Walking to School in Japan and Childhood Obesity Prevention: New Lessons From an Old Policy

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Active travel to school, such as walking and cycling, has been identified as an important source of physical activity in children. Many developed countries, including some cities, are now promoting walking to school as a way to increase physical activity, aiming to tackle the epidemic of childhood obesity.1–4 Meanwhile, Japan has exceptionally high rates (98.3%) of active transport to school among children in public school compared with other similar-income countries.5–10 Japan has a highly established “walking to school practice” that has been implemented since 1953.

In most of the urban areas throughout Japan, children in elementary and junior high school who attend public schools walk to school every day from their home, instead of parents driving them or using buses or other transport. Children normally attend the school that has been allocated by the municipal authorities in charge of public education, the boards of education. Although there is no national policy to promote walking to school in Japan, it is a common practice for each board of education to establish walking to school as compulsory if the school is located within a certain distance of the student’s home. Other methods of commuting, such as biking (by assigning parking spaces on school grounds), and school buses can also be implemented by the boards of education based on considerations of geography, climate, and transport. It is likely that this walk-to-school practice has shown some positive outcomes for children in terms of level of physical activity over a long period of time, as Japan has one of the lowest prevalences of childhood obesity in the world.11 Such an experience could be useful for many governments worldwide that are implementing similar interventions to promote physical activity as a way to tackle childhood obesity.

Childhood obesity is a serious public health issue worldwide, and its prevalence has increased at an alarming rate. In 2010, the number of overweight children younger than 5 years is estimated to be more than 43 million worldwide. Close to 35 million of these children are living in developing countries, whereas 8 million are in developed countries.12–14 In 2006, Wang et al. examined the recent trends regarding the prevalence of overweight and obese children in more than 60 countries around the world, including Japan. Their work showed that the prevalence of childhood obesity is increasing in almost all developed countries for which data are available, and in many developing countries as well. Obesity appears to have spread more dramatically in industrialized countries over the past 2 to 3 decades than in lower-income countries. In several industrialized countries that have been undergoing rapid socioeconomic transitions, obesity has increased at an accelerated rate. As with other conditions, rural and urban differences have been reported for obesity in Japan. For example, childhood obesity is more prevalent in rural areas than in urban areas. In middle-income countries such as China and Brazil, on the other hand, the opposite dynamic has been found to be true. However, there appear to be no such differences in the United States.15

Global increases in the number of children who are overweight or obese are attributable to a number of factors including increased intake of energy-dense foods that are high in fat and sugars but low in vitamins, minerals, and other healthy micronutrients; and decreased physical activity levels because of increasingly sedentary lifestyles, changing modes of transportation, and increasing urbanization.12–14 Overall, there is a close relationship between physical activity and obesity.

A shortage of physical activity itself also has some health consequences. Compared with active children, inactive children weigh more, have higher blood pressure, and have lower levels of heart-protective high-density lipoproteins. It is noted that inactive children are more likely to become inactive adults.15 For children and young people, physical activity includes play, games, sports, transportation, chores,
recreation, physical education, or planned exercise that takes place in the context of family, school, and community activities.

One of the ways to increase the level of physical activity is by walking to school; it seems to also have an impact on childhood obesity. There have been some studies examining the relationship between active travel to school, body composition, and physical activity and they have generally reported strong evidence for a positive association between active travel to school and overall physical activity level; however, there is less direct evidence linking active travel to school to leaner body composition and cardiorespiratory fitness. More interventions and longitudinal studies exploring the relationship between changes in health-related fitness and active travel are needed. Walking to school may only increase the level of physical activity by a small amount; however, it provides potential to tackle the weight gain seen among the developed countries.

A major factor associated with children being driven to school was the link between parent journey to work and student journey to school. Another study has pointed out that walk-to-school program components need to assist parents to walk to school with their children and then continue on to work by active travel. Another study has suggested that neighborhood safety is the key setting for intervention, encompassing the walking network (footpath and trails, etc.), public open spaces (parks), and recreation facilities. A 2004 survey of parents in the United States by the Centers for Disease Control and Prevention found that the top barriers to walking to school for children aged 5 to 18 years were distance and safety.

Although Japan manages to have one of the lowest prevalences of childhood obesity in the world, the incidence of childhood obesity has increased significantly in the past 30 years (Figure 1). Just as seen in other parts of the world, there are also regional differences in prevalence of obesity in Japan. A significantly higher incidence of childhood obesity is found in the Tohoku region, in the northern part of Honshu Island. Obesity among 12-year-old boys in Aomori, Iwate, and Miyagi prefectures was 20.2%, 15.6%, and 16.0%, respectively, which were all considerably higher than the national average for that age of 12.4%. This reflects an increasing trend in obesity among children living in rural areas in general.

