



[Clark, J.](#), and [Kearns, A.](#) (2015) Pathways to physical activity legacy: assessing the regeneration potential of multi-sport events using a prospective approach. *Local Economy*, 30(8), pp. 888-909. (doi:[10.1177/0269094215601993](https://doi.org/10.1177/0269094215601993))

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Deposited on: 16 July 2015

Pathways to physical activity legacy: assessing the regeneration potential of multi-sport events using a prospective approach.

Abstract

Urban regeneration is now commonly cited as the rationale for hosting multi-sport events. However, the concept of legacy arising from these events is contested and the evidence base in relation to benefits for the host community is weak, especially in respect of increasing physical activity and sports participation. A theory-based assessment framework is developed to provide a robust prospective assessment of the likely impacts of the Glasgow 2014 Commonwealth Games on physical activity for the host community in the East End of the city. We identify scope for change, anticipated causal pathways and propose supporting physical activity through better designed environments as a means of generating legacy benefits at population level.

Keywords

Urban regeneration, renewal, physical activity, Commonwealth Games, legacy, multi-sport events, policy.

Introduction

Regeneration strategies come in many guises - relating to housing, economic cluster-development, culture, and sport, amongst others - and have become a commonplace in response to urban decline (Leary and McCarthy, 2013; Tallon, 2010). Like many other post-industrial cities, Glasgow, Scotland has striven to manage a falling population and the challenge of transitioning from a manufacturing base towards the service sector. However, despite some justifiable pride in its status as 'a city that continues to reinvent itself', Glasgow also continues to struggle with greater rates of deprivation than other Scottish cities: Scottish Index of Multiple Deprivation (SIMD) data for 2012 shows that, of the 15% most deprived administrative datazones in Scotland, over one third fall within the Glasgow city boundary (SG, 2012).

In 2007 Glasgow was awarded the 2014 Commonwealth Games (CWG) and, independently, the Clyde Gateway Urban Regeneration Company was established, with a twenty year remit to achieve 'physical, economic and social change' across 840 hectares of the East End of Glasgow and neighbouring South Lanarkshire. Within this context, parts of the East End have undergone change at a rate and intensity outstripping that in the city's other designated transformational regeneration areas. One anticipated outcome from this CWG-related regeneration is that people will become more physically active. However, there is a lack of robust evidence connecting multi-sport events with positive health outcomes (McCartney et al., 2010, 2013; Weed, 2009). Alongside the equity imperative to assess whether those most disrupted by the Games are likely to derive benefits from the event, the apparent discrepancy between policy commitments to support physical activity and the evidence base demonstrates the importance of designing a robust assessment framework which can accommodate a holistic conception of legacy. This paper sets out a prospective assessment of how this period of concentrated investment might impact on the planned physical activity 'legacy' of the CWG for the host community, in the East End of the city.

Multi-Sport Events, Legacy and Physical Activity

Legacy research is relatively new academic field (Gold and Gold, 2008; Preuss, 2007), which has yielded insight into the object, nature and function of an expanding concept. . From six legacy domains, proposed at an International Olympic Committee (IOC) symposium in 2003, at least seven more have been identified latterly, including 'social issues', such as health (Cashman, 2003; Leopky and Parent, 2011). Notably, economic outcomes, rather than health, have been the predominant object of legacy claims (McCartney et al., 2010).

Securing co-operation between multiple actors is a critical requirement of preparing a multi-sports event bid (Parent and Smith-Swan, 2014) and the imprecise nature of the term 'legacy' can facilitate the building of alliances between groups with potentially divergent agendas. However, this scope for multiple interpretation has also been described as 'dangerous', particularly if legacy is considered as a 'bequest', implying benefit (2003: 33). Given institutional demands and the propensity of event organisers to stress positive outcomes, the scope for negative legacy arising from multi-sport events is often neglected, in both planning and evaluation (Mangan and Dyreson, 2009). Beyond different stakeholder groups having different legacy priorities (Smith, 2012), there is necessarily a positionality in evaluating legacy outcomes. Preuss (2007) highlights the scope for tension between objectives under different legacy domains, such as tourism and the environment. Furthermore, there are temporal considerations about where to begin

and end legacy evaluation if legacy is accepted as 'all planned and unplanned, positive and negative, tangible and intangible structures created for and by a sport event that remain longer than the event itself' Preuss (2007: 211).

Functionally, legacy serves both putative host cities and the event awarding body. It demonstrates the value of the event, justifying public expenditure and infrastructure development, supports future events by motivating potential bidders, and diverts criticism from the awarding body (Chalip, 2000; Gratton and Preuss, 2008). In 2002 the Olympic Charter was amended, institutionalising a requirement to consider legacy as part of the bidding process by planning a positive legacy for the host city, and country (IOC, 2003). This obligation can be seen as a response to the trend towards gigantism in multi-sport events, with increasing levels of expenditure and the possibility of unsustainable 'white elephant' infrastructure remaining (Gold and Gold, 2007). Although modest in relation to the £8.8bn budget of the London Olympics, the £575m cost of staging the CWG is still considerable. Nevertheless, considering that the scale of multi-sport events necessitates substantial urban modifications (Davies, 2012) there remains an element of circularity in the function of legacy: the changes required by the event also provide the rationale for hosting it.

Sports participation has been theorised as one of seven critical pathways linking multi-sport events and health (McCartney et al., 2013). This pathway comprised four routes: sports participation programmes; provision of new infrastructure; sports role models; and festivities and culture of sports participation (McCartney et al., 2013: 29). The authors associated the 'sporting role model' and 'festivities and culture' routes with the 'demonstration' and 'festival' effects respectively (see Weed et al., 2009). The demonstration effect is '*a process by which people are inspired by elite sport, sports people or sports events to participate themselves*' (Weed, 2009: 4). The festival effect draws on Chalip's (2006) conception of 'communitas' as a factor encouraging increased participation in informal activity through the desire to be part of a shared event, especially '*if the event is perceived to be bigger than and beyond sport*' (Weed et al., 2009: 10). Thus, the festival effect includes involvement with physical activity via initiatives relating to the multi-sport event, such as volunteering or community engagement. The 'festival effect' has been assessed as the most likely pathway for increasing physical activity in the least active members of the population (Weed et al., 2009). Notably this may be at the level of the very early stages of behavioural change, such as a shift to *contemplating* physical activity. These effects can be considered as a development of the transtheoretical stages of change model, which uses the concept of readiness for behavioural change as a means of designing and supporting interventions (Prochaska and Velicer, 1997). As well as stage-matching participants to interventions, the Active Celebration approach, designed for the London 2012 Olympics, sought to value-match participants to programmes, tailoring programmes to different population subgroups using a range of demonstration- and festival-based strategies (Mansfield et al., 2010; SPEAR, 2010).

