

**Paper written for presentation at the Transport Practitioners Meeting,  
University of Nottingham, 3-4 July 2003**

## **THE IMPACT OF WALKING BUSES**

Roger L Mackett, Lindsey Lucas, James Paskins and Jill Turbin  
Centre for Transport Studies, University College London

### **1. INTRODUCTION**

This paper is concerned with the development and impact of walking buses. The walking bus is a fairly recent initiative to encourage children to walk to school, and thus, potentially, reduce car use. It is important to set up initiatives to reduce the increasing reliance on the car by children (Mackett, 2002). A walking bus is a group of children who walk to school along a set route, collecting other children along the way at 'bus stops', escorted by several adult volunteers, one of whom is at the front ('the driver') and another is at the back ('the conductor'). Each walking bus has a co-ordinator who ensures that there are sufficient volunteers and registers the children who wish to use it. All the volunteers have undergone training and police checks (or Criminal Record Disclosures which replaced police checks in April 2002).

This work is being carried out within a project being undertaken in the Centre for Transport Studies at University College London (UCL), entitled 'Reducing children's car use: the health and potential car dependency impacts' (Mackett et al, 2003a). The project has funding for three years from the Engineering and Physical Sciences Research Council (EPSRC) and started in January 2001. The project is being carried out in co-operation with the Environment Department of Hertfordshire County Council as well as colleagues from the Department of Epidemiology and Public Health at UCL, the Department of Public Health at the University of Oxford, the Children's Health and Exercise Research Centre at the University of Oxford, and the Royston, Buntingford and Bishop's Stortford Primary Care Trust. The fieldwork is all being carried out in Hertfordshire, an area to the north of London.

One of the objectives of the project is to develop a framework for the systematic evaluation of interventions to improve children's physical activity (Mackett, et al, 2003b). To do this, a specific case has to be used so that the ideas can be tested in a practical context. The chosen case study is the walking bus. In another part of the project, five walking buses in Hertfordshire are being studied in depth over a year. To complement that work by providing evidence across a wider spectrum of situations, and to find out about schools which have not set up walking buses, a postal survey has been conducted. This has covered all the schools in Hertfordshire which have or could have set up a walking bus. This paper is based on the findings from that postal survey.

### **2. THE POSTAL SURVEY OF WALKING BUSES IN HERTFORDSHIRE.**

In 1993 the concept of walking buses was proposed in a book by David Engwicht (1993). Now there are walking buses in the USA, Canada, Great

Britain, Australia, New Zealand, and Denmark. According to CAST (2000), the walking bus set up early in 1998 at Wheatfields Junior School in St Albans was the first in Britain. By 2001, 50 out of 102 local authorities surveyed for the Department for Transport (2001) had implemented one or more walking buses, and a further 31 planned to do so. It was the most common planned initiative. This implies a very rapid rate of growth from the initial one in 1998.

By January 2002 there were 68 walking buses at 41 schools in Hertfordshire, as shown in Table 1. Questionnaires were sent to the headteachers of all these schools in May 2002. It was in two parts: Part A was about the school's part in setting up the walking bus and the perception of the benefits, and was to be completed by the headteacher or his or her nominee. Part B was designed to collect detailed information about each walking bus and so one was sent for each walking bus at each school for the headteacher to pass on to the respective co-ordinators for completion. Twenty-six completed Part As were returned. Part Bs were returned for 26 walking buses at 23 schools. This implies a response rate of 56% for schools completing Part A and at least one Part B, and 63% for the return of Part A. Of the 26 walking buses for which detailed information was obtained, 14 were still active at the time of the survey (May 2002), and 12 had ceased to operate. At one school a second walking bus had been planned but never started, although the first one was active. This large decline is reflected in the overall picture for Hertfordshire: by January 2003 there were only 26 walking buses operating at 22 schools.

**Table 1 The number of walking buses in Hertfordshire**

	<b>Schools</b>	<b>Routes</b>
Number at January 2002	41	68
Number at January 2003	22	26
Number responding to the survey – full response	23	26
Number responding to the survey – partial response	3	0

Thus it seems that walking buses are in decline. This makes this paper very timely, because it can shed some light on the reasons for the decline and help to explain why some schools have not been or will not be setting up walking buses.

