes to being active (i.e. they did not feel any worse about the negative aspects of PA as they were between 'disagree' and 'neither agree nor disagree' at all time points). When attitudes were considered as a whole score, there were no differences in participants' attitudes to being active at 7 (95% CI –0.10 to 0.06; $p = 0.667$) or 14 (95% CI –0.08 to 0.02; $p = 0.267$) months.

At 7 (95% CI –0.05 to 0.12; $p = 0.445$) and 14 (95% CI –0.11 to 0.01; $p = 0.105$) months, there were no differences in participants' perceptions of PA support from their family. At all time points, the unadjusted values for both groups lay between 'disagree' and 'agree' (i.e. 2.7 out of 4.0). At 7 (95% CI –0.12 to 0.10; $p = 0.880$) and 14 (95% CI –0.07 to 0.09; $p = 0.762$) months, there were no differences in participants' perceptions of PA support from their peers. At all time points, the unadjusted values for both groups lay between 'disagree' and 'agree'.

There was no difference in how participants perceived their school physical environment at 7 months (95% CI –0.10 to 0.15; $p = 0.684$). However, at 14 months there was a significant difference (–0.13, 95% CI –0.24 to –0.01; $p = 0.032$) between groups: participants' perceptions of their school physical environment decreased slightly more in the intervention group than in the control group. At all time points, the perceptions scores were on the positive side, lying between 'not sure' and 'agree'. There was no significant between-group difference in how participants perceived their school social environment at 7 (–0.01, 95% CI –0.10 to 0.07; $p = 0.758$) or 14 (–0.07, 95% CI –0.15 to 0.01; $p = 0.080$) months. At all time points, the perceptions scores were on the positive side, lying between 'not sure' and 'agree'.

There was no significant between-group difference in how participants perceived the support from their PE teacher at 7 (–0.03, 95% CI –0.23 to 0.16; $p = 0.733$) or 14 (–0.21, 95% CI –0.45 to 0.02; $p = 0.074$) months. At all time points, the perceptions scores were on the positive side, lying above 'neutral'.

There was no significant difference in participants' confidence in being active at 7 months (–0.02, 95% CI –0.09 to 0.04; $p = 0.472$). However, at 14 months there was a significant difference (–0.08, 95% CI –0.14 to –0.02; $p = 0.013$) between groups, with the confidence of participants in the intervention group decreasing slightly more than the confidence of participants in the control group. However, this was at a magnitude of difference marginal mean of 0.1 on a scale of 1 to 5 points.

There was no significant between-group difference in participants' enjoyment of PA at 7 (–0.03, 95% CI –0.14 to 0.08; $p = 0.592$) or 14 (–0.04, 95% CI –0.12 to 0.04; $p = 0.074$) months. The enjoyment scores from each measurement visit were generally 'neutral' (i.e. 3 out of 5 points).

Participant motivation to be physically active was queried and four domains of motivation were scored. At 7 (95% CI –0.11 to 0.07; $p = 0.680$) and 14 (95% CI –0.15 to 0.13; $p = 0.361$) months, there were no significant differences in extrinsic motivation. Values for extrinsic motivation lay between 'not really' and

'not sure' at all time points. At 7 (95% CI –0.11 to 0.102; $p = 0.143$) and 14 (95% CI –0.05 to 0.04; $p = 0.260$) months, there were no significant differences in introjected motivation. Values for introjected motivation lay between 'not really' and 'not sure' at all time points. At 7 months, there was no significant difference in identified motivation (–0.02, 95% CI –0.15 to 0.10; $p = 0.700$). However, at 14 months there was a slight but significant difference in identified motivation in favour of the intervention group (–0.09; 95% CI –0.18 to –0.0; P = 0.032). Values for identified motivation lay between 'not sure' and 'yes a bit' at all time points. At 7 (95% CI –0.18 to 0.18; $p = 0.990$) and 14 (–0.06, 95% CI –0.16 to –0.04; $p = 0.243$) months, there were no significant differences in intrinsic motivation. Finally, at 7 (–0.03, 95% CI –0.15 to 0.09; $p = 0.578$) and 14 (–0.02, 95% CI –0.14 to 0.09; $p = 0.684$) months, there were no significant differences in participant amotivation.

Participant physical self-perception was obtained through questions on three elements: self-esteem, physical self-worth and body attractiveness. A significant difference in self-esteem was seen at 7 months (0.06, 95% CI 0.01 to 0.11; $p = 0.025$) in favour of the intervention group but no difference was seen at 14 months (–0.06, 95% CI –0.13 to 0.01; $p = 0.086$). Scores for self-esteem were between 'neutral' and 'agree' at all time points. At 7 (–0.01, 95% CI –0.07 to 0.05; $p = 0.742$) and 14 (–0.03, 95% CI –0.09 to 0.03; $p = 0.322$) months, there were no significant differences in participants' feelings of physical self-worth. Scores declined equally in both groups to 'neutral' by 14 months' follow-up. At 7 (–0.05, 95% CI –0.12 to 0.03; $p = 0.195$) and 14 (0.02, 95% CI –0.05 to 0.08; $p = 0.630$) months, there was no significant difference in participants' feeling of body attractiveness. Scores for body attractiveness were between 'disagree' and 'neutral' at all time points.

Unintended consequences

Participants answered 'yes' or 'no' to simple questions on smoking and alcohol consumption. The percentage of participants answering 'yes' to each question is shown in *Figure 4*. At baseline, 8.6% of control participants and 9.2% of intervention participants answered 'yes' to having smoked a cigarette, and 33.3% of control participants and 31.4% of intervention participants answered 'yes' to having had an alcoholic drink. At 7 months, 15.4% of control participants and 12.5% of intervention participants answered 'yes' to having smoked a cigarette, and 42.1% of control participants and 38.9% of intervention participants answered 'yes' to having had an alcoholic drink. At 14 months, 17.7% of control participants and 15.7% of intervention participants answered 'yes' to having smoked a cigarette, and 53.5% of control participants and 47.7% of intervention participants answered 'yes' to having had an alcoholic drink. No adverse events were reported in this trial.
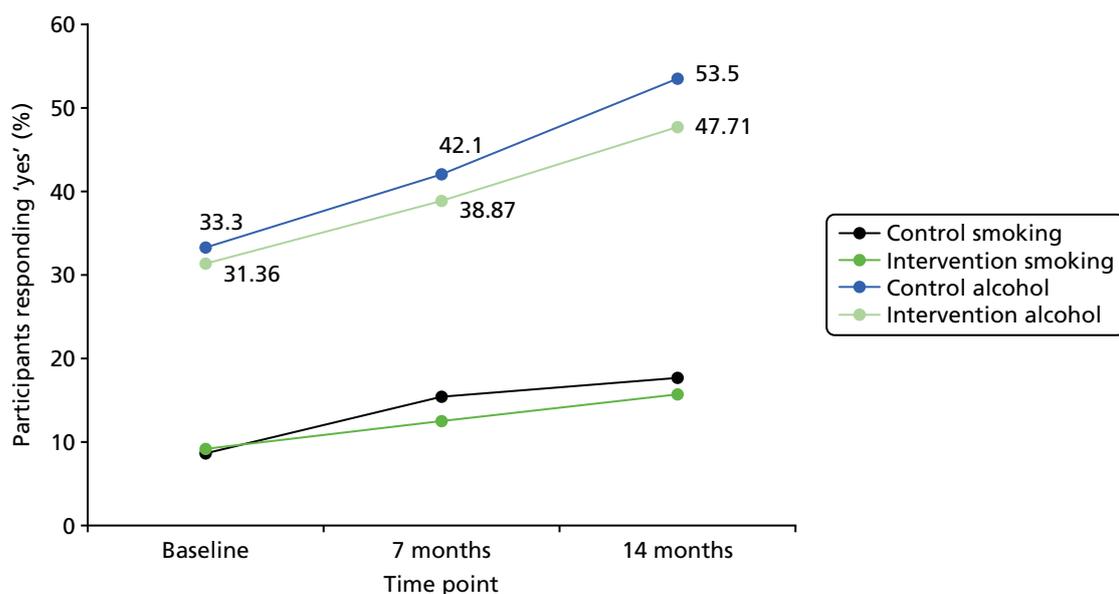
FIGURE 4 Proportion of participants who reported engaging in smoking and alcohol consumption at each time point. Adjusted intervention arm difference in MVPA (minutes/day) at 7 months.

Subgroup analyses

Tables 16 and *17* present the results of the prespecified subgroup analyses for the primary outcome; *Figures 5* and *6* are the corresponding forest plots. At 7 months, the between-subgroup interaction effects revealed a significant subgroup effect (i.e. the intervention had a differing effect depending on certain baseline characteristics) in terms of participant ethnicity and biological maturity. For ethnicity, the intervention was effective in white European participants, for whom there was a significant difference of 3.3 minutes per day ($p = 0.017$) favouring the intervention arm, whereas there was no difference between the intervention and control arms for non-white participants. For biological maturity, the intervention was effective in early maturers, in whom there was a significant difference between randomised arms of 5.1 minutes per day ($p = 0.003$), whereas there was no difference between the intervention and control arms for participants in the average and late stages of maturity.

At 14 months, the between-subgroup interaction effects revealed a significant subgroup effect (i.e. the intervention had a differing effect depending on certain baseline characteristics) in terms of school size. In larger schools (≥ 850 pupils), there was a significant difference between randomised arms of 3.9 minutes per day ($p = 0.001$), favouring the intervention arm. In smaller schools (< 850 pupils), there was a significant difference between randomised groups of –4.5 minutes per day ($p = 0.004$), favouring the control arm. In addition, there was a trend towards a significant interaction with year group ($p = 0.051$ for interaction), with the intervention becoming effective in later year groups, reaching a between-group difference of 4.7 minutes per day ($p = 0.008$) for those in Year 9.

TABLE 16 Marginal means (adjusted difference) of MVPA (minutes/day) at 7 months within subgroups

Subgroup	Mean difference of arm in subgroup (95% CI)	*p*-value for arm within subgroup	Mean difference between subgroups (95% CI)	*p*-value for interaction
School size				
< 850 pupils	2.51 (–1.19 to 6.20)	0.183	Reference	
≥ 850 pupils	2.40 (–0.35 to 5.14)	0.085	0.10 (–4.75 to 4.55)	0.965
School social deprivation				
Less than the median % of pupils receiving FSMs	0.91 (–1.07 to 2.89)	0.366	Reference	
More than or equal to the median % of pupils receiving FSMs	3.32 (0.20 to 6.44)	0.037	2.41 (–1.32 to 6.14)	0.206
Year group				
Year 7	1.43 (–1.34 to 4.21)	0.311	Reference	
Year 8	2.07 (–0.69 to 4.52)	0.142	0.64 (–2.75 to 4.03)	0.712
Year 9	5.29 (1.22 to 9.37)	0.011	3.86 (–0.15 to 7.87)	0.059
Ethnicity				
White European	3.31 (0.60 to 6.02)	0.017	Reference	
Non-white	0.05 (–2.85 to 2.95)	0.973	–3.26 (–5.93 to –0.59)	0.017
Biological maturity				
Early	5.08 (1.69 to 8.48)	0.003	Reference	
Average	2.10 (–0.22 to 4.41)	0.076	–2.99 (–5.70 to –0.28)	0.031
Late	2.12 (–1.44 to 5.68)	0.243	–2.96 (–5.84 to –0.09)	0.043

FSMs, free school meals.

TABLE 17 Marginal mean (adjusted difference) of MVPA (minutes/day) at 14 months within subgroups

Subgroup	Mean difference of arm in subgroup (95% CI)	*p*-value for intervention within subgroup	Mean difference between subgroups (95% CI)	*p*-value for interaction
School size				
< 850 pupils	−4.38 (−7.34 to −1.41)	0.004	Reference	
≥ 850 pupils	3.89 (1.39 to 6.09)	0.001	8.27 (4.35 to 12.18)	< 0.001
School social deprivation				
Less than the median % of pupils receiving FSMs	−0.23 (−3.59 to 3.14)	0.895	Reference	
More than or equal to the median % of pupils receiving FSMs	3.75 (0.84 to 6.67)	0.012	3.98 (−0.59 to 8.54)	0.088
Year group				
Year 7	0.74 (−2.29 to 3.77)	0.634	Reference	
Year 8	1.61 (−1.76 to 4.98)	0.350	0.87 (−2.21 to 3.96)	0.580
Year 9	4.68 (−1.77 to 8.15)	0.008	3.94 (−0.01 to 7.90)	0.051
Ethnicity				
White European	1.50 (−1.84 to 4.83)	0.378	Reference	
Non-white	2.09 (−0.92 to 5.10)	0.173	0.59 (−3.48 to 4.66)	0.777
Biological maturity				
Early	−0.42 (−4.48 to 3.64)	0.840	Reference	
Average	2.38 (−0.42 to 5.19)	0.096	2.80 (−0.73 to 6.33)	0.120
Late	2.59 (−1.87 to 7.05)	0.255	3.01 (−2.54 to 8.56)	0.288

FSMs, free school meals.
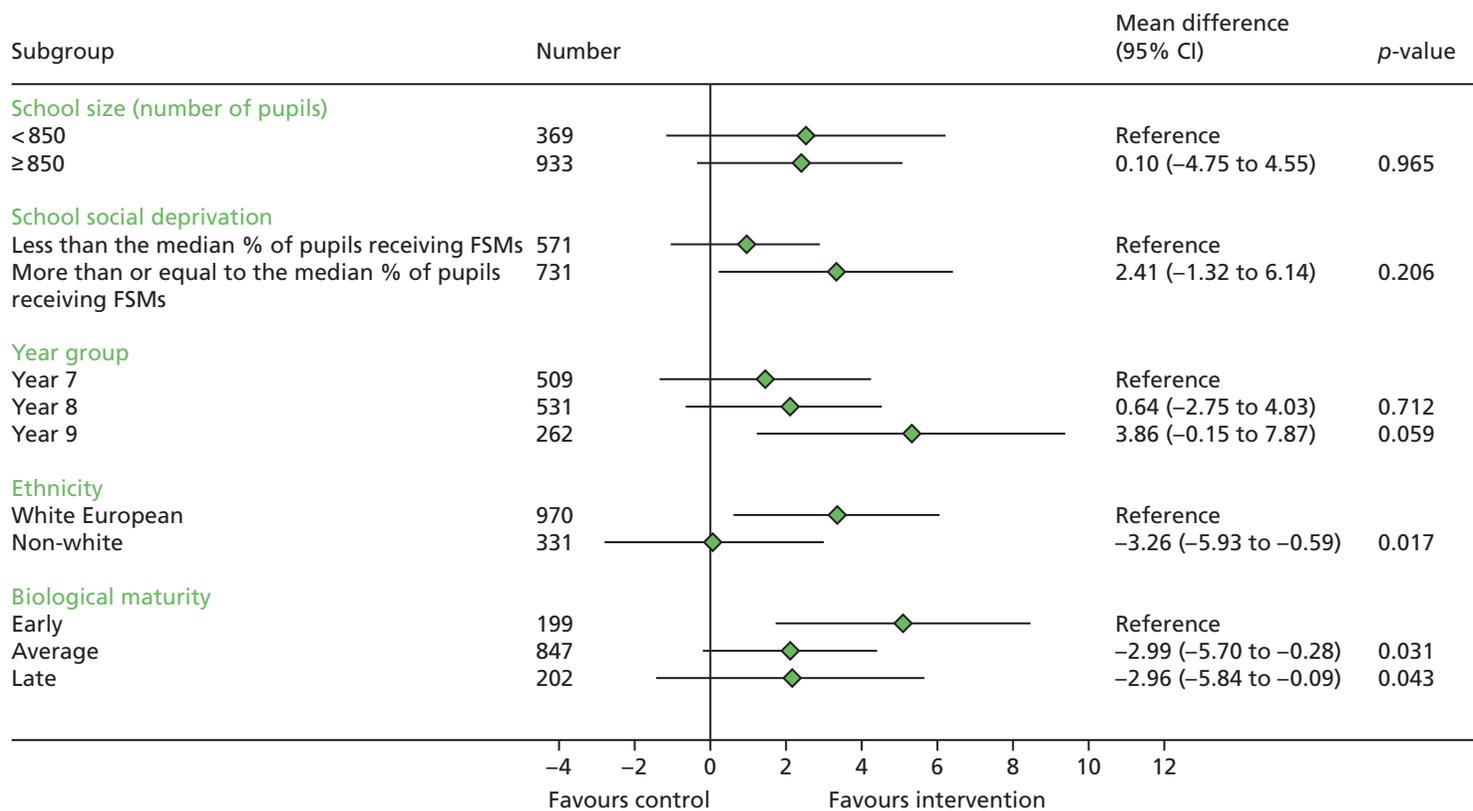
FIGURE 5 Forest plot of the effect of the intervention at 7 months on the primary end point by subgroup. Subgroups are defined at baseline. Schools with a percentage of pupils eligible for FSMs lower than the median are considered to be the less deprived schools and those with a percentage above the median are considered to be the more deprived schools. Based on a complete-case analysis, including pupils who have worn the accelerometer for a minimum of 2 valid days with at least 1 school day at baseline and 7 months (8 control and 10 intervention schools, $n = 1302$). Adjusted for cluster effect, baseline MVPA value, stratification categories (school size and percentage of non-white pupils), year group and school percentage of pupils eligible for FSMs. FSMs, free school meals.
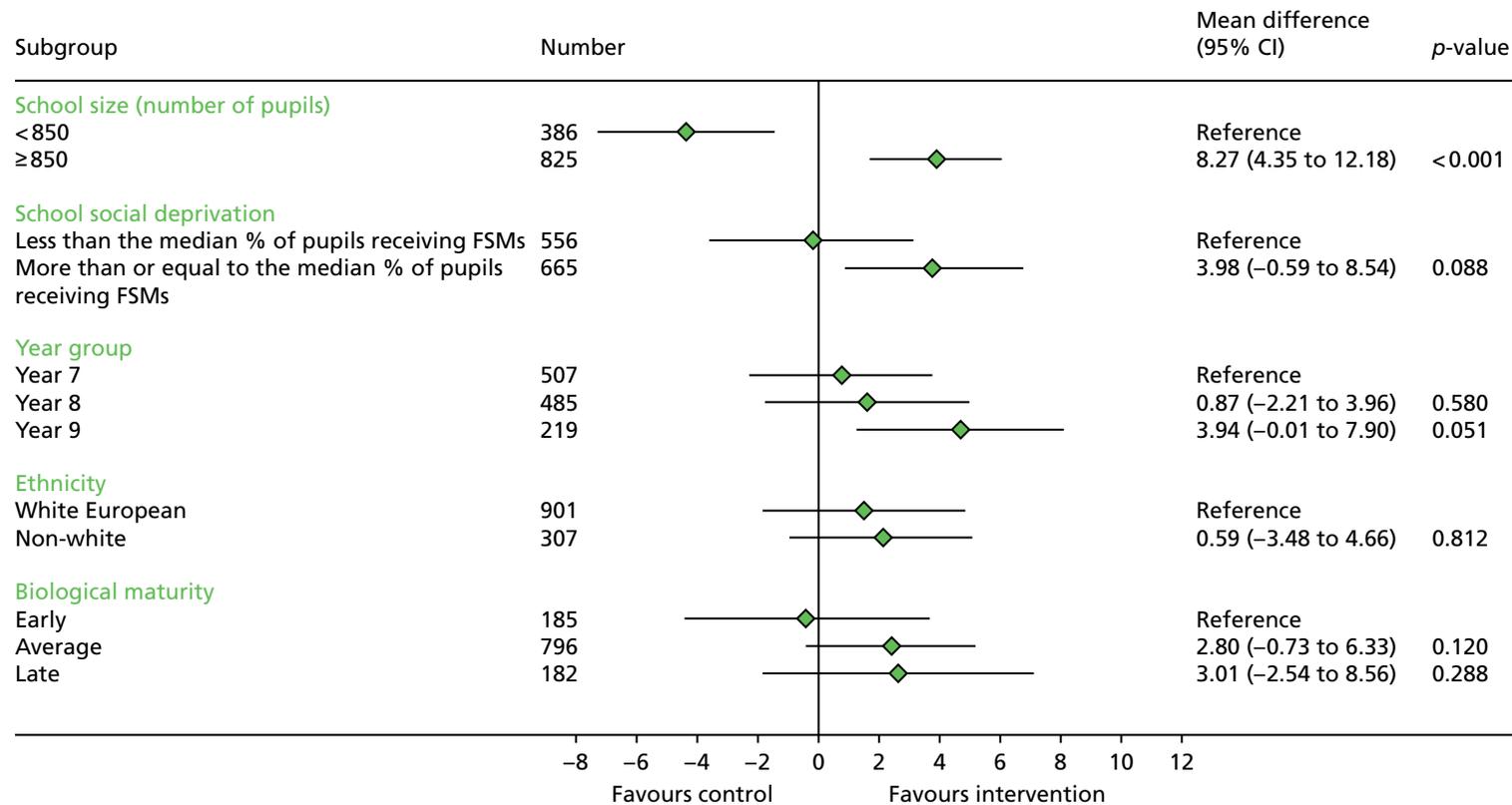
FIGURE 6 Forest plot of the effect of the intervention at 14 months on the primary end point by subgroup. Subgroups are defined at baseline. Schools with a percentage of pupils eligible for FSMs lower than the median are considered to be the less deprived schools and those with a percentage above the median are considered to be the more deprived schools. Based on a complete-case analysis, including pupils who have worn the accelerometer for a minimum of 2 valid days with at least 1 school day at baseline and 14 months (nine control and 10 intervention schools; $n = 1211$). Adjusted for cluster effect, baseline MVPA value, stratification categories (school size and percentage of non-white pupils), year group and school percentage of pupils eligible for FSMs. FSMs, free school meals.

Chapter 5 Economic evaluation

Introduction

Physical activity provides fundamental health benefits for children, contributing to the development of healthy bones, muscles and joints, the cardiovascular system and co-ordination, and it provides psychological benefits including a reduction in anxiety and depression and an improvement in self-confidence;[79] however, there is a lack of cost-effectiveness evidence surrounding PA interventions for children.[80,81] In this chapter, we provide an overview of the economic analysis of the Girls Active programme. We describe the measurement of outcomes and costs from a public sector, NHS and local authority perspective. We report the frequencies and costs of contact with community-based health-care services (GPs) and school-based health and social services (school nurses and school counsellors), by the intervention and control group over the 14-month follow-up period of the trial. We also report the outcomes of health-related quality of life (CHU-9D[63]) and minutes of MVPA per day. Methods for microcosting and the cost–consequences analysis are found in *Chapter 2*, *Microcosting methods* and *Cost–consequences methods*.

Microcosting results

Diary response rates

Out of the 10 schools, four schools completed the Microsoft Excel diary weekly. One school did not implement any of the Girls Active components and also failed to provide any diaries. The remaining five schools provided their information through the survey. Three schools also provided logbooks when returning the survey.

Implementation-level categorisation

From the descriptions of what the schools did in the diaries and when contacting teachers, it was clear that implementation varied across the nine schools. Owing to the nature of the programme, which was not prescriptive and gave schools the responsibility to implement the programme as appropriate within their own settings, Girls Active was implemented in different ways by the intervention schools taking part. Given the diversity of implementation, which is common in public health interventions, the results of the microcosting are presented as three costings that are defined in terms of the nine schools that cost information was received from:

1. a minimum implementation costing (base case), which entailed creating new development plans and delivered the programme within the curriculum after engaging with female pupils
2. a mid-range implementation costing, which entailed creating new development plans and delivered the programme within the curriculum after engaging with female pupils, and included additional activities, such as after-school clubs and taster sessions (approximately 3 hours per week)
3. a highest implementation costing (in terms of the nine sample schools in the trial), which entailed creating new development plans and delivered the programme within the curriculum after engaging with female pupils, and included additional activities, such as after-school clubs and day trips and events (approximately 4 hours per week and four trips per year, respectively).

From a resources perspective, using the minimum levels of implementation (*Table 18*) by delivering Girls Active during curriculum hours would require the least amount of teacher time and may be considered the least costly option for a local authority; however, there are additional commitments required, such as engaging with pupils, developing a peer leader group and action plans and, once these are undertaken, time devoted to the programme is confined to timetabled PE lessons, thus minimising resources. In contrast, devoting additional time and resources as described in the mid-range and highest levels of implementation

TABLE 18 Minimum level of implementation costing (base case): all costs (non-recurrent and recurrent)

Type of cost	Units	Unit cost	Total cost to school
Training and initial resource costs			
Training course	One-off training course lasting for 7 hours	Provided by YST	£0.00
Staff costs for a member of staff to attend a training course	One-off training course lasting for 7 hours for one teacher	7 hours × £26.00	£182.00
Travel costs for a member of staff to attend a training course	Mean distance travelled (return): 17 miles	17 miles × £0.45 per mile	£8.00
Resources for schools including marketing plans, an action-planning guide and a branding toolkit	Resource pack describing Girls Active	Provided by YST	£0.00
Peer review day			
Time spent at peer review day	4 hours	4 × £26.00	£104.00
Travel distance to and from peer review day	Mean distance travelled (return): 27 miles	27 × £0.45 per mile	£12.00
Girls Active school delivery costs			
Time spent reviewing current PE and sport culture and practice	2.5 hours	2.5 hours × £26.00	£65.00
Time spent recruiting Girls Active leaders	2.25 hours	2.25 hours × £26.00 spent recruiting a mean of 11 leaders	£59.00
Time spent engaging with Girls Active leaders to discuss current PE and school sport provision and what they would like to change	5 hours	5 hours × £26.00 spent engaging with a mean of 11 leaders	£130.00
Time spent engaging with pupils who are not Girls Active leaders to discuss current PE and school sport provision and what they would like to change (hours)	5 hours	5 hours × £26.00 spent engaging with a mean of 50 pupils	£130.00
Time spent developing action plans	8 hours	8 hours × £26.00	£208.00
Time spent planning new activities in order to implement the action plans	4 hours	4 hours × £26.00	£104.00
Total time spent implementing and delivering Girls Active per week – including undertaking PE lessons, meeting with staff and ordering new equipment	7 hours	7 hours × 39 weeks = 273 hours	£0.00[a]
Total amount of capacity-building funding received to implement Girls Active	YST capacity funding	2 × £500	£1000.00
Additional costs for PE and school sport equipment in order to deliver the Girls Active action plan – not covered by capacity-building funding, instead covered by school's own funds	£0	£0	£0.00
Time spent utilising support from hub school and YST (including e-mail correspondence, telephone calls and face-to-face contact)	2 hours	2 × £26.00	£52.00

TABLE 18 Minimum level of implementation costing (base case): all costs (non-recurrent and recurrent) (*continued*)

Type of cost	Units	Unit cost	Total cost to school
Total costs per school per year			£2054
Total costs per pupil per school per year (based on 90 pupils in each school)			£2054/90 = £23.00

a Undertaken as part of contractual 'usual' hours.
Note
This implementation level entailed creating new development plans and delivered the programme within the curriculum after engaging with female pupils.

tables (*Tables 19* and *20*), for example using lunch hours and after-school clubs to deliver further taster sessions and one-off events, may be considered more costly options by a local authorities; however, these models of implementation align more with a pupil perspective and take into account the programme's philosophy, which aims to improve pupil engagement in PE and change PE and exercise culture within schools. These implementation models are presented to demonstrate what happened in the trial, and give schools and local authorities wishing to roll out the programme an indication of the time and resources required. As the programme is not prescriptive, levels of implementation in real-world contexts will depend on number of staff members, staff time, availability of staff to share and delegate tasks related to the programme among each other and their peer leader teams, availability of funds for equipment and activities requested by pupils and support from senior members of staff to undertake new activities. A further description of implementation barriers and facilitators can be found in the results of the process evaluation in *Chapter 6*.