However, achieving sustained behavioural change in relation to physical activity is notoriously challenging and the evidence base relating multi-sport events to improved participation in physical activity is weak (CMSC, 2007; McCartney et al., 2010). The role of multi-sport events in relation to the immediate host community is particularly contentious, and concern over the lack of benefit to poorer communities around venues has been clearly articulated (Lenskyj, 2002; Gray and Mooney, 2011; Paton et al., 2012; Porter et al., 2009). A Scottish Government consultation about the 2014 CWG raised concerns from health organisations around the issue of health inequalities, including the possibility that inequalities might grow without targeting towards more vulnerable groups

(HRC/ACC, 2008). The possibility that the CWG might increase health equalities has been echoed in later work, alongside the observation that the new Sir Chris Hoy Velodrome would most likely benefit existing and elite sports participants (McCartney et al., 2013). Reviewing the MORI analysis of sporting participation following the Manchester 2002 Commonwealth Games, McCartney et al. (2010) note that, as well as a 2% decrease in overall sports participation (at a level of four or more times in the preceding four weeks), there was a significant increase in inequalities in participation between deprived and more affluent areas. Similarly, despite evidence of a significant increase in the number of people participating in sport following the London 2012 Olympics, there was no overall increase in physical activity, and uptake was greatest for managerial and professional people (Sport England, 2014). At the same time, Newham, one of the Olympic host boroughs, has the highest levels of inactivity in England, post-Games (UKActive, 2014).

Study Area

The Glasgow CWG were scheduled over 12 days in July-August 2014, with around one million tickets for 261 events across 17 different sports. An accompanying cultural programme comprised 'Culture 2014' celebrations across Scotland in the year leading up to the CWG, and 'Festival 2014' activities in Glasgow at Games time. Although venues across and beyond the city hosted events, the most concentrated centre of activity was in the relatively impoverished East End of Glasgow. The city's candidature file, submitted to the Commonwealth Games Federation (CWGF) in May 2007, contained a chapter on the theme of cultivating local support. Accordingly, local and central government emphasised benefits to the East End of the city, which is home to some of Glasgow's most disadvantaged communities. Both the Scottish Government and Glasgow City Council identified physical activity as a legacy 'theme' under which they expect programmes to have impact.

The core geography of the study area is specified as approximately one third the size of the city's East End and closely matches the boundaries of Glasgow City Council's East End Local Development Strategy Area (GCC, 2008). This area includes the main new Games venues (the Emirates Arena and Sir Chris Hoy Velodrome) and the site of the Athletes Village. It has the new International Hockey Centre at the western end and the recently extended Tollcross International Swimming Centre to the east (Figure 1). Twenty-one of the area's twenty-seven datazones are in the most deprived 15% in Scotland, with a further four in the most deprived quartile; the remaining two datazones are in the middle and second least deprived quintiles (SG, 2012). In 2012, the study area comprised 623 hectares, around 11,000 dwellings and a population of nearly 19,000 living in six communities: Bridgeton, Calton, Camlachie, Dalrnarnock, Gallowgate and Parkhead (Figure 2).

[Figure 1 here]

[Figure 2 here]

Methods and Assessment

The methodological approach draws on theory-based evaluation, which is particularly useful for complex interventions involving multiple, interacting components, actors and objectives (MRC, 2008). A framework designed to assess legacy impacts (Table 1) incorporates programme context, theorised mechanisms and outcomes, in order to provide insight into what works, for whom and under what circumstances (Kazi, 2000; Pawson and Tilley, 1997). Programmes and intended outcomes are assessed in respect of being

plausible, feasible and testable (Connell and Kubisch, 1998). Furthermore, along with primary and secondary outcome data, process information contributes to a realistic assessment (MacKenzie and Blamey 2005).

The mixed methods research design helps achieve a holistic understanding of intervention context, theorised mechanisms, delivery process, and evidence of achieved or potential outcomes. The main primary data source for the prospective assessment is the 2012 GoWell East baseline community survey. This is a longitudinal cohort household survey of 1,105 adults, who are to be re-interviewed following the Commonwealth Games in 2014, and again in 2016 to assess medium term impacts of changes and events around the Games (see Clark and Kearns, 2013). Primary data relating to young people and physical activity comes from the GoWell East 2013 longitudinal cohort study of physical activity among secondary school pupils in Glasgow. In 2013, 740 Secondary 1 pupils (S1) (11-12 years old) completed the Youth Physical Activity Questionnaire (YPAQ) survey across six schools, including two in the East End (see Clark and Kearns, 2014).

[Table 1 here]

The assessment also draws on qualitative data collected for GoWell East in both formal and informal settings. Qualitative data collected in formal settings included the following: semi-structured in-depth interviews with residents living near the main Games site (n=21); semi-structured interviews with staff in six schools (n=11); two workshops with policy-makers and practitioners (n=45); individual and group discussions with staff at key Games deliver organisations (n=10); four community feedback sessions (n= approx. 120 participants in total); feedback sessions to four stakeholder delivery and evaluation committees (n=approx. 50 participants in total). Some of these interactions were recorded and data transcribed; for others, notes of proceedings were taken. In addition, informal discussions took place during the course of the research with residents in seven local settings, and with staff in five of the schools.

The final element of the assessment involved analysing secondary administrative data and policy documents. Secondary data was of three kinds and from various sources: overall legacy progress monitoring data from Scottish Government and Glasgow City Council; venue usage data from Glasgow Life and Event Scotland; and legacy project awards data from three organisations (sportscotland, Big Lottery and Creative Scotland). Eight policy documents were analysed in three groups: Scottish Government Legacy Programmes framework, Games evaluation report, and physical activity strategy; Glasgow City Council's Legacy Framework and progress reports; and reports from organisations responsible for managing the Games and physical activity venues - Glasgow Life annual review and sportscotland Active Places guidelines.

Causality is always a challenging issue with complex interventions (Mayne, 2011), exacerbated in this case by preparations for the Games taking place alongside an extensive urban regeneration programme. The prospective approach avoids the issue of post-hoc rationalisation, which has been a concern with much early evaluation of multi-sport events, and strengthens any future attribution claims (McCartney et al., 2010; Preuss, 2007). Furthermore, prospective assessment allows for monitoring programmes as they unfold, offering greater insight into the role of social relations and wider context in programme delivery (Marchal et al., 2012). Recognising the multi-dimensional nature of legacy, the research design integrates qualitative and quantitative data from a range of sources, to combine insights from multiple perspectives and capture evidence of barriers to impact, and negative or unintended effects. Finally, theory-based evaluation

illuminates the circumstances under which particular interventions may or may not function successfully, increasing the policy-relevance and transferability of the analysis.