In addition, a questionnaire similar to the one sent to the headteachers of schools with walking buses was sent to other schools in Hertfordshire with children under the age of 11. This was sent to 464 schools, 58 of which were in the independent sector. Responses were received from 213 schools, giving a response rate of 46% for the schools which have not set up walking buses.

The questionnaires, plus the full version of the report upon which this paper has been based can be obtained from Mackett et al (2003c).

### 3. THE NATURE OF WALKING BUSES

Table 2 summarises the numbers involved in walking buses in Hertfordshire. For the active walking buses the figures are based on the average for the days on which it operates. One walking bus only operates on two days, while the rest operate five days a week. For the inactive walking buses, the figure is the typical number using it on any one day.

A total of 361 children were registered to use walking buses and 259 used them each day, on average, on the 26 walking buses covered in the survey. This gives an average of 10 children on a walking bus on the days it operates. The number of children registered varied from 41 down to 3, with 28 on the second largest and four each with 20 children registered. It is known from information supplied by Hertfordshire County Council that all except one of the walking buses operated only in the morning.

The total number of volunteers on the active walking buses is 50, implying that, on average, between three and four volunteers escort a walking bus, with a ratio of three children to each volunteer.

**Table 2 Numbers involved in walking buses in Hertfordshire**

	<b>Number of walking buses</b>	<b>Number of children registered</b>	<b>Number of children using</b>	<b>Mean number of children registered</b>	<b>Mean number of children using</b>	<b>Number of volunteers</b>
Active walking buses	14	200	150	14	11	50
Inactive walking buses	12	161	109	13	10	-
Total	26	361	259	14	10	-

*Note: The mean number of children using the inactive walking buses is based on 11 walking buses because the number of children was not provided in one case.*

Table 2 distinguishes between active and inactive walking buses. It can be seen that the active walking buses are only slightly larger than the inactive ones in terms of the numbers of children registered and using them. This suggests that, in general, the walking buses did not cease to operate simply because there were insufficient children using them, although it is quite possible that significant numbers have moved on to other schools.

The reasons behind the closure of the walking buses were covered in the survey, as shown in Table 3. It should be noted that some co-ordinators gave more than one reason for the closure. Five walking buses closed because of a shortage of children, but the lack of volunteers was much more significant, with three-quarters of them ceasing for this reason. Since the volunteers are

parents, usually mothers, of the children, there may well be cases where the child has dropped out, either through lack of interest or by leaving the school, and so his or her mother ceased being a volunteer. In three cases, the lack of a co-ordinator for that walking bus caused it to cease to operate. This may be for the same reason as that suggested above for volunteers. Out of the five walking buses which ceased because of a shortage of children, three also had a shortage of volunteers, but two did not. In the latter cases, the walking buses ceased simply because too few children were willing or able to use them. The other reasons given were 'Bad weather' and 'Lack of incentives' but in each case there was also a shortage of a co-ordinator and volunteers. The 'Lack of incentives' was added under 'Other reasons' rather than an option offered on the questionnaire.

**Table 3 Reasons why walking buses have ceased operation**

	Number	%
Lack of volunteers	9	75
Too few children	5	42
Lack of a co-ordinator	3	25
Bad weather	1	8
Lack of incentives	1	8

*Note: This table is based on 12 responses from schools which set up walking buses that have ceased to operate. Some respondents provided multiple answers.*

An important factor in the nature of walking buses is the age of the children. Table 4 shows the number in each school year for the fourteen active walking buses. There is a clear peak in year 2 (ages 6-7). Ignoring the two children in nursery, because many schools do not have a nursery class, there are similar numbers in the two years below this peak, then a tailing off amongst older children.

**Table 4 Number of children in each school year registered for the active walking buses**

School year	Age range	Number of children
Nursery	3-4	2
Reception	4-5	33
Year 1	5-6	29
Year 2	6-7	52
Year 3	7-8	26
Year 4	8-9	29
Year 5	9-10	17
Year 6	10-11	12
Total	3-11	200

This is a static picture across only fourteen walking buses, and care has to be taken in placing a dynamic interpretation on a static picture, but anecdotal evidence supports the concept of a reduction with age in the use of the

walking bus. Once they pass a certain age, some children would not wish their friends to see them on a walking bus with younger children or wearing the fluorescent jackets because of the perceived lack of credibility. If this decrease in use with age occurs then it is important that younger children are recruited to replace them, plus some of their mothers as volunteers, in order to maintain the viability of the walking bus. This implies that the active recruitment of new participants must be a continuous process, which will probably need the active support of the school, for example, by frequent mention in newsletters and by offering incentives to the users such as stickers and certificates.