TABLE 19 Mid-range level of implementation costing: all costs (non-recurrent and recurrent)

Type of cost	Units	Unit cost	Total cost to school
Training and initial resource costs			
Training course	One-off training course lasting for 7 hours	Provided by YST	£0.00
Staff costs for a member of staff to attend a training course	One-off training course lasting for 7 hours for one teacher	7 hours × £26.00	£182.00
Travel costs for a member of staff to attend a training course	Mean distance travelled (return): 70 miles	70 miles × £0.45 per mile	£32.00
Resources for schools including marketing plans, an action-planning guide and branding toolkit	Resource pack describing Girls Active	Provided by YST	£0.00
Peer review day			
Time spent at peer review day	4 hours	4 × £26.00	£104.00
Travel distance to and from peer review day	Mean distance travelled (return): 23 miles	23 × £0.45 per mile	£10.00

continued

TABLE 19 Mid-range level of implementation costing: all costs (non-recurrent and recurrent) (*continued*)

Type of cost	Units	Unit cost	Total cost to school
Girls Active school delivery costs			
Time spent reviewing current PE and sport culture and practice	8 hours	8 hours × £26.00	£208.00
Time spent recruiting Girls Active leaders	2.5 hours	2.5 hours × £26.00 spent recruiting a mean of 11 leaders	£65.00
Time spent engaging with Girls Active leaders to discuss current PE and school sport provision and what they would like to change	10 hours	10 hours × £26.00 spent engaging with a mean of 11 leaders	£260.00
Time spent engaging with pupils who are not Girls Active leaders to discuss current PE and school sport provision and what they would like to change	6 hours	6 hours × £26.00 spent engaging with a mean of 130 pupils	£156.00
Time spent developing action plans	10 hours	10 hours × £26.00	£260.00
Time spent planning new activities in order to implement the action plans	8 hours	8 hours × £26.00	£208.00
Total time spent implementing and delivering Girls Active per week – including undertaking PE lessons, meeting with staff and ordering new equipment	7 hours	7 hours × 39 weeks = 273 hours	£0.00[a]
After-school sessions delivered as part of Girls Active per week	3 hours	3 hours × 39 weeks = 117; 117 × £26.00	£3042.00
Total amount of capacity-building funding received to implement Girls Active	YST capacity funding	2 × £500.00	£1000.00
Additional costs for PE and school sport equipment in order to deliver the Girls Active action plan – not covered by capacity-building funding, instead covered by school's own funds	£900.00	£900.00 for sporting equipment and awards	£900.00
Time spent utilising support from hub school and YST (including e-mail correspondence, telephone calls and face-to-face contact)	2 hours	2 × £26.00	£52.00
Total costs per school per year			£6479.00
Total costs per pupil per school per year (based on 90 pupils per school)			£6479/90 = £72.00

a Undertaken as part of contractual 'usual' hours.
Note
This level entailed creating new development plans and delivered the programme within the curriculum after engaging with female pupils and included additional activity, such as after-school clubs and taster sessions.

TABLE 20 Highest level of implementation costing: all costs (non-recurrent and recurrent)

Type of cost	Units	Unit cost	Total cost to school
Training and initial resource costs			
Training course	One-off training course lasting for 7 hours	Provided by YST	£0.00
Staff costs for a member of staff to attend a training course	One-off training course lasting for 7 hours for one teacher	7 hours × £26.00	£182.00
Travel costs for a member of staff to attend a training course	Mean distance travelled (return): 47 miles	47 miles × £0.45 per mile	£21.00
Resources for schools including marketing plans, an action-planning guide and a branding toolkit	Resource pack describing Girls Active	Provided by YST	£0.00
Peer review day			
Time spent at peer review day	4 hours	4 × £26.00	£104.00
Travel distance to and from peer review day	Mean distance travelled (return): 23 miles	23 × £0.45 per mile	£10.00
Girls Active school delivery costs			
Time spent reviewing current PE and sport culture and practice	5 hours	5 hours × £26.00	£130.00
Time spent recruiting Girls Active leaders	3 hours	3 hours × £26.00 spent recruiting a mean of 18 leaders	£78.00
Time spent engaging with Girls Active leaders to discuss current PE and school sport provision and what they would like to change	14 hours	14 hours × £26.00 spent engaging with a mean of 18 leaders	£364.00
Time spent engaging with pupils who are not Girls Active leaders to discuss current PE and school sport provision and what they would like to change	4 hours	4 hours × £26.00 spent engaging with a mean of 70 pupils	£104.00
Time spent developing action plans	10 hours	10 hours × £26.00	£260.00
Time spent planning new activities in order to implement the action plans	9 hours	9 hours × £26.00	£234.00
Total time spent implementing and delivering Girls Active per week – including undertaking PE lessons, meeting with staff and ordering new equipment	7 hours	7 hours 39 weeks = 273 hours	£0.00[a]
After-school sessions delivered as part of Girls Active per week	4 hours	4 hours × 39 weeks = 156; 156 × £26.00	£4056.00
Day trips as part of delivering Girls Active over the year	6 hours	6 hours × mean of 4 trips over 1 school year = 24; 24 × £26.00	£624.00
Total amount of capacity-building funding received to implement Girls Active	YST capacity funding	2 × £500	£1000.00

TABLE 20 Highest level of implementation costing: all costs (non-recurrent and recurrent) (*continued*)

Type of cost	Units	Unit cost	Total cost to school
Additional costs for PE and school sport equipment in order to deliver the Girls Active action plan – not covered by capacity-building funding, instead covered by school's own funds	£1300	£1300 for coach hire for day trips, additional coaching (e.g. gymnastics)	£1300.00
Time spent utilising support from hub school and YST (including e-mail correspondence, telephone calls and face-to-face contact)	3 hours	3 × £26.00	£78.00
Total costs per school per year			£8545.00
Total costs per pupil per school per year (based on 90 pupils per school)			£8545/90 = £95.00

a Undertaken as part of contractual 'usual' hours.
Note
This level entailed creating new development plans and delivered the programme within the curriculum after engaging with female pupils, included additional activity, such as after-school clubs and day trips and events.

The nine diaries received were classified into the three categories: (1) three schools were categorised as having a minimum level of implementation, (2) four were categorised as having a mid-range level of implementation and (3) two were categorised as having the highest level of implementation. Please note that implementation levels are in the context of the sample of 9 schools. The mean training and delivery time based on the schools in each category is presented in *Tables 18–20*. A mean hourly rate of £26.00 (rounded to the nearest £1) is applied throughout the tables, which is based on the mean hourly rate of the salary information provided by the teachers completing the diaries. *Tables 18–20* show a range of costing models that could be employed to deliver the programme at different levels of implementation. Costs ranged from £2054 per school (which is £23 per pupil based on an average of 90 pupils) to £8545 per school (which is £95 per pupil based on an average of 90 pupils), with incorporating Girls Active strictly in curriculum hours being the least costly option. Staff time accounted for the largest costs in the costing. Schools received £1000 of funding from the YST, and in some cases they received funding from their own school budgets. Data from the process evaluation case studies (see *Chapter 6, School case studies*) indicated that many (6 out of 10) of the schools did not actually spend the capacity funding (one of these sought money from internal school funds), and one spent only 'a small bit'. When the schools did spend their funding (3 out of 10), it was generally used to purchase new equipment and deliver activities requested by the girls [e.g. to purchase dodgeballs and Zumba® (Zumba Fitness, LLC, Hallandale Beach, FL, USA) kits]. Further funding supplied, which was not received from the YST as part of capacity building, was from within public sector funding, typically the schools' own budget and funding. When conducting exploratory subgroup analyses, the level of implementation was not shown to have a statistically significant effect on minutes of MVPA per day, CHU-9D utility index scores or total frequency or costs of service use (see *Table 29*).

Opportunity costs were considered in the microcosting.[82] Opportunity cost is defined as the value of benefits forgone by not using resources in their next best alternative use. As Girls Active was delivered in usual school hours and replaced previous PE activities with those specified by the pupils, this resulted in minimal opportunity costs for the schools taking part in the trial. It is worth stating that in order to deliver Girls Active, teachers' usual activities were sometimes displaced; these included planning, preparation and assessment time, personal time outside working hours, overseeing social clubs or activities and free periods. On average across the nine intervention schools, teachers experienced 6 hours of displaced activity over the course of the year. Another factor related to opportunity costs is fees for training. *Tables 18–21* state that training was provided by YST to schools without a charge to schools; however, this training does incur a charge estimated by the YST in January 2017 as £300 for tutor costs, £30 for tutor travel and

TABLE 21 Characteristics of participants included in the economic analysis (*N* = 997) at baseline by trial arm

Characteristics	Trial arm	
	Control (*N* = 427)	Intervention (*N* = 570)
Non-white participants, *n* (%)	137 (32)	140 (26)
Year group of participants, *n* (%)		
Year 7	194 (46)	206 (36)
Year 8	176 (41)	232 (41)
Year 9	57 (13)	132 (23)
Age (years), mean (SD)	12.7 (0.8)	12.9 (0.8)
Participant IMD,[a] mean (SD)	6.3 (3.0)	5.2 (2.7)

a Number of observations reduces to 407 for the control group and 532 for the intervention group.

£50 per school for the resources pack, although these may be subject to change. Venue hire and lunches may also incur a charge, but no estimate was provided by YST, as this will depend on the training venue and their related charges for these services.

Cost–consequences analysis

As no significant effect on the primary outcomes for the intervention was found (see *Chapter 4*, *Main complete-case analysis*), a cost–consequences analysis was performed instead of the planned cost-effectiveness analysis stated in our published trial protocol.[26] This was a more appropriate analysis to perform given the non-significant result. Cost–consequences analysis is a variant of cost-effectiveness analysis in which an array of consequences/outcomes (e.g. health-related quality of life) and costs (e.g. health service use costs) are presented in a disaggregated format, comparing the two arms of the trial (intervention group and control group) in a disaggregated form, without combining these into a cost-effectiveness ratio or a cost–utility ratio. This type of analysis lists the components of an intervention without making judgements about their relative importance; the verdict is left to the decision-maker.[61,62] Cost–consequences analysis is supported by NICE as a method that is particularly relevant to economic evaluations alongside public health interventions.[83] Weatherly *et al.*[84] have argued for cost–consequences analysis to be conducted as part of economic evaluations alongside cost-effectiveness or cost–utility analysis.

Cost–consequences results

Health economics sample

A total of 1752 participants were recruited to the trial. For the economics analysis, we excluded participants who had missing data for both costs and outcomes, as economic evaluations require complete cases from both costs and outcomes.[85,86] Of the 1362 participants who returned for the 14-month follow-up, 1163 had CHU-9D data at both baseline and 14-month follow-up, and 1157 had service-use data at both baseline and 14 months post baseline. After participants with missing data were removed, and participant ID numbers were matched across time points, the final sample for the economic complete-case analysis was 997 participants (intervention, *n* = 570 and control, *n* = 427). *Table 21* presents the characteristics of the complete-case economic sample at baseline.

Tables 22 and *23* shows the results from the xtgee models, demonstrating that the intervention did not have an effect on the main outcomes of MVPA per day, CHU-9D utility index score or service use for the economic sample; however, characteristics, such as results at baseline, school size and percentage of BME pupils, did have an effect on the results, adding weight to the cluster trial design and therefore justifying their inclusion in the xtgee model.

TABLE 22 Results from the xtgee models

Factors	Results at 14 months post baseline, β-coefficient, SE (95% CI)			
	MVPA/day	CHU-9D utility index score	Total frequencies of service use	Total costs of service use
Randomisation	1.369, 1.536 (–1.641 to 4.379)	–0.009, 0.008 (–0.238 to 0.006)	0.036, 0.020 (–0.003 to 0.074)	–0.001, 0.001 (–0.003 to 0.001)
Minutes of MVPA/day at baseline	0.643, 0.381 (0.568 to 0.717)[a]	N/A	N/A	N/A
CHU-9D utility index score at baseline	N/A	0.584, 0.035 (0.516 to 0.652)[a]	N/A	N/A
Total frequencies of service use at baseline	N/A	N/A	–0.024, 0.001 (–0.027 to –0.021)[a]	N/A
Total costs of service use at baseline	N/A	N/A	N/A	–0.000, 9.967 (–0.000 to –0.000)[a]
School size (< 850 or ≥ 850 pupils)	–1.205, 1.994 (–5.113 to 2.703)	–0.003, 0.009 (–0.019 to 0.014)	0.159, 0.035 (0.089 to 0.228)[a]	0.002, 0.001 (–0.000 to 0.004)
Percentage of BME pupils (< 20% or ≥ 20%)	–3.930, 1.193 (–6.268 to –1.592)[a]	0.026, 0.009 (0.009 to 0.043)[a]	–0.139, 0.022 (–0.182 to –0.096)[a]	0.001, 0.001 (–0.001 to 0.003)
Constant	14.488, 2.855 (8.892 to 20.083)[a]	0.318, 0.036 (0.247 to 0.388)[a]	0.405, 0.024 (0.358 to 0.451)[a]	0.011, 0.001 (0.009 to 0.013)[a]

N/A, not applicable; SE, standard error.
a Significant at a 0.05 level of statistical significance.
Note
β-coefficients, SEs and 95% CIs are all rounded to three decimal places.

TABLE 23 Marginal mean minutes/day of MVPA, CHU-9D utility index scores and total service use following 14 months' post-baseline xtgee models, and mean differences between groups (1000 bootstrapped 95% CI)

Outcome	Marginal mean, SE (95% CI)		Difference between groups (1000 bootstrapped 95% CI)
	Intervention ($n = 570$)	Control ($n = 427$)	
Minutes of MVPA/day	42.220, 0.827 (40.599 to 43.842)	41.692, 1.140 (39.459 to 43.926)	0.528 (0.000 to 0.000)
CHU-9D utility index score	0.821, 0.004 (0.813 to 0.830)	0.835, 0.006 (0.824 to 0.847)	0.014 (–0.022 to 0.004)
Total service use frequency	2.430, 0.116 (2.201 to 2.657)	3.247, 0.373 (2.515 to 3.978)	N/A
Total service use cost	94.316, 7.234 (80.138 to 108.494)	115.692, 22.853 (70.900 to 160.484)	21.376 (–151.919 to 123.412)

N/A, not applicable; SE, standard error.
Note
Marginal means, SEs and 95% CIs are all rounded to three decimal places.

The intervention group and the control group reported similar marginal means (means calculated following the xtgee model taking clustering into account) in terms of the three outcomes (MVPA/day, CHU-9D utility index scores and total service use). The control group reported a slightly higher marginal mean of total service use frequency and related costs; however, this cost was only £22 higher in the control group than in the intervention group.

Both the intervention group and the control group participated in an average of 42 minutes of MVPA per day. The intervention group reported a mean CHU-9D utility index score of 0.821, which is slightly lower than the mean utility score of 0.835 reported by the control group; however, these differences were not statistically significant (see *Table 26*). Compared with the control group, the intervention group had slightly lower frequencies of contacts with health care and school services [two contacts (intervention) vs. three contacts (control) over several months] and associated costs of service use [£94 (intervention) vs. £116 (control) over several months]; however, this difference was not statistically significant (see *Table 23*). After conducting the xtgee models, ICCs were calculated for the three outcome measures. An ICC of 0.198 was found for MVPA per day, an ICC of –0.000 was found for CHU-9D utility index score, and the ICCs were –0.008 and –0.005 for frequencies of total service use and costs of total service use, respectively.

Table 23 shows no significant differences between the marginal means of the intervention and control group for the three outcome measures and costs as indicated by the bootstrapped CIs (bootstrapping was used to create 1000 valid bootstrap replications).

Service use
Tables 24 and *25* report the results from xtgee models of the individual services. As in the main analysis reported in *Tables 22* and *23*, the intervention did not have an effect on service use when divided further into individual services. GPs were the health professionals that the participants were most likely to see. The intervention group and control group reported similar marginal means when service use was broken down into individual services. Marginal mean frequencies and costs of service use were similar between groups; however, the control group reported slightly higher marginal means of service use frequency and related costs. Differences in costs are most noticeable in the reporting of school counselling frequency and costs; however, this cost was only £10 higher in the control group than in the intervention group.

School absenteeism
Participants in the trial were asked to report the number of days in which they had been absent from school in the preceding 7 months. *Table 26* reports the results from xtgee models of absenteeism. The intervention was shown to not effect absenteeism for the sample.

Sensitivity analysis
As the intervention follow-up period was > 1 year, as part of the sensitivity analysis, service use costs at 14 months post baseline were discounted at 3.5% (the base rate recommended by NICE in 2013[66]), and the model was re-run with these discounted costs (*Table 27*). *Table 27* demonstrates that the sensitivity analyses replicated the main analysis results, showing no effect for the intervention, but an effect of baseline costs and constant. The discounted marginal means reported are similar to the undiscounted marginal means reported in *Tables 23* and *25*.

Furthermore, as part of the sensitivity analyses, missing data were imputed following methods employed in the main analysis for service use, which increased the economics sample size to 1752 (intervention, *n* = 861; control, *n* = 885). *Table 28* summarises the xtgee model results from the imputed data. As in the complete-case analysis, the intervention did not have an effect on total frequencies and total costs of service use, even when using imputed data. CHU-9D utility index scores were not imputed because the developers of the measure state that utility values cannot be calculated when questions have missing answers.[63] Data on MVPA per day were not imputed as this was previously done by the main analysis.

Exploratory subgroup analysis
As part of an exploratory subgroup analysis, the effects of year group and levels of implementation, which were based on the levels described in the microcosting, were tested on the complete-case sample by being included in the xtgee model run in the main analysis. *Table 29* shows that year group was found to have a statistically significant effect on minutes of MVPA per day, but did not affect any other outcomes. *Table 29* also shows that the level of Girls Active implementation did not affect any of the three main outcomes.

TABLE 24 Results from the xtgee models of individual services

Factors	Service use, β-coefficient, SE (95% CI)					
	GP		School nurse		School counsellor	
	Frequencies	Costs	Frequencies	Costs	Frequencies	Costs
Randomisation	−0.055, 0.139 (−0.327 to 0.216)	−2.015, 4.972 (−11.760 to 7.730)	0.030, 0.124 (−0.213 to 0.273)	1.338, 5.438 (−9.321 to 11.996)	−0.116, 0.183 (−0.475 to 0.244)	−4.834, 7.704 (−19.932 to 10.265)
Frequencies of GP service use at baseline	0.390, 0.078 (0.237 to 0.544)[a]	N/A	N/A	N/A	N/A	N/A
Costs of GP service use at baseline	N/A	0.390, 0.078 (0.237 to 0.544)[a]	N/A	N/A	N/A	N/A
Frequencies of school nurse service use at baseline	N/A	N/A	0.375, 0.083 (0.212 to 0.538)[a]	N/A	N/A	N/A
Costs of school nurse service use at baseline	N/A	N/A	N/A	0.376, 0.083 (0.213 to 0.539)[a]	N/A	N/A
Frequencies of school counsellor service use at baseline	N/A	N/A	N/A	N/A	0.488, 0.049 (0.392 to 0.584)[a]	N/A
Costs of school counsellor service use at baseline	N/A	N/A	N/A	N/A	N/A	0.488, 0.049 (0.392 to 0.584)[a]
School size (< 850 or ≥ 850 pupils)	−0.276, 0.197 (−0.662 to 0.110)	−10.259, 7.077 (−24.130 to 3.611)	−0.122, 0.159 (−0433 to 0.189)	−5.393, 6.968 (−19.051 to 8.264)	−0.134, 0.208 (−0.541 to 0.273)	−5.585, 8.719 (−22.675 to 11.505)
Percentage of BME pupils (< 20% or ≥ 20%)	−0.117, 0.150 (−0.410 to 0.177)	−3.836, 5.385 (−14.391 to 6.719)	0.249, 0.133 (−0.012 to 0.510)	10.978, 5.824 (−0.437 to 22.392)	0.150, 0.226 (−0.293 to 0.593)	6.169, 9.477 (−12.405 to 24.743)
Constant	1.103, 0.142 (0.824 to 1.381)[a]	39.730, 5.116 (29.703 to 49.756)[a]	0.424, 0.183 (0.066 to 0.782)[a]	18.619, 8.025 (2.890 to 34.348)[a]	0.567, 0.228 (0.121 to 1.013)	23.784, 9.563 (5.040 to 42.528)[a]

N/A, not applicable; SE, standard error.
a   Significant at a 0.05 level of statistical significance.
Notes
β-coefficients, SEs and 95% CIs are all rounded to three decimal places.
Values are all reported for 14 months' follow-up.

TABLE 25 Marginal means of individual services following 14 months' post-baseline xtgee models

	Marginal mean, SE (95% CI)	
Outcome	Intervention (*n* = 570)	Control (*n* = 427)
Frequencies of GP service use	1.319, 0.101 (1.121 to 1.518)	1.416, 0.118 (1.185 to 1.646)
Costs of GP service use	47.319, 3.638 (40.190 to 54.448)	50.805, 4.224 (42.526 to 59.085)
Frequencies of school nurse service use	0.645, 0.066 (0.517 to 0.774)	0.635, 0.1.7 (0.425 to 0.845)
Costs of school nurse service use	28.397, 2.881 (22.751 to 34.043)	27.875, 4.675 (18.711 to 37.038)
Frequencies of school counsellor service use	0.504, 0.122 (0.265 to 0.742)	0.753, 0.134 (0.491 to 1.016)
Costs of school counsellor service use	21.148, 5.120 (11.113 to 31.184)	31.636, 5.601 (20.658 to 42.613)

SE, standard error.
Note
Marginal means, SEs and 95% CIs are all rounded to three decimal places.

TABLE 26 Results from the xtgee model of school absenteeism

Factors	Days of school when absent at 14 months post baseline, β-coefficient, SE (95% CI)	
Randomisation	–0.301, 0.401 (–1.087 to 0.485)	
Days of school absenteeism at baseline	0.447, 0.061 (0.328 to 0.566)[a]	
School size (< 850 or ≥ 850 pupils)	0.807, 0.451 (–0.076 to 1.691)	
Percentage of BME pupils (< 20% or ≥ 20%)	–1.100, 0.495 (–2.069 to –0.130)[a]	
Constant	1.926, 0.403 (1.137 to 2.716)[a]	
	Intervention (n = 570)	*Control* (n = 427)
Marginal mean, SE (95% CI)	3.332, 0.258 (2.827 to 3.837)	3.808, 0.304 (3.214 to 4.403)

SE, standard error.
a   Significant at a 0.05 level of statistical significance.
Note
β-coefficients, SEs and 95% CIs all rounded to three decimal places.

Table 30 reports the marginal means of the subgroup analysis: pupils in Year 7 reported the highest marginal mean minutes of MVPA per day (47 minutes in the intervention group and 46 minutes in the control group) compared with pupils in Year 8 (41 minutes in the intervention group and 40 minutes in the control group); pupils in Year 9 reported the lowest means (36 minutes in the intervention group and 33 minutes in the control group).

Summary of cost–consequences analysis

The cost–consequences analysis demonstrated that, depending on how Girls Active was implemented, costs ranged from £2054 per school (£23 per pupil based on 90 pupils per school) to £8545 per school (£95 per pupil based on 90 pupils per school). There were no statistically significant differences found between the groups for the three outcomes of interest (MVPA/per day, CHU-9D utility index scores and frequencies and costs of service use) at 14 months; however, factors, such as results at baseline, school size and percentage of BME pupils, were shown to have an effect on these three outcomes of interest. Participants in the economic analysis achieved only 42 minutes of MVPA per day on average, which is below the recommended[79] target of 60 minutes of MVPA for those aged between 5 and 17 years. The exploratory subgroup analysis of the

TABLE 27 Results from the xtgee models using discounted costs as part of sensitivity analyses

Factors	Discounted costs, marginal mean, β-coefficient, SE (95% CI)			
	Total costs of service use	GP service use	School nurse service use	School counsellor service use
Randomisation	–0.001, 0.001 (–0.003 to 0.001)	–1.854, 4.826 (–11.313 to 7.605)	1.293, 5.254 (–9.006 to 11.591)	–4.670, 7.443 (–19.258 to 9.918)
Total costs of service use at baseline	–0.000, 1.033 (–0.000 to –0.000)[a]	N/A	N/A	N/A
Costs of GP service use at baseline	N/A	13.563, 2.726 (8.221 to 18.906)[a]	N/A	N/A
Costs of school nurse service use at baseline	N/A	N/A	0.363, 0.080 (0.205 to 0.520)[a]	N/A
Costs of school counsellor service use at baseline	N/A	N/A	N/A	0.471, 0.047 (0.378 to 0.564)[a]
School size (< 850 or ≥ 850 pupils)	0.002, 0.001 (–0.000 to 0.004)	–9.820, 6.867 (–23.280 to 3.639)	–5.211, 6.733 (–18.407 to 7.985)	–5.396, 8.425 (–21.908 to 11.116)
Percentage of BME pupils (< 20% or ≥ 20%)	0.001, 0.001 (–0.001 to 0.003)	–3.820, 5.229 (–14.068 to 6.428)	10.607, 5.627 (–0.422 to 21.635)	5.960, 9.156 (–11.986 to 23.906)
Constant	0.011, 0.001 (0.009 to 0.014)[a]	38.324, 4.948 (28.626 to 48.022)[a]	17.989, 7.754 (2.792 to 33.186)[a]	22.980, 9.240 (4.870 to 41.090)[a]
	Intervention (n = 570)	Control (n = 427)	Intervention (n = 570)	Control (n = 427)	Intervention (n = 570)	Control (n = 427)	Intervention (n = 570)	Control (n = 427)
Marginal mean, SE (95% CI)	91.127, 6.989 (77.428 to 104.825)	111.778, 22.081 (68.502 to 155.057)	45.803, 3.531 (38.881 to 52.726)	49.123, 4.094 (41.099 to 57.148)	27.437, 2.783 (21.981 to 32.892)	26.932, 4.517 (18.078 to 35.786)	20.433, 4.947 (10.737 to 30.130)	30.566, 5411 (19.960 to 41.172)

N/A, not applicable; SE, standard error.

a Significant at a 0.05 level of statistical significance.

Notes

Marginal mean, β coefficients, SEs and 95% CIs are all rounded to three decimal places.

Results presented at 14 months' follow-up.

TABLE 28 Results from the xtgee models using imputed data

Factors	Total frequencies of service use, β-coefficient, SE (95% CI)	Total costs of service use, β-coefficient, SE (95% CI)
Randomisation	−0.524, 0.291 (−1.096 to 0.048)	−21.465, 11.514 (−44.069 to 1.134)
Total frequencies of service use at baseline	0.484, 0.061 (0.364 to −0.605)[a]	N/A
Total costs of service use at baseline	N/A	0.490, 0.061 (0.369 to −0.610)[a]
School size (< 850 or ≥ 850 pupils)	−0.034, 0.363 (−0.747 to 0.678)	−1.915, 14.305 (−29.989 to 26.159)
Percentage of BME pupils (< 20% or ≥ 20%)	0.085, 0.325 (−0.553 to 0.722)	4.975, 12.893 (−20.326 to 30.277)
Constant	1.978, 0.329 (1.333 to 2.623)[a]	78.287, 13.152 (52.458 to 104.116)[a]

N/A, not applicable; SE, standard error.
a　Significant at a 0.05 level of statistical significance.
Notes
β-coefficients, SEs and 95% CIs are all rounded to three decimal places.
Results presented at 14 months' follow-up.

TABLE 29 Results from the xtgee models including the variables year group and level of implementation as part of subgroup analyses

Factors	Results, marginal mean, β-coefficient, SE (95% CI)			
	MVPA/day	CHU-9D utility score	Total frequencies of service use	Total costs of service use
Randomisation	4.761, 2.715 (−0.560 to 10.081)	−0.008, 0.132 (−0.034 to 0.017)	−0.040, 0.056 (−0.070 to 0.149)	−0.001, 0.001 (−0.001 to 0.004)
Minutes of MVPA/day at baseline	0.625, 0.372 (0.553 to 0.698)[a]	N/A	N/A	N/A
CHU-9D utility index score at baseline	N/A	0.586, 0.033 (0.521 to 0.652)[a]	N/A	N/A
Total frequencies of service use at baseline	N/A	N/A	−0.021, 0.002 (−0.025 to −0.018)[a]	N/A
Total costs of service use at baseline	N/A	N/A	N/A	−0.000, 1.487 (−0.000 to −0.000)[a]
School size (< 850 or ≥ 850 pupils)	−2.544, 2.477 (−7.399 to 2.310)	−0.003, 0.011 (−0.023 to 0.018)	0.015, 0.033 (−0.080 to 0.050)[a]	−0.001, 0.001 (−0.004 to 0.001)
Percentage of BME pupils (< 20% or ≥ 20%)	−4.029, 1.101 (−6.187 to −1.871)[a]	0.026, 0.009 (0.008 to 0.043)[a]	−0.061, 0.024 (−0.107 to −0.014)[a]	−0.002, 0.001 (−0.003 to −0.000)[a]
Year group	−1.915, 0.611 (−3.112 to −0.718)[a]	0.003, 0.005 (−0.007 to 0.013)	0.022, 0.024 (−0.026 to 0.070)	0.001, 0.001 (−0.003 to 0.000)
Level of implementation (based on microcosting categories of minimum, mid-range and high)	−1.785, 1.342 (−4.415 to 0.845)	0.000, 0.006 (−0.013 to 0.012)	−0.040, 0.030 (−0.099 to 0.019)	−0.001, 0.001 (−0.003 to 0.000)
Constant	17.645, 3.051 (11.666 to 23.625)[a]	0.313, 0.034 (0.248 to 0.379)[a]	0.514, 0.048 (0.421 to 0.607)[a]	0.014, 0.002 (0.010 to 0.017)[a]

N/A, not applicable; SE, standard error.
a　Significant at a 0.05 level of statistical significance.
Notes
Marginal mean, β-coefficients, SEs and 95% CIs are all rounded to three decimal places.
Values at 14 months' follow-up.