People and place: health and wellbeing in the East End study area

This section reviews survey data on the health and wellbeing of the host population, considering scope and appetite for change, alongside barriers to impact. Considerable scope for impact from 'Active' legacy initiatives was found with a third of people over forty years old and 17% of the whole overall describing their general health as 'poor'. A third of the cohort had concerns with mental health, having consulted a GP or other health practitioner in the last twelve months about feeling stressed, anxious or depressed (29% men; 37% women). Moreover, 45% of participants reported having a longstanding illness, disability or infirmity; for those in social rented housing, this figure was 54%. However, there is limited readiness for behavioural change: around a quarter of both men and women took no exercise and were not considering starting (Figure 3).

[Figure 3 here]

Committed, regular exercisers were a minority in the study cohort. Men were significantly more likely than women to be regular exercisers (39% men against 28% women), although women in the non-exercising group were more likely to be considering exercise (18% women against 15% men). When asked about participation in sports and other physical activities, such as dancing, cycling and rambling (see Clark and Kearns, 2013), 58% of interviewees had done at least one activity in the preceding four weeks. Perceived barriers to participation were analysed by 'active' (the 58% who had participated in at least one activity) and 'inactive' groups (non-participants) (Table 2).

[Table 2 here]

The relatively active group were constrained by time (47%), cost of participation (22%) and, less frequently, concerns about their health not being good enough or having no-one to do it with (both 12%), not enough information or lack of interest (both 10%). The predominant barrier perceived by the inactive group was concern about health (49%), followed by time and lack of interest. Less frequently cited for this group were cost (11%), feeling out of place (9%) or having no-one to do it with (8%).

Physical activity, including sports participation, can have a role supporting general health and mental wellbeing, reducing anxiety and depression and limiting the damage done by long periods sitting (Biddle and Asare, 2011; Owiti and Bhui, 2012; Ströhle, 2009). However, the level of poor health in the study area, along with the fact that poor mental health may act as a barrier to taking up opportunities for participation, act as constraints upon potential programme impact. Additionally, that 19% of the cohort was over 65 years old and exercise levels fall with age has implications for targeting physical activity interventions. For infrequent or non-exercisers, initiatives which provide support and reassurance about appropriate levels of exertion might be particularly important. For those already active, encouragement to take exercise in a way which does not require access to facilities with restricted opening hours may be a beneficial approach.

Physical activity legacy: programmes and plausibility

The core phase of the evaluation is based on detailed examination of policy documents, engagement with key policy stakeholders and media monitoring, to identify legacy programmes intended to support physical activity and categorise the pathways through

which they were intended to operate. This section offers a brief overview of these programmes and an overall assessment of the plausibility of each pathway in relation to the host community.

A total of 39 legacy programmes relevant to a physical activity legacy were identified from 138 reviewed. Primarily these were drawn from the Scottish Government and Glasgow City Council 'Active' themes but additional projects, which may also have a bearing on physical activity in the host community, were also included.

Physical activity programmes were classified according to the pathways through which they are intended to impact, distinguishing four main pathways:

- Sports facilities: relating to investment in new and improved sports and leisure facilities, so that people have the opportunity to take more exercise.
- Social infrastructure: the development of social infrastructure through sports clubs, events, coaching and volunteering in order to stimulate grassroots participation in sport.
- Schools: programmes which involve schools in order to promote greater levels of physical activity for children.
- Environment: programmes which aim to support physical activity and active travel through better-designed environments.

The extent to which legacy programmes were attributed to the CWG was assessed through stakeholder consultation: wholly; partially (enhanced, safeguarded or accelerated; and not attributed (ongoing) (Table 3). There was a tendency during consultation for stakeholders to increasingly identify programmes as partially attributable to the CWG rather than merely ongoing: these attributions are reflected in Table 3 but are not always something we were able to satisfactorily verify. The framework was then applied to explore the potential impacts of the pathways in relation to the study area and its residents.

[Table 3 here]

Pathway One: Sports Facilities

This pathway relates to investment in new and improved sports and leisure facilities so that people have the opportunity to take more exercise. The Scottish Government and Glasgow City Council jointly supported seven major sports infrastructure projects around the city, with £140.9m investment in three of the most significant sites either within or bordering the study area: the Emirates Arena and Sir Chris Hoy Velodrome; Tollcross International Swimming Centre; and the Glasgow Green National Hockey Centre. There was effective project delivery, with the new and improved venues open for public use at least a year ahead of the CWG and rapidly reopened (within 22 days of the closing ceremony) after Games time.

However, the community survey demonstrates the limited relevance of these investments to those living around the area. We found significant differences in rates of sports participation between different population groups. Rates of regular participation drop with age (Figure 4). Also of great concern, people with long-standing illnesses (LSI) are significantly less likely to use sports facilities (Figures 5 and 6). Without targeting and additional support, it is doubtful that the facilities pathway will prove effective means of supporting physical activity for these groups.

[Figure 4 here]

[Figure 5 here]

[Figure 6 here]

There is considerable scepticism around the demonstration effect (Lyle, 2009). Nevertheless, mega-sports events have been associated with increased participation frequency in people already involved in sport, and the re-engagement of 'lapsed' participants.(Weed, 2009). However, even for already or previously active participants there may be activity switching rather than an increase in activity, and the 'competence gap', between athlete and layperson performance can also be a deterrent to physical activity in some cases (Weed et al., 2009). In the case of the 2014 Games, Glasgow Life is responsible for the management of the new facilities, which are run as normal 'Glasgow Club' amenities. Glasgow Life is a limited company with charitable status, set up by the local authority to operate a network of leisure services throughout the city. That these sites were established well before the CWG and reopened rapidly afterwards should benefit both new and returning participants (Cox, 2013), further establishing facilities as normal city venues. Integrating these facilities into a pre-existing framework, appropriate to the needs of the city, should also underpin the long term sustainability of the venues (Smith, 2012).