#### **4. THE IMPACTS OF WALKING BUSES**

The impacts of walking buses can be identified in two ways from the questionnaires: firstly by asking about the objectives of the walking buses and whether they were achieved, and secondly, by presenting a list of possible outcomes and seeking views on whether the respondents would expect them. The first can only be presented for the schools where walking buses have been set up, as shown in Table 5, whereas the latter can be answered as a hypothetical question for schools where walking buses have not been set up.

Table 5 shows the achievement of objectives by walking buses for 22 of the schools which have set them up. These answers were not structured on the questionnaire: they were written in and coded, using the categories for the perceived impacts as far as possible (shown in Table 6), adding further categories where necessary.

Of the 22 schools, twenty said that reducing congestion at the school entrance was an objective. The second most popular objective, with twelve schools mentioning it, was to give children more exercise, followed by the general desire to increase walking to school, cited by seven schools. Two schools mentioned reducing car use to school, and two others cited ensuring that children reach school on time. The other objectives given, each stated by one school were: to improve the children's road safety skills, to create safer routes to schools, to increase social interaction between the children, to be environmentally friendly, to slow down the traffic, to escort children who currently walk unsupervised, and to reduce the need to bring younger siblings to school. No schools set the objectives of increasing social interaction between the parents or making the children more mentally alert at school, which were amongst the possible impacts discussed below.

Table 5 also shows whether the objective was achieved. In some cases they were achieved partially. A success rate has been calculated by summing the number of schools achieving the objective, plus half those partially achieving the objective, and dividing by the number of schools which set that objective. Overall, 65% of the objectives were achieved. Of the three main objectives (in terms of the number of schools setting them), giving the children more exercise had a success rate of 79%, followed by reducing congestion at the school entrance at 60%, and increasing walking to school at 50%. Most of the

other objectives were achieved. Overall, it can be argued that walking buses are seen as fairly successful. Nearly all the schools at which walking buses were still operating at the time of the survey, regarded them as successful, whereas some of the schools where they were no longer operating recorded them as not achieving their objectives simply because they were no longer operating. Of course a walking bus that is inactive cannot achieve any objectives, but, as discussed above, the reasons for abandoning them was not the failure to achieve positive outcomes, but the lack of volunteers, coordinators or children. Hence it can be argued, that the success rate in terms of achievement of objectives is probably higher than the figure of 65% implied above. In terms of continuity it is rather lower than this since, in the survey, only 14 out of the 26 that started were still operating (54%).

**Table 5 Achievement of objectives by walking buses**

Objective	Number of schools with this objective	Objective achieved?			Success rate (%)
		Yes	Partially	No	
To reduce congestion at the school entrance	20	10	4	6	60
To give the children more exercise	12	9	1	2	79
To increase walking to school	7	3	1	3	50
To reduce car use to school	2	2	-	-	100
To ensure children reach school on time	2	1	1	-	75
To improve the children's road safety skills	1	1	-	-	100
To create safer routes to school	1	1	-	-	100
To increase social interaction between the children	1	1	-	-	100
To be environmentally friendly	1	-	1	-	50
To slow down the traffic	1	-	1	-	50
To escort children who currently walk unsupervised	1	-	-	1	0
To reduce the need to bring younger siblings to school	1	-	-	1	0
To increase social interaction between the parents	0	-	-	-	-
To make the children more mentally alert at school	0	-	-	-	-
Total	50	28	9	13	65

*Note: This table is based on 22 responses from schools which have set up walking buses. Some respondents provided multiple answers. The success rate has been calculated by dividing the number of achieving the objective plus half the number achieving partial success by the number of schools setting that objective.*

Another way to assess the impacts of walking buses is to ask the respondents what they perceive the potential impacts to be. This question was asked of headteachers at both schools which have set up walking buses and those which had not. Table 6 shows the results separately for these two groups. The possible responses were defined on the questionnaire. The responses are shown in order of declining percentages of responses from the headteachers at the schools which have set up walking buses.