TABLE 30 Marginal means of MVPA/day, CHU-9D61 utility index score and frequencies and costs of service use split by year group and level of implementation following xtgee models

Factors	MVPA/day, marginal mean, SE (95% CI)		CHU-9D utility score, β-coefficient, SE (95% CI)		Total frequencies of service use, β-coefficient, SE (95% CI)		Total costs of service use, β-coefficient, SE (95% CI)	
Year group								
	Intervention (n = 206)	Control (n = 194)	Intervention (n = 206)	Control (n = 194)	Intervention (n = 206)	Control (n = 194)	Intervention (n = 206)	Control (n = 194)
Year 7	47.185, 1.444 (44.356 to 50.015)	46.067, 1.221 (43.674 to 48.459)	0.813, 0.008 (0.797 to 0.829)	0.847, 0.006 (0.834 to 0.859)	2.621, 0.326 (1.982 to 3.260)	2.539, 0.190 (2.167 to 2.912)	104.41, 13.441 (78.066 to 130.758)	100.778, 7.842 (85.408 to 116.15)
	Intervention (n = 232)	Control (n = 176)	Intervention (n = 232)	Control (n = 176)	Intervention (n = 232)	Control (n = 176)	Intervention (n = 232)	Control (n = 176)
Year 8	41.314, 1.252 (38.862 to 43.768)	39.749, 1.702 (36.412 to 43.085)	0.828, 0.005 (0.819 to 0.838)	0.834, 0.011 (0.813 to 0.855)	2.161, 0.331 (1.513 to 2.809)	3.188, 0.207 (2.783 to 3.594)	85.607, 13.608 (58.936 to 112.277)	124.965, 8.097 (109.096 to 140.834)
	Intervention (n = 132)	Control (n = 57)	Intervention (n = 132)	Control (n = 57)	Intervention (n = 132)	Control (n = 57)	Intervention (n = 132)	Control (n = 57)
Year 9	36.318, 0.595 (35.152 to 37.484)	32.779, 1.593 (29.657 to 35.901)	0.821, 0.005 (0.813 to 0.829)	0.801, 0.004 (0.794 to 0.808)	2.565, 0.275 (2.026 to 3.104)	2.522, 0.785 (0.984 to 4.060)	97.786, 15.885 (66.652 to 128.920)	99.664, 20.193 (60.087 to 139.241)
Level of implementation								
	Intervention (n = 0)	Control (n = 427)	Intervention (n = 0)	Control (n = 427)	Intervention (n = 0)	Control (n = 427)	Intervention (n = 0)	Control (n = 427)
0 (control to no intervention)	N/A	41.728, 0.713 (40.330 to 43.126)	N/A	0.835, 0.005 (0.825 to 0.845)	N/A	2.829, 0.089 (2.655 to 3.004)	N/A	116.591, 13.701 (89.737 to 143.445)
	Intervention (n = 227)	Control (n = 0)	Intervention (n = 227)	Control (n = 0)	Intervention (n = 227)	Control (n = 0)	Intervention (n = 227)	Control (n = 0)
1 (minimum level of activity)	45.121, 1.194 (42.781 to 47.461)	N/A	0.835, 0.000 (0.835 to 0.836)	N/A	2.927, 0.755 (1.446 to 4.408)	N/A	102.083, 1.899 (98.361 to 105.805)	N/A

Factors	MVPA/day, marginal mean, SE (95% CI)		CHU-9D utility score, β-coefficient, SE (95% CI)		Total frequencies of service use, β-coefficient, SE (95% CI)		Total costs of service use, β-coefficient, SE (95% CI)	
	Intervention (n = 207)	*Control (n = 0)*	*Intervention (n = 207)*	*Control (n = 0)*	*Intervention (n = 207)*	*Control (n = 0)*	*Intervention (n = 207)*	*Control (n = 0)*
2 (mid-range level of activity)	40.221, 0.208 (39.813 to 40.630)	N/A	0.807, 0.001 (0.806 to 0.808)	N/A	2.152, 0.062 (2.030 to 2.274)	N/A	82.992, 1.736 (79.590 to 86.395)	N/A
	Intervention (n = 136)	*Control (n = 0)*	*Intervention (n = 136)*	*Control (n = 0)*	*Intervention (n = 136)*	*Control (n = 0)*	*Intervention (n = 136)*	*Control (n = 0)*
3 (maximum level of activity)	40.730, 0.277 (40.187 to 41.273)	N/A	0.821, 0.001 (0.820 to 0.823)	N/A	2.718, 0.260 (2.209 to 3.228)	N/A	107.137, 8.161 (91.141 to 123.133)	N/A

N/A, not applicable; SE, standard error.
Notes
Marginal means, SEs and 95% CIs are all rounded to three decimal places.
Values are presented at 14 months' follow-up.

participants in the economic analysis demonstrated only that participants in Year 7 were the most active of the three year groups, achieving an average of 47 minutes of MVPA per day in the intervention group and 46 minutes of MVPA per day in the control group. Participants in Year 9 were the least active of the three year groups, achieving an average of 36 minutes of MVPA per day in the intervention group and 33 minutes of MVPA per day in the control group, which is around half of the recommended time.

The intervention group reported a mean CHU-9D utility index score of 0.821, which is slightly lower than the mean utility score of 0.835 reported by the control group; however, this difference was not statistically significant. The sample's mean CHU-9D utility index scores were slightly lower than the mean score of 0.850 reported by Stevens[63] and Ratcliffe *et al.*[87] in a UK community sample of 11- to 17-year-olds.

Participants reported minimal levels of absenteeism: participants reported a mean of 3 and 4 days off school over a 7-month period in the intervention group and control group, respectively. The low absenteeism rate corroborates figures released by the Department for Education in 2016,[88] which show a reduction in overall school absenteeism. In the autumn term, overall absence rates across state-funded secondary schools reduced from 5.1% in 2014 to 4.6% in 2015. The sensitivity analyses replicated the main analysis results, showing no effect for the intervention.

Chapter 6 Process evaluation

Introduction

A thorough process evaluation using quantitative and qualitative methods was conducted throughout the intervention delivery to address the following aims:

1. assess recruitment strategies (summarised in *Chapter 4*)
2. assess what was implemented and the extent to which schools engaged
3. describe any unintended events
4. assess participant satisfaction, acceptability and enjoyment
5. understand enablers and barriers
6. understand how the lead teachers were supported
7. consider the sustainability of the intervention
8. understand what improvements could be made to the intervention components.

Methods

The methods and analysis of the process evaluation were described in *Chapter 2*. *Table 31* summarises how many participants were involved with each method of data collection and which aim each method contributed to.

TABLE 31 Process evaluation methods and number of participants involved

Type of data	Collected from	Timing	Number of participants	Aims that were contributed to
Training attendance and evaluation forms	Training deliverer	The end of the training	1 training deliverer	2
	Lead teachers at training	The end of the initial training day	7 teachers	4 and 7
	Lead teachers at training	The end of the peer review event	7 teachers	4 and 7
	Peer leaders	The end of the peer leader event	56 girls	4 and 7
Interviews	Lead teachers	7 and 14 months	10 for the intervention group and 8 for the control group at both time points	2–7
	YST staff members	7 and 14 months	3 members of staff at each time-point	2
	The hub and development coach	7 and 14 months	1 staff member from hub; 1 development coach at both time points	2
Focus groups (intervention schools only)	Peer leaders	14 months	46 pupils from 8 schools (range 4–9 schools)	2–4 and 7
	Subgroups of evaluation sample	14 months	58 from 8 schools (range 4–10 schools)	4 and 7
	A sample of boys	14 months	38 from 6 schools (range 2–8 schools)	3
Exit survey	Girls from original sample in all intervention schools	14 months	722 girls	2 and 4

Results

School case studies

Short case studies that outline the engagement of each school with the intervention components are presented in *Boxes 1–10*. It is evident from these case studies that engagement varied between schools, and generally all schools were behind their set timelines for implementation and did not achieve all the actions planned during the training events. These case studies will be referred to throughout this chapter.

BOX 1 School 1 case study

School 1 evaluation visit dates: 30 September 2015 (7 months) and 27 April 2016 (14 months).

Lead teacher: head of PE, female, < 40 years old.

Peer Leader selection

- Teacher asked students to write a letter and apply but only two did, so students were then invited either by the teacher or asked by other peer leaders. Teacher chose who they thought would be good advocates.
- One peer leader noted that: 'I speak for those who HATE PE'.
- Selected 2 weeks before the 7-month interview, $n = 9$ (number of attendees at peer leader day).

Impact observed

- At 7 months: N/A – peer leaders had only just been selected.
- At 14 months: 'I wouldn't say that's had an impact yet, I'd like to think it will when it's up and running and a lot better, but not yet'.

Challenges to implementation

Peer leaders' perspective: getting inclusive activities, other girls think the GALS weird or nerdy, girls feel that they get judged, some questions from boys ('jealous' or 'they think it is sexist').

Teacher's perspective: 'life gets in the way', getting it started with other priorities, fitting the changes to the national curriculum, timing for training days, timetable restrictions on what is possible, need for culture change and this takes time, transport.

Facilitators of implementation

Peer leaders' perspective: PE teacher helping to promote and acting on suggestion box.

Teacher's perspective: nothing mentioned but suggested could perhaps involve Sixth Former to delegate some Girls Active tasks to.

Activities implemented

Support activities: by 7 months the teacher had spoken with the head teacher about the project and done a presentation to staff to try and find other members of staff to get involved – some were interested but needed to find them something to do. At 14 months the peer leaders had held meetings, organised a suggestion box and hoodies, looked at PE content and talked to form groups.

Physical activities: by 14 months they were looking to start a girls' only extra-curricular club and a loyalty card for attendance at activities.

BOX 1 School 1 case study (*continued*)

Money: first payment received December 2015, second payment received May 2016. Had spent money only on hoodies (£150) and a noticeboard to date.

Training days: teacher attended the initial training day and the peer review event. Peer review event acted as a stimulus to start doing things after OFTSED. Pupils attended Peer Leader day – teacher felt there could have been more opportunities to share ideas with other schools.

Mission analysis: submitted both action plans. Most things still to be implemented.

Resources: limited use of the resources at 7 months, was going to use with GLAMs group members in coming months. At 14 months, the teacher reported that the case studies were a useful source of ideas; they had not used the marketing resources much but hoped that they would in the future as activities got started.

Support from hub school and YST: by 7 months no contact from hub school reported but had had one-to-one chats with YST development coach between 7 and 14 month visits and these were felt to be useful.

Contextual factors

- OFSTED inspection in December 2015: affected everything and had repercussions for implementation of Girls Active.
- Introducing A-level and GCSE PE next September and this had implications for workload.

GLAM, Girls Leadership and Marketing.

BOX 2 School 2 case study

School 2 evaluation visit dates: 8 October 2015 (7 months) and 21 April 2016 (14 months).

Lead teacher: head of PE, female, > 40 years old.

Peer Leader selection

- In place by 7 months.
- Teacher's perspective: picked 14 girls from tutor lists, met with this group and then chose 8 girls. The girls were a mix of sporty and non-sporty. Letter sent to parents.
- One or two had dropped out and been replaced.
- Peer leaders' perspective: the teacher picked us because we are confident, responsible and had lots of ideas when we met.

Impact observed

- At 7 months: teacher perspective – new clubs have had a 'really big influx'.
- At 14 months: teacher perspective: initial clubs had attracted mostly those who 'usually come to clubs in the first place', some who 'haven't normally come to clubs'. Other activities had just started. Peer leaders – confidence, more active.

Challenges to implementation

Peer leaders' perspective: transport for those who live far away, need teachers involved.

Teacher's perspective: staffing, time (one staff member is part time so limits the days when meetings can happen), need a set time to work on Girls Active, overcoming logistics (looked at taxis for those who live far away but too many barriers to implement), daylight (reported club numbers dwindling 'as dark nights have drawn in').

Facilitators of implementation

Peer leaders' perspective: nothing mentioned but suggest that ideas from peer leaders at other schools would help.

Teacher's perspective: suggested that assistance from another teacher and money to get external coaches would help implementation.

Activities implemented

Support activities: by 7 months teacher had recruited another member of staff to assist, GLAMs group members' meeting held once a week, posters advertising clubs, done a survey of girls, looking at after-school transport issue, looked at painting changing rooms but this on hold owing to move to new site for next school year, peer leaders went to head teacher to explain what they are going to do. By 14 months after school transport was not possible to resolve, inspirational posters for changing rooms (in lieu of painting) and every tutor room, PE teacher promotes Girls Active in PE lessons. Peer leaders stated they had encouraged their friends and there were weekly bulletins.

Physical activities: by 7 months there were new clubs (cheerleading, Zumba, dance, basketball) with external coaches delivering these (these had been set up in the September 2015, no longer operating at 14 months). By 14 months had started the week before the interview a 'Healthy Life Club' (once a week, walk/jog/run/talk to music) and an activity loyalty card.

Money: first payment received July 2015, second payment received January 2016. Spent 'quite a bit' on external coaches, some on photocopying posters, a lunch for the peer leaders (as a reward), bus to peer leaders day. Money all spent (possibly overspent).

Training days: attended training day and peer review event. Found the peer review event useful because heard from other teachers and realised everyone in the same boat with time issues. Peer leaders attended the peer leader day.

Mission analysis: submitted both action plans. Feel they have met most of their goals except the one about after-school transport.

Resources: teacher perspective – useful at the start as 'we used a lot at the start, not really at all towards the end'. Poster formats useful.

Support from hub school and YST: did not have direct contact with the hub school. Valued the visit from YST development coach (chance to discuss options and get ideas).

BOX 2 School 2 case study (*continued*)

Contextual factors

- Moving to a new school in the next academic year so some ideas were seen as non-feasible at this time (e.g. painting changing rooms).

GLAM, Girls Leadership and Marketing.

BOX 3 School 3 case study

School 3 evaluation visit dates: 24 November 2015 (7 months) and 18 April 2016 (14 months).

Lead teacher: PE teacher (part time), female, < 40 years old.

Peer Leader selection

- At 7 months the girls' leader group had been set up. Interested girls had to submit an application form and the teacher interviewed them.
- Consisted of 10 girls from Years 8, 9 and 10.
- The teacher reported that they were a mix of girls in terms of personality and engagement in sport.
- According to the leaders, the teacher approached two girls who then picked a team of girls they could get along with and who tended to be sporty but interested in different sports.
- Meet once a week at lunchtime.

Impact observed

- At 7 months the teacher reported that girls felt more valued.
- At 14 months the teacher reported a slight increase in the numbers attending clubs.
- At 14 months the teacher felt that it was making a difference to motivation levels and understanding of the importance of girls' involvement.
- At 14 months the teacher reported that boys were being restricted on some occasions to using the all-weather facility at break times so that the girls could use it for netball (previously boys always used it).
- Felt that Girls Active has given the school a step forward in girls' participation.
- Appears to be a stronger uptake for athletics.

Challenges to implementation

Peer leaders' perspective: head teacher not supportive of changes to PE kit; hard to come up with new things that everyone likes; feel like the other students are relying on them to get changes; do not think enough of the school know what GLAMs group members stand for; some people think they are showing off.

Teacher's perspective: issues with the funding being released in a timely manner; no active involvement from other staff; time.

Facilitators of implementation

Peer leaders' perspective: not mentioned.

Teacher's perspective: girls driving the events; regularly talking to girls in the school to ask what they want; having deadlines (i.e. measurement visits was a motivator).

School 3 case study (*continued*)

Activities implemented

Support activities: by 7 months peers leaders had done an assembly to launch Girls Active to the girls in the school using the This Girl Can campaign; questionnaire to girls about what they want (idea from resources); girls' 'drop in' sessions; designed new netball kit. By 14 months had reviewed PE kit policy and petitioned to get changes to the kit (i.e. not to wear baggy shorts) but head teacher did not approve the requested changes; meeting between peer leaders and SLT (planned); hoodies for peer leaders (planned next term).

Physical activities: nothing at 7 months. By 14 months had run a Sport Relief event (ninja warrior course in the gym – 200 attendees); non-uniform sports day; changed some activities to make them girl-friendly (planned next term); yoga, dance and boxercise sessions (with lights turned off so no-one can see them doing it).

Money: first payment received May 2016, second payment received May 2016 (received after final evaluation visit).

Training days: attended initial training day and found it useful for getting ideas. Did not attend peer review or peer leader events owing to other commitments.

Mission analysis: submitted both mission analyses (26 November 2015 and 20 April 2016).

Resources: the teacher and peer leaders used the resources a lot at the start to get ideas (did a questionnaire and reviewed PE kit policy as a result); used This Girls Can resources.

Support from hub school and YST: by 7 months had not had any telephone calls with hub school or YST; at 14 months had a call from hub school (26 November 2015); by 14 months had a visit from YST development coach (2 February 2016) and another visit planned for end of April 2016.

Contextual factors

- At 7 months the teacher reported that the school had a GCSE programme to import, which they did not have before ('we're just Key Stage 3 and now moving to Key Stage 3 and 4').
- The Girls Active teacher will be leaving at the end of term so a new teacher will take over.

GLAM, Girls Leadership and Marketing.

School 4 case study

School 4 evaluation visit dates: 26 January 2016 (7 months) and 17 May 2016 (14 months).

Lead teacher: PE teacher, female, < 40 years old.

Peer Leader selection

- At 7 months the teacher was in the process of setting up GIRLS (Girls Involved in Raising Leadership in Sports) involving girls in Years 8, 9 and 10.
- By 14 months a girls group had been set up and it was called Girls Council. It had 24 girls from those disengaged with sport, those who are engaged but do not come to any extra clubs and those who are very engaged. They are girls from Years 7, 8, 9 and 10.

BOX 4 School 4 case study (*continued*)

- To select the girls, the teacher had an assembly with all the girls in the school to explain Girls Active and interested girls wrote their names down on a list and ticked a box to show what engagement category they were in (e.g. disengaged from sport). The names were then picked at random.
- The teacher had plans to split the council into two groups, one for Key Stage 3 girls and one for Key Stage 4 girls as their needs will be different.
- Girls Council was introduced to the whole school the week of the 14-month visit.
- The teacher plans to meet with the Girls Council every half term.

Impact observed

- At 7 months the teacher reported an increase in attendance at after-school netball (from 28 to 42), which led to splitting the club into two clubs on different nights but this caused issues for other after school clubs.
- At 7 months the teacher reported increased female attendance at table tennis.
- At 14 months the teacher felt that the main impact was increased awareness about physical activity and that the actually impact will happen next year (2017).
- At 14 months the teacher reported that the boys had asked why they cannot be involved and why there are clubs just for the girls.
- The girls commented that the teachers give them more opportunities and choice in PE and it increases enjoyment.

Challenges to implementation

Teacher's perspective: only 1 female lead in the school, not enough staff involved, not enough female role models in the school, small school, time between teaching, not a whole-school priority have to pay to hire sports hall after 17.30.

Facilitators of implementation

Teacher's perspective: external people to come in and facilitate delivery of sessions (but cost is a barrier).

Activities implemented

Support activities: by 7 months the school had asked the girls who were not involved in sport what they wanted to do (teacher went round as many classes as possible with pen and paper) and teacher also had feedback from the school stakeholder group (boys and girls); ensuring clubs take place indoors (in response to feedback); at 14 months the teacher reported plans to set up a reward scheme for regular attendance at clubs; Plans for the Girls Council to present to Senior Leadership Team.

Physical activities: by 7 months there was a girls-only after-school fit club (set up as a result of talking to non-sporty girls); at 14 months reported an after-school rounders club and dance club.

Money: first payment received December 2015, second payment received January 2016. At 14 months school had not sent any of the money, wanted to plan it properly and mentioned plans for Girls Council badges, hoodies, reward trips and coaches.

Training days: did not attend the initial training session, attended a 'mop up' session with one other school; could not go to the peer review event owing to a clash with PGT training; did not attend peer leader day.

Mission analysis: submitted both action plans. Completed first mission analysis with the PE department. At 14 months, the teacher felt that they were sticking to their plans but the timelines had slipped.

Resources: has used bits and pieces from the resources, case studies were good but did not fit in with their school so just used ideas from a few of them and merged them together to suit their school. Felt that the Girls Council would use them more going forward.

Support from hub school and YST: at 7 months the school reported no contact from hub school but had contact with YST development coach. Really valued the support from the YST development coach, it helped refocus goals and plans.

Contextual factors

- At 7 months teacher reported that prior to Girls Active they did a lot of girls' PE.
- At 7 month the teacher reported a change of head teacher and structure change at the senior level.
- At 14 months teacher reported that Challenge Partners had been in (like a mini Ofsted) so this delayed Girls Active things.

BOX 5 School 5 case study

School 5 evaluation visit dates: 17 November 2015 (7 months) and 10 May 2016 (14 months).

Lead teacher: Health and Wellbeing Officer, female, < 30 years old.

Peer Leader selection

- At 7 months reported already having a group called 'TEAM <school name>' (girls from Year 7 to Sixth Form) who meet once a week and consisted of different groups of students responsible for different things (e.g. media, sports, marketing). Felt that it was not necessary to set up a separate group.
- Some of the 'TEAM <school name>'were trained Sports Leaders UK but some hated PE and did not get the point of trying to encourage others.
- At 14 months the new lead for Girls Active felt that the previous peer leader group did not have the right focus (i.e. were promoting sporty activities) so the new lead put in place another peer leader group consisting of Young Health Champions.
- These Youth Health Champions were trained only in March 2016 (a couple of months prior to 14-month follow-up visit).
- The Youth Health Champions are a mix of the girls who try hard in sports clubs and the ones who attend for mental health support as the teacher felt it would be a good confidence boost.

Impact observed

At 7 months it is slowly having an impact and the marketing has helped increase numbers at after school taster sessions.

Challenges to implementation

Peer leaders' perspective: the girls felt like they had to sacrifice going to some clubs because they were busy with planning.

Teacher's perspective: the Health and Wellbeing officer does not sit within the PE department so she has found it challenging trying to link with the PE staff; trying to get other staff within the school to promote it; staff off sick; being released from school for the training days; Year 10 peer leaders getting dominated by school work

BOX 5 School 1 case study (*continued*)

so new lead at 14 months ensured leaders were from younger age groups; trying to spread the word about the programme.

Facilitators of implementation

Peer leaders' perspective: the teacher let them get on and be leaders but know if they need support the teacher is there; teacher takes a step back and allows them independence.

Teacher's perspective: the Health and Wellbeing officer being involved because she does not teach.

Activities implemented

Support activities: by 7 months – marketing during form time, assemblies, video displays around the school; designing stand-up banners with reminders to be active and where pupils can access information; designing a club board for the gym using local information on clubs from the This Girl Can website.

Physical activities: by 7 months – taster and satellite sessions after school; at 14 months reported a Sports Relief fitness challenge (just before Easter 2016) and leaders were planning a Zumba party.

Money: first payment received January 2016, second payment received January 2016. Used to purchase peer leader programme equipment (£50), dodgeball equipment (£50). Also stated that the funding is used to support their Health and Wellbeing Officer job role; this means that there is always someone available to help facilitate Girls Active.

Training days: attended initial training day, it was useful for inspirational ideas; attended the peer review event, felt that it was useful to hear about other people's challenges and realising they are not on their own; attended peer leader day, felt that it was enjoyed by the girls but felt that it would have been beneficial for the girls to get together and make formal plans, felt it did not propel them forwards.

Mission analysis: submitted both mission analyses; lots of actions planned, only a small number have been achieved and these are linked with ongoing activities in the school.

Resources: has referred to the resources, particularly the case studies, and as a result has now applied to be a 'Race 4 Life' school; reported finding the folder useful for ideas but it was not the only resource that was used by the teacher.

Support from hub school and YST: the teacher reported that they were unsure what support was available and unsure of the purpose of arranged telephone calls; support from YST development coach between 7- and 14-month visits was very valuable for discussing ideas and receiving feedback and did not feel like they were being judged.

Contextual factors

- The focus was on after-school provision.
- At the 14-month interview the lead teacher was changed from the PE teacher to the Health and Wellbeing Officer (i.e. a non-PE staff member).
- Girls Active was tagged onto the Healthy Minds Project and that seemed like the main focus. The leaders and wider group of girls were only aware of mental health promotion activities.

BOX 6 School 6 case study

School 6 evaluation visit dates: 26 October 2015 (7 months) and 11 May 2016 (14 months).

Lead teacher: PE teacher, female, < 30 years old.

Peer Leader selection

- Teacher put on an assembly and the girls nominated themselves and names were then pulled from a hat, although one pupil suggested that the teacher picked participants who do clubs.
- Peer leaders were all active and wanted to inspire/motivate others.
- In place at 7 months, $n = 11$ (number of attendees at peer leader day); at 14 months the teacher reported that some of the GLAMs group members had dropped out (she thought mainly as a result of other commitments).

Impact observed

- At 7 months: nothing specific, peer leaders chosen.
- At 14 months: teacher perceives that the peer leaders are more confident and the girls who come to activities enjoy the activities and social interaction with girls they would not necessarily interact with.

Challenges to implementation

Peer leaders' perspective: more opportunities for boys and therefore less time for girls' clubs, how to provide variety, stereotypes of girls activities, getting girls to come (embarrassment, friends not going, timing conflicts), girls being self-conscious doing PE with boys.

Teacher's perspective: access to space, time, priorities, knowing what to do, doing it 'right', would have liked more guidance (postponement of peer review event had a negative impact) and a time frame to increase priority, no link to other schools doing Girls Active.

Girls' perspective: timing conflicts limit attendance; more opportunities for boys, therefore, less time for girls; location and temperature at activities.

Facilitators of implementation

Peer leaders' perspective: the teacher helps by sending out reminders, helping with posters and organising events, providing encouragement.

Teacher's perspective: feeling part of something bigger, supervising the after-school club, support from Senior Leadership Team and other teachers, external support from YST.

Activities implemented

These all happened after the 7-month visit.

Support activities: by 14 months – assemblies, meetings, asking people what they wanted, posters/bulletins.

Physical activities: by 14 months – 'Thursday Club' (after school, different activities could be tried, 15–30 attend, after a while there had been a dip in participation); GLAMs group members' PE lesson.

Money: first payment received July 2015, second payment received May 2016. Paid for one coach, holding on to money to be able to use in the next year.

BOX 6 School 6 case study (*continued*)

Training days: teacher attended first training day (would have liked more of a steer on what they were to actually do and timelines around implementation to increase the priority given to Girls Active); disappointed at postponement of the peer review event (had questions to ask), attended rearranged peer review event; peer leaders attended their day (this was positively received – see general review of day; plus teacher said 'they loved it. It really motivated them'; however, the teacher also noted that 'to bring it back in is quite hard').

Mission analysis: submitted both action plans. The teacher felt that they had completed most of the things on their action plan.

Resources: some use at the very beginning 'when looking at very first action plan . . . but other than that it's not been used at all'. Why? 'I just don't think it's jumped out at you really. I've just got on with what I thought that we should do here and made it school specific to us and generally not really looked in it'.

Contextual factors

- Head teacher changed during the project, but new head described as supportive. General support from other staff.
- School changed in size and now has Year 11, which has affected teacher's time, workload and what they teach.
- New behavioural policy in place, but there were no policy changes that had an impact on PE.
- Also doing Girls Active Lifestyle (12-week project of different exercises, day out at leisure centre, and some get to go on a big GALs day with other schools; would be running April to June). Lead for Girls Active is also the GAL lead. The two projects became linked to avoid confusion.

GLAM, Girls Leadership and Marketing.

BOX 7 School 7 case study

School 7 evaluation visit dates: 1 October 2015 (7 months) and 19 May 2016 (14 months).

Lead teacher: PE teacher, female, < 30 years old.

Peer Leader selection

- In place by 7 months (*n* = '5 or 6' – teacher's words).
- Initially teacher invited girls to be part of the Girls Leadership Squad, if they were interested they received a letter, which they signed and returned.
- Teacher said that she selected students who would be committed but were not the ones that already did loads of sport and that had different skills. Later additions to the squad wrote letters about why they should be included. Girls said they were chosen because they enjoy doing sport and a good leaders.

Impact observed

At 7 months: teacher perspective – none yet, as had not actually launched the project, been doing a lot of planning.

At 14 months: teacher perspective – at the taster sessions 'it was a completely different group of girls to what come to a normal club". Perhaps these girls are now more confident to attend other clubs. No negative impacts. Peer leaders' perspective – planning skills, better leaders, confidence.

Challenges to implementation

Peer leaders' perspective: getting girls to come, overcoming girls insecurity about doing activity, getting started with Girls Active (but it gets easier).

Teacher's perspective: time, girls have 'competing demands'.

Girls' perspective: most girls 'can't be bothered', having other commitments.

Boys' perspective: girls afraid of losing friends if they do sport, attitudes and gender stereotypes, boys take over.

Facilitators of implementation

Peer leaders' perspective: PE teacher support, resource booklet gave ideas, other teacher who gave time for loyalty scheme.

Teacher's perspective: support from other teachers encouraging the girls to get involved, being part of the project.