FIGURE 1—Changes in the prevalence of obese children in Japan.

Source: Ministry of Education, Culture, Sports, Science, and Technology.18

RESULTS

Japan has a very high walking rate to school. Japanese children walk to school in groups unaccompanied by their parents. The law requires that elementary schools be sited within no more than 4 kilometers, and for junior high schools no more than 6 kilometers from the children’s home.

The Japanese compulsory educational system was established in 1947 as the School Education Act was enacted. Article 38 states that “Each municipality shall establish the necessary number of elementary schools in a particular district.” Article 49 states the same regulation for junior high schools. In 1953, the municipal board of education became responsible for school siting. The School Education Act enforcement order was enacted in 1953, in which Article 5 states that “If there are more than two elementary and junior high schools in the municipality, the municipal Board of Education must specify the school for each student who is scheduled to enter school.” With regard to the distance to school, the second part of Article 4 of the Enforcement of the Act on State Liability Compulsory Education Schools and Facilities Costs states that “The commuting distance for elementary school should be within 4km, and for junior high school should be within 6km.” In accordance, the board of education must make sure that all children served live within no more than the specified distance.

METHODS

We reviewed gray literature, online government information, local policy documents, and regulations following a case study methodology to document this policy. We sought official public documents, which clearly state the policy on public schools, through the Web site of each city or ward. Based on the availability of the information on the Internet, we chose a total of 25 cities and 1 ward. We made personal communications with boards of education as necessary to obtain supplemental information. Populations ranged anywhere from 0.7 to 3.6 million, and Yokohama, Kanagawa, had the largest population of all cities. We collected the following information: description of the policy; maximum walking distance to school, and whether they follow the national standard; maximum time limit to walk to school, if applicable; other permitted methods of commuting to school (e.g., cycling, school bus, etc.); and safety measures. We used the Ministry of Education, Culture, Sports, Science, and Technology Web site to identify the existing safety initiatives.
distance from schools to allow them to walk to school. Each municipal board of education responds specifically to the local characteristics, including geography, climate, and transport situation of its district to determine the distance to school, method of commuting, and the safety management. One of the reasons for its feasibility is that there is high availability of schools in the urban areas, which means most of the schools are located within the specified walking range of the children’s homes. In addition, along with the low crime rate in Japan, well-established safety interventions could be other reasons for its success.

### School Availability

In Japan, education is compulsory at the elementary and lower-secondary level (up to the age of 15 years). Almost all students attend public schools through the end of junior high school. The most recent Basic School Survey showed that public schools cater to more than 98% of elementary-school children and more than 91% of junior-high-school children. Children attend public schools in their local district in the municipality. In other words, the place of residence determines the school that each child should attend (school district systems). In most municipalities, children are asked to walk to school because they are located close enough from their home. The recommended limit of the distance is stated to be within 4 to 6 kilometers for elementary and junior high school in Article 4 of the Enforcement of the Act on State Liability Compulsory Education Schools and Facilities Costs. However, this range is not fixed, because the decision is entirely up to the board of education as explained previously. In addition, the distance should not be so far as to cause tiredness (and thus adversely affect the quality of work at school), or to disturb the daily balance of time configuration. In most of the municipalities, distance generally ranges from 2 to 4 kilometers for elementary schools, and 3 to 6 kilometers for junior high schools. The feasibility of walking to school relies on school district systems and availability of schools.

### Competency of Boards of Education

Boards of education act specifically in response to each municipality’s characteristics. Although there is no national statutory provision to walk to school in Japan, boards of education generally make it compulsory to walk to school if the school is located within walking distance. If the school is outside this range, boards permit use of public transport, school buses, school taxis, etc., as is common to use in rural areas. In some rural parts of Japan, mergers or closures of schools have become a serious problem because of declining birthrates and the growing proportion of elderly population.

