Results From Scotland’s 2016 Report Card on Physical Activity for Children and Youth

John J. Reilly, Avril Johnstone, Geraldine McNeill, and Adrienne R. Hughes

Background: The 2016 Active Healthy Kids Scotland Report Card aims to improve surveillance of physical activity (PA), facilitate international comparisons, and encourage evidence-informed PA and health policy. Methods: Active Healthy Kids Canada Report Card methodology was used: a search for data on child and adolescent PA and health published after the 2013 Scottish Report Card was carried out. Data sources were considered for grading if based on representative samples with prevalence estimates made using methods with low bias. Ten health behaviors/outcomes were graded on an A to F scale based on quintiles (prevalence meeting recommendations ≥80% graded A down to <20% graded F). Results: Three of the seven Health Behaviors and Outcomes received F or F- grades: Overall PA, Sedentary Behavior, and Obesity. Active and Outdoor Play and Organized Sport Participation could not be graded. Active Commuting to School was graded C, and Diet was graded D-. Family and Peer Influence was graded D-; Perceived Safety and Availability of Space for PA as well as the National Policy Environment were more favorable (both B). Conclusions: Grades were identical to those in 2013. Scotland has a generally favorable environment for PA, but children and adolescents have low PA and high sedentary behavior. Gaps in surveillance included lack of objectively measured PA, no surveillance of moderate-to-vigorous PA in children, summary surveillance data not expressed in ways which match recommendations (eg, for PA in young children; for screen-time), and no surveillance of Sport Participation, Active and Outdoor Play, or Sitting. Scottish policy does not include sedentary behavior at present.

Keywords: exercise, sedentary behavior, obesity, adolescent

A brief description of Scotland, and the rationale for an Active Healthy Kids Scotland Report Card, distinct from report cards produced by the other UK nations, was provided in the report on the 2013 Active Healthy Kids Scotland Report Card. Physical activity (PA) surveillance of children and adolescents in Scotland is based largely on the nationally representative Scottish Health Survey (SHeS	extsuperscript{2}), which uses self/parent-report measures of PA. For many years the SHeS has made the unlikely assumption that all reported PA is of moderate-to-vigorous intensity PA (MVPA).

During 2013, the first Active Healthy Kids Scotland Report Card was developed and launched in both short-form and long-form, as part of a Knowledge Translation project modeled closely on the Active Healthy Kids Canada Report Cards, organized by Active Healthy Kids Scotland (www.activehealthykidsscotland.co.uk). As noted in the 2013 Active Healthy Kids Scotland Report Card, child health in general, and PA in particular, has been a high priority in Scottish government policy. Scottish policy since 2013 has used the hosting of a major international sporting event, the 2014 Commonwealth Games, to promote PA among children and adolescents.

The primary aim of the present paper is to summarize the process and results of the Active Healthy Kids Scotland 2016 Report Card. Secondary aims are to identify any changes in report card grades since 2013, to critique Scottish PA and health surveillance data for children and adolescents, and to critique any changes in PA and health surveillance and policy since 2013.

Methods

The 2016 Active Healthy Kids Scotland Report Card was produced by a RWG, based on the Canadian model which consisted of the 4 authors of the current article. The RWG was advised by a diverse group of stakeholders from many sectors (academia; health and education practice and policy; transport; sport; play), based on the approach taken in the Canadian card and in the 2013 Scottish card. Members of the Stakeholder Group commented on a draft version of the Scottish card. The 2016 Active Healthy Kids Scotland Report Card was cofunded by grants from 2 Scottish charities, The Robertson Trust (www.therobertsontrust.org.uk) and Inspiring Scotland (www.inspiringscotland.org.uk). The funders...
have particular interests in using evidence to inform policy, and the promotion of child PA and health, but had no role in the content of the report card, and no role in the current manuscript.