Activities implemented

Support activities: by 7 months – an aunt of one of the peer leaders came in and did a session on marketing; meetings; planning of loyalty scheme. By 14 months – surveys of other pupils, bulletin board, posters, meetings, assembly, and introduced loyalty scheme (late in 2015).

Physical activities: by 7 months – already had lots of clubs so decided not to introduce more. By 14 months – one-off taster sessions ($\approx$25 girls attend) (e.g., Zumba, hula, yoga; spread throughout one term), about to run a 'Girls Active day' (June 2016) for all girls in the school with lots of tasters sessions and quizzes and prizes (e.g. cheerleading, trampolining, Zumba, boxercise).

Money: first payment received July 2015, second payment received January 2016. Spent money on printing and stamps for loyalty cards, external instructors for taster sessions, refreshments for events. Using a small portion of the money per year to make it 'last for a long period of time'.

Training days: attended training day and peer review event. Found peer review event useful to share ideas. Girls attended the peer leaders' day. Teacher felt that this could have come earlier so girls saw they were part of something bigger.

Mission analysis: submitted both action plans.

Resources: teacher used the resources at the start but has not used them since. Girls used it for posters.

Support from hub school and *YST*: no contact with hub. Had a visit from YST development coach in late 2015 and viewed this as 'really useful'.

Contextual factors

- Small school in terms of pupil numbers.
- Struggled to put on any more clubs after school owing to limited resources (staff and facilities).

BOX 8 School 8 case study

School 8 evaluation visit dates: 29 October 2015 (7 months) and 9 May 2016 (14 months).

Lead teacher: PE teacher, female, < 30 years old.

Peer Leader selection

- No formal GLAMs group just some girls who help occasionally.
- Just asked who would like to help and did not want to turn anyone away if they were willing to help.
- They are girls in Years 7–11 and they like sport.
- At 14 months the teacher had not utilised any girls to help organise and implement the rewards scheme activities, she had done everything herself, felt that it would be quicker but in hindsight acknowledges this was a mistake.

Impact observed

- At 7 months the teacher felt that there had been a big increase in participation in team sports, dance, swimming (increased from 18 to 43) and the school had entered competitions, which they had not done before.
- The PE kit policy change has resulted in fewer notes and excuses to not do PE.
- The reward incentive of a trip to Planet Bounce increased girls' participation in clubs. The teacher felt that different girls were now going to the clubs (i.e. ones that she had not seen at clubs before, particularly Year 8 girls).
- At 14 months the teacher felt that the rewards scheme was still having an impact on attendance as students were always commenting on how many more hours of attendance they needed to get the next reward.

Challenges to implementation

Teacher perspective: time; Girls Active seen as important but usually not the priority; other teachers did not realise how big Girls Active could be and how big an impact it could have; at 7 months reported little help from other staff; should have taken an additional staff member to the initial training day; felt disappointed at the cancellation of the original peer review day, was using that as a 'next step'; felt that no-one was adding anything to Dropbox; wanted support from the hub school or YST a few weeks following the initial training; at 14 months felt that other PE staff were reluctant to put on extra clubs; had a little help from other staff members to deliver reward scheme; would have liked more idea sharing.

Facilitators of implementation

Teacher perspective: supportive assistant head teacher who has provided funding for the rewards scheme; support and ideas provided by YST coach; having someone monitoring you; training days.

Activities implemented

Support activities: by 7 months – questionnaire to all girls, resulted in changes to PE kit policy; whole-school reward initiative, which involved logging extracurricular activities and the reward for attendance was trip to Planet Bounce. By 14 months – a second whole-school reward initiative was being implemented from Easter and students could receive a range of different rewards for participation in any clubs (not just physical ones) (e.g. free skipping ropes, footballs, basketballs, cricket stumps, art packs, lunch queue jump).

BOX 8 School 1 case study (*continued*)

Physical activities: at 7 and 14 months no additional physical activities (i.e. clubs delivered).

Money: first payment received July 2015, second payment received May 2016. However, not spent any of the money by the 14-month visit, keeping it for sustainability reasons and instead received funding from the assistant head teacher to fund the rewards scheme and 30 weeks' coaching from a premier league club football club (£1800).

Training days: attended initial training day, felt it was really inspiring; was looking forward to the original peer review event as the next step for ideas, felt that the date was quite short notice for teachers; attended part of rearranged peer review event, felt that it was useful and would like more of those meetings; did not attend peer leader day (missed off the e-mail list).

Mission analysis: submitted both mission analyses; did mission analysis with Head of PE; original plans on mission analysis had not been achieved at 7 or 14 months; several plans made on second mission analysis of which one had been achieved (the reward scheme).

Resources: felt that most of the case studies were not relevant for their school; used the posters but did not work very well and very time-consuming; has not really access the folder since initial training day; used This Girl Can resources and displayed around the school.

Support from hub school and YST: have not accessed support from hub school, forgot that they were there; felt support from YST coach was great and generated lots of ideas, felt it was a useful prompt.

Contextual factors

- The head of PE was on maternity leave when the Girls Active opportunity arose so it was passed to the teacher who was free to attend the initial briefing event.
- The school introduced a new behavioural policy and if students do not bring their PE kit they get a 30-minute after-school detention.
- High proportion of Muslim students so after-school clubs often clash with Mosque attendance.

GLAM, Girls Leadership and Marketing.

BOX 9 School 9 case study

School 9 evaluation visit dates: 11 November 2015 (7-month visit) and 18 May 2016 (14-month visit).

Lead teacher: PE teacher, female, < 30 years old.

Peer Leader selection

- Called Miss Motivators ($n = 8$ originally, now 9).
- Chosen by May 2015.
- Pupil perspective: a notice went up, the teacher talked about the idea and asked for volunteers. Teacher chose people with different strengths (e.g. sporty, confident speaker). One pupil thought that they had been chosen at random.
- Teacher perspective: selected by a poll of the PE team – went for people from all different area (individual sports, team sports, those who show commitment).

BOX 9 School 9 case study (*continued*)

Impact observed

- At 7 months: teacher's perspective – taking on pupils' views more than they have in past; getting more students at clubs, a 'real buzz around physical activity'.
- At 14 months: teacher's perspective – at the clubs seeing 'quite a few faces that I wasn't expecting to see as such'; more positive engagement in PE, easier to teach some of the groups, does not know whether it has affected PA levels. Pupils' perspective: teamworking.

Challenges to implementation

- Peer leaders' perspective: attitudes and stereotypes around participating in activity and around provision; availability of teachers to lead activities; getting girls to do the sports.
- Teacher's perspective: time to do Girls Active organisation and tasks, timing of activities.

Facilitators of implementation

- Peer leaders' perspective: teacher showing that she was listening to them.
- Teacher's perspective: got a fully funded gymnastics instructor for 6 months through the Activate scheme, being part of Girls Active helped to secure this funding; Senior Leadership Team support, administrative staff support.

Activities implemented

Support activities: by 7 months: peer leader hoodies, assembly to girls, leggings now on PE kit list, meetings, teacher spoke to staff at a CPD event, questionnaire to girls, external badminton player came in and did inspirational talk to 20 girls from Years 8 and 9 (those who were not engaged but had influence), weekly challenge to say something positive to someone in their lesson, using staff as role models (e.g., if they have done something active display it on the school TV screens). By 14 months: posters and MOODLE pupil online bulletin boards.

Physical activities: by 7 months; dodgeball and gymnastics club (around 30 attendees at each), fitness challenge in form time [e.g. plank and wall sit challenge (whole school)]. By 14 months: reward card scheme, activity day and promotion of existing clubs. Gymnastics club instructor was funded by the local leisure entre at 1 hour per week for at least one term.

Money: first payment received July 2015, second payment received January 2016. Used to pay for hoodies, fixtures, clock for changing rooms, printing and to fund the loyalty card.

Training days: attended the training day – afterwards 'was a bit like, so what do we actually do?'. Disappointed at postponement of peer review event. Went to the rescheduled peer review event – motivated her to empower the Miss Motivators more and 'pass over responsibility to the girls', shared resources between schools after the day. Pupils attended peer leader day.

Mission analysis: submitted both action plans (had help from hub to do so).

Resources: teacher referred to the resources initially but has not gone back to it as the programme progressed. Girls used for posters.

Support from hub school and YST: by 7 months had talked with hub school. Got other help via e-mail and telephone from hub. Had 2 visits from YST development coach (one prior to 7-month visit and one after), plus e-mail help – has been a helpful point of call. These visits also acted as motivation to get things done.

Contextual factors

- Introduced a Sky Sports Leaders Scheme: a badminton player came in and did an inspirational talk with 20 girls.
- Changes to assessment pathways: all departments working hard to make the new system work.

BOX 10 School 10 case study

School 10 evaluation visit dates: 5 November 2015 (7 months) and 16 May 2016 (14 months).

Lead teacher: Director of Sport, male, < 40 years old.

Peer Leader selection

- No peer leader group established.

Impact observed

- N/A as has not implemented anything.

Challenges to implementation

- Teacher perspective: the teacher felt that there was a lack of support from the intervention providers; at 14 month the teacher role and focus changed.

Facilitators of implementation

- Teacher perspective: N/A as has not implemented anything.

Contextual factors

- At 7 months the teacher was unsure what Girls Active actually was and did not understand what he/she were meant to be doing as part of the programme.
- At 7 months the teacher stated that because of this confusion he/she just carried on doing what they were doing already.
- At 7 months the teacher felt like the school did not have an issue with girls participation in PE and sport, the issues were the same for boys and girls.
- The school already had a sports leaders programme.
- At 14 months the teacher stated that the dynamic in the school had changed and the he/her role had changed so originally this would have fell within their role but now their focus has been changed and the teacher was a little unsure where their role was going.

BOX 10 School 10 case study (*continued*)

Activities implemented

Support activities: nothing done.

Physical activities: by 14 months the teacher had a set up an after-school girls-only fitness class led by an external coach (funded by Northamptonshire Sport), with approximately 15 girls attending (any year groups) but it was not directly related to the Girls Active programme.

Money: first payment received July 2015, second payment received January 2016.

Training days: did not attend initial training day, attended a 'mop up' half-day training session with one other school; did not attend the peer review day as felt that there was no point as he/she had not implemented anything Girls Active related; did not attend peer leaders day.

Mission analysis: submitted both mission analyses but has not actioned anything from either of them, felt that there was a lack of support to help with actioned items of the mission analysis.

Resources: teacher does not recall receiving any resources.

Support from hub school and YST: had a visit from the YST development coach but shortly after the teacher's role changed and there was uncertainty in where the role was going.

Training days and events
Over the course of the 14 months, there were a number of training days and events that were run by the YST and the hub school (*Figure 7*).

Initial teacher training day
The initial training day for lead teachers was the first part of the intervention. The objectives of the teacher training day were as follows:

- Describe why it is important for girls to fully engage in PE and sport and identify the challenges and key principles for engaging adolescent girls.
- Analyse PE and sport for girls within your school.
- Discuss a marketing approach to PE and sport for girls, to engage the girls through decision-making and delivery.
- Describe the resources available to support the Girls Active project and identify how to access, adapt and use them.
- Explain how to use the mission analysis self-review tool and a peer-review process to measure and evaluate progress.
- Describe the Girls Active project process, timescales and implementation steps.

FIGURE 7 Girls Active training timeline.

The training took place at the hub school and was delivered by a tutor employed by the YST. Teachers from 8 out of the 10 intervention schools attended this initial training day in April 2015. Teachers from the remaining two schools who could not attend on this date attended a 'mop-up' training day in June 2015. Evaluation forms were completed by seven out of the eight teachers at the end of the training day (one teacher had to leave early so did not complete the evaluation form). *Appendix 8* contains the teacher feedback scores. This feedback demonstrated that all the teachers rated the training positively, with all sessions that were delivered rated as 'good' or 'excellent'. The majority of teachers (71–100%) felt that the objectives of the training had been fully met; however, although 29% of teachers reported feeling 'very confident' to be able to go back to their school and implement Girls Active, the remaining teachers felt only 'somewhat confident'.

Teachers were asked in the 7-month interview about this initial training day. Teachers highlighted their perspectives on the day, and their positive comments from the interviews reinforced the feedback questionnaire data. Comments were generally about it being useful for generating ideas and allowing time to talk to teachers from other schools:

> *We got quite a few ideas about how to broach it with the girls, what sort of tasks to do with them. We had a folder, and it's got all the information in that we need, so that was good to guide the girls with tasks. So that's how they kind of came up with the questionnaires and the different ideas for meeting the girls.*
>
> *Teacher, 7 months, school 3*

> *That training day, in my opinion, was really inspiring. I found it really brilliant. I came back really buzzing, can't wait to get things started . . . I thought I got loads out of it, this is how we can do this, this is how we can do that, came back and had a really positive meeting with the department.*
>
> *Teacher, 7 months, school 8*

> *It also got you to talk with other staff from different schools where you can learn the different situations people are in and different ideas that people have got which was good.*
>
> *Teacher, 7 months, school 1*

One teacher commented that they struggled to put themselves in the mindset of the girls and to consider barriers to participation and that, although the training was useful for discussing ideas, they did not necessarily learn anything new:

> *We had to work in groups and come up with what you think the barriers are to girls doing . . . which is really difficult to do when you're a PE teacher because you're at the complete opposite end of the spectrum . . . In terms of knowing that it is an issue I don't think I took away anything that I didn't already know . . . I guess it got you thinking about it again.*
>
> *Teacher, 7 months, school 1*

Some schools sent two teachers and this was generally seen as helpful for the development of ideas and generating a more comprehensive picture of the programme. Teachers who attended on their own commented that they wished they had taken a colleague with them:

> *The only drawback, I went on my own so I was only able to get inspired myself, I just wish, in hindsight, someone else would have come with me so that they could have bounced off my ideas and we could have shared it together.*
>
> *Teacher, 7 months, school 8*

Some of the comments perhaps reflect why some teachers were only somewhat confident in implementing Girls Active. This largely seemed to be around being unsure of exactly what they should do when they went back to their school, which was also highlighted by the YST development coach:

> *It was a nice introduction, you could have almost done with some more ideas of what is it you want us to do, that's the kind of bit . . . not that we're struggling with but it's almost, right, hang on what do you want me to do? I've got the girls, we've got the GLAMs [Girls Leadership and Marketing] now ready, what do you want me to do?*
>
> *Teacher, 7 months, school 6*

> *It was good to talk to others about it. I didn't feel, probably when I came back home, and they asked me the next day, oh, so what do we have to do? I kind of felt a bit like, I'm not really sure. I knew why we were doing it, but then I was a bit like, so what do we actually do? So yeah, maybe that bit more of a guidance, of OK, so you're going to get back to school, what are you going to . . . And I knew I had to talk to SLT [senior leadership team] and I knew I had to like read through the book but it was like, but actually, what are we delivering?*
>
> *Teacher, 7 months, school 9*

> *I think there were some real common themes coming through. It's fascinating because after the workshop it's kind of, some people at the review day said we wanted to know what the first step was. But it's kind of like you're almost left to work it out yourself 'cause then you've got more ownership of it.*
>
> *YST development coach*

Peer review event

The peer review event was the event that enabled lead teachers to come back together to share practice. This event took place at the hub school and was delivered by a representative from the hub school with support from the YST development coach. The objectives of the peer review event were:

- for schools to revisit their plans
- to provide schools with the opportunity to learn about and share good practice
- to share and celebrate success among the schools
- for schools to receive peer-to-peer coaching.

The first date that was set for the peer review event (September 2015, 5 months after the initial training) was postponed because a number of teachers were unable to attend. Teachers cited reasons, such as school commitments, the date for the event was provided at too short notice, their schools' senior leadership team was not willing to release them and general staffing issue, that meant that cover for lessons could not be found. Teachers who were able to attend expressed disappointment at the postponement during the 7-month interviews and said that they felt that they had lost an opportunity to get support, gather momentum or seek clarification:

> *We haven't had our peer review bit yet, because we were able to come to that meeting, and then it was cancelled, which is a massive shame. We were gutted.*
>
> *Teacher, 7 months, school 2*

> *I was hoping that the meeting [peer review day] that was cancelled . . . there was something that was going to come out of that for me to then say, right, let's get all these girls together using this, using that, off you go. It's a shame that that was cancelled because that's what I was using for the next step. The notice that teachers need to attend something like that, I think that might have been an issue last time.*
>
> *Teacher, 7 months, school 8*

The peer review event was then rearranged for December 2015 (8 months after the initial training day), when teachers from 7 out of the 10 intervention schools were able to attend. Teachers who could not attend received an e-mail with the content that had been covered during the peer review event. This content was also touched on during any subsequent interactions with the development coach. Teachers rated the peer review event highly in terms of gaining knowledge, improving skills, increasing motivation and being put in a position to take action back at their school. Nearly all of the teachers felt that the venue, deliverers, delivery and format of the session were very good. Overall, the teachers rated the whole event either as 'very good' (86%) or 'good' (14%). Feedback scores are presented in *Appendix 9*.

The teacher interviews at 7 and 14 months provided more insight into the peer review event. Most teachers mentioned that they found the review day useful for a number of reasons. They appreciated the opportunity to gather information from the hub and the development coach or other teachers. They felt that it was a good opportunity to talk to each other (teachers) about what they had and had not done at that point and the challenges they faced regarding implementation, as well as finding out that they were all in the 'same boat' (i.e. had perhaps not achieved as much progress as they had wanted). The following quotations demonstrate the positive feelings that the teachers had about the peer review event:

> *It was really useful. Useful to share and hear what other people were doing but also quite nice for sharing what we've done as well and other people being interested in it . . . really good sharing opportunity and appreciated to know that either you are ahead of what other people are doing, or you have helped somebody to be able to get where they are or there are certain things that you are finding difficult . . . Yes, it was really interesting and useful.*
>
> <div align="right">Teacher, 14 months, school 7</div>

> *Think the good thing about it was you realised that it went both ways, you realised that some people had done an awful lot and you were a little bit like 'oh I've not done enough' but then also there was some people who done less than what you'd done which made you feel a bit better . . . And it was just great to chat to people and I think you just got a good feeling of 'OK I'm not doing . . . 'you just got a boost of 'actually I'm not doing a bad job' which was good. And I think you could give some advice to other people and they were quite helpful for that which always makes you feel good.*
>
> <div align="right">Teacher, 14 months, school 1</div>

> *Someone had brought resources and they'd put their own words in the This Girl Can pictures and I thought, yeah that's a really good idea and if it wasn't for this meeting I wouldn't have known about that and if it wasn't for this meeting, you lot wouldn't know about Planet Bounce.*
>
> <div align="right">Teacher, 14 months, school 8</div>

> *Obviously I think perhaps the most useful thing is just hearing about the challenges so you just feel like you're not on your own and you're like, okay, I'll just keep going.*
>
> <div align="right">Teacher, 14 months, school 5</div>

Peer leader day

The purpose of the peer leader event was to get the peer leaders together as a celebration of the work they had done so far and to share practice, do practical activities (taster sessions) and to discuss motivators and challenges. The peer leader day took place at the hub school on 1 February 2016 (10 months after the initial teacher training day) and was facilitated by a hub school representative. Lead teachers from 7 out of the 10 intervention schools attended with their peer leaders: $n = 56$ girls in total. *Appendix 10* contains the girls' feedback scores. This feedback demonstrated that the girls felt that the event had increased their understanding and improved their skills and confidence. Nearly all of the girls felt that the venue, deliverers,

delivery and format of the session were either 'very good' or 'good'. Overall, the majority of the girls rated the whole event either as 'very good' (57%) or 'good' (41%). In the free-text comments, girls wrote that the event was fun, they learned new skills, improved their confidence and made new friends; however, some commented that a wider range of activities could have been included and more time could have been dedicated to talk to girls from other schools.

The interviews with teachers at 14 months provided an insight into their own thoughts of the peer leader day. The teachers had hoped to empower the girls even more, so that more responsibility could be passed on to them, and they wanted their leaders to hear what each peer leader group was doing in their school and share ideas; however, although the girls and the teachers found the day enjoyable, the teachers felt that limited time was given for the girls to share ideas. Like the peer leaders, the teachers felt that it would have been more beneficial if the day had been longer, had involved more sharing of ideas between schools and if it had been held earlier in the programme:

> *It was really good except one thing, I just think the girls themselves they could have spent a bit more time finding out from each other what they did. They got a lot from it but I don't think they actually got to share their ideas much with each other which I think would have been useful because then for my girls they maybe could have picked up ideas and picked up enthusiasm from what the other girls had done and thought 'oh that will be a really good idea we could go and do that'.*
>
> *Teacher, 14 months, school 1*

> *They loved the activities and things, it was good team bonding stuff, but actually having more of a 'right this is what we're doing, this is where we want to go' could do with maybe a little bit more advice to give them a little bit more direction. But they definitely enjoyed it and I thought it was definitely . . . it certainly wasn't a waste of time, it definitely was worth it.*
>
> *Teacher, 14 months, school 9*

Mission analysis and action plans

A mission analysis self-review form was required to be completed prior to the initial training day for lead teachers, with the purpose of enabling schools to review their sport, PE and PA provision and identify priority areas for Girls Active implementation. Following the initial teacher training, teachers were then requested to submit an action plan to specifically outline what they planned to do and when. They were then required to submit another action plan approximately halfway through the programme. The capacity funding (£1000) that the schools were due to receive was contingent on the schools submitting their action plans (£500 was received on receipt of action plan 1 and £500 on receipt of action plan 2).

Most of the teachers mentioned that they found the first action plan challenging to complete (in terms of the Microsoft Excel document format) and time-consuming, with some teachers reporting that too much time was spent completing paperwork rather than being able to actually get on with implementing the programme. They felt that more guidance and/or support, especially within the first few weeks following the initial training session, would have been appreciated; for example, having someone look at their action plan to tell them if they were on the right lines:

> *Hard work to be very honest. Oh it's taken ages to complete and sometimes we look at it and we go does that really mean that? Yeah it's taken a lot of time to go through.*
>
> *Teacher, 7 months, school 2*

> *I didn't understand really, what they were asking. So like, so kind of strategies into action, does your plan drive everything you do? What plan? What kind of things do you mean by that?*
>
> *Teacher, 7 months, school 9*

The format of action plan 2 was modified following comments made about the action plan 1, and teachers commented that they found it considerably easier to complete and felt that overall the questions flowed better; however, it did still appear that there was some confusion about the meaning of different sections:

The action plan that they gave us the second time around was a lot easier . . . that's what I want to do and this is where we're going and it was as easy that . . . but with the confusion of the action plan at the start to the next one you've got is something that we've been able to put on a second action plan that we didn't put on the start, but should have been on the start. I think if they were, we'd have completed them in a better way or we'd have done them sooner.

Teacher, 14 months, school 6

The difficulties reported regarding completing action plan 1, along with some teachers being unsure of exactly what they needed to do following the training day, may have contributed to the late submission of the action plan to the YST by several schools, which had a knock-on effect on when the first capacity funding instalment was received. A YST representative also acknowledged that the delay in submission of the mission analysis may have been attributable to a lack of understanding:

I suppose the communication side of things. So when we've asked schools perhaps to link back in terms of the action plans I think in some cases it might have been a little . . . not lack of understanding, but not quite sure on certain tasks.

YST representative, 14 months

Appendix 11 summarises when each school submitted their action plans and when they received their capacity funding instalments. Action plan 1 was due before the end of the school summer term (i.e. July 2015) and action plan 2 was due in January 2016. Although all intervention schools did submit both of their action plans, four schools did not submit action plan 1 until after the 7-month follow-up evaluation visit (8 months after the initial training), and hence they did not receive their first funding instalment. Four schools also did not submit action plan 2 until the time of the 14-month evaluation visit. As a result, there was some delay in receiving the funding prior to the follow-up visits.

Resource folders

The teachers were given a folder of resources at the initial training day; these contained marketing plans, case studies, images and a branding toolkit. Many of the teachers mentioned how useful the resource folder was for generating ideas, particularly from the case studies, and that they used the content with the peer leadership group to help them understand what they needed to be doing and to facilitate the girls working independently:

The resources that we receive are very, very useful I think that enabled the girls that had taken part as the girls group to actually do everything themselves so therefore I've not . . . they've come to me and said 'shall we do this?'.

Teacher, 7 months, school 7

The case studies were really good, it was nice to see all the schools were in a similar boat . . . because you are quite isolated in the school, you know, other than the bit of networking in the sense of PE, but you know, those sort of niggles with your kit, uniform, participation, those general day-to-day things. There were some nice resources to use for assemblies to start with as well.

Teacher 14 months, school 3

Although the resources were felt to have been a good starting point, the teachers reported that later into the programme they had not continued using them as they had developed their own resources or had

other resources they could use. Furthermore, some of the teachers felt that, although the case studies were good, they did not necessarily reflect their school context or pupils and so were not relevant:

> *At the very start of the project, when you're looking at the very first action plan and looking at kind of cases and things . . . you know, it kind of . . . OK, what can we do, but other than that, it's not been used at all.*
>
> *Teacher, 14 months, school 6*

> *We used a lot at the start, not really at all towards the end.*
>
> *Teacher, 14 months, school 2*

> *Some of the case studies are really good and some of the ideas are good, but wouldn't fit in this school. Some of them are good, I'll nick that bit of that one, but I'll take that bit of that one and then merge them together.*
>
> *Teacher, 14 months, school 4*

Dropbox and newsletters

Teachers had access to an online Dropbox™ (Dropbox, Inc, San Francisco, CA, USA) folder to share ideas and resources. They were asked if and how they had accessed this Dropbox folder. It appeared that this resource was underutilised. Teachers had either forgotten about it or had accessed it but felt that it was not being updated regularly enough:

> *There's a Dropbox account. I have looked in there a couple of times but no one seems to have put anything in. That's a bit of a shame because . . . and I hold my hands up, I haven't put anything in there.*
>
> *Teacher, 7 months, school 8*

> *I know there's the Dropbox, again, it's trying to get the time to even think about getting into the Dropbox to look.*
>
> *Teacher, 7 months, school 6*

A monthly newsletter was also sent to lead teachers from the YST, which gave links to material in the Dropbox: relevant news headlines; reports and studies about school PE, sport and PA; and tasks and challenges to prompt teachers to think about how to link materials to practice in their school.

Peer leadership and marketing group

The majority of schools (8 out of 10) established a girls' peer leadership and marketing group; there was some variation on when this was done during the intervention programme (i.e. some schools set up these groups early in the programme, whereas other schools had only recently established them by the time of the 14-month evaluation visit). Two schools did not establish a peer leader group: one school did not engage with the intervention implementation because of confusion about the purpose and, at the other school, the teacher felt that it would be quicker to do tasks herself, although she did acknowledge that this was a mistake. More detail for each school is provided in *School case studies*.

How the peer leader groups were established

The peer leader groups were established in a variety of ways including teachers inviting individuals, teachers having a group meeting from which they then selected people, asking people to apply or PE staff having a poll to select students. Peer leaders held a number of views as to why they had been selected: their confidence levels, being responsible, having ideas, being sporty and representing the non-sporty.

Type of girls selected for the peer leader groups

The Girls Active programme suggests that each school should aim to select girls who are not necessarily engaged in sporting and physical activities or particularly enthusiastic about participation, but those who would be seen as leaders for non-sporting reasons and thus could have a positive influence on their peers.

Teachers suggested that they tried to choose a variety of girls with different interests in sport and PA; however, during the focus groups, most of the peer leaders suggested that they were sporty or had an interest in PA. One girl, however, said that she 'spoke for those who hate PE' (peer leader focus group, school 1).