However, the value of venues to the local community is a subject of contention and concern (McCartney et al., 2013; Paton et al., 2010). In 2012, 41% of survey participants said that they intended to use a facility linked to the CWG. In the year before the CWG, attendances at Glasgow Life sports facilities overall increased by 5% with attendances at the Emirates Arena and the Velodrome growing towards the CWG (EKOS 2014; Glasgow Life, 2014). How this might translate into increasing physical activity levels in the host community is, however, another issue. There is some indication that local residents have taken up memberships at a higher rate around the new amenities than in other areas across the city. The Glasgow Club has 12.0% membership across the city overall; using postcode data, the membership rate around the Emirates and Tollcross stands at 13.9% and 13.8% respectively (EKOS, 2014). However, this is also indicative of a serious constraint: only a small minority of people have Glasgow Life membership and most people in the area do not use gyms. Furthermore, although concessionary discounts (around 30%) are available to people in a wide range categories, direct debit is the most cost-effective way of participating. At prices from £23 per month for a one year membership, these are sums which may be beyond the reach of many households in the study cohort. Additionally, for those who use the new facilities, there is an element of tension in that the venues continue to be used for competition events. Although this secures the future of the facilities, venue space is not availability to the public at all times. Considering the importance of establishing habits in taking exercise, having only intermittent use of amenities is problematic.

Pathway Two: Social Infrastructure

This pathway includes the largest suite of interventions, although with modest investment levels compared to the sports facilities pathway. The pathway concerns the development of social infrastructure through sports clubs, events, coaching and volunteering in order to stimulate grassroots participation in sport. Eighteen programmes are categorised into: community participation; training and coaching support; club development and support;

and event-based activities. The number and orientation of social infrastructure programmes demonstrates a focus on mass participation, including interventions geared towards people at different life stages or facing additional challenges. Overall, policymakers identify the majority of programmes as either wholly or partly attributable to the CWG, suggesting additionality from the event. With the exception of a minority of programmes, including those where funding allocations are not yet complete, we have identified known or potential benefits in the host community. Although programmes are not specifically targeting at the East End, the additional Glasgow Life amenities in the area (through which some initiatives are delivered) increase the availability of social infrastructure support.

Given the limited appeal of sports infrastructure to important groups, the emphasis on community participation (9 programmes) and demographic targeting of initiatives is appropriate. The pathway includes programmes for disadvantaged young people or working age adults, as well as older people, and those with long-term health conditions (e.g. *Street Soccer*, *BIG 2014 Communities* support and Glasgow Life *Good Move* programmes for older adults). From the event-based programmes, *Games for Scotland* and *Get Scotland Dancing* have provided additional community events; dancing is a popular activity in the study area and a relatively female-friendly activity. The *training and coaching support* and *club development and support* programmes predominantly represent programmes attributed to the CWG by policymakers, although the Local Authority has supported similar programmes for many years. The new Core Coach Programme has been particularly successful, providing an additional 15,300 hours of coaching support in community clubs.

Collectively the social infrastructure programmes indicate an understanding that bricks and mortar amenities alone are not sufficient to generate population-level change in physical activity. Insofar as the CWG communicate sport and physical activity as positive social values (Smith, 2012), strengthening social infrastructure could increase opportunity, incentive and positive reinforcement around participation. The relatively large number of legacy plans relating to social infrastructure is encouraging, considering the role of grass-roots community engagement and the presence of community programmes in supporting demonstration or festival effects (Kemlo and Owe, 2014; Weed et al., 2009). This range is particularly significant, since a focus on elite sport can lead to the underfunding of child participation and adult recreational activities; it is with this in mind that Crawford (2009) stresses the importance of securing and strengthening funding for sports participation at community level.

The amount of pre-Games legacy planning for community sports infrastructure, training and coaching support programmes should leave local amenities well-positioned to capture any post-Games increase in demand due to demonstration or festival effects. Following the CWG, Glasgow Life launched the 'Good Move' single access point to programmes at all levels of physical activity and the 'Good Move' and 'Keep Your Games Face On' publicity campaigns. Good Move is an information campaign, particularly targeted at less active people, and Keep Your Games Face On includes two reduced cost one-month and twelve-month membership offers during September 2014. The range of targeted community programmes, alongside the high profile of sport and volunteering, should support a 'festival' effect, capturing enthusiasm around participation (Weed et al., 2009). Ideally, these programmes should engage some of the 9% of 'inactive' survey participants who reported concern with feeling out of place and the 10% of 'active' survey participants who listed 'not enough information' as barriers to doing more sport.

However, social infrastructure measures have similar limitations to the facilities pathway: the appeal is to a minority of the host community; they tend to attract people who have

previously been active in sport, rather than those furthest from regular physical activity; barriers relating to concerns about health remain; and cost is an issue for accessing many programmes. Bearing in mind that many of the social programmes intended to deliver a physical activity legacy are modestly funded and of finite duration, there is also the risk that, once the Games are over, policy rhetoric in favour of community development in sport will not be matched by funds (Jolly, 2013). The social infrastructure pathway should complement and add value to the facilities pathway as, although the effect may be short-lived, a successful demonstration effect is more likely to be evident when programmes supplementing the main events have been planned (Weed, 2009). Nevertheless, there are tensions around the multiple functions that the new sports venues are required to accommodate. Furthermore, concerns about poor health and cost, where participant charges are involved, are likely to remain obstacles for many, especially financially struggling and workless households.

Pathway Three: Schools

School-based legacy initiatives form the second-largest suite of programmes. Of nine programmes, eight were wholly or partially attributed to the CWG. School programmes are large scale in that they can offer a means of reaching an entire cohort quickly (Khambalia et al., 2011). The majority of legacy programmes amplify this benefit through an orientation to whole-school or peer-to-peer approaches (MacDonald-Wallis, 2012). These promote physical activity in all children rather than only those already well disposed towards sports. Two programmes in particular were aimed at generating a festival effect, raising awareness and interest in the CWG: the city's civic leader (Lord Provost) toured every primary school in the city promoting the CWG; and Clyde, the CWG mascot visited all schools in Glasgow.

GoWell East research in schools demonstrates the relevance of these programmes to East End pupils, in that children from the relatively disadvantaged schools took part in a significantly smaller range of sports and were less likely to have taken part in a sporting activity in the week prior to survey than their counterparts in more affluent schools (Figure 7). Pupils from the disadvantaged schools were also significantly less likely to report walking or hiking for exercise in comparison with those in more affluent areas.

[Figure 7 here]

Educational environments play an important role in obesity prevention, provide an effective means of engaging young people, and influence future adult behaviours (Bull et al., 2010; Verrotti et al., 2014). Specifically with regard to multi-sport events, they may be associated with increased sports participation and widen the range of sports played (Frawley and Cush, 2011; Weed et al., 2009). School is an especially important environment for children in relatively deprived areas, such as the East End, supporting access to opportunities with little or no cost to the child's family (SE, 2003).