**Table 6 Perceived impacts of walking buses**

	Schools which have set up walking buses (%)				Schools which have not set up walking buses (%)			
	Yes	No	Do not know	Total	Yes	No	Do not know	Total
Give children more exercise	100	0	0	100	94	5	2	100
Improve children's road safety skills	82	9	9	100	90	4	6	100
Reduce car use to school	82	14	5	100	86	9	5	100
Increase social interaction between the children	77	5	18	100	65	13	22	100
Reduce congestion at the school entrance	73	27	0	100	84	10	6	100
Increase social interaction between the parents	59	14	27	100	54	19	27	100
Make the children more mentally alert	27	0	73	100	52	8	40	100

*Note: This table is based on 22 responses from schools which have set up walking buses and 191 which have not.*

The most popular response in each case was, 'Give children more exercise', with all the headteachers at schools which have set up walking buses identifying this as a potential impact. The second most popular response in each case was 'Improve children's road safety skills', followed by 'Reduce car use to school'. 'Increase social interaction between the children' and 'Reduce congestion at the school entrance' were the next two factors for the schools where walking buses had been set up, each cited in about three-quarters of the cases. The latter was cited rather more at the schools where walking buses have not been set up and the former rather less. 'Increase social interaction between the parents' came next in each case. Last in each case was 'Make the children more mentally alert', which was cited much more in the schools where walking buses have not been set up.

The main differences between the two groups seem to be that the headteachers at schools which have set up walking buses have a greater recognition of the social aspects of walking buses, while the schools which have not, have greater expectations in terms of reducing congestion and improving the children's road safety skills and mental alertness.

For the schools where walking buses have been set up the results are fairly consistent with the success of the walking buses in achieving the objectives set for them, as shown in Table 5. (These were asked in an unstructured form, and asked prior to the suggestions of possible impacts shown in Table 6).

One of the key objectives of setting up a walking bus is to reduce car use to school. This desire may manifest itself in various ways, such as reducing congestion at the school entrance, or giving the children more exercise. Such factors dominate the objectives cited in Table 5. Table 7 shows the number and percentage of children using the walking bus who used to travel by car for eleven walking buses. This shows an average of 62% of the children using the walking bus used to travel by car, with a range from 31% to 100%. It should be recognised that these are estimates by the co-ordinators and that the children who used to travel by car might not have done so every day. Indeed, some of them may still travel by car if they are dropped off at the starting point of the walking bus. It does seem that setting up a walking bus can attract children out of their cars, although it should be acknowledged that 107 children are a small proportion of all the children in Hertfordshire who travel to school by car.

**Table 7 Estimated shift from the car in the schools with active walking buses (where information was provided)**

<b>Walking bus number</b>	<b>Number of children registered</b>	<b>Number of children who used to travel by car</b>	<b>Percentage of children who used to travel by car</b>
1	12	7	58
2	5	2	40
3	15	7	47
4	5	3	60
5	13	4	31
6	13	6	46
7	14	7	50
8	28	9	32
9	18	18	100
10	41	39	95
11	8	5	63
<b>Total (for schools providing data)</b>	<b>172</b>	<b>107</b>	<b>62</b>

## **5. THE BARRIERS TO WALKING BUSES**

About one quarter of the schools that do not have walking buses have tried to set them up but have not succeeded, as shown in Table 8.

Table 9 shows the reasons why they did not succeed. The dominating factor is the lack of parental interest or support, which was cited in well over half the schools. The next two most important reasons were concern about traffic



danger and the lack of the headteacher's time to set it up (or other priorities). Lower in terms of numbers are the nature of the area (usually in rural areas) and parental concerns.

**Table 8 Potential for walking buses at schools which do not have them**

	Attempted to set up a walking bus previously?		Plans to set up a walking bus in the future?	
	Number	%	Number	%
Yes	50	25	60	32
No	153	75	125	68
Total	203	100	185	100
No response	10		28	

**Table 9 Factors preventing the setting up of walking buses previously at schools without them**

	Number	%
Lack of parental interest or support	47	65
Traffic danger	8	11
Lack of time to organise it or other priorities	7	10
Nature of catchment area	4	6
Parental concerns	2	3
No crossing patrol	1	1
Other	3	4
Total	72	100

*Note: This table is based on 67 responses from schools which have not set up walking buses. Some respondents provided multiple answers.*

Turning to the future, 60 of the schools which have not set up walking buses have plans to do so in future, as Table 8 shows. In order to do so, they will have to overcome some barriers. Table 10 shows the perceived barriers to setting up walking buses, separated into schools that stated that they plan to set them up and those that did not. For the schools that plan to set them up, the dominant barrier is lack of parental support, followed, a long way behind, by the lack of time to organise it. The nature of the catchment area is the third factor. This is the most popular reason in the schools that did not plan to set up walking buses, followed closely by the lack of parental support. 'Nature of the catchment area' means that the pupils are scattered widely either because the school is in a rural area or because the school draws its pupils from particular segments of the community, such as members of a religious group. A walking bus needs one or more clusters of pupils' homes within walking distance of the school. If this is not the case, there is little point in trying to set up a walking bus. This is likely to be the case in rural areas and for schools which draw pupils from a large area.