Benefits of being a peer leader

The teachers felt that it was important to give the peer leaders independence and ownership in key decisions, such as deciding what activities to do, how to respond to feedback from the girls in their school and how the activities were marketed. The degree of independence given to the peer leaders increased over time as teachers and peer leaders became more familiar with the programme. There was also a realisation that a balance needed to be struck as the peer leaders had a lot of other school work and commitments and teachers did not want to give them too much work:

> *They've been able to go away and design the posters and everything with them looking as a professional and them feeling like they're doing it and it not being me leading it all the time. I think it was useful.*
>
> *Teacher, 7 months, school 7*

> *They've actually come into us now which is nice. We used to have to call meetings for them and say right, and actually deliver them tasks, now they're coming to us with things they've done, which is brilliant.*
>
> *Teacher, 14 months, school 3*

> *She was more there as like a supporter and it gives us more independence to get our ideas across.*
>
> *Peer leader, 14 months, school 5*

> *She lets us be the leaders but she's always there. Like when we were planning the neon thing she took a step back because she wanted it to be for the students.*
>
> *Peer leader, 14 months, school 5*

The peer leaders reported several benefits from being involved in the Girls Active programme, including developing organisational, planning and problem-solving skills, taking responsibility and ownership for something and improving their confidence. The peer leaders also suggested wider social benefits from working with teachers and people they did not know or had not worked with before:

> *If we were in a job that we needed to organise or plan something or make our own ideas it kind of helps because we've had practice putting stuff together and like resolving problems that we've faced in like the middle of trying to make it.*
>
> *Peer leader, 14 months, school 3*

> *Maybe like general life skills as well because we've learned to socialise with each other and like the teachers and other people, trying to get them involved.*
>
> *Peer leader, 14 months, school 3*

> *It makes you feel good about yourself because you have responsibility, have responsibilities, they can help you feel confident.*
>
> *Peer leader, 14 months, school 5*

> *I think it's given us, like, a sense of responsibility, helped us be included more with people. And, like, I think being with you . . . like, we all been [sic.] learning to become friends because we didn't all know each other to a really close extent.*
>
> *Peer leader, 14 months, school 6*

> *It's changed my personality from being shy to confident.*
>
> *Peer leader, 14 months, school 2*

Negatives/challenges of being a peer leader

The peer leaders reported some challenges in their role. There were initial challenges around knowing what to do and raising awareness of their role among other pupils. As the programme unfolded, some peer leaders felt pressure to meet the desires of all students and that they had to create change. Some also experienced clashes with other in-school or out-of-school commitments and others felt that they were perceived as showing off:

> *I think just getting started was quite challenging, just trying to advertise it and trying to get the girls just to know about us, but then after that it, sort of, everyone knows about us . . .*
>
> *Peer leader, 14 months, school 7*

> *They just see it as almost like not that we're trying to show off, or anything, but like it's 'oh, they're just trying to do it because they like sport'.*
>
> *Peer leader, 14 months, school 3*

> *Sometimes it's like coming up with new things that are like for everyone.*
>
> *Peer leader, 14 months, school 3*

> *Some of them like they're desperate to get improvements and they want changes in the school and I think they're relying on us because they know we've been like asking people and like going to the principal and trying to like get these things to happen.*
>
> *Peer leader, 14 months, school 3*

> *I think it has been difficult. I think there's been some things that you've had to sacrifice . . . Like clubs and things that you might have normally been going but you thought, actually 'I'm not going to do that because I'm doing this'.*
>
> *Peer leader, 14 months, school 5*

One group of girls who were not peer leaders noted some negative perceptions about peer leaders getting opportunities that others were not getting:

> *I think GLAMs [Girls Leadership and Marketing] is unfair as they get more chances and experiences than other students.*
>
> *Girls' subgroup, school 2*

What was implemented in the schools?

The individual school case studies detailed in *School case studies* outline what each school implemented and when implementation took place during the programme. All schools except one had implemented a series of activities for the Girls Active programme throughout the 14-month time frame. Of these, all but one had commenced some form of implementation by the 7-month visit. The implementation activities could be grouped into (1) support activities and (2) provision of PA opportunities. From the case studies, it is evident that most of the activities implemented were support activities. These activities are ones that are aimed at finding out what girls in the school wanted or are aimed at beginning to target cultural change.

By 7 months, half of the schools ($n = 5$) had conducted some sort of canvassing of opinion from girls within the school through questionnaires or face-to-face questioning (three other schools also did this but not until after the 7-month visit). This enabled the schools to understand what changes the girls wanted to see in the school for PE, sport and PA. During this time, six schools had set up their peer leader groups (however, two schools had established them only just prior to 14 months). As a result of the questionnaires, three schools then made changes to their PE kit policy or sports kit. Additional support activities included marketing to launch and promote Girls Active (e.g. assemblies, posters, bulletin boards, banners and purchasing branded hoodies for leaders).

By 7 months, two schools had introduced taster sessions (either one-off sessions or over several weeks) or new activities or clubs in which, in some cases, an external coach was brought in; however, in the other schools, these were introduced late in the intervention cycle, either just prior to 14 months or the teachers were planning to implement these in the next term. A number of schools also delivered 'one-off' events.

Five schools had also opted to run a rewards scheme for attendance at clubs: pupils could gain points for attendance and then receive rewards when they achieved certain milestones. Similarly, this tended to happen at some point between the 7- and 14-month evaluations, with the exception of one school that started it prior to 7 months and continued into 14 months and another school that was in the planning stages at 14 months. The schools that chose to deliver the rewards scheme offered this to girls only, except in one school in which it was delivered as a whole-school initiative and any extracurricular club could be attended to gain points (i.e. it did not have to be a physically active club). These rewards included a 'queue jump' pass at lunch, free sports kit, free trips (e.g. to Planet Bounce) and free snacks. In most of the schools, the peer leaders had decided on what type of rewards were on offer. The rewards scheme seemed to be a popular choice among schools, and teachers reported that this really encouraged girls to take part in activities/clubs (see *Impact of Girls Active* for more detail on impact).

Although it is positive that all schools except one had implemented some Girls Active activities, there was variation among the schools in terms of how much had been implemented within the 14-month programme. It was evident from the interviews and the mission analyses that the schools had not achieved as much as they had planned to do in the time frame. This was also acknowledged by the YST development coach:

> To be honest they're different to what I thought they were going to be and I think that's because, through no fault they're either one reason or another the schools haven't been as far down the route as I would've expected them to have been.
>
> *YST development coach*

Ongoing support available from hub school and Youth Sport Trust
Teachers had access to ongoing support and contact throughout the programme in the form of monthly newsletters, a dedicated mailbox for them to contact with queries as well as telephone calls and face-to-face visits. The telephone calls and visits were optional offerings from the hub school and YST, and not all schools accepted; in particular, the telephone call opportunities were not used by some schools.

Hub school
The Health and Well-being School in Leicester was the hub school, with the purpose of providing ongoing support to the schools in the form of e-mail and telephone support (as well as delivering the peer review and peer leader events). However, it appeared that the teachers did not have a completely clear understanding of the hub school's role in ongoing support. They felt that there was not enough provided during the first few weeks and months of getting the programme started. This was especially to the teachers who were not completely sure of whether what they were doing was in line with the intended Girls Active programme. Furthermore, a number of schools reported not having had any contact with the hub:

> A follow-up by someone might have been nice, even if it was just a phone call or a meeting or, look what we have done here. There were e-mails, but, again, I think maybe face to face would have been nice.
>
> *Teacher, 7 months, school 8*

> To be honest I've forgotten . . . but I think the reason I've forgotten to use them is because they're not in the forefront . . . but regular e-mails just to keep prompting, reminding and . . . you know, maybe it's an e-mail that 'oh, someone's tried this, why don't you give it a go?'.
>
> *Teacher, 14 months, school 8*

It might have been nice for them [the hub school] to have come in and spent half an hour a few weeks after that initial meeting just to kind of pull us back in, make sure that we've actually started something.

Teacher, 7 months, school 8

The interview at 7 months with the hub school representative also highlighted that the hub school representative had not been integrated into the initial training session, which may have led to the teachers being unclear as to the hub school's role in the support available. However, another YST representative did mention that they always included the contact details of the hub school in the monthly newsletters that were sent to the teachers in order to encourage open communication.

Youth Sport Trust

A developmental coach was also available as a support mechanism to conduct face-to-face visits, as well as to provide e-mail and telephone support to the schools, to see whether or not they required any help and to share practice between schools. The majority of the teachers mentioned that the support that they received from the coach had been very useful for discussing ideas and action plans and they felt comfortable contacting her and vice versa. Overall, they felt that the coach was very supportive. In the majority of the schools, this support acted as a prompt and motivator to get things done. Teachers felt that without this they would not have implemented some aspects of the programme to the extent that they had:

She is great . . . I've got a lot of ideas and feel supported by her when we have the meetings . . . She completely appreciates the time constraints and the issues that I've got here at this college, but I've definitely taken some things on board and she's not pushy, but she's very supportive in what she would advise you to do.

Teacher, 14 months, school 8

She's been so useful for bouncing ideas off and, kind of, yes, just giving feedback on how perhaps I could have approached something that would have helped me out. It's just been really useful because she is so casual about it so I haven't felt judged as well. If I've said, oh, no, this hasn't gone very well or anything, you know, she's been really good and just that general having someone to feed back to, ask questions to, it's been really useful.

Teacher, 14 months, school 5

I think if you hadn't got the likes of her [the YST coach] and the YST saying 'we need your action plan', I think people would lose the focus and you almost need that support throughout the project to keep you going and to keep the motivation and the self-belief . . . yeah, you are doing the right thing and I think without that, I don't think it would work.

Teacher, 14 months, school 6

She's someone who you know is monitoring you, without you feeling like you're being monitored. I feel like she's supporting, rather than pointing the finger at things that you may not have done. Without her, I'd be left to my own devices, and without being reminded and in contact with these people, I don't know where that would feature on my to-do list.

Teacher, 14 months, school 8

The development coach also felt that the schools valued this support. Arranging the meetings at convenient times for the school and taking a non-judgemental approach was important to the success of these interactions:

The schools have all been quite welcoming of having somebody come. I think because I've been going to them and I've been doing it on a day and a date when it's convenient to them and I'm trying to do it so that I'm not leaving them with lots of work.

YST development coach

[When asked about the development visits and telephone calls] I'd say very well. I think initially again because of some of them may not have got up to speed as quickly as they would've liked to they sometimes start off a little bit cagey. But when they discover that I'm there to, I said just be really honest with me because then we can work and we can go forward, they're great, they're really happy.

YST development coach

Funding

When the schools received their funding instalments is detailed in *Appendix 11*, *Table 39*. Six schools received the first funding instalment by the end of the summer term in 2015 (July), which was 3 months after the initial training day. However, as mentioned, several schools struggled to complete their mission analysis and this delayed receipt of funding: these schools did not receive their funding until late 2015/ early 2016 (8–9 months following the initial training day). One school did not receive its first instalment until May 2016. The second funding instalment was received in January 2016 by six schools; the remaining four did not receive their instalment until May 2016, which was around the time of the schools' 14-month evaluation visit. It is evident from these dates that funding had often been received late in the programme cycle and, therefore, there had been only limited opportunity for spend and subsequent potential impact.

The capacity funding was viewed positively, especially at a time when school budgets were (and still are) tight. In some cases, being part of the Girls Active programme had even helped schools to apply and receive additional funding for the Girls Active activities. Even though the schools were positive about the funding, the majority of them spent none, or only a very small amount, of the funding during the 14-month programme. Some schools reported that because they rarely received money they wanted to keep it for the future to ensure sustainability. Others felt that they should clearly plan activities within their school before spending the money and this takes time:

It's definitely something that it allows us to have more scope. So we're quite tight on budget anyway and even things like printing and stuff, is getting stricter and stricter. And it's just for me, to be able to go 'well it could go in the Girls Active fund'. And then so, my head of department's a lot more like 'oh, OK, yeah, if that's . . . you go ahead then', rather than having to, not fight for it. It has allowed us to really, just be more accessible really, and allow us to kind of think a bit bigger.

Teacher, 7 months, school 9

If we can make that money last for a long period of time, then that is, you know, if we are only using a real small portion of it per year, we would make it last maybe 2 or 3 years.

Teacher, 14 months, school 7

We've been very lucky that we've got this money through the Girls Active, but we want it to last as long as possible. Once that money has gone, it's not then sustainable, so we've only had one coach in. We've only spent a little bit of money, but it means that in September we can get another coach in, so it's like spreading it out and we can sustain this now for a couple of years.

Teacher, 14 months, school 6

The schools that did spend some of the money reported spending it on printing materials for promotion, hoodies for the peer leaders, notice boards, a clock for the girls' PE changing rooms and external coaches. Only one school spent all of the money, on external coaches and travel to Girls Active training events.

Impact of Girls Active

School environment questionnaire

The number of sports/activities offered at each intervention school for KS3 pupils and any changes that happened over the 14-month study are summarised in *Table 32*. Teachers in nearly all of the schools reported some changes in the sports/activities that were offered to KS3 pupils at 7 and 14 months,

TABLE 32 Changes in school sport and activity offerings over the course of the Girls Active programme

| School number | Number of sports/activities | | | | |
	Baseline	7 months	Changes: baseline to 7 months	14 months	Changes: baseline to 14 months
1	17 (B = 0, G = 1, B&G = 16)	14 (B = 0, G = 1, B&G = 13)	Volleyball, trampolining and circuits no longer offered at any groups	15 (B = 0, G = 1, B&G = 14)	Volleyball, trampolining and dodgeball no longer offered to any groups; and hockey now offered to both groups
2	15 (B = 2, G = 4, B&G = 9)	17 (B = 3, G = 1, B&G = 13)	Table tennis and martial arts offered to boys and girls; rounders and badminton now for girls only; football now for boys only; dance now for boys and girls	21 (B = 2, G = 3, B&G = 16)	Table tennis, dance, cycling, aerobics, skating and martial arts offered to boys and girls; walking for exercise now offered to girls only; and badminton now for girls only
3	Not returned	19 (B = 0, G = 0, B&G = 19)	Not returned	Not returned	Not returned
4	15 (B = 0, G = 2, B&G = 13)	Not returned	Not returned	14 (B = 0, G = 8, B&G = 6)	Girls-only football and tennis/badminton, athletics, rounders, walking for exercise fitness now offered; cricket and outdoors offered to both groups; and golf no longer offered
5	18 (G = 18; girls-only school)	14 (G = 14; girls-only school)	Cricket, rugby, table tennis and ethnic dance no longer offered	17 (G = 17; girls-only school)	Cricket and table tennis no longer offered; and walking for exercise now offered
6	16 (B = 0, G = 0, B&G = 16)	Not returned	Not returned	13 (B = 0, G = 0, B&G = 13)	Hockey, rugby and aerobics no longer offered to boys and girls
7	19 (B = 0, G = 3, B&G = 16)	Not returned	Not returned	16 (B = 0, G = 10, B&G = 6)	Girls-only football, cricket and rugby, dance, rounders, fitness, hula fitness offered; table tennis, outdoors, quidditch, lacrosse and racketball no longer offered to any groups; and hockey now offered to both groups
8	17 (B = 0, G = 4, B&G = 13)	12 (B = 0, G = 2, B&G = 10)	Volleyball, rugby and skipping no longer offered to any groups; yoga and gymnastics no longer offered to girls	11 (B = 0, G = 3, B&G = 8)	Volleyball, table tennis, fitness and skipping no longer offered to any groups; girls-only yoga and aerobics no longer offered; and dance now for girls only
9	13 (B = 0, G = 2, B&G = 11)	Not returned	Not returned	17 (B = 0, G = 2, B&G = 15)	Volleyball, aerobics, fitness and dodgeball now offered to both groups
10	12 (B = 0, G = 1, B&G = 11)	12 (B = 0, G = 0, B&G = 12)	Netball now offered to both groups	12 (B = 0, G = 0, B&G = 12)	Hockey now offered to both groups; dance no longer offered to any groups; and netball now offered to both groups rather than girls only

B, boys-only activity; B&G, activity for boys and girls; G, girls-only activity.

although it appears that the majority of these changes were attributable to the usual change in offerings across the different school terms and not necessarily attributable to Girls Active. However, schools 4 and 7 had a notable increase in sports/activities offered to girls only. The teachers also reported almost identical access to facilities and equipment during non-teaching time for the students over the 14-month study period. A couple of schools reported changes in PE policy and these were also captured during the teacher interviews and have been noted in the school case studies. The teachers were also asked to list any other programmes outside the typical PE and school sports clubs for girls in KS3. Similarly, the majority did not list anything and those that were listed had already been mentioned during the teacher interviews and have been noted in the school case studies.

Impact on girls

At the 7-month evaluation, the schools that had started to implement programme activities felt that these activities were already having an impact on attendance at clubs and that the girls were more engaged and motivated. The activities were also attracting girls who did not normally attend after-school clubs. One school attributed the effects specifically to a rewards scheme, which gave the pupils something to work towards (i.e. the pupils received prizes for regular attendance at clubs) and one school attributed it to the baseline evaluation visit. There was a sense that the effect would grow as the programme slowly influenced the whole-school ethos:

> The first time we did swimming was in the first week of this term and there were 18 students. Last week there were 43 . . . I've never seen some of the girls in Year 8 before, now I know who they are because they're regularly coming to clubs . . . Why have you started to come to swimming club? I want to go to Planet Bounce [talking about logging activities and winning a free trip to Planet Bounce].
>
> *Teacher, 7 months, school 8*

> We've found that numbers to our clubs have dramatically increased because they're now saying things like, 'oh when you're having the next prize collection, I need 3 more hours to get those cricket stumps'. No they're keeping coming because they know there's something to work towards.
>
> *Teacher, 7 months, school 8*

> And we've now got dodgeball on the extracurriculum, and the amount of people that come to those clubs is fantastic. We've got 30, which is just brilliant, and the same with gymnastics. We don't normally get that much attendance on after school. And so they are both things that we put on this year, that we haven't done before.
>
> *Teacher, 7 months, school 9*

> I think it's slowly having an impact. I think this is something that once we get a bit more of a whole-school ethos, then I think there will be more of an impact. We're definitely having an impact on the girls, now that we're getting more taster sessions of sports.
>
> *Teacher, 7 months, school 5*

> We had a surge after the first set of testing of clubs going from 28 to 42 at netball. Getting a new club up and running. I've had females at table tennis, which was traditionally a male, kind of, sport in the school.
>
> *Teacher, 7 months, school 4*

At the 14-month evaluation, the majority of teachers reported an increase in motivation among the girls (attributable to being able to have an opinion on activities) and an increase in attendance at clubs, and

some teachers mentioned that they had girls coming to clubs whom they had never seen before, although such cases did seem to be small in number:

> *I think it's definitely making a difference to the motivation level of the girls and understanding that it isn't just . . . it's not boys. Because actually they're starting to have an opinion more than they've ever had before.*
>
> *Teacher, 14 months, school 3*

> *Actually I've seen girls, the ones that haven't necessarily come to a club before, we've then seen that they have come to that and gone, 'oh it's actually alright', and then gone to something different.*
>
> *Teacher, 14 months, school 7*

> *With the likes of the dodgeball and those kind of activities I've seen quite a few new faces.*
>
> *Teacher, 14 months, school 9*

> *The ones that came to the club, they are . . . I can think off hand, probably three or four that don't come to any club at all, which is really good.*
>
> *Teacher, 14 months, school 2*

However, one school felt that the programme was not yet having an impact because they were only just getting everything up and running, but they perceived that the impact would come in the future. Furthermore, the schools that had already reported some impact felt that this would continue to increase as they increased implementation in the next school term(s) (after the 14-month visit):

> *I wouldn't say that's had [sic.] an impact yet, I'd like to think it will when it's up and running and a lot better but not yet.*
>
> *Teacher, 14 months, school 1*

However, there was sometimes contrast in opinions between teacher and pupil focus groups on the impact of the Girls Active programme. For example, in one focus group with a subgroup of girls, the girls reported that they felt that not a lot had happened yet as a result of Girls Active, even though the teacher had reported an increase in motivation and a slight increase in attendance, perhaps demonstrating that it had yet to have reached the wider school:

> *I think they're trying to be good but maybe not a lot has come out of it yet but might in the future if they keep on carrying it on.*
>
> *Subgroup, 14 months, school 3*

This was reinforced by the findings from the exit survey, which demonstrated that, although the majority of girls (79%) in the schools had heard of Girls Active, only 36% reported taking part in Girls Active activities. Furthermore, the main aspects they mentioned in these surveys were either sports or aspects associated with the evaluation measurements. For example, the 'watches' and measurements were the most frequently mentioned aspect of Girls Active.

Appendix 12 reports data from the exit survey on girls' opinions on aspects related to the Girls Active programme. The results demonstrated that some girls (25–48%) felt that their ideas and opinions had been sought during Girls Active, and approximately 40% felt that the peer leaders and the teacher had encouraged them to take part. This demonstrates that, although Girls Active has had some impact on girls within the schools, it had not reached all girls.

The peer leaders and girls felt that the impact of the teacher allowing them to have an opinion/voice about what activities were happening within the school increased their enjoyment of participation, particularly in PE. Some girls reported being more active at break times, suggesting an impact beyond PE. These interpretations

were partially reinforced by the exit survey results that indicated that 46% of girls reported liking PA a bit or a lot more and 45% reported liking sport and PE a bit or a lot more:

> *The PE teachers give us a choice of what we want to do in PE rather than telling us what we've got to do. It makes us enjoy PE more because it's doing something that we want to do rather than being . . . forced to do it.*
>
> *Girls' subgroup, 14 months, school 4*

> *Quite a few girls feel better and more confident during PE lessons and attempt to join in now.*
>
> *Girls' subgroup, 14 months, school 4*

> *I'm not a person who likes PE. I used to hate it. And as soon as I talk to most people who don't like PE, I've, sort of, found out what they don't like about it, what we have in common that we both don't like, you know, we both . . . all of us don't like. When I talked to Miss [teacher] about it and she, sort of, changed our entire curriculum and then she asked other people, 'what would you like to do, or, how can we change it to make PE a lot more fun?'. So now I put in a hundred per cent effort in to everything I do in PE and then everyone's, sort of, enjoying it more.*
>
> *Peer leader, 14 month, school 6*

> *Like I've become more active now because normally at break we'll just sit down and play cards. Now we go out and play football a bit.*
>
> *Peer leader, 14 month, school 6*

Impact on boys

One of the factors we were asked to examine by the TSC was the views that boys had of the Girls Active programme. Teachers reported that the programme did not significantly affect the boys and they still tended to have more sports opportunities. Teachers also reported that the boys were interested and were wondering what was going on, mainly regarding the evaluation and why the girls were getting rewards, etc. The focus groups with boys generally reflected this, although a small number of boys asked why they could not have something similar as not all boys are active. One boy also commented that he thought Girls Active was sexist:

> *'Why do the girls . . . can I wear one of those?' So I have explained to a couple of boys the reasons behind why we are doing the Girls Active and why the driving is towards girls.*
>
> *Teacher, 14 months, school 7*

> *Their ears have pricked up a little, 'what's going on, why are the girls getting that, why are they getting that, what's happening with those vouchers and things?'.*
>
> *Teacher, 14 months, school 3*

> *A lot of the boys have made comment that they weren't allowed to be involved in it. They wanted to be involved in something and 'why are the clubs only for girls, why is there [sic.] more girl clubs than boys?'.*
>
> *Teacher, 14 months, school 4*

> *[What is Girls Active?] Sexist. Because why don't boys get the opportunity, because there are some boys that don't play sport and there are some girls that play sport, so I don't see why it should be different for girls? Yeah, it's good to get girls, like, active, but, like I say, it's the boys as well that need to be active as well, it's not, like, girls are just going to change the world by doing sport.*
>
> *Boys' focus group, 14 months, school 7*

A couple of the teachers did report some negative impact on boys with regard to access to school facilities (i.e. the increase in girls' clubs resulted in boys not being able to access the facilities during the times when these clubs were running):

> *They've lost some of their time that they've been out on the pitches.*
>
> *Teacher, 14 months, school 3*

Facilitators of implementation

Teachers mentioned a variety of support factors that helped them either implement or reprioritise the programme. Specifically, support from the PE department and their senior leadership team helped provide an environment in which the lead teacher could implement the programme. Furthermore, a couple of the schools specifically mentioned that the development coach's visits had acted as prompts to get things done. These visits were viewed as very helpful and useful for motivation, clarification of direction and general support. Finally, in some cases the data collection visits themselves acted as deadlines that encouraged action:

> *It's not just coming from me telling them, it's coming from an outside person going, 'oh we need to make sure . . .' then I can say to them, 'look they're coming in, this needs to be done'.*
>
> *Teacher, 14 months, school 2*

> *If you just came to me now and kind of gave me a load of resources and the booklet, I don't know whether I would . . . it was more the pressure of kind of having the three kind of dates coming up and having . . . and it's coming in, so I had a bit of a . . . something to work towards. When you've got so many other demands within the school it's like you kind of need those kind of guides, like dates to hit as such and potentially having something to work towards, it does definitely make a difference.*
>
> *Teacher, 14 months, school 9*

> *The assistant head's actually very, very, good and he's completely on our side. We proposed this whole idea to him and he said, whatever you need go for it, just make sure that you're not too elaborate. He gave us . . . well it was about £600 for the initial trip to Planet Bounce for 30 students.*
>
> *Teacher, 14 months, school 8*

> *Just general support really within the department . . . you know, they've all been really supportive of what we're doing.*
>
> *Teacher, 14 months, school 6*

Challenges to implementation

It is useful to identify the challenges that teachers faced in order to understand why some schools struggled to undertake some components of the programme. Some challenges may be specific to Girls Active; however, other challenges have important implications for other school-based programmes, which aim to make a culture shift within a school using a flexible approach.

Time

Time to dedicate to the programme was mentioned on many occasions during the research to be a major barrier to implementation progress, especially when one teacher was working on their own to facilitate the programme in their school. Teachers felt that trying to fit Girls Active into the normal daily work routine and workload was difficult, and a lack of dedicated time was a common reason why teachers had not made as much progress as they had hoped. In addition, there were challenges regarding finding mutually

convenient times for meetings if more than one person was involved or when trying to meet with the peer leaders:

> *Just trying to get everything done really, managing your time. It's an extra project that we took on and it's just finding those extra bits of time to kind of do it alongside everything else that you've on. It's been good, but not a lot of work, but at times felt a lot of work.*
>
> *Teacher, 14 months, school 6*

> *Time restraint. I was saying to one of the PE staff earlier I've got this meeting with you now and I just hope that . . . not that we would get told off or looked down on but unfortunately it does take a back-burner. It's not because it's not important, it's because the constraints and the responsibilities that this job has is so demanding and time-consuming that I would love to put my all into it but just can't.*
>
> *Teacher, 7 months, school 8*

> *We've got one member of staff dealing with it. There's three-hundred and odd girls in the school.*
>
> *Teacher, 7 months, school 4*

One of the main features of Girls Active is that a lot of the programme is intended to be led by the peer leaders, thus reducing the teachers' time investment. The YST development coach felt that the teachers could have reduced their time commitment by giving ownership of the programme to the peer leader group, because this is what the programme tries to promote. One teacher also commented on delegating tasks to the peer leaders:

> *One of the really big things that we've found is quite key and a big part of the training is the identification of a group of girls that are going to start to take ownership of the work in school . . . it was quite key that that branding and marketing thing, well to be honest more the ownership side, they needed to let go of it a little bit more. They needed to kind of just give the girls particular projects and let them run with it.*
>
> *YST development coach*

> *Because I just . . . I'm so busy, I'm also a bit of a control freak so part of me I want to do it and I want to keep it mine but then I need to learn to fob it off.*
>
> *Teacher, 14 months, school 1*

School-level commitments
Another challenge to implementation reported by teachers was that wider school-level commitments that needed to take priority increased their overall workload, and this pushed Girls Active to the 'back-burner'. These commitments included preparation for Office for Standards in Education, Children's Services and Skills (OFSTED) visits, amalgamating schools, adding or removing year groups from their school [i.e. changing from year groups 7–9 (ages 11–14) to Years 7–11 (ages 11–16 or 18)], changes in systems of assessment at a national level that required school-level paperwork, preparation of students for GCSE (General Certificate of Secondary Education) and other exams, and timetabling. Although some of these are common issues reported by teachers generally, others are situation specific (e.g. merging of schools leading to increasing school or class sizes) and could be a one off. Although the resulting disruption is large, the disruption and barriers caused are not likely to be long term:

> *Yes, and then there's the big changes in . . . A [Advanced] level and GCSE are coming in next September as well . . . everybody's now having to get their head around the new specifications and how things are going to run as of September next year. It's a big . . . I mean, there is a lot of changes going on.*
>
> *Teacher, 7 months, school 1*

It stalled slightly after that because OFSTED hit in the last week of term in the December so then when we came back in January there was a lot of stuff that we had to implement. I had to put the Girls Active stuff a bit on the back-burner.

Teacher, 14 months, school 1

I wasn't teaching GCSE last year, I am this year. So whereas I didn't have as workload last year that's now increased it, which obviously does have an impact on it, so kind of where we wanted to be we're not quite where we want to be . . . it seems to be a busy term.

Teacher, 7 months, school 6

It's been a bit difficult, it's just a very difficult time of the changing . . . because we're changing from Key Stage 3 to 4, so everybody's very, very busy.

Teacher, 14 months, school 3

So senior leaders have changed, so we've had a change of head teacher, a structure change at senior level. And there's a new leadership band which my other female PE teacher is now in, which means that there's nobody to support. Myself is [sic.] the point of contact for every individual female sport fixture club and so that is a major change.

Teacher, 7 months, school 4

Not a priority at the senior leadership level

Some teachers also mentioned that the Girls Active programme was not seen as a priority for the school and, therefore, they felt that they could not prioritise time for it within their already stretched workload; thus, planning and implementing Girls Active activities took a lot longer than anticipated:

Our head is a PE specialist but I'm not quite sure she appreciates how big it is and how big it can be. I think if she did know, she might be more inclined to give us a bit more time. But, even then, time gets taken off of us like that. She'd say, not today, you can't do that today, you've got to do this instead, but she's got her own pressures.

