

# Primary care

## The broader impact of walking to school among adolescents: seven day accelerometry based study

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How children travel to and from school may significantly influence their overall physical activity levels.<sup>1 2</sup> We measured moderate to vigorous physical activity (MVPA) among adolescents and explored their means of travel to and from school.

### Participants, methods, and results

We recruited four classes, each of about 30 pupils aged 13-14 years, from four schools in the Edinburgh area. We visited the classes three times: to introduce the study and distribute consent forms and information for pupils and parents or guardians; to allocate accelerometers (instruments used to measure vertical movement); and to collect accelerometers and issue questionnaires. Inclusion in the study required consent from pupils and primary guardians.

In spring 2004 we obtained objective measures of the children's activity with precalibrated accelerometers (MTI, Fort Walton, Florida; model 7164), which record activity accumulated each minute.<sup>3</sup> We asked the pupils to wear the accelerometers on their hip from waking until bedtime, except while showering, bathing, swimming, and participating in other water based activities. We used age specific cut-off points (on the accelerometer count) to calculate minutes of MVPA per pupil for weekdays ( $\geq 10$  hours' data daily from 0500 to 2400); during school, including morning and lunch breaks; time outside school (defined as daily MVPA minus MVPA accrued at school, including travel time). Cut-off points were  $\geq 1399$  and  $\geq 1547$  per minute for ages 13 and 14 respectively.<sup>4</sup>

We collected data from the questionnaire responses about the children's main part of their journey to school (options were walking, car, bicycle, bus, train, or other). Responses to both questions reflected very good agreement after a 14 day retest ( $K_w = 0.874$  and  $0.836$  respectively).

Of the 30 accelerometers, two malfunctioned at each school, yielding a potential sample size of 112. Overall, 103 pupils (92%) participated in the study. Average age was 13.8 (standard deviation 0.27) years; 58 (57%) were boys. Of the 103 participating pupils, nine failed to report how they travelled and too few ( $n=2$ ) reported cycling for us to include cycling in the analyses.

The 92 pupils accrued at least 10 hours of valid data on three (12 pupils (13%)), four (27 (29%)), or five (53 (58%)) days. Cohorts represent pupils who travelled both ways by car, bus, or train; those who walked both ways; and those who walked one way. Mean daily minutes of MVPA for each pupil represent total MVPA minutes divided by the number of days with valid data. Neither sex nor numbers of valid data days differed significantly between groups.

The table shows the amount of moderate to vigorous physical activity of the three different travel groups. Pupils who walked both ways accrued the most minutes of MVPA for every time period we examined, followed by those walking one way (table). Moderate to vigorous physical activity outside school hours was significantly higher among those pupils who walked both ways than among those using a car, bus, or train. In all, 87% (41/47) of the group using a car, bus, or train, accumulated an average of 60 or more minutes of MVPA on weekdays compared with 90% of those who walked one way and 100% of pupils who walked both ways.

### Comment

Walking to school was associated with higher overall moderate to vigorous physical activity throughout the day compared with travelling by car, bus, or train. Similar results have been reported for 10 year old children,<sup>2</sup> although among 5 year olds, mode of travel to school did not significantly affect overall physical activity,<sup>5</sup> suggesting that walking to school may be more effective for older children. Reasons for increased physical activity (not investigated) may include differences in appreciation of activity, and walking in the morning may stimulate further activity and social facilitation. Understanding these differences would help in promoting healthy ways to travel to school.

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Mean number of minutes (daily) of moderate to vigorous physical activity (weekdays) among 13 and 14 year olds reporting their means of travel to and from school

Time period	Mean No of minutes			Difference between car, bus, or train and walking both ways (95% CI)
	Car, bus, or train both ways (n=47)	Walking one way (n=10)	Walking both ways (n=35)	
Entire weekday	97.2	113.1	123.1	25.9 (9.3 to 42.4)
School day	43.4	50.0	52.3	8.9 (1.2 to 16.6)
Morning break	3.7	4.5	4.2	0.5 (-0.3 to 1.4)
Lunch break	12.4	17.5	18.4	6.0 (2.5 to 9.5)
Outside school	53.8	63.1	70.8	17.0 (5.2 to 28.9)

What is already known on this topic

Adolescents are less active than young children

In 10 year olds, walking to school seems to affect overall physical activity

What this study adds

Among adolescents, walking to and from school is associated with higher overall moderate to vigorous physical activity throughout the day, compared with travelling by car, bus, or train

Ethical approval: Ethical approval was obtained from the University of Edinburgh School of Education's ethics committee.

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