Proximity to the new venues has made it easier for local schools to take advantage of the new facilities, reducing the challenge of transport costs and travel time. Furthermore, the CWG and ongoing high-profile competition events at the nearby venues have raised the profile of sport for local pupils in the East End and teachers anticipate that engagement with the venues will be ongoing. Staff in East End schools reported pupils trying new sports, following the CWG, and requesting new sports clubs; following CWG success, boxing and martial arts were particularly mentioned. Furthermore, East End pupils have used the Emirates Arena for school sports days, as well as visiting for sports 'taster'

sessions and training for accreditation in the Velodrome. Nevertheless, although there seems consensus that the CWG had raised the profile of new sports, some staff stressed that increasing the number of sports clubs and developing links with other schools and community amenities were processes already, again, casting the CWG as an enhancement to supporting pupil physical activity rather than a step-change.

Scope for the schools pathway to deliver benefits for young people in the East End area is constrained by resource issues and social norms. Traditionally, taking pupils outside of school grounds, even to green space opposite the school, has required a lower pupil/ staff ratio, incurring extra staffing costs. Although Active Schools coordinators provide useful support with resource bids, competition for funding raises issues of equity, in terms of relative need and capacity for schools in more challenged neighbourhoods. The CWG have reportedly boosted the number of teachers willing to offer extra-curricular support for school clubs. However, 'burn out' and the high demands which engagement with pupil clubs can put on teachers' personal lives are a recurrent theme in teacher interviews. This new enthusiasm, therefore, may be temporary and those schools which are best able to raise money from parents to support physical activity, coaching specialists or extra-curricular excursions will remain relatively advantaged. Despite mixed evidence on the relationship between socio-economic status and child physical activity (NICE, 2007), parental support for physical activity has consistently been found to be a positive influence on child behaviour (Troost and Loprinzi, 2011), yet The level of financial and instrumental support which parents can provide for child physical activity varies widely between areas in Glasgow.

A further constraint on the schools pathway is its limited scope for influencing the sometimes high proportion of leisure time children spend in sedentary activities outside school. The GoWell East Schools survey found that 22% of boys and 10% of girls spent, on average, five hours or more 'screen time' on weekdays. At weekends, those figures rose to 37% for boys and 22% for girls.

Pathway Four: Environment

The environment pathway encompasses programmes which aim to support physical activity and active travel through better-designed environments and includes large scale, targeted investment in the East End.. There is evidence that all four environment legacy programmes could provide benefits for the study area. The focus of these programmes is on walking or cycling as 'active' modes of travel and providing spaces for informal exercise (in contrast to organised sport). This agenda is in accord with the Glasgow City Plan, which aims that new developments facilitate walking and cycling, providing safe, direct and well lit access to green space and other amenities. The infrastructure elements of this pathway involve considerable investment targeted at the East End, albeit not on the same scale as in the sports facilities pathway. Just south of the study area, at the Cuningar Loop site of the River Clyde, an old landfill site is being transformed into a fifteen hectare woodland park in a £5.7m development. This will be connected to Dalmarnock in the study area by a new footbridge. New and upgraded cycleways have been built in the area, connecting the Emirates Area with the city centre. On a smaller scale, a £77,000 award from the Legacy 2014 Active Places fund has been made towards a green space project in Camlachie.

With regard to the relevance of these projects to the host community, the GoWell East 2012 community cohort reported relatively high rates of cycling, although percentages are low in absolute terms; 5% of interviewees in work or full time education cycled as their main mode of transport, compared with 2% across the rest of the city (ONS, 2011).

Furthermore, 18% of men and 10% of women interviewed also reported cycling in the last four weeks, making this the 4th most popular sporting/ physical activity for men and the 10th for women. However, there were significant differences in rates of cycle commuting by both age and gender, with 80% of cycle commuters being male and predominantly below forty years old.

While rates of walking in the local neighbourhood did not vary by gender, age and longstanding illness were significant factors: 38% of participants aged 40-64 years and 44% of participants of sixty-five years or over reporting no walking in the local neighbourhood in the previous week; 43% of the group with a longstanding illness reported never walking in the local area, as opposed to 25% of others. Interviewees with longstanding health problems were also less likely to make use of green space than the rest of the cohort. Comparative data on visits to a *river, loch, canal, beach or seashore* and *woodland, forest or the countryside* can be found below (Figures 8 and 9). In terms of programme delivery, Clyde Gateway urban realm improvements, to paths, lighting and public spaces, are ongoing in the area. The Cuningar Woodland Park is due to open in 2015. Cycle paths were in place for the CWG although, perversely, a number of routes were closed during the Games themselves.

[Figure 8 here]

[Figure 9 here]

The World Health Organisation draws attention to physical activity and health as societal issues, rather than simply about individual behaviour, and high quality, accessible green space provides an effective population-wide strategy for health promotion and reducing health inequalities (Marmot et al., 2010 Richardson and Parker, 2011; WHO, 2003). Additionally, exercise in green space is associated with lower levels of stress and greater mental wellbeing (Giles-Corti et al., 2005; Grahn and Stigsdotter, 2003; Mitchell, 2013; Pretty et al., 2005, 2007). Although there is a lack of clear evidence relating to health effects from population-level interventions, targeted programmes to increase active travel have been shown to improve fitness, general health and mental wellbeing by increasing levels of physical activity (de Nazelle et al., 2011; de Geus et al., 2007; Ogilvie et al., 2007). Early evidence from the London 2012 Olympics also suggests that a demonstration effect may have operated following medal success in cycling. After the Olympics, there was a significant increase in the number of people cycling recreationally and an increase in the number of non-cyclists who said they were more motivated to take up the activity (Grous, 2012). Glasgow-based research about adult physical activity has found that using of local facilities, feeling safe after dark, and the quality of parks and open spaces are positively associated with walking in the local neighbourhood (Mason et al., 2011; 2013). Considering the younger population, children undertaking active travel to school have higher overall levels of physical activity than those who use motorised transport and changing from motorised to active modes increases levels of physical activity (Lee et al., 2008; Smith et al., 2012).