Teacher, 7 months, school 8

Their immediate focus is not on a project like this. It would be on developing exam grades at the moment for Year 11. So we're obviously getting a new school as well, which is meaning that there's a lot of pressure on trying to make and fix things. There's a lot of changes going on with subjects and options and so I do feel that maybe this has took a back-burner.

Teacher, 7 months, school 4

Just maybe give a bit of a time frame because that's the only trouble, you find that it's not necessarily the priority so therefore sometimes it does get . . . I know in my workload, it kind of gets pushed to the bottom of my workload, because there are a lot of other things that I have to do before it.

Teacher, 7 months, school 6

Lack of support/help from other staff

During the training events, lead teachers were encouraged to get other school staff involved in the delivery of Girls Active at their school. The interviews with the YST highlighted the importance of engaging with other staff and the senior leaders in order to embed the programme within the school:

What we really want to do is get it embedded in schools so it doesn't just sit with that one teacher that attends training. We encourage multiple colleagues to come to the training. But if that isn't possible for whatever reason then the lead teacher goes back into that school and they link up with a senior leader. We've said that senior leader just so that it's on the school's radar . . . So it's internally embedding it and having that critical friend.

YST representative, 14 months

Although this was encouraged during the training days, the teachers often reported that they were actually the only staff member working on Girls Active and felt that they needed more staff support, especially from their own PE department (e.g. to help run the extra clubs). Some teachers reported having some help, but this was usually just one other person:

> It's just me, just because they don't have the time to be perfectly honest. We've got a small department as it anyway and it's as simple as that, really.
>
> *Teacher, 14 months, school 7*

> I'd say the barrier, at the moment, that we have is trying to get other staff to promote it as well, without having to really think about it and getting staff to be willing to say what they do. But it's not because they don't want to, it's just, when you're asking other people to just do even a little thing for you extra, it can be quite a big deal sometimes.
>
> *Teacher, 7 months, school 5*

> Yes, I haven't had much backing . . . It's like you're on your own and you actually haven't got the support to go anywhere else.
>
> *Teacher, 14 months, school 5*

Sustainability

Views on continuing the programme in the future were generally positive; however, some teachers did mention the role of the capacity funding within the programme and the possible impact on the programme when that money runs out. Others acknowledged that the programme was low cost and it was more about ensuring that the programme is embedded into the culture of the school without being reliant on the funding. Capacity funding was not always spent for logistics reasons (i.e. the delayed timing of payments), but the desire to keep the programme going in the future also influenced spending patterns. Developing a rolling recruitment of peer leaders each year and keeping the peer leaders interested were also mentioned as important for the programme moving forward:

> Yes, I do think it is sustainable because it only costs such a small amount of money. If we can make that money last for a long period of time, then that is, if we are only using a real small portion of it per year, we would make it last maybe 2 or 3 years.
>
> *Teacher, 14 months, school 7*

> It's down to making damn sure that you do it, if you want it to be sustainable you've got to . . . it's down to us and the girls to make sure that that's what it is and if we want it we've got to work hard to do it. I don't think there's anything tangible that we could add that would make it one way or the other, it's just got to be down to willingness to do it.
>
> *Teacher, 14 months, school 1*

> It's more about status and less about money isn't it, it's about the status and doing things rather than actually having the physical money to buy things. It's more about what's the word, presence, isn't it?
>
> *Teacher, 14 months, school 3*

> I think now it's been kind of put in place, I think the Miss Motivators are sustainable with our four going into each year. It's just about keeping them like occupied with certain jobs . . . we'd have to make sure we actually do have set kind of meetings, set agendas and things like that to hit.
>
> *Teacher, 14 months, school 9*

Teachers' overall views of the Girls Active programme

Overall, the Girls Active programme was seen in a positive light. Teachers seemed to view it as a worthwhile programme and a great opportunity for their school. Teachers reported that they would take part again if the opportunity arose, while acknowledging the need for more people to help within their school:

I'd definitely get involved again. There's been a few admin/technical issues that we probably need to iron out but, yeah I'd definitely get involved again. It's given the girls a bit of a lift. It's about them as well, it's quite important that the girls have had a chance to show enthusiasm and interest for girls' sport.
Teacher, 7 months, school 3

We thought it was a brilliant project that our girls would be on board with this and it was a good thing for the school to be honest . . . [Interviewer: would you do it again if you were . . .] Yes, definitely, yeah.
Teacher, 7 months, school 2

Oh, I would do everything again the same, and set up similar to how I have done this time. Because I do feel that it's probably impacted them better than I thought it would do. It might just be that you have more staff, so you could spread the workload, maybe make it even more, kind of, focused. So, if there is two of you, one of you in charge of 7 and 8 [year groups], one of in charge of 9 and 10 [year groups]. So, you can really focus on what they needed. But, yeah, I definitely would do it again.
Teacher, 14 months, school 4

Honestly I think Girls Active project is such a good one. I think because anything we can do to get girls involved in PE is so important and I think it's just the way to do it like getting the girls to do it themselves so that it spreads the word that way; really good.
Teacher, 14 months, school 5

Control schools

The teacher responsible for the study in each control school (i.e. evaluation) completed a school environment questionnaire. They were also interviewed at 7 and 14 months to explore whether or not any changes had happened in the school that might have had an impact on girls' PA, for example any changes to PE, new sports and activity clubs at lunchtime and after school, new sports facilities or equipment, or involvement in new initiatives. All schools except one reported some changes in their school within the 14-month programme. Two schools (schools 15 and 16) reported using This Girl Can resources (e.g. posters and quotes) in the school at 7 months. Two schools (schools 11 and 16) also reported taking a small selection of girls to 1-day activity events in which they took part in cheerleading and taster sessions of different activities. One school (school 13) reported taking part in a Women in Sport and Physical Activity (WISPA) event at 7 months, at which girls in the school were offered 6 weeks of Zumba classes. Another school reported taking part in a NHS Healthy Minds project that aimed to improve the physical, social and emotional well-being of adolescents. This project appeared to have been offered to schools in the Northamptonshire county. Two schools (schools 16 and 17) reported reductions to their PE allocation for certain Year 10 pupils at the 7-month time point. This would only have the potential to have an influence at 14 months, when the pupils who were in Year 9 at baseline were followed up; 6 out of the 10 control schools included Year 9 pupils. At 14 months, four schools (schools 13, 14, 16 and 18) reported the introduction of new clubs/activities. One school reported a new girls-only after-school club for Year 8 pupils at which they could choose to go any sport/PA, another school reported a lunchtime boxing session, one school had carried on with Zumba classes because of their popularity when delivered as a 6-week taster prior to the 7-month time point and another school reported that it had started lunchtime clubs (having not previously provided any lunchtime activities). The changes noted above are evidence of the usual evolution of offerings within schools. These alterations and additions have the potential to influence the PA levels of girls in those schools and could therefore mask any effect of Girls Active in the intervention schools.

Summary

The data collected during the process evaluation show that Girls Active was implemented to at least some extent in all of the schools, although one school sent a representative to the initial training day and submitted action plans but did not carry out any further implementation. Teachers and peer leaders attending training events reported that they found them well organised, informative and useful, and that the feedback received was extremely positive; however, it was not possible for all schools to send a representative to all training events because of other school commitments. The training components were delivered largely as intended. Although the initial training was well received, it did not necessarily leave teachers with a clear plan or timeline for the next steps and this, combined with the challenges associated with completing the first mission analysis, led to delays in completing the mission analysis and getting started for some schools. This had knock-on effects to funding and other programme activities. All schools submitted the two mission analyses and therefore received their full amount of capacity funding, but schools tended to either limit spending or not spend the money at all during the programme, potentially diluting the dose of the intervention delivered.

Teachers, peer leaders and pupils voiced support for the Girls Active programme and what it was trying to achieve, but implementation of programme components was slow, and often came late in the evaluation time frame, meaning that the potential for impact on outcomes of interest, including MVPA, was limited. Furthermore, many of the activities undertaken in the schools were 'support' activities aimed at finding out what girls in the school wanted or targeting cultural change. Although these are recognised as important steps, their potential impact on PA is limited in the short term. When schools did introduce new clubs or taster sessions, these were only for a limited time, and several schools held one-off events. The majority of schools did establish a group of peer leaders, but teachers often struggled to delegate tasks to them. Schools were also positive about the resources provided, although these only tended to be used at the start of the programme.

Teachers appreciated the one-to-one support they received from the development coach and felt that they would not have made as much progress without this support; however, most teachers highlighted that this would have been useful if it had closely followed the initial training day to facilitate the development of ideas and timelines and to keep attention on the programme early on. External events or changes within schools (e.g. preparation for OFSTED visits, introduction of GCSEs and merging schools) all had a negative impact on teachers' ability to deliver the programme. Furthermore, the majority of teachers did not engage other staff or the senior team within the school, therefore limiting the embedding of the programme within the whole school and increasing the time pressure on the teacher leading Girls Active.

The Girls Active programme is based on schools developing their own programme of implementation that suits their particular context. Although this is a strength, it is also a challenge because the flexibility afforded by choice in both activities and timings created uncertainty at times. Without milestone dates, teachers found that other priorities took over and the programme drifted. Therefore, by the end of the programme, the majority of schools did not achieve everything they had set on their mission analyses; however, the teachers felt that what they had already implemented (or what they were starting to implement) within the schools was making some positive impact in terms of motivation and attendance levels, even with those girls who did not necessarily engage with PA previously. The following factors may have contributed to the null result for the primary outcome:

- delays in submitting mission analysis
- late selection of peer leader groups in some schools
- delays in receiving capacity funding and unwillingness to spend the money once received in order to improve sustainability
- failure to set clear milestone dates
- limited support in first few months after the training day
- lack of engagement of other staff and senior team
- one teacher responsible for Girls Active in the school
- concentration on support activities
- provision of new PA opportunities being one-off events or short-term taster sessions.

Chapter 7 Discussion

Main findings of the randomised controlled trial

The primary objective of this school-based cluster RCT was to investigate whether or not the Girls Active programme led to higher objectively measured MVPA at 14 months when compared with the control group. The complete-case, ITT and per-protocol analyses found no evidence of an effect on objectively measured MVPA between the intervention group and the control group at the primary end point of 14 months. The results showed a similar pattern when the analyses were limited to files with differing numbers of valid accelerometer days of wear. This was also the case for MVPA when the measurement period was partitioned into different time periods (school days, weekends, school hours and after school). However, at the shorter follow-up point of 7 months we did observe significant differences in MVPA between groups in the complete-case, ITT and per-protocol analyses, but the differences in change were small (between 2.3 and 3.1 minutes/day). When analyses were restricted to participants who provided more days of valid accelerometer data (i.e. ≥ 4 days), results were no longer significant. Similarly, there was no significant difference in self-reported PA levels from the questionnaire.

The primary analysis was repeated for a variety of prespecified subgroups including ethnicity, school social deprivation level, school size, participant year group and biological maturity category (early, average or late), to investigate whether or not the intervention had an effect in certain subgroups. Subgroup analyses highlighted some interesting differences at the 7-month follow-up. The intervention was effective in white European participants, among whom there was a significant difference in MVPA of 3.3 minutes per day favouring the intervention arm, whereas there was no difference between the intervention arm and the control arm for non-white participants. For biological maturity, the intervention was effective in early maturers, among whom there was a significant difference between arms of 5.1 minutes per day, whereas there was no difference between intervention and control arms for participants in the average and late stages of maturity. At the 14-month follow-up, school size was an important factor for intervention success, with the intervention having a significant, positive effect on MVPA in larger schools (+3.9 minutes/day) but appearing to cause a decrease in MVPA in smaller schools (–4.4 minutes/day).

At 7 months, we saw some differences between groups for average acceleration over the whole measurement period (1.4 mg/day), sedentary time in the after-school period (–4.7 minutes/day) and light activity over the whole measurement period (5.7 minutes/day) and on school days (4.5 minutes/day) in favour of the intervention group, but, again, these differences were small. Furthermore, there were no differences in the percentage of girls meeting the recommended PA guidelines at either time point. The fact that the results at 7 months were no longer significant when only participants who provided more valid data were included suggests that the 7-month results should be interpreted with caution. The effect of season meant that the significant effects found at 7 months disappeared when we controlled for baseline season and both baseline and follow-up seasons. Controlling for baseline season meant that the primary outcome at 14 months was significant but small (0.83 minutes/day, 95% CI 1.21 to 3.45 minutes/day).

We also assessed a range of potential psychosocial mediators; however, we found little evidence of any changes during the course of the intervention. There were no significant differences between groups for enjoyment of PA, attitudes towards being active, family, peer and teacher support, self-worth and perceived body attractiveness. There were also no differences in any form of motivation for PA, except for identified motivation at 14 months in favour of the intervention group. When significant differences were found for potential mediators (i.e. intentions to be active, perceptions of the school environment and confidence to be active at 14 months and perceived importance of PA at 7 months), these were in favour of the control group, with the exception of self-esteem at 7 months. However, even though these differences were statistically

significant, the magnitude was very small (i.e. usually < 0.5 on a scale of 1 to 5) and they have little practical relevance.

Girls Active is a peer-led programme in which peer leaders aim to influence other girls at their school to become more active. Although girls felt positively about their teacher in the focus groups, there was no difference in the girls' self-reported teacher social support. There was also no difference in participant perception (via questionnaire) of social support from peers. It seems that the peers were largely selected by teachers and were sporty, keen and responsible, etc. It is possible that these peers had somewhat limited reach/legitimacy with some of the least active girls. In addition, the group of peer leaders were selected across Years 7–9 so in reality there was only a small number of leaders doing their influencing per each school year group. Overall, only a handful of these peer leaders were included in the evaluation population reported herein (because participants in the evaluation were chosen at random). The exit survey for all intervention school participants revealed that, although 79% of participants had heard of Girls Active, only 36% had taken part in activities and many of them recalled more of the evaluation component of the work than the activities themselves, so the peer leaders may not have had a discernible impact and influence at that stage.

Perceptions of the school physical environment decreased further in the intervention group than in the control group, although the magnitude of change was extremely small (marginal mean was just 0.13 of a score out of 5). There were no differences in perceptions of the school social environment. This is surprising, as much of the work carried out in Girls Active could be considered to be targeting the physical and social aspects of the school environment; however, even if attitudes had changed, there is the possibility that they were subtle enough that the pupils did not pick up on them. Conversely, as a result of participating in the trial, pupils may have become more aware of their surroundings and what the school lacked in terms of environmental support for PA. The school environment questions focused on opportunities and offerings within the school and, according to the focus groups, these were aspects that the peer leaders hoped to change. Although teachers did seek the girls' opinions, offer choice through taster sessions, promote the current PA offerings and apply a reward card system, there were no long-term systemic changes or adaptations made to the school social environment. Adaptations to the school environment would be considered a longer-term strategy, which may take many years to implement.

Main findings of the health economics analysis

The cost–consequences analysis in this report demonstrated that, depending on how Girls Active was implemented, costs ranged from £2054 (£23/pupil based on 90 pupils/school) to £8545 (£95/pupil based on 90 pupils/school) per school. The least costly option was to absorb Girls Active strictly in curriculum hours. The analysis demonstrated no effect for the intervention for the three main outcomes of interest (MVPA/day, CHU-9D utility score and service use) at a modest cost per pupil. The impact of factors, such as year group, school size and percentage of BME pupils, could provide lessons for future intervention design and implementation by including these in cluster methodologies because these were shown to affect results. The intervention group reported a slightly lower CHU-9D utility index score than the utility score reported by the control group. The intervention group had slightly lower frequencies of contacts with health and school services and associated costs of service use than the control group. Health-related utility index scores reported by the sample were slightly lower than the mean, based on a sample of UK 11- to 17-year-olds.[63,87] In the disaggregated cost–consequences form, our economic analysis shows that the Girls Active programme was no more effective than receiving standard PE and school PA provision.

Main findings of the process evaluation

Teachers in all 10 schools attended some form of initial training event, but attendance at all training events by all schools was not possible because of other school commitments. The feedback received for training events was extremely positive, with the teachers finding them informative and worthwhile, although some

schools were unclear on the subsequent plan for implementation or the timeline for the next steps (due to the flexible nature of the Girls Active programme). All schools submitted two action plans and received their full amount of capacity funding, although in some cases this took place a few months later than anticipated. Schools tended to either limit spending or not spend the funding at all during the 14 months of the programme. The programme was implemented to some extent in all but one school. The majority of schools did establish a peer leader group, but teachers often struggled to delegate tasks to them. Schools were positive about the resources provided, although these only tended to be used at the start of the programme. Many of the activities undertaken by schools were 'support' activities and, although these are recognised as important steps, the potential for impact on PA could be limited to the short term. Some schools introduced new clubs or taster sessions for a limited time or one-off events. Teachers appreciated the one-to-one support received from the development coach and felt that they would not have made as much progress without this support. They highlighted that this would have been more useful if it had closely followed the initial training day. The majority of schools did not achieve all parts of their action plans by 14 months; however, they did feel that what they had already implemented, or were starting to implement, was making some positive impact in terms of motivation and attendance levels, even with those girls who did not necessarily engage with PA previously. Teachers reported several challenges to implementation, including finding adequate time to dedicate to the programme, a lack of engagement from other staff and the senior leadership team, the programme not being viewed as a priority within the school, difficulties with completion of the first action plan and a lack of initial support/progress monitoring during first few months of programme. Overall, teachers, peer leaders and wider pupil groups voiced support for the Girls Active programme and what it was trying to achieve and felt that it was a worthwhile programme and a great opportunity for their school. The Girls Active programme is based on schools developing their own programme of implementation that suits their particular context. Although this is a strength, it is also a challenge, as the flexibility afforded by choice in both activities and timings created uncertainty. Without milestone dates, teachers found that other priorities took precedence and the programme drifted from their focus.

Interpretations

No difference was found in MVPA between the Girls Active group and the control group at 14 months; there may be a number of reasons for this. Although Girls Active was a flexible programme, it was designed, in the first instance, for teachers to target girls with low PA levels. Because it took a long time to get the programme up and running, it may have had effects only on the peer leaders rather than on a wider cohort of girls across KS3. A disconnect between the plan for the peer leaders' activities and the actual activities undertaken by the peer leaders was seen. There was evidence that the peer leaders felt frustrated by a lack of progress and change and also that they found conflicts with school commitments. Furthermore, peer leaders may have been slightly too young to take responsibility for tasks within their school and the teacher was more involved than would be hoped in a peer-driven programme. Both the teachers and peer leaders suffered from a lack of time, and activities and changes took longer to plan when the peer leaders met only once per fortnight or briefly during their lunch break.

The activities that were undertaken during the 14-month period (e.g. gathering data on pupil preferences and asking for changes in PE kit) would be more likely to have an effect on the motivations, perceptions of the school social environment or perceptions of PE teacher support among the peer leaders rather than on MVPA among the wider female student population. A long-term culture and provision change at the school level that comes from the senior leadership team may promote these sustained levels of MVPA, preventing the natural decline as girls get older. Teachers were encouraged to engage the senior team and wider school staff so that the programme could become embedded within the school, but this did not appear to happen. The finding that there was a significant difference at 7 months but not at 14 months warrants discussion. This could mean that a programme like Girls Active can have a small effect in the short term. At 7 months there was a difference of 2.4 minutes of MVPA per day between groups. This is because MVPA declined more in the control group than in the intervention group over the first 7 months. In some schools, momentum was good in the first few months following the initial training but then tailed

off and not a lot of delivery took place between 7 and 14 months. Conversely, other schools struggled to implement anything prior to 7 months. It may be that the implementation of the programme components happened only at certain points, in 'bursts', over the 14 months. School timelines indicated that some schools had a burst of delivery of activities following the peer review day, the peer leader day or after contact with the development coach, when enthusiasm was high, with the frequency of activities tailing off thereafter. These activities undertaken were either asking girls their opinion, promoting the PA and sport offerings already place or adding new short-term or one-off taster sessions. Based on teacher interviews, decreased momentum could have been due to lack of clarity regarding what they should have been doing (i.e. they needed guidance or reassurance), perceived or actual lack of early support from the YST or from within their own school, or just generally that the programme was too flexible with no set timetable or deadlines. It would seem that the plan for implementation (the action plans) and what was actually implemented (as per the case studies) did not correspond as much as teachers had hoped; however, the 14-month interviews revealed that the in-person visits from the development coach gave teachers the support and reassurance that they needed and that momentum was restarting just prior to the 14-month visit.

Subgroup findings have important implications for designing and planning PA promotion efforts in schools. Differences favouring the intervention arm among white European participants and early maturers were found. At the 14-month follow-up, school size was an important factor for changing MVPA, with larger schools doing better and smaller schools doing worse. The relative success in larger schools makes intuitive sense because larger schools have a greater diversity of agents (teachers, support staff, etc.) within a larger system, which may mean that there is a broader range of skills and/or staff commitment to draw on when implementing action in Girls Active. Findings from the process evaluation would show that lead teachers in smaller schools often had a large or sole responsibility for girls' PA, PE and school sport; however, actual change may be harder in these schools. Larger schools also may possess more complex system-level structures, including larger numbers of subsystems and suprasystems,[89] thereby providing a challenge to change.

The lack of difference and change in most of the psychosocial outcomes/potential mediators following the intervention provides an important insight into the lack of intervention effect in PA levels at the end of the trial. Specifically, SCT (on which Girls Active was based) suggests that behaviour change is only initiated and sustained if specific motivational factors are targeted as part of the intervention, particularly factors related to self-efficacy. This trial suggests that the Girls Active programme did not successfully target these factors and therefore failed to effectively set the preconditions needed for behaviour change. Indeed, some important aspects that indicate behaviour change seemed to get slightly worse as a result of the intervention, such as a marginal reduction in confidence to be physically active and in perceptions of the school environment. This suggests that, at least for some participants, the intervention was actually having a detrimental impact on motivational factors in the 14-month time frame.

In the ideal scenario, the barriers of time and personnel would not be an issue as the programme is intended to be run by the peer leaders, who would do much of the work. However, from the process evaluation it would seem that teachers either did not or could not hand over this work to allow the programme to run without a huge amount of resource. Changes in the local and national policy environment in England at the time of the intervention meant that there were changes in how teachers and schools needed to operate; for example, *Assessment Without Levels* (September 2015)[90] was mentioned as having an impact on the paperwork that the PE teachers had to do, the burden on other teachers and the ability of the senior leadership team to support new initiatives at that time. These changes, combined with the preparation needed for OFSTED inspections, meant that priorities were dictated at the school level.

Girls Active is a programme where a school culture shift is necessary. This means that not only the pupils, but also PE personnel, teachers from other departments and (most importantly) the senior leadership team, need to be at the heart of the adoption of a new culture. Hence, we might not expect to see any changes in MVPA or mediators in the short term (e.g. 14 months). In fact, it might be that the intervention/support is required over a number of years for the innovation to spread and for there to be a change in policies

and practices in order to actually have any impact on girls' MVPA and the variety of mediators; for example, incorporating a student voice, in itself, will not happen overnight. Time is needed to create momentum and for students to learn how to communicate and have the confidence to engage in decisions in the school, and also for schools to reflect on their own practices and policies to allow for students voices to be heard and acted on as default. Previous research suggests that students' lack of knowledge of school governance can hinder student voice.[91] This points to the importance of sustainability and ongoing support (teacher peer support) for the teachers themselves from the appropriate source.

Girls Active is a programme that is currently delivered in schools in the UK. Although the core components of the programme have been outlined in *Chapter 1*, *Details of the Girls Active programme*, and in *Table 4*, there is no 'dose' or 'one size fits all' standard delivery of the programme. By design, the programme is not prescriptive regarding hours to be spent or the amount of resources that need to be used to deliver it. The main premise of the programme is to facilitate a culture shift in the school, in the curriculum and among pupils. It is flexible and, if undertaken in the true sense of the spirit of the programme, should have required few resources (i.e. financial or consumables) and little teacher time. From the extensive series of interviews and focus groups, we found that this culture shift can be achieved readily over 14 months is not wholly possible. Schools do not have sufficient human resources, and much of the burden of programme delivery (in the first 14 months at least) was placed on busy staff with limited time to commit. Although none of the teachers said that a lack of start-up funds (i.e. capacity funding) or specific project funding was a barrier, they did not use this money for additional human resource (aside from one school in which the funding was used to support the lead teacher's specific role) to help with the programme. Instead, they held on to the money with the goal of carrying it over until another year for sustainability purposes. This points to a system issue in that teachers are unsure of funding status and, because it is unusual to receive money that can be carried across school terms, do not spend funds when perhaps they should early on. The trial has helped demonstrate what resources were actually used to implement the programme, which will be highly valuable for future research and rollout. The programme can also help the YST to refine the content and then deliver and perhaps identify/add/communicate a minimum time commitment when the programme is being advertised to schools.

Strengths and limitations

Main trial design

A major strength of this evaluation is the robust methodology. This was a fully powered cluster RCT in which randomisation took place at the school level after baseline assessments. Allowing Girls Active to be implemented at the school level (rather than at the class level) was more ecologically valid (as it is a school-based programme). For the evaluation, a random sample of 80–90 girls per schools were included. Depending on the school size, this ranged from 25.9% to 78.2% of KS3 girls (mean 37.2%). Logistics and cost made it difficult to include all KS3 girls in the evaluation. Given that teachers are encouraged to embed Girls Active within the whole school, we felt that it would have had an impact on any girl in KS3 if this objective had been met; however, the reality is that in the shorter term the programme seems to have more focus and a narrower targeted evaluation sample may have yielded different results. Although our 14-month follow-up is longer than many school-based programmes, the analysis may have benefited from a longer time frame, assuming that schools were still committed to delivering elements of the Girls Active programme in the longer term. Our sample size accounted for a loss of two schools (we were unable to measure two schools at 7 months and one school at 14 months) and a 30% non-compliance/loss to follow-up over the course of the 14-month evaluation. At 14 months, we had 69.1% of the baseline sample to analyse, which is slightly lower than our power calculation accounted for.

An objective measure of the primary outcome was a major strength.[92] We chose a wrist-worn rather than a waist-worn accelerometer to maximise wear among adolescents. The compliance with wrist accelerometer wear was excellent at each time point, with 96.0% and 93.5% of the seen/available sample providing at least 1 day of data at the 7-month follow-up and 14-month follow-up, respectively. This compares

favourably to previous large studies of a similar age group[93] and also to the average missingness from young people's accelerometer studies of 37.4% (SD 20.2%, range 3.3–75.4%).[94] These previous studies used non-wrist protocols so it would seem that our variety of strategies of using the wrist placement, an incentive for device wear (£5 voucher) and a full explanation of the device to the students resulted in great compliance with the protocol.

Novel aspects of applying health economics to the Girls Active trial

There is a lack of cost-effectiveness evidence surrounding PA interventions for children and young people.[80,81] This cost–consequences analysis adds to the literature and provides results from a UK context. As mentioned previously, cost–consequences analysis is championed as a method that is particularly relevant to economic evaluations alongside public health interventions.[83,84,95]

Conducting economic evaluations alongside public health interventions has been described as challenging, and often requires a pragmatic approach.[84,95] The difficulties faced by teachers in completing the Microsoft Excel version of the cost diary, which was essential for the economics analysis to quantify the resources required to deliver the Girls Active programme, raised a particular challenge in this trial. We took a pragmatic and iterative approach to designing measures to collect this information, adapting the Microsoft Excel cost diary to a survey and logbook to increase response rates. This adaptive approach to the economic data collection yielded further responses from the teachers and resulted in 9 out of the 10 intervention schools providing data for the microcosting analysis.

The intervention was not prescriptive in nature. It did not dictate how schools should deliver Girls Active nor the number of hours teachers should spend recruiting peer leaders, reviewing current activity and developing new lesson plans. This presented the challenge of displaying the costs of the intervention in a meaningful way, which reflected what happened for the intervention schools taking part in the trial, but could also be used in the future by local authorities to indicate how Girls Active could be rolled out in their locality. Owing to the adaptive approach taken to collecting cost information, we had a wealth of data to draw from. Furthermore, by undertaking follow-up telephone calls with the teachers who completed the cost diaries, we had first-hand accounts of their experiences, which provided context to the information received. This context was instrumental in helping the researchers to make the decision to present the data as three costings, using the different levels of teacher activity and additional hours outside timetabled PE lessons, which we believe provides useful information for those interested in delivering Girls Active.

Process evaluation

An extensive process evaluation, following the guidance for process evaluation of complex interventions,[96] was conducted, collecting data from a variety of sources and using a variety of methods. We used feedback forms, interviews, focus groups, training records and observer notes to build up an accurate picture of the how the Girls Active training was delivered and the how the intervention was implemented. As Girls Active is designed to be a flexible programme, there is an infinite number of ways that teachers, pupils and schools could decide to implement the programmes and make PA changes in the school; our variety of methods were able to account for this flexibility. The school-specific case studies in *Chapter 6*, *School case studies*, have built up a full picture of what the programme can actually look like in schools. These case studies were informed by a variety of subjective and objective sources. Our TSC lay members provided valuable contextual information on the policy and practice climate in which Girls Active is being implemented. They suggested questions and themes that were added to the interview and focus group schedules, and the addition of a boys' focus groups was also a suggestion of our engaged TSC.