**Table 10 Perceived barriers to setting up a walking bus in the future**

	Schools which stated that they plan to set up a walking bus		Schools which did not state that they plan to set up a walking bus		Total	
	Number	%	Number	%	Number	%
Lack of parental support	36	60	47	32	83	40
Nature of the catchment area	6	10	48	33	54	26
Traffic danger	4	7	16	11	20	10
Lack of time to organise	8	13	12	8	20	10
Too close			4	3	4	2
Parental concerns	2	3	2	1	4	2
Volunteer: pupil ratios			2	1	2	1
Lack of information			1	1	1	0
Most children already walk			1	1	1	0
Other	4	7	14	10	18	9
Total number of obstacles	60	100	147	100	207	100

*Note: This table is based on 172 responses from schools which have not set up walking buses. Some respondents provided multiple answers.*

## 6. THE FUTURE POTENTIAL FOR WALKING BUSES

As Table 8 shows, 60 schools without walking buses plan to set them up. However, over twice as many do not, even though a lot of potential benefits were seen, as shown in Table 6. This raises the interesting question of whether the schools see travel to and from school as a policy issue with which they need to be concerned. As Table 11 shows there is a large difference between the schools which have set up walking buses and those which have not. Of those that have set up walking buses, 84% regard travel to and from school as a policy issue they need to be concerned with. In contrast, nearly half the schools (45%) that have not set up walking buses do not regard it as an issue for them. It can be seen that four schools have walking buses even though they do not regard children's travel to and from school as a policy issue for the school. These schools set up the walking buses in an attempt to reduce congestion around the school entrance and for the health benefits for the children, which is similar to the other schools, as was shown in Table 5.

**Table 11 Is children’s travel to and from school regarded as a policy issue for the school?**

	<b>Schools which have set up walking buses</b>		<b>Schools which have not set up walking buses</b>	
	Number	%	Number	%
Yes	21	84	108	55
No	4	16	87	45
Total responses	25	100	195	100
No response	1		18	

Given that the majority of schools do regard travel to and from school as a policy issue for the school, it is interesting to see what initiatives they have taken or plan to take, as shown in Table 12.

These were unstructured answers which have been coded. The top answer was ‘Discourage car use to school’ which included educating the children as part of personal, social and health education (PHSE), competitions, walk to school weeks and messages to parents through newsletters. The second most popular choice was ‘Involvement with an outside organisation or campaign’ which usually meant working with Hertfordshire County Council. The next most popular answer was ‘Set up a walking bus’. This is high because this is precisely what 21 of the schools have done. (In fact, none of them mentioned it explicitly, but it would have been perverse not to have included it in the figures). The next most popular answer was ‘Set up a travel plan’, followed by ‘Address traffic and parking issues’ which included shutting the school car park to parents at one school, and opening a new car park adjacent to the school entrance at another. Other initiatives include consultations with parents and governors, education and training of the children (pedestrian skills training and road safety education), physical measures such as new road layouts and pelican crossings.

If ‘Set up a walking bus’ is excluded from the table, the policies being pursued are fairly similar at both the schools which have set up walking buses and those which have not, with greater emphasis on travel plans, education and training, and physical measures in the former, and on consulting parents and governors, and running a coach, minibus or car share scheme, in the latter. Consulting parents and governors’ implies that these schools have not gone as far as the walking bus schools in their thinking since those schools would have had to do so as part of the setting up process. ‘Run a coach, minibus or car share scheme’ reflects the dispersed nature of the school catchment area in some cases.