Infrastructure developments and supporting active travel promotion measures, along with public realm works and improvements to paths and lighting in the area should cumulatively have a positive effect. In terms of the health challenges faced by some of the host population, interventions to support walking can be effective for all, including the most sedentary (Ogilvie, 2007). Unlike many deprived communities, there is good access to green space in much of the East End (Clark and Kearns, 2014). However, there are significant variations across the area and in Dalmarnock, the site of most disruption, almost half our interviewees (48%) rated the quality of local parks as 'very poor'. Given the value of proximity in green space use (Coombs et al., 2010), the Active Places funding

for green space in Camlachie and the Cuningar Woodland Park, joined to Dalmarnock by a footbridge, should benefit local people. Furthermore, the Smarter Choices Smarter Places (SCSP) programme, which ran in the East End of the city from 2009-2011, provides some indication that cycle traffic between the East End and the city has been increasing, alongside the perception that cycling is a healthy way to travel (SCSP, 2013).

There are important constraints on the impact of this pathway. The Clyde Gateway Urban Regeneration Company has contributed positively to the quality of the urban realm. However, beyond the new sports facilities, the environmental legacy programmes do not *per se* offer much to enrich the urban environment for day-to-day walking activity; a wider spread of local retail, social or cultural amenities would be useful. There are also still problems with neighbourhood incivilities such as litter and vacant or derelict land (Clark and Kearns, 2013), which may discourage local walking. Finally, there are gendered issues around cycling, as a predominantly male commuting activity, and perceptions of neighbourhood safety. Regarding the former, cycling has greater appeal to men and younger people. In the latter case, although it might be hoped that improved access to the River Clyde and the new Cuningar Woodland Park will reduce disparities in access to the outdoors for older people and those with longstanding illnesses, nearly half of all women interviewed (48%) and almost a third of men (31%) reported feeling unsafe walking alone in their local area after dark. These are disturbing figures in their own right as well as being poor in comparison with overall Glasgow and Scottish rates (Clark and Kearns, 2013).

Conclusion

This paper specifies a framework for conducting a prospective assessment of potential legacy impacts from multi-sport events. By applying the framework to physical activity legacy in relation to the Glasgow 2014 Commonwealth Games we identify four potential pathways to 'active' legacy. Considerable effort has gone into planning for a physical activity legacy from the Glasgow 2014 Commonwealth Games and it is likely that all four pathways will make a positive contribution.

Population-level benefits to the host community are most likely to be achieved through the environmental pathway, which supports physical activity and active travel through better-designed environments. For a relatively disadvantaged population where many people have health issues, a safe and attractive urban environment, including local amenities and services within walking distance, is an important means of supporting physical activity. Programmes orientated towards physical activity, rather than exclusively sport, are likely to be especially productive. In addition, the social infrastructure and schools pathways also provide benefits to sections of the local community, through targeted efforts to engage with different population subsets and the use of peer support initiatives. Considering the facilities pathway, there are indications that local people are using the new and improved sports amenities. Cross-pathway benefits have also been found: interviewees report that the Games venues have been financially as well as physically accessible to schools in the area, offering new opportunities to local children; new facilities also provide increased opportunities for delivering community participation programmes as part of the social infrastructure pathway, further encouraging physical activity.

Nevertheless, although there is early evidence of physical activity legacy benefits deriving from the CWG, hosting a multi-sport event would not be the first choice of regeneration strategy aimed at encouraging increased levels of physical activity. The Games venues constitute the most expensive component of the active legacy programmes, and yet the current limited appeal of sports-based physical activity is a major constraint upon the

facilities pathway. Furthermore, visiting these venues requires time, a level of confidence and physical competence, and incurs costs (albeit sometimes subsidised); all of these things represent obstacles to impact, since time constraints, concern over health, and costs were frequently cited as barriers to sports participation in the area.

In terms of more conventional regeneration work in the area, much has already been achieved by clearing derelict land, re-purposing vacant buildings and improving the availability of local destinations. However, street cleaning, street lighting, and ensuring that foot and cycle paths remain clear and safe are also relevant and important matters of urban management. The test of a longer term, physical activity legacy for the host community will also depend upon whether school-based and community programmes to support physical activity, both in the sports venues and the local environment, are continued, and whether the focus on these more vital everyday issues is sustained after the Games have gone.

Acknowledgements

Figures 1 & 2 were prepared by Dr Angela Curl. The use of maps and code point data is © Crown Copyright and Database Right 2015. Ordnance Survey (Digimap Licence)

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Figures

Figure 1 Glasgow city and the study area, including Commonwealth Games venues (See additional file for TIFF)

Figure 2 The study subareas (See additional file for TIFF)