Table 1 shows the dependency of decision-making on distances to school in 26 different cities and wards. The distance ranges of within 2 kilometers (elementary schools) and 3 kilometers (junior high schools) are only applicable in 5 of the 10 largest cities. This may be associated with the fact that they are population-dense cities and, hence, there is good availability of schools. Many of the cities apply the national standard, which means that children must go to a school no farther than 4 kilometers (elementary schools) and 6 kilometers (junior high schools) away. However, there are exceptions to this. For instance, Hachioji, Tokyo, applies a different range of distance from the standard recommendations. They have uniformly set the boundaries to be within 2 kilometers for both elementary and junior high schools. The reason for this is simply to avoid children walking for more than 1 hour to and from school. However, this does not apply to every child because some children could take more than an hour to go to school. In such cases, Hachioji allows the family to send their child to school by public transport. This is an example of a board of education paying more attention to commuting time than to distance. In 2008, the number of elementary schools in Hachioji that permitted public transport was 6 out of 69 (8.7%), and for junior high schools, 6 out of 37 (16.2%). Moreover, there are 3 cities and wards that do not apply limits on commuting distance. An example is Shinagawa Ward in Tokyo, where the board of education indicates that, because all homes are located within 2 kilometers of a school, there is no need to set the boundaries like in other municipalities.

### Safety Management

Children living in the same neighborhood go to school together. In places where there is a lot of traffic, parents, school staff, and local volunteers take turns supervising road crossings to make sure the children can cross safely. Children are taught to raise their hand to let drivers notice that they are crossing. In certain elementary schools, lower graders are all asked to wear a bright yellow hat when they are on their way to or from school to make it easier for drivers and others to see them. To make walking safe, many different initiatives exist depending on the characteristics of the district. In each municipality, the board of education or school is responsible for safety management.

<table>
<thead>
<tr>
<th>Dependency</th>
<th>Examples of the Cities and Wards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within 2 km (elementary school) or 3 km (lower secondary school)</td>
<td>Sapporo (Hokkaido), Osaka (Osaka), Yokohama (Kanagawa), Nagoya (Aichi), Fukuoka (Fukuoka)</td>
</tr>
<tr>
<td>Within 4 km (elementary school) or 6 km (lower secondary school)</td>
<td>Niigata (Niigata), Kashii (Chiba), Wakayama (Wakayama), Kobe (Hyogo), Imabari (Ehime), Kyoto (Kyoto), Kawasaki (Kanagawa), Saitama (Saitama), Kitakyushu (Fukuoka), Kumamoto (Kumamoto), Shizuoka (Shizuoka), Sagamihara (Kanagawa), Okayama (Okayama)</td>
</tr>
<tr>
<td>Time limit</td>
<td>Hachioji (Tokyo), Mihara (Hiroshima), Saga (Saga)</td>
</tr>
<tr>
<td>No time limit (local characteristics)</td>
<td>Hiroshima (Hiroshima), Shinagawa (Tokyo), Sakai (Osaka)</td>
</tr>
</tbody>
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The Ministry of Education, Culture, Sports, Science, and Technology has published the Safety of Children Walking to and From School as a guideline for boards of education and schools, following 2 cases of murder involving children commuting to or from school in 2005. This guideline consists of 5 components, and examples of safety measures applied to each of the 5 components are described in Table 2. Each component also includes safety measures that are operated by the board of education or schools.

One example of school safety management is the Safety Precautions on Adachi Ward School Routes organized by Senju Honmachi Primary School in Adachi Ward, Tokyo. In this program, children and their parents commute to school together to identify risky areas and also to find the places to evacuate to in case of emergencies on particular school routes at the beginning of the program. In accordance with the checklist, the school and parent–teacher association worked together to prepare a safety map that included all of this information. In Hamamatsu’s Kiga Elementary School, located on the outskirts of the city, the Safety Precaution and Inspection of the School Zone During Commuting program includes group walking involving teachers and caregivers, guided commuting for low graders, inspections of school routes, patrolling by the local volunteers, and sharing information. Another example is Awano Elementary School on the outskirts of Tsuruga, Fukui Prefecture, which holds a Week for Strengthening Safety Precautions in School Zones. Parents identify the places where the child is likely to be alone on his or her school route. In some cases, actions are taken to improve safety. Awano Elementary was selected as a “safe station model area” by the National Police Agency. Aki Junior High School in Aki, Hiroshima, introduced an approach called Safety Is Never 100%: Things That We Do to Save Lives. Students prepare a sheet of safety measures and discuss these measures on the way to and from school with their parents to avoid becoming alone on school route. Patrols by teachers and parent–teacher association volunteers also take place.