**Table 12 Ways in which schools have or intend to address travel to school policy issues**

	Schools which have set up walking buses		Schools which have not set up walking buses		Total	
	No	%	No	%	No	%
Discourage car use to school	8	14	34	20	42	19
Involvement with an outside organisation or campaign	6	11	33	20	39	17
Set up a walking bus	21	37	12	7	33	15
Set up a travel plan	7	12	22	13	29	13
Address traffic and parking issues	4	7	19	11	23	10
Consult parents and governors	0	0	19	11	19	8
Education and training	6	11	9	5	15	7
Physical measures	5	9	7	4	12	5
Run a coach, minibus or car share scheme	0	0	12	7	12	5
No specific plans	0	0	2	1	2	1
<b>Total</b>	<b>57</b>	<b>100</b>	<b>169</b>	<b>100</b>	<b>226</b>	<b>100</b>

*Note: This table is based on 21 responses from schools which have set up walking buses and 92 which have not. Some respondents provided multiple answers.*

It is interesting to see whether the schools that have set up walking buses intend to set up more. Table 13 shows that of the twenty schools that supplied complete information on this topic, six plan to set up more and fourteen do not.

**Table 13 Plans for new walking buses at schools which have previously set up walking buses**

	Plan to set up more walking buses	Do not plan to set up more walking buses	Total responses	No response
Schools with a walking bus at the time of the survey	5	7	12	2
Schools without a walking bus at the time of the survey	1	7	8	1
Total responses	6	14	20	3
No response	0	2	2	1

Of the six that plan to set up more, five had one or more walking buses at the time of the survey and only one did not. This suggests that schools that have had walking buses which have ceased to operate, do not tend to want to try again. This may well reflect difficulty in obtaining parental support. Even amongst the schools which had one or more walking buses in operation at the time of the survey, the majority (seven out of twelve) do not plan to set up any more.

## **7. CONCLUSIONS**

A number of useful conclusions about the nature and behaviour of walking buses be drawn from this survey work.

In Hertfordshire, the number of walking buses grew rapidly from one in early 1998. Four years later, there were 68 in 41 schools in the county. One year after that, there were 26 at 22 schools. This suggests that the number may have peaked.

The postal questionnaires were distributed to the 41 schools. Twenty three provided complete responses including detailed information about one or more walking buses (covering a total of 26 walking buses), and three schools provided more limited information. The walking buses have an average of 14 children registered to use them, with a range from 3 to 41. On average, 10 children use each walking bus, escorted by three or four volunteers. The children range in age from Nursery (age 3-4) up to Year 6 (age 10-11) but there is a clear peak in Year 2 (age 6-7), with a tailing off amongst older children.

Of the 26 walking buses for which detailed information was supplied, twelve had ceased to operate by the time of the survey. In nine cases this was because of a lack of volunteers to escort the walking bus. For three of them, nobody was available to co-ordinate that walking bus. Five walking buses closed because there were too few children. Three of these also had a shortage of volunteers. In only one case was the closure of the walking bus not associated with a shortage of one or more out of children, volunteers and a co-ordinator.

Walking buses have not been closed because they did not achieve the objectives for which they were set up. The main reasons for setting them up were to reduce congestion at the school entrance, to give the children more exercise, and to increase walking to school. These were achieved in the majority of cases. Overall, about 65% of the objectives were achieved. Most of the objectives relate to shifting children from the car to walking. According to the co-ordinators, 62% of the children using walking buses used to travel to school by car (but not necessarily every day).

The perceptions of the headteachers about the likely impacts of walking buses largely match the observed effects, but with the addition of improving the children's road safety skills, which was only mentioned explicitly for one of the

schools as an objective. When the views of the headteachers of schools that have set up walking buses are compared with those of schools that have not, it is found that the former have greater recognition of the social aspects of walking buses whereas the latter have greater expectations in terms of reducing congestion, and improving the children's road safety skills and mental alertness.

The main reason that walking buses have not been set up at the schools that do not have them is the lack of parental interest or support. For some schools the nature of the catchment area would make it difficult to recruit enough children to form a walking bus. Otherwise the main problems are concerns about traffic danger and the lack of the headteacher's time to start the process.

Most of the schools who responded to the questionnaire regard children's travel to and from school as a policy issue for the school. Of course, one reason that some schools did not respond to the survey may be because they do not regard travel to and from school as a relevant issue for them. The schools have taken or intend to take a wide variety of actions to address travel to school issues, including education and training of the children, setting up travel plans, and working with the County Council.