The Active Healthy Kids Scotland Report Card in 2016 had the same 10 indicators (Table 1) as in 2013. Most of the indicators were health behaviors, but, as in 2013, the Research Working Group (RWG) felt that it was important to retain at least 1 health outcome (obesity) among the indicators, and 1 non-PA behavior (diet). Obesity has been a high priority of Scottish government policy for some time, and the inclusion of obesity provides an opportunity to increase the usefulness of the report card in Scotland. As in 2013, for some of the indicators there were multiple sources of Scottish surveillance data, and the aim was to base grades, where possible, on evidence which met the following criteria: data should be recent, published after the Active Healthy Kids Scotland Report Card in 2013; data should be derived, where possible, from nationally representative samples; data should be have minimal bias, obtained using methods which do not lead to large overestimates or underestimates of the prevalence of the health behavior or outcome.

During March and April 2016 the RWG searched for relevant evidence from Scotland, prioritizing nationally representative surveys as before. For the 10 indicators draft grades were assigned by the RWG during April 2016, by comparison of the national survey data against a relevant evidence-based recommendation (eg, 60 minutes MVPA/day, every day, for school-age children and adolescents) where this was available. The benchmark approach from the Active Healthy Kids Canada Report Cards was used: grade A (we are succeeding with ≥80% of children and adolescents); grade B (succeeding with 60 to 79%); grade C (succeeding with 40 to 59%); grade D (succeeding with 20 to 39%); grade F (succeeding with <20%); and INC (incomplete data). Each indicator was assigned a ‘+’ if there was evidence that trends were improving since the last report card in 2013 or a ‘-’ was assigned if there was evidence of worsening time trends since the last report card, and/or good evidence of marked socioeconomic inequalities for that indicator.

For each indicator we considered the probability of bias arising from error in the measures used. Where the probability and magnitude of bias were both high the measure was not used. For example, we declined to assign a grade to the SHiE surveillance measures of PA for the reasons given above, but graded this indicator based largely on a measure of MVPA from the Health Behavior in School Age Children (HBSC) 2014 Survey which has a much smaller prevalence of the health behavior or outcome.

Consultation comments, and our responses to them, are available on the project website (http://www.activehealthykidsscotland.co.uk).

### Results and Discussion

The 2016 Active Healthy Kids Scotland Report Card grades are summarized in Table 1, and the ‘cover story,’ the card theme of Active and Outdoor Play, is summarized in Figure 1. The short-form report card, and a more detailed rationale for the indicators and grades, are both accessible from the project website (http://www.activehealthykidsscotland.co.uk).

Five of the seven Health Behaviors and Outcomes Indicators (Table 1) could be graded with a combination of the availability of a

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Grades</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Physical Activity Levels</td>
<td>F</td>
</tr>
<tr>
<td>Organized Sport Participation</td>
<td>INC</td>
</tr>
<tr>
<td>Active and Outdoor Play</td>
<td>INC</td>
</tr>
<tr>
<td>Active Transportation</td>
<td>C</td>
</tr>
<tr>
<td>Sedentary Behavior</td>
<td>F</td>
</tr>
<tr>
<td>Family and Peer Influence</td>
<td>D-</td>
</tr>
<tr>
<td>Obesity</td>
<td>F-</td>
</tr>
<tr>
<td>Diet</td>
<td>D-</td>
</tr>
<tr>
<td>Community and the Built Environment</td>
<td>B</td>
</tr>
<tr>
<td>National Policies, Strategies and Investments</td>
<td>B</td>
</tr>
</tbody>
</table>

*All 2016 grades identical to 2013 grades.

Figure 1 — Front cover of the 2016 Scottish Physical Activity Report Card.
recommendation for that indicator, and a high degree of confidence
in the benchmark of the percentage of children and adolescents
meeting the guideline as noted above. The indicators Active and
Outdoor Play and Organized Sport Participation could not be graded,
in part because of a lack of an evidence-based recommendation for
these behaviors, and in part because available Scottish data were
limited or absent.9 Table 1 shows that the key health behaviors and
outcomes were generally assigned low or ‘fail’ grades.