Generalisability

The generalisability of the findings must be considered in terms of whether or not the setting (schools) and the recipients (participants) of the intervention were representative of the area and the country from which they were drawn. For this study, 82 schools were contacted to yield 20 schools that entered the trial. The area in which this study was undertaken was deemed to be suitable because it included a mix of urban and rural schools, a range of socioeconomic levels and schools with varying percentages of non-white

pupils. When the characteristics from *Table 5* are considered, it would seem that there was a higher proportion of larger schools (≥ 850 pupils) in the trial (70.0%) than the English average (57.8%). Girls Active schools had slightly more non-white pupils (23.5%) than the English average (20.9%) and the percentage of pupils eligible for free school meals (11.5%) was lower than the English average (14.8%).

In terms of the participant characteristics, the proportion of participants who were overweight/obese at baseline (28.2%) was lower than the average values for England (32.2%; Year 6, 2015/16).[97] In the Girls Active sample, 5.0% were classed as underweight, compared with the English average of 1.5% of Year 6 girls (at 9/10 years old, these girls are younger than those in the Girls Active sample). One of the reasons for this could be that the sample contained a large proportion of South Asian children (11.7%) who, based on National Child Measurement Programme data (2015/16), have the highest prevalence of being underweight at Year 6.[97] In the present sample at baseline, the proportion of underweight participants was 9.5% among South Asian girls compared with 4.6% among white European girls.

Sources of potential bias

We do not have any information on the girls who, although randomly chosen as part of the first 90 girls, did not provide assent or have their parents/guardians return the opt-out consent form. However, those who were the least active, older and had higher BMI *z*-scores at baseline were more likely to opt out of the two follow-up visits. This is unsurprising and is a limitation of many trials. The large proportion of white European participants who were lost to follow-up came from the school that was uncontactable at 14 months and the school that opted for a slimmed-down version of the measurement day. Therefore, of the 390 participants (22.3%) who did not complete the 14-month assessment, 89 were from the school that was uncontactable and 28 were from the school with the shortened measurement visit; these 117 participants actively decided not to return for a follow-up visit. There may have been selection bias in the subgroup of girls and boys chosen by the teachers for the focus groups; however, this was done in an effort to find a range of activity levels and, also, to find pupils who would be willing to speak up in these situations. Their views may not be representative of all the pupils in their school.

Comparisons with other studies

Historically, school-based PA interventions targeting adolescents have been largely unsuccessful, particularly for older adolescents. For example, a recent systematic review of 12 RCTs targeting adolescents[98] in the school setting and reporting objectively measured PA found the effects on MVPA to be small and non-significant. We identified six recent school-based PA trials (four from the UK[99–102] and one each from Australia[103] and the Netherlands[104]) that have a primary outcome of accelerometer-assessed MVPA. However, it should be noted that only three[99,102,103] of these interventions are in a secondary school (the rest are in primary schools) and only one[102] was specifically targeted at adolescent girls. The MOVE Project[99] was a clustered RCT of two education interventions designed to increase PA of UK secondary school students. Overall, 16 secondary schools received a peer mentoring intervention (Year 7 pupils aged 11–12 years were paired with Year 9 children for six weekly peer mentoring meetings), 14 schools were given a participative learning intervention (Year 7 pupils took part in six weekly geography lessons using personalised movement data), 14 schools participated in a combination of the other two arms and 16 schools were recruited as controls. Evaluation results showed no significant difference in objectively measured MVPA between any of the intervention arms and the control group at 12 months after the intervention.[99] The Bristol Girls Dance Project,[102] a girls-only secondary school-based cluster RCT, consisted of 75-minute dance sessions twice per week in 18 UK schools. Evaluation suggested that there were no significant differences in objectively assessed MVPA 12 months after baseline.[102] The only identified secondary school-based intervention to report a significant effect on objectively measured MVPA (3.8 minutes/day) was the Physical Activity 4 Everyone (PA4E1) trial in Australia.[103] The PA4E1 was a comprehensive intervention in disadvantaged secondary schools (utilising seven PA components that targeted the curriculum, school environment, parents, community and six implementation adoption strategies including the provision of an in-school

PA consultant). However, at 12 months' follow-up, the results were only statistically significant for boys (i.e. there was no significant effect among girls).

A number of secondary school-based studies are currently under way in the UK. PLAN-A[105] is a two-arm cluster randomised feasibility trial looking at the use of nominated influential Year 8 girls in promoting PA to their peers. GoActive[106] is an ongoing study using mentors and in-class peer leaders, with feasibility data providing promising first steps for the refinement of the programme.[107] RCTs in other countries are looking to capitalise on social media and commercially available PA devices.[108] In the process of this trial, we have provided evidence of the challenges that peer leaders faced when becoming leaders to influence their peers and to drive change in PA culture within their schools. Future studies that incorporate peers as a means of delivering messages or driving changes should be mindful of these challenges.

The findings of this report add to the existing body of evidence on the lack of effectiveness of school-based PA interventions on objectively assessed MVPA.[99,102] When there is a significant effect, it is 'small'.[98] This further highlights the challenges with intervening in adolescents' PA within the school setting. The comprehensive nature and high level of support apparent in the infrequent successful trials (such as the PA4E1[103]) highlights the extensive support that may be required to show significant but modest intervention effects.

Recommendations for Girls Active and similar programmes

Although the teachers were positive towards the Girls Active programme, there were a number of suggestions to enhance the future implementation and impact within schools. These could also apply to other programmes that are similar to Girls Active. In no particular order, these suggestions included the following.

1. Provision of support to schools within the first few weeks after the initial training event. For example, having an external person visiting the school to make sure that staff have instigated something and to answer any initial queries.
2. To make action plans and other documentation as simple as possible.
3. Have the peer review day earlier in the intervention and provide all training dates at the start of the programme.
4. Give peer leaders more time to discuss, share ideas and plan during the peer leader event and have the peer leader event earlier in the programme.
5. Give more structure (e.g. suggested time frame/timetable) to teachers for intervention activities and set deadlines/monitoring for achieving certain milestones to avoid the intervention ending up on the back-burner.
6. Provide more regular contact and support. This was suggested in several forms and may differ depending on the preferences of the teacher. Simple e-mails, texts and support visits from the development coach every term were some suggestions.
7. Include more formal peer support for teachers as a core part of the programme through, for example, pairing lead teachers with another school.
8. Provide smaller but more regular capacity funding instalments. Consider funding with a time limit to spend to ensure that the money does not get nested away and not used at the critical early phase on a programme.
9. Use social media more to share ideas, achievements, pictures, etc., among schools.
10. The lead staff member within the school should preferably be an individual who has protected time to dedicate to a programme or an external person who comes in every couple of weeks to provide dedicated time to support a lead teacher.

Recommendations for future research

Our measurement of PA was gold standard and the trial was undertaken with best practice in mind; however, future large-scale RCTs should be cognisant of the balance between gold-standard methods, ideal timings, who participates in the evaluation and the practicality of capturing the outcomes of interest. We aimed to engage a diverse range of participants in the research process that represent the 21st century UK population. Research should continue to focus on research and the promotion of lifelong PA engagement among under-represented groups.

Considerations for future research could include appropriateness of outcome measures and how the challenges of capturing data during the school day can be balanced with the breadth and/or depth of data needed to capture changes in school culture. Previous research has criticised the reliance on self-reported measures to assess PA.[10,13,15] There may need to be a wider context brought into this research that goes beyond accelerometer data and self-reported measures. Future research may wish to collect information on school absence on the days when a pupil has a PE lesson scheduled, the number of sick notes excusing pupils from PE during the course of the trial and information on pupil engagement in PE throughout the course of the trial. Do pupils who tend to hide in the background or not participate change their behaviour? There was evidence of this happening from the teacher focus groups ('new faces' coming to clubs) or pupils reporting putting more effort into PE. The capture of such information over longer time periods could help ascertain whether or not the culture shift in the school is leading to a culture change among the pupils.

The need for longer follow-up has been highlighted in previous research.[10,13,15] This is particularly pertinent for the Girls Active programme or any intervention that adopts a culture change (rather than a discrete intervention model) that is dictated by a short-term time horizon. Owing to the design of Girls Active, there may be a lag in realising changes within pupil behaviour and attitudes, as younger pupils (Years 7 and 8) may show more benefit from having this culture shift throughout all their schooling, compared with older pupils (Years 10 and 11) who only had the intervention for 1 or 2 years. Timing of measurements are also crucial, as much of the momentum was only being gathered around the 14-month follow-up time point.

Subgroup findings have important implications for designing and undertaking PA research in schools. Different strategies within a programme, not necessarily different programmes, may be needed for non-white European girls and late-maturing girls. At the 14-month follow-up, school size was an important factor for changing MVPA, with larger schools doing better and smaller schools doing worse. Again, this means that different strategies and support may need to be in place within a programme depending on school size (or related parameters, such as number of PE staff). It will be important to involve key stakeholders and include the views and input of these and other relevant subgroups when designing or refining future school-based programmes.

Results from the peer leader focus groups would suggest that using peer leaders and girls to drive flexible programmes within schools may not be as easy as researchers and programme delivery staff think. A number of social, personal and contextual barriers to success were raised by the peer leaders. Their own peers from the subsample also observed barriers to the peer leaders' success. It would seem that the methods of how the peer leaders are chosen, how they are promoted and how they are perceived may all have an impact on how successful the peer leaders are in motivating their peers.

The inclusion of an economic evaluation is a marked strength of this study. Cost–consequences analysis is recommended by NICE[83] as being particularly relevant as a method of economic evaluation alongside public health interventions; however, in pragmatic trials conducted in the community, there is a balance to be achieved between quantity and quality of data. As researchers, we would argue that weekly diaries would be the preferred method to capture this information, as they use shorter recall periods and could be used to track activity as and when it happened; however, we found the surveys to be the method most

preferred by the teachers. In future trials, it may be beneficial to undertake consultations with the teachers prior to the start of a trial to find a method to capture costs that works for both the teachers and the researchers. It would also negate the need to adapt and develop methods during the course of the trial, which could be burdensome and confusing for those completing them.

Missing service use data could be addressed in a future trial by using electronic records rather than relying on participant recall. Although the measure was kept brief and focused on key professionals, the 7-month period of recall seemed to be the main source of difficulty; however, longer recall periods have been demonstrated in the field. The Database of Instruments for Resource Use Measurement,[67] an online repository of resource use questionnaires used in economic evaluations, holds questionnaires with recall periods ranging from 1 week to 1 year. Heijink et al.,[109] in a review of approximately 90 country-level health surveys, demonstrated recall periods of typically 1 or 12 months. Future research could explore reducing the recall period by administering the service use questionnaire more frequently; however, this would need to be considered against the time and resources required and the potential disruption to pupils and teachers. The difficulty in remembering contacts could also be attributed to the relative levels of independence and autonomy in the sample of participants, whose ages ranged from 11 to 14 years. Although adolescence is considered a time when individuals are experiencing greater independence and autonomy, it is likely that many of the sample appointments, such as those to see a GP, would be arranged by a parent or guardian. It is also likely that the parent/guardian would remind their child of the appointment and take them to the surgery; this perhaps makes it harder for participants to recall contacts with the health-care professionals when asked. Future research could explore the use of parents/guardians to gather the information or request that parents/guardians also complete the measure so that the information provided by the adolescents could be corroborated.

In terms of the development and testing of programmes in the future, we would encourage the development of programmes using a robust round of piloting and refinement as well as systematic mapping onto behaviour change theory. Girls Active was a programme that already existed, was being delivered in UK schools and was originally developed without specific reference to theory. Although the research team applied theory to the programme post hoc in an effort to understand the mechanisms of action, there are limitations to this method. Refinement of the programme was beyond the scope of this evaluation study.

Conclusions

At 14 months, our primary measure of effectiveness was change in MVPA at 14 months. We found no difference in change in MVPA between the control and Girls Active intervention schools. At 7 months, there was less of a decline in MVPA in the intervention schools than in the control schools. Overall, the Girls Active programme was seen positively by teachers: it was seen as a worthwhile programme and as a great opportunity for their school. Teachers felt that they would take part again if the opportunity arose but that they would need more support. Teachers did not achieve everything they set out to do. Although teachers felt that what they had done within the 14-month evaluation had made a positive impact on girls' motivation, engagement and attendance, this was not evidenced in the self-reported questionnaire results. Programmes like Girls Active that are flexible and also provide a support network for teachers were seen as valuable and needed; however, they have limited benefit in making sustained changes to girls' PA in the short term (i.e. 14 months). Programmes that promote a change in attitudes and culture at a school may be of particular value but it may take longer than 14 months for them to have an impact on the PA of the wider pupil population (i.e. the focused impact may have been missed by evaluating a random sample of girls). The flexible nature of the programme often created uncertainty, and the lack of milestone dates, as well as issues with competing priorities and workload, meant that teachers found that other priorities took over. Therefore, by the end of the programme the majority of schools did not achieve everything that had been set on their mission analyses. The Girls Active programme was viewed positively by the peer leaders but the programme was often not fully understood by the wider groups. Although Girls Active is designed to be flexible, future implementation may need to provide teachers with more support and guidance on

strategies and activities during the programme and encourage teachers to engage more staff and delegate to peer leaders. For these programmes to really be a success in the longer term, the stated barriers of time and lack of school-level support need to be addressed. Funding was not seen as a barrier to implementation. In fact, teachers made a conscious decision to not spend the capacity-building funding in an effort to increase the chances of making Girls Active sustainable. An unintended consequence of this may have been that funding was not spent by teachers in the early stages of programme implementation. It is possible that dedicated staff resource to run this programme would be more useful. However, this does have funding implications for a future implementation. Future programmes should look to engage the senior leadership team as early as possible and have another non-PE teacher involved to support the lead teacher. Changes to PA culture would have an impact on boys too. Overall, Girls Active was seen as a worthwhile programme but teachers did not achieve everything they set out to do. Although lead teachers felt that what they had done within the 14-month evaluation had made a positive impact on girls' motivation, engagement and attendance, this was not reflected in any changes in objective PA or self-reported attitudes and behaviours from the random sample of participants evaluated in this study.

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Contributions of authors

Deirdre M Harrington (Lecturer in Physical Activity, Sedentary Behaviour and Health) co-led the study, co-led the study design and methods development, conducted fieldwork, co-wrote the first draft of the manuscript, co-ordinated responses from all authors and obtained funds to complete the project.

Melanie J Davies (Professor of Diabetes Medicine) had overall responsibility for the study as the primary investigator, led the study design development and obtained funds to complete the project.

Danielle Bodicoat (Lecturer in Epidemiology) led the study design development, designed the statistical analysis plan, undertook subsequent rounds of statistical analysis and obtained funds to complete the project.

Joanna M Charles (Research Fellow in Health Economics) conducted the economic analysis and drafted the economic analysis sections of the report.

Yogini V Chudasama (Research Assistant) wrote the statistical analysis plan, cleaned and managed the data and undertook the first round of statistical analysis.

Trish Gorely (Senior Lecturer) contributed to methods development, analysed process evaluation data, drafted the process evaluation sections of the report and obtained funds to complete the project.

Kamlesh Khunti (Professor of Primary Care Diabetes and Vascular Medicine) contributed to methods development and obtained funds to complete the project.

Alex V Rowlands (Senior Research Associate) cleaned, managed and analysed the accelerometer data and drafted the related sections of the report.

Lauren B Sherar (Senior Lecturer in Physical Activity and Public Health) contributed to methods development, conducted fieldwork, drafted sections of the manuscript and obtained funds to complete the project.

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Appendix 1 Process evaluation: lead teacher's interview questions at the 7-month follow-up

Note: each numbered question is the opening question. Please probe (using the notes in italics) to allow the participant to expand on the topics.

Who	Questions

YST – trainer	1. Briefly, can you please describe the training day? We are going to go through this in more detail, but just as an overview briefly what happened
	2. Could you describe your role throughout the day?
	3. *Go through the trainer notes, highlight the key sections of the training day.* Could you talk us through each session? What was actually delivered?
	  i. How was it received?
	  ii. Do you recall any challenges/difficulties?
	  iii. Were there any bits not completed/extended (check that all activities, etc., were completed; e.g. identification of peer buddy)
	4. To sum up in your view, how did it go?

YST – theme lead	1. Can you feed back to us how you feel Girls Active is going so far? Generally and then specifically from a:
	  i. Training perspective
	  ii. Hub school support
	  iii. Within schools themselves
	2. Any challenges they are encountering?
	3. It was noticed on some of the material there is the 'This Girl Can' logo, and other indications of sponsorship/support – could you just explain what the tie in is? How is it working?
	4. Has a relationship with 'This Girl Can' brought anything to the Girls Active schools (evaluation specific and more widely)?

YST – action plan reviewer	1. How many of the action plans have you received/reviewed? 2. What is your overall sense of them? 3. What were your expectations of these reviews? Did they live up to your expectation?

YST – project manager	1. Can you feed back to us how you feel Girls Active is going so far? Generally and then specifically from a:
	  i. Training perspective
	  ii. Hub school support
	  iii. Within schools themselves
	2. Have your reviewed the action plans? What were your expectations of these reviews? Did they live up to your expectation?
	3. I have one question on how things all fit together: what is the process for the schools for resetting their action plan and re-evaluating? *Provide an overview from the YST of what should happen when (i.e. a combination of the timeline and slide 7.1)*
	4. How has the contact with the schools been going? What were your expectation of how responsive schools would be? Has the contact matched you expectations?

Hub school – lead teacher and any other staff member that may be providing support in person or on the telephone	1. What was your perspective of the training day? What worked and what did not work? What was your role in the training day as the hub school person? 2. Since the training day describe what (if any) your involvement with any of the schools? 3. The other side of your involvement is your interaction with the YST. Since the training, talk us through how that side of things has been going/that side of the project? (i.e. are you the middle man?) *Have list of all elements we think the hub school is being implicated in* 4. Has anything been sought from the intervention schools? If yes, who instigated the request/where did the contact come from/who reached out to who?

Who	Questions

Intervention schools – lead teacher	1. How did your school get involved in Girls Active evaluation?
	2. How did you specifically become the lead teacher for your school?
	3. I now want to ask some general questions about your school first and then also about Girls Active:
	  i. What has gone on in the school generally since we saw you 7 months ago?
	  ii. *If they say all as normal then that is fine. If not, then probe as there is reported to be a shift in something over the summer. Policy, staffing, change in direction, leadership, more things going on*
	  iii. Are there any policy shifts that you are aware of from a national or local point of view?
	  iv. Is this year different from previous years in any way?
	4. Can you tell us about the training day – what went on? What was your role on the day? (probe for preparation beforehand)
	5. What were the key messages that you took away?
	6. Can you talk us through what has gone on in your school since the training day? *Probes: mission analysis? Peer leader selection? Peer leader involvement in mission analysis? Marketing/posters, etc. Engaging other teachers/senior management; both physical activity and general school policy broadly*
	  i. *How done; who involved; challenges, etc. If mention either of these explore what they did; how gone; key messages delivered; perceptions of support/engagement form others*
	7. In your opinion, is what you are doing making a difference *might be too early for this but we can probe a bit. If nothing, engage in discussion of barriers/obstacles, etc.*
	8. At the training day, you paired with a peer buddy (another teacher at another school) – how has this gone?
	  i. If used, then please describe
	  ii. If not, is there a reason for that? Have you sought support elsewhere?
	9. Have you identified a senior leader to act as a mentor to them within your school – how has this gone?
	  i. If used – describe, etc.
	  ii. If not – is there a reason for that? Have you sought support elsewhere
	10. Have you (and then ask your school) had any previous ties or engagement with YST? If yes, please elaborate

Intervention schools – another teacher	1. I want to ask some general questions about your school first and then also about Girls Active 2. What has gone on in the school generally since we saw you 7 months ago? i. *If they say all as normal then that is fine. If not, then probe as there is reported to be a shift in something over the summer. Policy, staffing, change in direction, leadership, more things going on* 3. Are there any policy shifts that you are aware of from a national or local point of view? 4. Is this year different from previous years in any way? 5. Can you describe to me what you understand Girls Active to be about? 6. What has your involvement been so far? (e.g. how did you hear about it/get involved? Have you received any training/info? From where, how or who?) 7. Can you describe what has gone on in your school for Girls Active? *Probes: mission analysis? Peer leader selection? Peer leader involvement in mission analysis? How done; who involved; challenges, etc. If nothing – engage in discussion of barriers/obstacles, etc.* 8. Are you involved in any planning over the last 7 months? 9. Who else in the school has been involved (at the teacher level)?

Who	Questions
Control schools – lead teacher	1. How did your school get involved in Girls Active evaluation study? 2. How did you specifically become the lead teacher for your school? 3. I want to ask some general questions about your school first. What has gone on in the school generally since we saw you 7 months ago? i. *If they say all as normal then that is fine. If not, then probe as there is reported to be a shift in something over the summer. Policy, staffing, change in direction, leadership, more things going on* 4. Can you tell me about any policy shifts that you are aware of from a national or local point of view? 5. Is this year different from previous years in any way? 6. Can you tell me about what your school does to promote girls physical activity and sport? *Want to identify whether anything has been implemented in the control schools*

Appendix 2 Process evaluation: lead teacher's interview questions at the 14-month follow-up – control schools

Question/guidance	Probe	Rationale/aim
1. I just want to ask you some brief questions about how things have been going since we spoke to you last time. Last time you spoke to us about *<insert an overview of what the teacher told us was going on at 7 months>*. Is this still the case or has anything changed?		Opening, reminding them of what they told us and checking whether this is still the case. If they did not tell us anything at 7 months we can ask questions 2 and 3
2. I want to ask some general questions about your school first. What has gone on in the school generally since we saw you 7 months ago before Christmas?	Has there been any changes in: ● policy ● staffing ● change in direction ● leadership team ● more things going on at the school in general	To explore the school culture and context and whether anything is different since last time
3. Last time you told us about *<list any programmes or activities that went on in the school>*. Are these still going on? Has anything else been tried or started since our last conversation? What kind of impact are these initiatives having so far?	A few things nationally around girls PA and sport. Have you heard of any of these and brought anything into the school?	Want to identify whether anything has been implemented in the control schools. Along with the school environment questionnaire we are trying to see whether there is anything new that the girls could be involved in or impacted by
4. Can you describe what level of staff movement into your school?	Each new year do many teacher come in from other schools? Typically is it from schools locally/East Midlands?	Contamination
5. Can you describe what level of student movement into your school?	Each new year do many new students come in from other schools? Typically is it from schools locally?	Contamination
6. As you know, our team spend some time with the participating girls at three time-points when they fill out questionnaires about physical activity, PE and sport. Can you describe any impact this process may have had on the pupils at all? Please provide and discuss an example	Did they start talking about PA more? Was there an increase in uptake to PE or your other usual offerings?	We have heard from other schools that just be filling out the PA questionnaire the girls realised that they did not do much PA
7. You heard a lot about Girls Active before you were randomised into the control group. Being in the control group for the last year meant that you did not receive the Girls Active programme until the end of our evaluation. Has the awareness of the Girls Active programme or our evaluation visits had any impact on you over the last year?	Did you use the evaluation days in any way stimulate a conversation with pupils? The way you teach? The types of activities that you have done?	

Question/guidance	Probe	Rationale/aim
8. Other teachers have mentioned that the new GCSE PE is a little different *<add specifics here>*. Do you teach GCSE PE? If yes, do you feel that the goals of Girls Active, or what you know of Girls Active, could align with the new GCSE PE?		
9. Finally, is there anything else that you think we should know about your school on girls sport/physical activity/PE provision?	Something that might impact on the Girls Active evaluation	

Appendix 3 Process evaluation: lead teacher's interview questions at the 14-month follow-up – intervention schools

Question/guidance	Probe	Rationale/aim
Last time we chatted you said you were about to/you just did <insert tailored details about how far they had come at 7 months . . .> or you were just about to do <xx activity>

Can you tell me how that went?

Is there anything else that has happened around Girls Active since I last spoke to you in November time? | • Mission analysis and action plan?
• Peer leader selection?
• Peer leaders involvement in mission analysis?
• Marketing/posters, etc.
• Engaging other teachers/senior management
• Both physical activity and general school policy broadly
• Spent rest of money? On what?
• Attendance (are some activities more popular than others? Who has been turning up typically? Same girls at all activities or different at each activity?)

For anything that is mentioned probe on how it was done, who was involved, challenges, etc.

Explore what they did, how it has gone, perceptions of support/ engagement from others | Identified where they were at the last time so we are building on what we know already

<Make a list of the activities and then can probe later further. Attendance, impact, etc.>

Key questions on what component of Girls Active have been planned or implemented. Want to get a sense of barriers or challenges they have faced as well as identifying characteristics or things that are allowing the lead teachers to succeed |
| Have you used the folder of resources that the teachers and girls receive?

Teacher pack: what do you think about the content? What did you use, etc.? Anything missing?

Girls pack: what do you think about the content? What did the girls use, etc.? Anything missing? | • Have a folder with us to show pages as triggers | |
| What has attendance been like at the various activities? | If they say simply 'good' then probe by asking what does good mean. How many pupils approximately?

• Are some activities more popular than others?
• Who has been turning up typically?
• Same girls at all activities or different at each activity? | Getting an idea of the reach |
| In your opinion, is what you are doing making a difference in terms of girls getting involved in physical activity? What sort of impact?

Do you get a sense they are enjoying it?

Some things went well and did not go well? | If no, engage in discussion of barriers/ obstacles, etc.

List of barriers and obstacles may include . . .

• Examples might include . . . more willing to come to PE | |

Question/guidance	Probe	Rationale/aim
At the peer review day and peer leader day you engaged with other teachers • Did you continue contact with these teachers? How? • If not, is there a reason for that. Have you sought support elsewhere? • Who would be your critical friend(s) when it comes to Girls Active?		Trying to understand what networks accompany the Girls Active programme that they draw on Looking at support
Can we just take a look at a copy of your mission analysis and double check what you said you would do. Can you have a look through and tell me what you did do and did not do?	*<Use probes from the individual mission analysis>* For the things that have not been done probe on why? Barriers/challenges, do they plan to do it in the future Did your plans change from the first to the second one?	Use it is a trigger and also talk about what has and what has not happened if they have not talked about these already
Did you go to the peer review day? If yes, can you tell us about the peer review day • What went on? • What was your role on the day? • Key messages from the day • Was there anything new you implemented from what the other teachers said? If no, was there a reason why you could not attend? Did you go to the peer leader day? If yes, can you tell us about the peer leader day • What went on? • What was your role on the day? • Key messages from the day • Was there anything new the girls implemented from what the girls from other schools said? If no, was there a reason why you could not attend?	Use transcripts from the recorded event to help mould the questions or probe. Or some handouts to trigger their memory	To ascertain what they took from it, how much they engaged with the day itself and what they found useful
At the peer review day and peer leader day you engaged with other teachers • Did you continue contact with these teachers? How? • If not, is there a reason for that? Have you sought support elsewhere? • Who would be your critical friend(s) when it comes to Girls Active?		Trying to understand what networks accompany the Girls Active programme that they draw on Looking at support

Question/guidance	Probe	Rationale/aim
So far we have mentioned the peer review day, mission analysis, etc. There are other components of the Girls Active programme we would like to explore Hub school – how much have you accessed them for advice/support? Support funding from YST – how important that is? YST development coach? – role?	How important these are each of these to you in your school? Could you have implemented Girls Active without this element of the programme?	
Have you sought support elsewhere over the course of Girls Active implementation?	For example other teachers within the school or a senior leader to act as a mentor within your school If used – describe what this support looked like If not – is there a reason for that? Have you sought support elsewhere? <formal or informal networks>	It is briefly mentioned in the training folder that they should seek out a senior mentor. Trying to understand what formal or informal networks teachers draw on (i.e. is it over a glass of wine with their PE school friend) to support their Girls Active work
Is there anything else you would have liked to see included in Girls Active? • Is there any other type of support for you or training for you or the girls who may have been useful?		
Who else in the school has been involved (at the teacher level) in helping with Girls Active? Anyone else give support in any way?		A different types of support to that mentioned in question 7. Is there anyone else we may need to talk to about the Girls Active implementation?
Have you applied for or secured any external funding to support Girls Active or other activities within the school on the back of the Girls Active programme?		Want to see whether Girls Active could bring any added value to the school by allowing them to leverage the programme or their connections to a research study to gain funding
In your opinion, is what you are doing making a difference in terms of girls getting involved in physical activity? What sort of impact? Do you get a sense they are enjoying it?	If no, engage in discussion of barriers/obstacles, etc. List or barriers and obstacles may include . . . Examples might include . . . more willing to come to PE Did some things go well and did not go well?	
Can you describe whether being in the evaluation had an effect on the girls in any way? Did it have an effect on you in any way?		Feedback from the 7-month interviews was that it meant more paperwork, that some girls were more aware of PA, more aware that they did not do much after completing the questionnaire
To what extend would the activities have been delivered without the programme?	Explore whether they would have all gone ahead in the same way, on a smaller scale, at a later date or not at all	

Question/guidance	Probe	Rationale/aim
<remind them/summarise what the positive outcomes and outputs seem to have been from there school> To what extend would these outputs and outcomes have been achieved without the programme?		
Can you describe whether being in the evaluation has changed the way you went about Girls Active in your school?		Whether going through the evaluation changed anything in any way. For example – feeling more pressure to implement certain components, more motivation, getting prompts from the interviews and reminders that they may not receive if they were not going through the evaluation
How have the boys reacted to the Girls Active offerings?	• Do they get less activities? Your time taken from them? • Do they want something similar? • What has their reaction been? We can then probe about sustainability within their school	To identify impact of Girls Active on the boys
<insert general summary statement about what has gone on at the school> So looking forward into the future will you carry on with any parts of the Girls Active? If you were to go to another school what would you take with you?	• What is the reason for choosing this to keep going with? • Why can't you carry on with certain things? • Why can you carry on with some parts and not with others? • What are the barriers? • What will help you, prevent you? • How sustainable do you think this programme is? • What support would you need to help with sustainability? • What learnings would you take with you to try and implement elsewhere?	
What key messages would you like to come from your Girls Active experience? If you were promoting this to another school what are the positives? What would you warn teachers about/what mistakes not to make? How would you sum up your experiences?		
I now want to ask some general questions about your school and how things have been at the school since we last talked 7 months ago: • What has gone on in the school generally since we saw you 7 months ago? • Are there any policy shifts that you are aware of from a national or local point of view? • Is this new term (from Christmas onwards) different from previous years in any way?	If they say all as normal then that is fine. Policy, staffing, change in direction, leadership, more things going on • Has your workload changed? • Has there been a change in staffing within PE or within the senior leadership team?	These questions are to explore the school culture and context that Girls Active is being parachuted into. What characteristics or elements at a school level mean that Girls Active will or will not be successful Want to understand • Has lead teacher's workload changed? • Has there been a change in staffing within PE or within the senior leadership team?