It has been shown that, in Hertfordshire, the number of walking buses grew rapidly but now seems to be in decline. The key issue underlying this trend is the lack of volunteers, often associated with a shortage of children because usually the volunteers are mothers of some of the participants. If the children cease to use it, either because they leave the school or they no longer wish to take part, then their mothers also do so. Because the maximum number of children on the walking bus is dictated by the number of volunteers, one child dropping out may mean that several others cannot use it. There needs to be a regular process of renewal of a walking bus, with new pupils being encouraged to join, with at least some of their mothers becoming volunteers. This may not happen if the organisation of the walking bus is left to those who currently use it because they have no incentive to ensure its continuation after it ceases to meet their individual needs. There is a need for a higher level of supervision of walking buses, to ensure their continuation.

Hertfordshire County Council is aware of these issues and is addressing them. It has appointed a county-wide walking bus co-ordinator and has updated its walking bus information pack.

The project on children's car use at UCL is also carrying out a detailed study of five walking buses in Hertfordshire, including interviews with the children and their parents, including those who have ceased using them. This will provide a deeper understanding of the factors that underlie the dynamics of walking buses, and so should help ensure their continuation.

Another element of the project at UCL is an assessment of the contribution that walking to school can make to a child's daily quantity of physical activity. This involves the use of three-dimensional accelerometers and diaries of

activities and travel patterns over a period of four days for a sample of children. The work is continuing, but it has already been shown that walking to school can contribute about 5% of children's daily physical activity which is about 2.6 times that obtained travelling by car (Mackett et al, 2002). Walking home from school can contribute as much again, and it is likely that children who are in the habit of walking to school will be more willing to walk elsewhere compared with children who are taken by car.

This report has illustrated the role and behaviour of walking buses in Hertfordshire. Given that Hertfordshire is an area where walking buses evolved earlier than many other parts of Great Britain, there may be useful lessons for interested parties elsewhere. In particular, it may help to stem the potential decline after the first cohort of children and their mothers have left the walking bus.

There are a number of good reasons to encourage children to walk rather than go by car, in terms of their health and the environment, both in the short and long term. Walking buses can help to break down the barriers to walking perceived by parents and children, in terms of concerns about the children's safety, competence and knowledge. Therefore, walking buses should be encouraged. It is hoped that this paper will help in the process.

## **ACKNOWLEDGEMENTS**

This paper has been written as part of a project entitled 'Reducing children's car use: the health and potential car dependency impacts' funded by the UK Engineering and Physical Sciences Research Council under grant GR/N33638 at the Centre for Transport Studies at University College London. The assistance of Hertfordshire County Council in providing information about the schools which have set up walking buses is acknowledged. The time and effort taken to complete and return the questionnaires by the headteachers, walking bus co-ordinators and others is appreciated.

## **BIBLIOGRAPHY**

CAST (2000) *An Evaluation of the Walking Bus at Pirehill First School: A report for the Staffordshire Walking Bus Partnership*. The Centre for Alternative and Sustainable Transport, Staffordshire University.

Department for Transport (2001) Levels of activity relating to school travel plans and initiatives (2001), available at <http://www.local-transport.dft.gov.uk/schooltravel/travelplan/index.htm>.

Engwicht, D. (1993) *Reclaiming Our Cities and Towns: Better Living with Less Traffic*, New Society Publishing, Philadelphia.

Mackett, R. L. (2002) Increasing car dependency of children: should we be worried? *Proceedings of the Institution of Civil Engineers: Municipal Engineer*, **151** (1), 29-38.

Mackett, R. L., Lucas, L., Paskins, J., Turbin, J. (2002) Health benefits of non-car travel by children, paper written for presentation at the Hertfordshire County Council Centre of Excellence Conference on 'School and Business Travel Plans' held in Hatfield, November 2002, obtainable from <http://www.cts.ucl.ac.uk/research/chcaruse/index.asp>.

Mackett, R. L., Lucas, L., Paskins, J., Turbin, J. (2003a) Reducing children's car use: the health and potential car dependency impacts - project website, available from <http://www.cts.ucl.ac.uk/research/chcaruse/index.asp>.

Mackett, R. L., Lucas, L., Paskins, J., Turbin, J. (2003b) A methodology for evaluating walking buses as an instrument of urban transport policy, *Transport Policy* (forthcoming).

Mackett, R. L., Lucas, L., Paskins, J., Turbin, J. (2003c) Walking buses in Hertfordshire – results from a postal survey, available from <http://www.cts.ucl.ac.uk/research/chcaruse/wbreport.asp>.