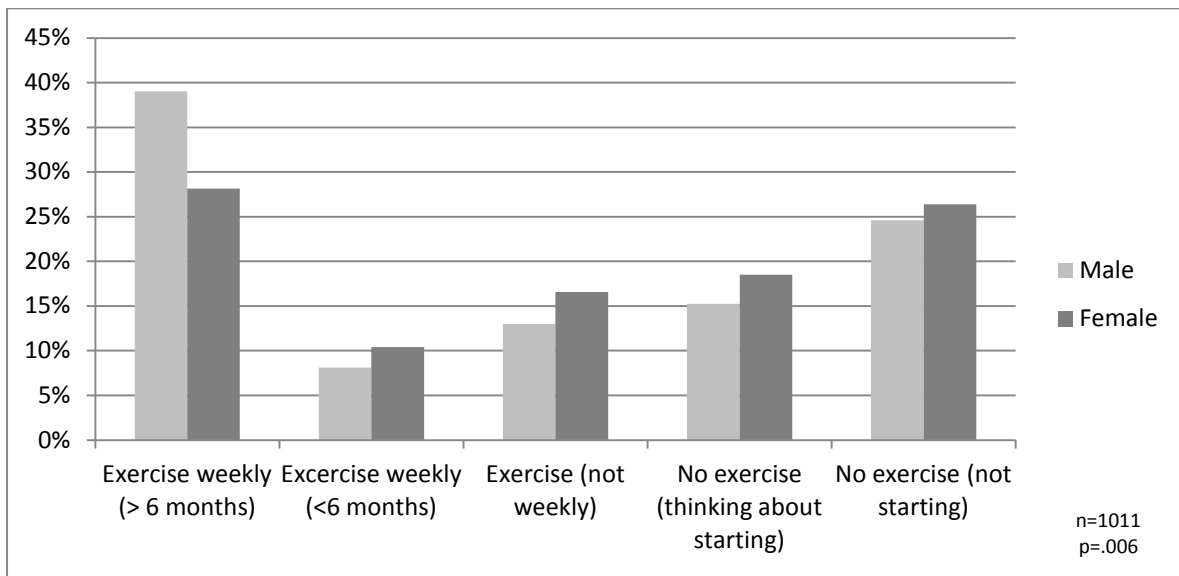


Figure 3 Current exercise behaviour

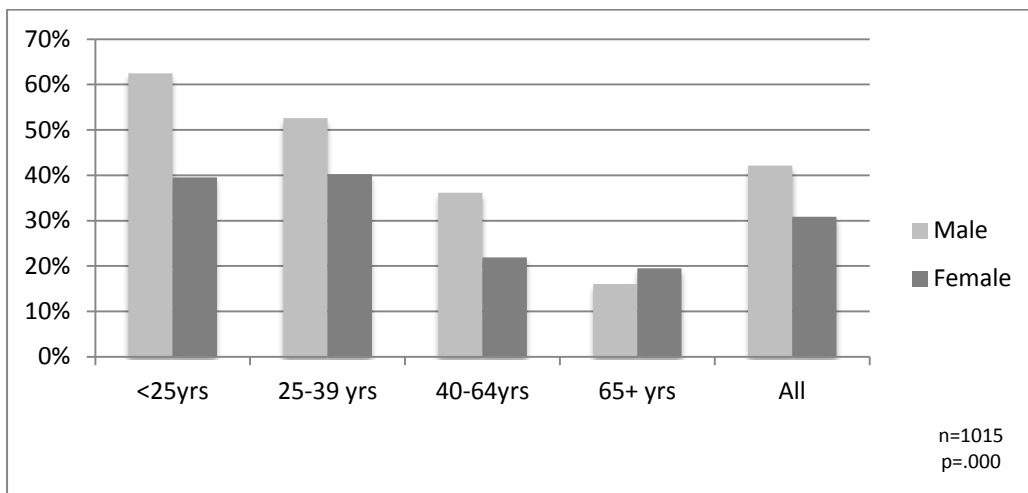


Figure 4 Regular participation in sport by age

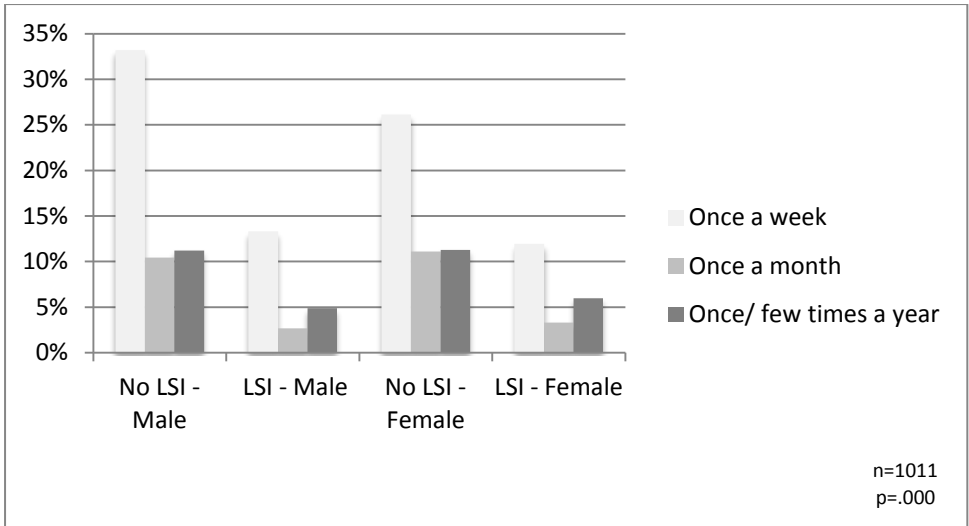


Figure 5 Sports hall, gym or fitness Centre Use by longstanding illness or disability (LSI)

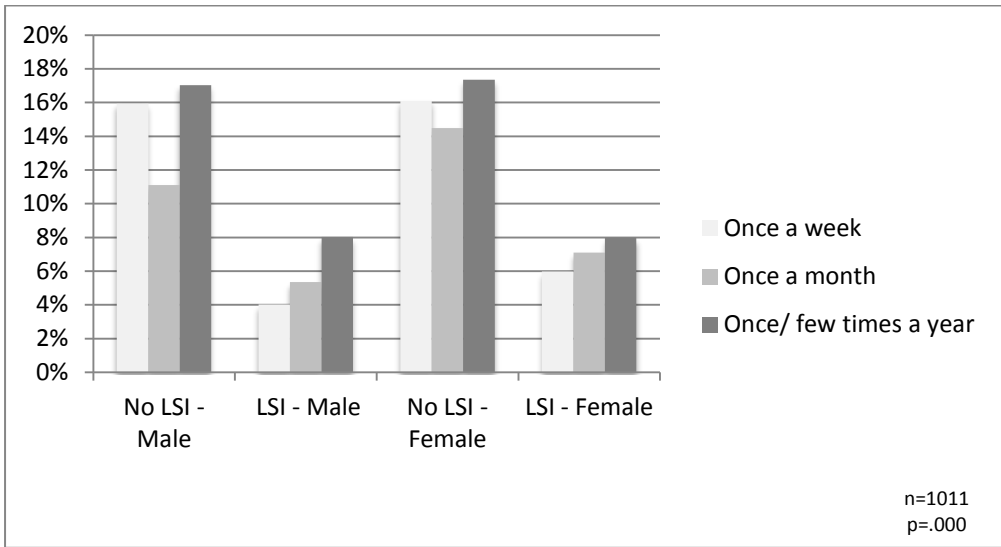


Figure 6 Swimming pool use by longstanding illness or disability (LSI)

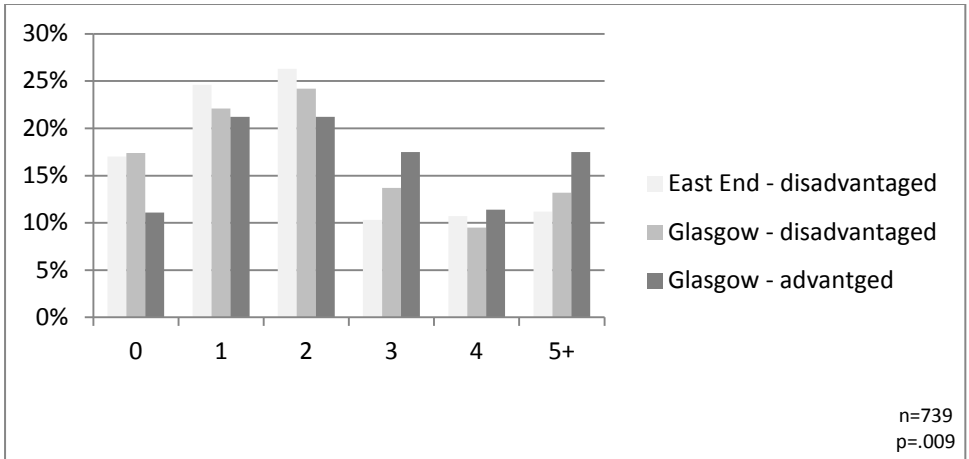


Figure 7 Schools: no. of different physical activities undertaken (Monday-Friday)