Grades for the indicators of Influences on Physical Activity
and Health Behaviors and Outcomes were generally much better
than grades for health behaviors and outcomes (Table 1). For the
indicator Family and Peer Influence on Physical Activity Behav-
iors and Outcomes, no direct evidence of family or peer influence
was available, and so proxy measures for the peer and adult health
behaviors and outcomes had to be used, as in the 2013 report card.1
Scotland is characterized by obesity prevalence which is high,
increasing, and socially patterned; adherence to adult PA recom-
mendations is apparently moderate; adherence to dietary recom-
mendations is low, socially patterned, and worsening over time.
The indicator Community and the Built Environment (perceived
safety, access to, and availability of space for PA) was graded B,
reflecting the evidence that access and availability of space appeared
to be generally favorable to PA, and perceived safety was moder-
amately high. The indicator Policy referred to national policy only,
and was graded B on the grounds that Scotland has many national
government policies, strategies, and investments which target most
of the 7 health behaviors and outcomes included in the card (the
notable exception in 2016 being sedentary behavior, as in 20131).13
Since the 2013 Scottish report card, national policy and strategy in
this area has arguably improved, or at least increased, with greater
recent emphasis on policy implementation including the signing
of implementation agreements between national and local govern-
ments.3 In addition, recent Scottish policy in this area has sought to
take advantage of the hosting of the 2014 Commonwealth Games
to provide a population-wide PA ‘legacy.’4

Key Health Behaviors and Outcomes Related
to Physical Activity and Sedentary Behavior

For children and adolescents reported exposure to recreational
screen time was extremely high, well above the 2 hours per day
recommended internationally. The 2 data sources on recreational
screen time available for grading had reporting limitations: SHEs
surveillance of recreational screen time expresses the prevalence
of the child and adolescent population exceeding 4h/d, not the 2h/d
used in the screen-time recommendation;2 the HBSC data are sum-
marized for different forms of recreational screen time (TV viewing;
gaming) separately, so estimating total recreational screen time for
individuals is problematic.13 The overall PA grade was based on ado-
lescents only, using MVPA data from the HBSC 2014.14 These data
are based on a simple self-report method which has only a small bias
for the assessment of adherence to MVPA recommendations.14,15 and
suggest that around 30% of boys adhere to the recommendation at
age 11, and 15% at 15; in girls 21% adhered at age 11 and 11% at
age 15.13 As noted above, surveillance of MVPA is not available for
school-age children in Scotland as it is not measured in the SHEs.
An additional problem identified by our critique of surveillance is
that the SHEs erroneously uses school-age recommendations for PA
when considering the adequacy of PA levels in preschool children.2

The low grades for the ‘headline’ report card indicators of
PA and sedentary behavior, and in fact all grades in 2016, were
the same as in 2013.1 The 2016 Active Healthy Kids Report Card
Scotland therefore provides no evidence for an improvement in
PA and health behaviors since the last report card, and there was
some evidence of a possible worsening of some of the indicators,
discussed briefly below.

The ‘cover story’ for the 2016 Active Healthy Kids Scotland
Report Card8,9 (Figure 1) was Active and Outdoor Play. The ratio-
nale for the cover story was that active and outdoor play represents
a potentially important opportunity to increase MVPA.20 Active
and outdoor play is a neglected domain of PA in PA promotion—
research and policy efforts have focused on school-based domains
(especially PE, a high policy priority in Scotland)4,5 and no Scottish
data sources exist for active and outdoor play specifically. An
additional argument for surveillance of active and outdoor play,
and consideration of this domain in PA policy, is that differences
in MVPA between children in high-income versus low-income
countries might be partially attributable to differences in the amount
of time spent in active and outdoor play.21,22 In addition, recent sys-
tematic reviews suggest that the school-based domains (PE, recess,
active commuting to school) which have been the focus of most
previous research and policy effort may contribute relatively little to
population MVPA at present.23–25 Comparisons of the likely effect
of different interventions on population MVPA20,26 also suggest that
future efforts should extend beyond the school.