Paraphrase what they have said to summarise the interview so far. Then say that you have a number of questions that have come up over the course of the study. Can we ask you some of these today?

Question/guidance	Probe	Rationale/aim
Some schools will have a lot of children who leave and start new schools. Does this happen at your school? If yes, has it had any impact on Girls Active?	Has there been a turnover of peer leaders? i.e. have they left the school or dropped out? Have you replaced them and, if yes, with whom and how? Do you know what schools they may have gone to?	Probing for issues around delivery or potential sustainability. Peer contamination
Would you say there is a predominant religion at your school? Do religious activities have any impact on: • Whether the girls can stay after school to do after-school Girls Active activities (or do they have to go to faith events)? • Whether the open spaces are available to use for Girls Active or do faith activities use these spaces?		
Have there been any unexpected outcomes?	Unintended consequence. This could be positive or negative but something that you may not have expected Example – bullying	Impact, unintended/unexpected outcomes
How many new teachers left the school in the last 14 months approximately? Can you tell me if these teachers had any involvement in Girls Active	What involvement did they have Has this had any impact of Girls Active delivery? How?	Looking at staff turnover and whether these were involved in Girls Active somehow
Have you heard of This Girl Can campaign? What do you understand this to be?	Have you used their resources? Has it helped with the delivery of Girls Active in any way?	Girls Active seems to rely heavily on This Girl Can campaign. We want to tease out whether the school use This Girl Can in some way
Were you able to exploit any local free offerings or free amenities to help with Girls Active? <example – a local Zumba teacher offers to do a taster session for free> Where did you hear about these offerings? Is there anything else you would have liked to hear about or heard too late?		
One teacher we spoke to raised an issue about the new PE GCSE curriculum. <insert specific details>. What is your view on this? Do you teach GCSE PE? If yes, can you describe how the goals of Girls Active aligns with the new GCSE PE If no, do you have any knowledge of how the goals of Girls Active align with the new GCSE PE?		The general gist is that the new PE GCSE does not include 'fitness' or any of the possible Girls Active activities as an individual activity to count towards their grade/fit the GCSE criteria

Question/guidance	Probe	Rationale/aim
Would you be the lead teacher again?	Probe – overall are you satisfied or dissatisfied with the programme? What points do you like and did not like?	To probe to uncover any negative feeling towards it
Finally, how should we promote our findings? How and where do you usually hear about new information/news and new opportunities?		To help with dissemination
Overall how would you sum up your experience of Girls Active over the past year?		

Appendix 4 Process evaluation: Youth Sport Trust and hub school interview questions

Who	Questions	Preamble

YST – theme lead	1. When we spoke you had just had the peer review day. Talk me through what happened from that point onwards:
	
	• Peer leader day
	• Hub school
	• Development coach
	
	Other parts of the country does a development coach happen? How did they come up with this idea? Has this issue come up in other schools?
	
	2. Can you feed back to us how you feel Girls Active is going so far? Generally and then specifically from a:
	
	• Training perspective
	• Peer review day
	• Hub school support
	  – what are the changes?
	  – why did these changes occur?
	  – impact on Girls Active delivery at the time and now?
	  – impact on Girls Active support offered at the time and now?
	• Within schools themselves
	  – are there some school where it is working/they are interacting better than others? Why?
	3. Any challenges YST are encountering?
	
	• Personnel
	• Delivery
	
	Even if the challenges have been fixed how have they been resolved? What can we learn/what would be done differently?
	
	4. The last time you said *<insert specific details>* about your interaction with the hub school. They are in the middle of the pathway of dissemination. Is this still the case?
	
	5. Now, the other link is the hub to the schools. Hub is the key link in the chain? Interactions, direction? Frequency
	
	6. YST and This Girl Can relationship moving forward – if this was to not be in existence/if it disappeared how do you think it would affect Girls Active?
	
	7. Sustainability – have you received the payment for action plan? If yes, have you spent this money?
	
	8. Information flow, from the schools, the hub and through the team members at the YST?
	
	9. Intentions for the future of Girls Active. Can you tell me what you would take forward in the future and/or do differently in the future?
		Summarise what has gone on before and now we want a catch-up
		
		Get general comments and then ask specifically about 8 and 9
		
		When we spoke last there were challenges about long-term sick but you have adapted/amended. Have there been other challenges or amendments since then?

Who	Questions	Preamble
YST – action plan reviewer	1. Could you describe your role within Girls Active? • Follow-up any areas that are not to do with action plans (use questions from other boxes as appropriate including challenges faced to anything) . . . specifically . . . 2. Would like to focus in now on the action plans – How many of the second round (revised) action plan have you received/reviewed? 3. Have you noticed any substantial differences to the first round? *Have they changed? What types of things? Do you get a sense as to why any changes been made?*	
YST – administrator	1. Could you describe your role within Girls Active? 2. Do you have a sense of that some schools were more engaged simply due to the amount of e-mail contact from them? Do you have a log of contact with schools? 3. Has the e-mail traffic changed at all? 4. Can you describe the pathways of communication between you and the YST team and between you and the lead teachers?	
YST – project manager	1. When we talked to you last you told us *<summarise how far the programme had gone>*. Talk me through what has happened from that point onwards 2. Probe for the purpose/aims of the following and how well they are working. Any challenges or successes. Any changes since last time: • Peer leader day • Hub school • Development coach • Specifically talk about what has gone on from: • Implementation at schools • Hub school support 3. Has there been any further changes to the support the hub are offering since we last spoke *<remind them what was said last time>*? 4. Can you describe how the hub are supporting schools in the last 7 months? 5. Within schools themselves, are there some schools where the support is working better than others. *Why?* 6. Useful to know what challenges you have encountered and what we can learn from that. What, if any, has the YST encountered in implementing Girls Active? 7. We appreciate the evaluation added an extra dimension of complexity to you here at the YST. When you look more broadly at other areas what other challenges have you met there? 8. Have your reviewed any of the second round of action plans? Have you noticed any substantial differences to the first round? *Have they changed? What types of things? Do you get a sense as to why any changes been made?*	We are reasonably familiar with the Girls Active up until the peer review days. Looking at how it has evolved and just start at this point onwards

Who	Questions	Preamble
	9. The last time you told us that *<insert update on the schools contact>*. The schools seem to be moving along since then now that the development coach is in place. How has the contact with the schools been going now?	
	10. Can you tell me about how the YST interacts with the hub school? How has that been going?	
	11. What are your views on where Girls Active should go? If it is to be taken forward what parts would be taken forward? Done differently in the future. Your opinion and your opinion is valuable	
Development coach	1. At that time you described your role as *<insert what she said last time>*. Is that how you would still describe your role? Describe what else you do now?	
	2. Think through all the 10 schools you have been working with. Choose one school and specifically tell me about the role within the school. Now, take a contrasting school and describe your role within it. Are there any other ways it has been differentiated between schools. How the level and type of support may have been different in different schools and what levels and methods of support have been different	
	3. Review of plans. What is your sense of them? Have they changed? How have they played out at schools, have you seen them in action? Have they evolved?	
	4. From your experience what determines the level of time and input at the school. Follow-up: do you feel you are driving it, being proactive or reactive? Who is driving her use of time? Who decided on the level of support that the schools should be given?	
	5. Mixture of personalities? Did you have to have different approaches to different schools? Why might this have been?	
	6. Tell me about the peer leader event. What went on? What was the purpose? What did the teachers get from it, the girls, you?	
	Was this different from the national event? What were the cost implications?	
	7. Pathways of communication?	
	8. What is the other support they might have needed? What would that have looked like?	
Hub school other	1. What is your role within Girls Active?	
	2. Can you describe how much support you yourself have provided to the Girls Active schools over the past 7 months?	
	3. Can you describe any other support you have offered the Girls Active study in general?	
	4. Successes and challenges	
	5. Talk to us about the peer leaders event. Why was that initiated? What were the aims of the event? How did it go and what were the achievements?	

Appendix 5 Process evaluation: peer leader focus group questions

Question	Probe	Rationale for question
Thank you for coming here. You are the experts in what happens at your school and I want to ask you some questions about the Girls Active project that has been happening here over the last 14 months. As you are a *<insert name of the peer leaders at that school>* it is really important to us to find out what you have been up to with Girls Active and how you have found it		
Tell me what Girls Active is about at your school? What was Girls Active trying to do?	If they speak about the evaluation days probe about the actual programme	General overview of Girls Active
How did you become a *<insert name of the peer leaders at that school>* at your school?	Follow-up with: what were your reasons for (1) wanting to be involved (if they volunteered) or (2) agreeing to be involved (if they were nominated/asked/told)	To understand whether the pupil was actively interested in getting involved or whether they were approached by someone else (i.e. a PE teacher) and may not be as committed from the outset
After you became a *<insert name of the peer leaders at that school>*, did you get any training or help from teachers for example?	Can you describe this training? Did this training/help prepare you enough to be a *<insert name of the peer leaders at that school>*? What were you told about the role of a peer leader? Responsibilities/expectations?	
Can you tell me what the *<insert name of the peer leaders at that school>* have been doing at your school?	Explore how the various steps and activities came about, help and support they got, etc.	Understanding what they actually did once they were recruited. Mapping of Girls Active at the school level
Now that we have an overview of what went on, what impact do you think these activities had on other girls in your school?	What seemed to work well? What was more challenging? For example, what type of activities? Did anyone tell you about being active? Did your friends become more active?	Perceived impact
What did you like most about being a peer leader? What did you like least?		
Did you participate in any Girls Active activities during the course of the project?	If yes can you tell about what you did?	Reach, engagement?
What did the other people in your year think about your role as a peer leader?	Did you get any praise/compliments from others? Did anybody say anything negative to you?	Impact positive or negative

Question	Probe	Rationale for question
I now want to ask you about some other skills you may get from being a leader. As a result of being a *<peer leader>* can you describe how, if at all, have the following have changed	That is, increased a lot, increased a bit, stayed the same, decreased a bit, decreased a lot	
• Your confidence in leading and influencing your peers or other young people • Your confidence in delivering physical activities for young people of all abilities (including those with disabilities or special educational needs) • Your confidence to influence others to be physically active for life		
Have you heard of This Girl Can campaign? What do you understand this to be?		Girls Active seems to rely heavily on This Girl Can campaign
Would you be a *<peer leader>* again? Why/why not?		
Finally, when we finish our research study we want to let other schools, young people, etc. know about the findings – do you have any ideas on how we could do this?	How and where do you usually hear about physical activity, sport and health information?	To help with dissemination!

Appendix 6 Process evaluation: subgroup focus group questions

Question	Probe	Rationale for question
Thank you for coming here. You are experts in what happens at your school and I want to ask you some questions about a physical activity and PE project that has been happening here at your school over the last 14 months		
1. Have you heard of Girls Active? <Or alternative name used by the school> <add some specific examples from their school> 1a. If **no**, generally, what goes on in girls PE/PA/sport in your school?	If they have heard about Girls Active then be sure to probe if they mention any specific activities here ask . . . tell me about some of those activities you have mentioned? What they you think are they trying to achieve with the girls? *If they don't mention specific activities Then go directly to Q2 and there will be an opportunity to get details on specific activities further on in Q6* If **no,** ask question 1a. Probe with . . . do the girls do the same activities as boys? What kinds of activities do girls get to do in PE, at lunchtimes, after school? Are there any special activities that are new, any clubs, anything else? *<Then give some Girls Active examples specifically from their school that might trigger them>* If they mention any specific activities here ask . . . tell me about some of those activities you have mentioned? What they you think are they trying to achieve with the girls?	Awareness of Girls Active
2. Can you describe Girls Active at your school. What have you heard? What has been going on?	Be clear that it is not the evaluation days/wearing watches. Probe about the actual programme	Awareness of Girls Active
3. What do you think Girls Active is trying to do?	Probe about what they think the programme is trying to do specifically for girls and their PA/PE/sport?	Understanding of Girls Active
4. Are there any changes to girls' PE, sport or PA provision, facilities or rules since the start of the school year i.e. last September time that you have noticed? *OR* What have you noticed going on in girls' physical activity/sport provision in your school in this school year? Can you tell me about anything else that your school has done in the past year to promote girls physical activity and sport?	Provision means the amount of things that are going on for girls to do or the amount of equipment that is available Have you noticed any extra sessions being put on, questionnaires, girls wearing hoodies, changes to facilities or changes to anything in PE? Probe again around what do you think these activities are trying to do for girls?	NOTE: students may see each individual year as completely separate. So just because they are getting Zumba in October Year 8 just means that they get Zumba in Year 8. They may have no idea that they last group of girls in Year 8 did not get Zumba in Year 8. Allow participant to describe what is going on in general rather than just changes

Question	Probe	Rationale for question
5. Have you heard of *<insert name of the peer leaders at that school>*	If no, have you noticed hoodies or t-shirts *(bring a photo of the t-shirt)* *If still no go straight to Q12*	Awareness of the peer leaders
6. Can you tell me what you think/know they have been doing at your school?	Have they affected you in any way?	Awareness of what the peer leaders do
7. Have the *<peer leaders>* influenced you to do anything different?	Is this why you got involved with some of the activities? Motivations? Messages?	
8. Were the *<insert name of the peer leaders at that school>* helpful?	Did they tell you about being active? Did they encourage you to be more active? How? What sort of things did they do? Did they encourage you to take part in different things?	
9. Is anyone here actually good friends with one of the *<insert name of the peer leaders at that school>*? If **yes**, what has your friend been doing/what has she told you? Is she active? Does she think being active is important? Do you do many activities together? Had she influenced you to do anything different? Describe whether she motivates you in any way What are the good and bad bits about having a friend as a *<peer leader>*?	Good friends may mean being in your top five list of best friends Is this why you got involved with some of the activities? Probe about whether they do activities at the school, as part of Girls Active or things outside school	Earlier we asked about what the peer leaders have been doing and how they have influenced the wider KS3 group. But now we want to find out whether anything different is going on if you have a peer leader as a friend (rather than just a general peer)
10. Have you taken part in any activities that were specifically related to Girls Active?	Why did you choose to do them? Were any of these totally new to you up until this year?	Effectiveness, motivations for getting involved
11. What has been the impact, if any, of Girls Active on girls PE and sport?	Probe for positives and negatives Examples – do you get new equipment? New activities? Less time in the gym? Teacher does less with the very sporty girls now?	Impact positive or negative
12. Have you heard of This Girl Can campaign? What is it all about?	Has it made you think about being active? Encouraged you to do any activity that you would not otherwise had done?	Girls Active seems to rely heavily on This Girl Can campaign

Appendix 7 Process evaluation: boys' focus group questions

Question	Probe	Rationale for question
Thank you for coming here. You are experts in what happens at your school and I want to ask you some questions about a physical activity and PE project that has been happening here at your school over the last 14 months		
1. Have you heard of Girls Active? *<or alternative name used by the school>* *<add some specific examples from their school>* 1a. If **no**, generally, what goes on in girls PE/PA/sport in your school?	If they have heard about Girls Active then be sure to probe if they mention any specific activities here ask . . . tell me about some of those activities you have mentioned? What they you think are they trying to achieve with the girls? *If they don't mention specific activities Then go directly to Q2 and there will be an opportunity to get details on specific activities further on in Q6* If **no,** ask question 1a. Probe with . . . do the girls do the same activities as boys? What activities do the girls get to do that boys do not? *<Then give some Girls Active examples specifically from their school that might trigger them>* If they mention any specific activities here ask . . . tell me about some of those activities you have mentioned? What they you think are they trying to achieve with the girls?	Awareness of Girls Active
2. What do know about Girls Active?	Be clear that it is not the evaluation days/wearing watches Do you know anything more about it? How did you hear about Girls Active and what is going on? Probe for getting information through the peer leaders, other girls, the PE teacher, posters in the school	Awareness of Girls Active
3. What do you think Girls Active is trying to do?	Probe about what they think the programme is trying to do specifically for girls and their PA/PE/sport?	Understanding of Girls Active
4. Have you heard of *<insert name of the peer leaders at that school>*	If no, have you noticed hoodies or t-shirts *(bring a photo of the t-shirt)* *If still no, end the activity*	Awareness of the peer leaders
5. Can you tell me what you think they have been doing at your school?	Have they affected you in any way?	Awareness of their activities

Question	Probe	Rationale for question
6. Are there any other changes to girls' PE, sport or PA provision, facilities or rules since the start of the school year i.e. last September time' that you have noticed? OR What have you noticed going on in girls' physical activity/sport provision in your school in this school year?	Provision means the amount of things that are going on for girls to do or the amount of equipment that is available Have you noticed any extra sessions being put on, questionnaires, girls wearing hoodies, changes to facilities or changes to anything in PE? Probe again around what do you think these activities are trying to do for girls?	Awareness of Girls Active offerings NOTE: students may see each individual year as something completely separate. So just because the boys see Year 8 girls doing Zumba in October Year 8 just means that the girls get Zumba in Year 8. They may have no idea that they last group of girls in Year 8 did not get Zumba in Year 8. Allow participant to describe what is going on in general rather than just changes
7. What has been the impact, if any, on boys' PE and sport because of Girls Active?	Probe for positives and negatives Examples – do you get new equipment? New activities? Less time in the gym? Teacher does less with the boys now?	Impact positive or negative
8. You have told us about <list the items>. Is there anything that you have seen happening that you would like to do?		What do they think is going on at their school and do they want it too?

Appendix 8 Teacher feedback from initial training day

TABLE 33 Teacher ratings for each of the sessions delivered within the training

	Rating (%)			
Sessions	**Poor**	**Satisfactory**	**Good**	**Excellent**
Why PE and sport for adolescent girls – the challenges and principles	0	0	57	43
Analysing PE and sport for girls, considering motivations	0	0	57	43
Marketing PE and sport for girls	0	0	57	43
Resources and support for the pilot project	0	0	57	43
Girls Active self review and action-planning	0	0	71	29
Girls Active process, evaluation and next steps	0	0	57	43

TABLE 34 Teacher ratings for how well the training objectives had been met

	Rating (%)		
Training objectives	**Not met**	**Partially met**	**Fully met**
To support delegates to explore their role and effectiveness in engaging girls in PE and sport in school	0	29	71
To challenge delegates to consider the motivations of girls	0	0	100
To help delegates to look at how a marketing approach can develop girls' participation	0	0	100
To enable delegates to review a range of case studies and support resources	0	14	86
To provide delegates with the opportunity to share and develop practice with their peers	0	14	86
To challenge delegates to develop an action plan to deliver on the Girls Active principles	0	0	100

Appendix 9 Teacher feedback from peer review day

TABLE 35 Teacher ratings for peer review event (1)

Statement	Rating (%)			
	To a great extent	To some extent	To a little extent	To no extent
I have gained new knowledge related to the provision of PE, PA or sport for girls in my school	86	14	0	0
I have improved my skills to help me undertake my role more effectively	71	29	0	0
I have been inspired and motivated to improve the delivery of PE, PA or sport for girls in my school	86	14	0	0
Do you feel supported by the Girls Active delivery team?	100	0	0	0
Do you feel clear on your next steps?	86	14	0	0
Are you in a position to take action?	71	29	0	0

TABLE 36 Teacher ratings for peer review event (2)

Statement	Rating (%)				
	Very good	Good	Average	Poor	Very poor
Supporting information and details sent in advance	57	43	0	0	0
Venue	43	57	0	0	0
Deliverers	86	14	0	0	0
Format of delivery	86	14	0	0	0
Pace of delivery	86	14	0	0	0
Meeting your needs	86	14	0	0	0
Overall, how would you rate your experience of the peer review workshop?	86	14	0	0	0

Appendix 10 Peer leader feedback from peer leader event

TABLE 37 Ratings for the peer leader day by the girls (1)

Statement	Rating (%)			
	To a great extent	To some extent	To a little extent	To no extent
I have a better understanding of the Girls Active programme . . .	45	55	0	0
I have a better understanding of what motivates girls . . .	36	55	7	2
I have a better understanding of the benefits . . .	64	32	4	0
I have gained new ideas to help me . . .	36	59	5	0
I have improved my skills to help me . . .	45	50	5	0
I have been inspired and motivated to encourage . . .	41	52	7	0
I have gained more confidence to influence . . .	48	45	5	2
Do you feel clear on your next steps?	42	51	7	0
Are you in a position to take action?	44	53	3	0
Do you feel supported by your teachers?	80	20	0	0

TABLE 38 Ratings for the peer leader day by the girls (2)

How would you rate the following aspects of the Girls Active leaders event?	Rating (%)			
	Very good	Good	Average	Poor
Venue	67	27	6	0
Instructors	65	33	2	0
Format of delivery	48	44	8	0
Pace of delivery	52	38	8	2
Meeting your needs	50	42	8	0
Overall, how would you rate your experience of the event?	57	41	2	0

# Appendix 11　Action plan and funding timeline for each intervention school

TABLE 39　Timings of action plan submission and receipt of capacity funding for each school

School	Action plan 1	Funding instalment 1	Action plan 2	Funding instalment 2
1	December 2015	December 2015	April 2016	May 2016
2	May 2015	July 2015	December 2015	January 2016
3	November 2015	May 2016	April 2016	May 2016
4	December 2015	December 2015	December 2015	January 2016
5	December 2015	January 2016	December 2015	January 2016
6	June 2015	July 2015	January 2016	May 2016
7	June 2015	July 2015	December 2015	January 2016
8	June 2015	July 2015	April 2016	May 2016
9	June 2015	July 2015	January 2016	January 2016
10	June 2015	July 2015	December 2015	January 2016

Appendix 12 Scores in the exit questionnaire on participant opinions of Girls Active

TABLE 40 Participant opinions on aspects of Girls Active

Aspect of Girls Active	Rating (%)					
	Disagree a lot	**Disagree a little**	**Neither agree nor disagree**	**Agree a little**	**Agree a lot**	**Missing (%)**
The peer leaders encouraged me to take part in Girls Active	9.6	11.1	28.4	31.0	7.3	12.6
The peer leaders listened to me and my ideas during Girls Active	11.9	8.0	38.3	18.4	7.3	16.1
The teachers encouraged me to take part in Girls Active	8.8	8.4	28.7	28.4	12.6	13.0
The teachers listened to me and my ideas during Girls Active	11.1	10.7	36.4	18.8	8.8	14.2
During the last school year I have increased the amount of physical activity I do	7.7	8.4	22.2	33.0	15.3	13.4
The teachers asked me (maybe directly or using a questionnaire or a comment box) what sorts of physical activity I would like to do	10.7	10.3	29.5	25.7	10.0	13.8
The teachers asked me (maybe directly or using a questionnaire or a comment box) what changes could be made at school to help me be active	11.5	9.6	32.6	24.9	8.4	13.0
The teachers listened to my views and opinions	10.7	13.4	30.7	23.4	8.0	13.8
Physical activity options for girls have improved during the last school year	8.0	9.6	31.8	26.8	10.3	13.4
There is more choice for me for what physical activities I would like to do in the last year	8.8	9.2	31.0	26.1	10.7	14.2
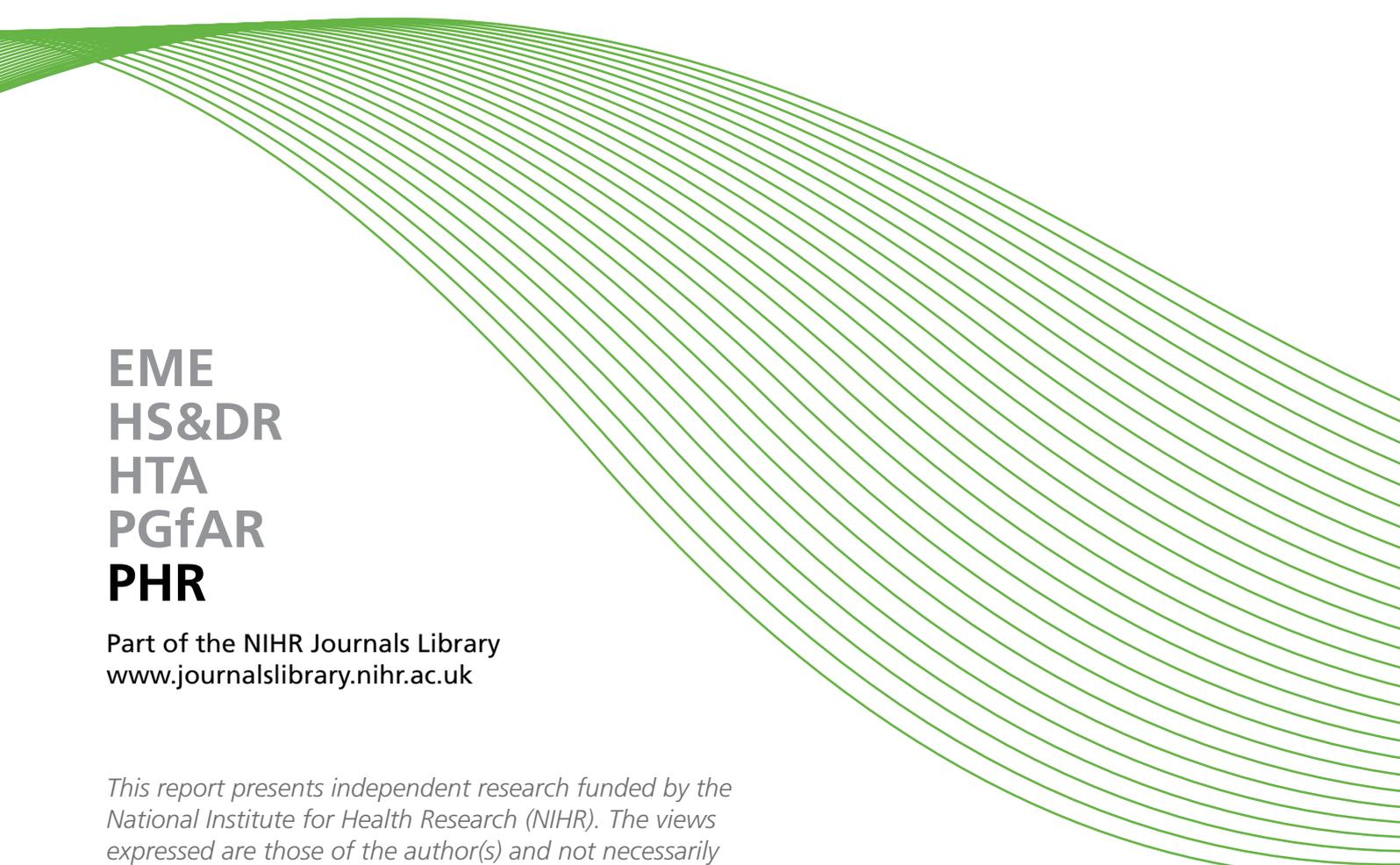
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