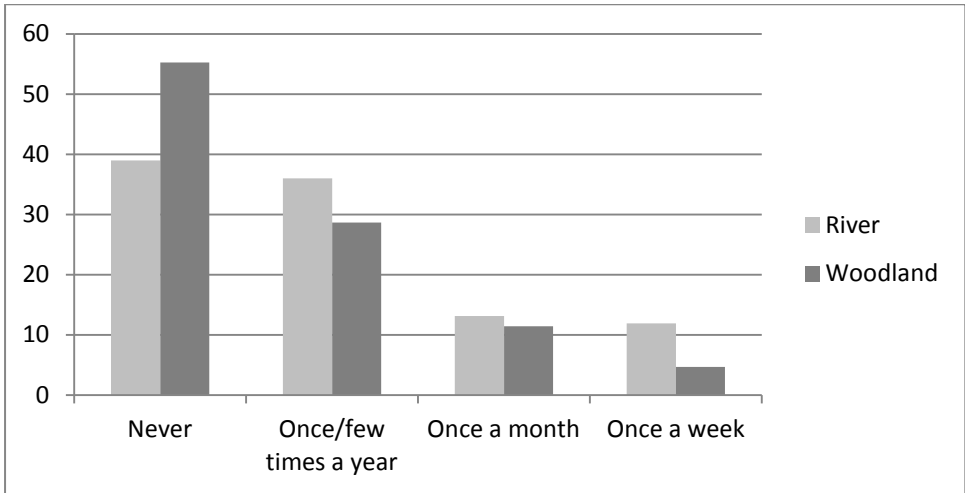


Figure 8 Frequency of visits to river/loch/canal/ beach or woodland/forest/countryside

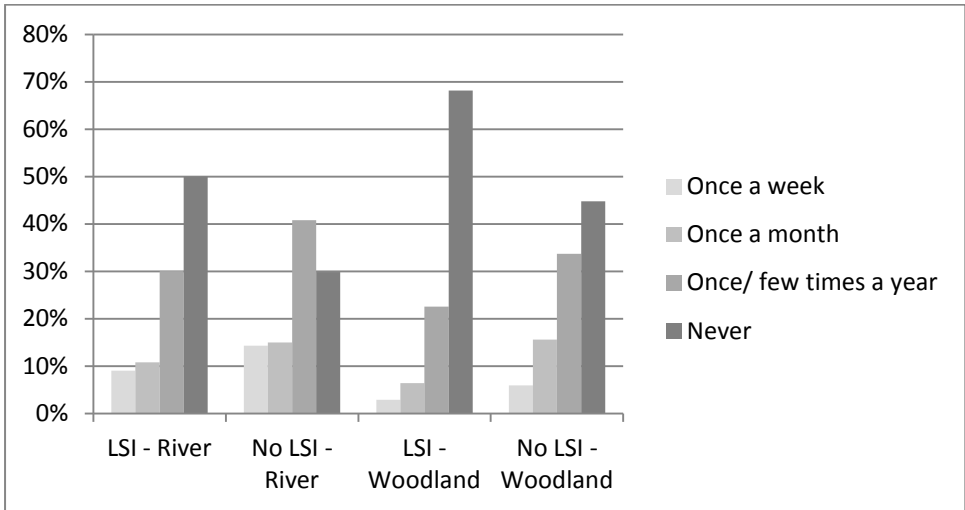


Figure 9 Frequency of visits to river/loch/canal/ beach or woodland/forest/countryside by longstanding illness or disability (LSI)

Tables

Table 1 Framework for prospective assessment of legacy impacts

<p>People and Place: Identifying the potential for impact, drawing on current performance data for the study area. Three questions are considered:</p> <p>Scope: How much scope or room for improvement is there, compared with city and national norms?</p> <p>Preferences: What are the preferences of local residents for some of the programmes being delivered and outcomes being sought through legacy?</p> <p>Barriers: Are there identifiable barriers to the programmes having impact upon the East End community, or upon their intended beneficiaries?</p>
<p>Programmes: This part of the assessment considers the nature and success to-date of the legacy programmes relevant to economic impacts. Four groups of questions are asked:</p> <p>Relevance: Are programmes being delivered which are relevant to producing the outcomes sought? Are the programmes relevant to the needs & interests of the host community?</p> <p>Scale: Are the programmes of sufficient scale (in terms of money or intended participants/beneficiaries) to have impact within the study area?</p> <p>Targeting: Are the programmes targeted in whole or in part upon the East End community? Or is the East End one among many areas that may potentially benefit from the programmes? Is there any evidence of East End impacts?</p> <p>Feasibility: Are programmes being implemented as planned and are outputs emerging which are necessary for impacts upon outcomes? What causal pathways are providers anticipating?</p>
<p>Plausibility: In order to assess the plausibility of what is being attempted, we address the following three kinds of questions:</p> <p>Evidence: Does the existing evidence from evaluations of other multi-sport events or from other similar programmes indicate that impact upon the outcomes of interest is likely?</p> <p>Linkages and Pathways: Is there evidence that indicates that key linkages or elements for success are present or absent from programmes? What causal pathways would the research evidence suggest might be operative or required?</p>

Table 2 Main Perceived barriers to sports participation

'Active' interviewees		'Inactive' interviewees	
Barrier	% of group reporting	Barrier	% of group reporting
Difficult to find time	47	Health not good enough	49
Costs too much	22	Not really interested	20
No-one to do it with	12	Difficult to find time	20
Health not good enough	12	Costs too much	11
Not enough information	10	Feel out of place	9
Not really interested	10	No-one to do it with	8

Table 3 Glasgow 2014 - physical activity legacy

	Number of Programmes	Of Which:	
		Wholly or partially attributed to CWG	With potential or known benefits to the East End
Overarching Cross-theme	1	0	1
Sports Facilities:	7	7	3
Social Infrastructure Programmes:			
<i>Community Participation</i>	9	8	8
<i>Training and coaching support</i>	4	3	3
<i>Club development and support</i>	2	1	2
<i>Event-based activities</i>	3	3	3
<i>Total</i>	18	15	16
Schools Programmes:	9	8	7
Environment Programmes:	4	3	4
All	39	33	30