Scottish government surveillance and policy is based heavily on
the SHEs.4,5 The critique of SHEs data and data interpretation for
the current study has highlighted multiple weaknesses in the SHEs
data collection, data presentation, and data interpretation. For example,
Organized Sport Participation is not measured specifically by the
SHEs, despite the prominence of the potential Commonwealth
Games legacy in policy. As noted above, the SHEs does not mea-
sure Active and Outdoor Play specifically. A serious weakness of
the SHEs data interpretation is that the survey attempts to measure
total volume of PA2 but data on total volume of PA are errone-
ously treated as time spent in MVPA when used in surveillance
and in evidence-based policy.4,5 As a result, apparent adherence to
MVPA recommendations based on this misinterpretation of SHEs
data are extremely high: 80% of boys and 73% of boys at age 11
to 12, with even higher apparent adherence in children according
to the SHEs.2,4,5 These estimates greatly exceed those for the same
age from the HBSC Surveys,13 as well as those from the other
countries in the UK,27–29 and suggest that typical levels of MVPA
among Scottish children are similar to those of children from rural
Mozambique.30 No objectively measured Scottish MVPA data were
available across the child and adolescent age range. Finally, SHEs
data on preschool children are compared against the MVPA recom-
recommendations for school-age children and adolescents in the SHEs2;
this is inappropriate, and the lack of distinction between preschool
and school-age children is also inconsistent with the increasing
emphasis on the early years in Scottish government policy.

Multiple sources of Scottish data were available, as before,1
on active commuting (walking, cycling) to and from school, and
these data sources were highly consistent in suggesting that that
around 50% of Scottish primary school children normally commute
actively to school, and 40% to 45% of those at high school commute
actively, hence a C grade was assigned. New Scottish data on active
commuting to nursery became available since the 2013 report card,
and this suggested that around half of preschool children commute
actively.8,9 Surveillance effort on active commuting to school/
primary school in Scotland is substantial, based on multiple surveys, and

JPAH Vol. 13, Suppl. 2, 2016

Unauthenticated | Downloaded 08/30/19 01:06 PM UTC
some of the current surveys are likely to be redundant. A gap identified by the current study is that active commuting to other locations, on
the 160 or so days per year that children are not at school, is not included in current surveillance.

Key Influences on Health Behaviors and Outcomes

The D− grade for the indicator Family and Peer Influence on Physical Activity Behaviors and Outcomes was limited to proxy data because we were unable to find direct Scottish evidence of parental or peer influence based on measures of PA or diet with minimal bias. The proxy data indicates that Scottish children and adolescents develop among adult norms of overweight and obesity, obeseogenic diet, but apparently moderately high levels of PA. Peer norms of low PA and high exposure to screen time suggest that peer influences are also unfavorable.

The B grade for the indicator Community and the Built Environment was based on evidence8,9 that Scottish children and adolescents have high perceived access to/availability of space for PA, and perceived safety of such space was moderately high.1,8,9 The national policy environment was graded B. Many Scottish policies are relatively recent, and they may need greater time and/or greater implementation efforts if they are to impact on the generally unfavorable grades for the indicators in the Health Behaviors and Outcomes category. The emphasis on implementation of policy in Scotland has increased since the last report card, with the recent signing of implementation agreements between national and local government.2 The major gaps in the national policy environment were the absence of any policies on sedentary behavior, and the lack of emphasis on evaluation of policy implementation.

Obesity and Diet Indicators

Obesity prevalence (graded F−), as defined by BMI percentile, is much higher than in the past,1,8,9 is more prevalent among the more socioeconomically deprived, and socioeconomic inequality in child and adolescent obesity appears to be widening. In addition, systematic reviews of obesity diagnostic studies have shown that obesity prevalence estimates using BMI are highly conservative.18,19 Since the WHO BMI standards and adolescent obesity appears to be widening. In addition, systematic reviews of obesity diagnostic studies have shown that obesity prevalence estimates using BMI are highly conservative.18,19 Since the WHO BMI standards32 and suggest very high prevalence (17% edge Exchange Grants from Inspiring Scotland and The Robertson Trust. The authors thank members of the Stakeholder Group for their varied and substantial contributions to the card. This work was supported by Knowledge Exchange Grants from Inspiring Scotland and The Robertson Trust.

References