### DISCUSSION

Although walking to school—a practice that has been in place formally for more than 50 years in Japan—was not originally intended as an intervention to promote physical activity, walking to school seems to be providing unintended positive outcomes. As Japan has managed to maintain one of the lowest prevalences of childhood obesity in the world, it is likely that the walk-to-school policy benefits schoolchildren in terms of their levels of physical activity. Despite the higher level of childhood obesity in the Tohoku region, about 80% of the boys and 70% of the girls in primary and secondary school engaged in some kind of physical activity according to the investigation of child’s mental health and lifestyle, although level of physical activity declines with age. From Figure 2, we can assume that Japan may have a greater physical activity level compared with that in other developed countries. The good news is that walking to school actually meets the physical activity guidelines for children published by Japan Sports Association. Normally, the walking distance to school ranges between 2 and 4 kilometers for elementary school, and between 3 and 6 kilometers for junior high schools. Two kilometers is equivalent to 30 minutes of walking and 3 kilometers is equivalent to 45 minutes of walking, when velocity is calculated as 4.1 kilometers per hour, which is an average velocity for a 7-year-old child.

There may be other factors outside the scope of this article to explain the low prevalence of obesity, such as dietary intake, as the Japanese diet has been shown to be healthier than the American or Western diet. In addition, lunch served at school is planned daily by a dietitian, and its nutrition content is uniformly calculated to maintain health of schoolchildren.

### Key Factors

This investigation of walk-to-school schemes revealed several key factors. First, there is high availability of schools within walking distance for children, particularly in urban areas. Also, the districts and distances to and from school are decided on the basis of the local characteristics of each municipality. The local board of

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**TABLE 2—Ministry of Education, Culture, Sports, Science, and Technology Guidelines for the Safety of Children Walking to and From School: Japan**

<table>
<thead>
<tr>
<th>Guideline Components</th>
<th>Examples of Measures</th>
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<tbody>
<tr>
<td>Dissemination of information about suspicious areas on school routes, and conduction of safety inspections to ensure safe conditions</td>
<td>Inspection of school routes to find out the place where children are likely to be alone on the way to school or home (e.g., Shizuoka, Fukuoka, Tokyo, Kumamoto)</td>
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<tr>
<td>Safety management of schoolchildren when walking to and from school</td>
<td>Group walking with teachers or caregivers, guided group walking for low graders, walking with dog and local volunteers as suggested by the local police station, GPS location identifier to be provided to elementary school students, and handmade signboard with safety messages to be placed around the school district (e.g., Yamagata, Ehime, Aichi, Toyama)</td>
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<tr>
<td>Promotion of safety education to equip children with skills to be able to avoid risk</td>
<td>Creation of the security map with the PTA and school, discussion on security and traffic safety at school, traffic safety guidance by the PTA, and security bells as a signal for parents or local volunteers (e.g., Shizuoka, Aichi, Kyoto, Osaka, Kagoshima, Hokkaido, Kumamoto)</td>
</tr>
<tr>
<td>Sharing of information on suspicious individuals on a regular basis</td>
<td>E-mail updates from police station messages to be sent to those registered with the police e-mail updates when security information from parents or schools becomes available, patrol car with security stickers or car with blue rotating light for area patrolling, cable TV announcements to provide security information (e.g., Aichi, Tochigi, Kanagawa)</td>
</tr>
<tr>
<td>Cooperation with police to promote safety measures during commuting</td>
<td>Patrolling of the school district where local post office, fire station, police station, and board of education work together to place a security and fire protection sticker on postal delivery vehicles (e.g., Kanagawa)</td>
</tr>
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education is the body that is responsible for making all the decisions regarding whether it is possible to walk to the nearest school. In some rural areas where the population is small, some schools had to be integrated or even closed and children may have to spend an hour or more getting to school on foot, or by school bus or public transport. This situation is rather common in Tohoku, where many of the schoolchildren are actually driven to and from school by their parents, and where childhood obesity is more predominant.38 Currently, there are 2 Tohoku prefectures working on childhood obesity. In Akita Prefecture, the “walk-to-school campaign” has been implemented since 2001. The intention of this campaign was mainly to reduce the use of private cars for commuting to school and encourage children to walk to school to build up their physical strength. Because walking to school is considered as promoting physical activity, diminishing the number of overweight children can be considered a goal. In Iwate Prefecture, measures on “prevention of obesity and building up physical strength” among schoolchildren have been implemented since 2008. One of the approaches in Hiraizumi Town Elementary School, in Iwate, is re-evaluating the current school bus operation status and working to encourage walking to school. As a result, the number of children who walk to school has reportedly increased. Schools advise remaining school bus users to get off at the previous stop and walk home from there.39,40

Second, there are highly established safety measures in place in Japan. Again, the local board of education or the school itself is responsible for these safety initiatives, so that each one is unique and specific to each municipality or school. In most of the cases, parents, school staff, and local volunteers are all involved in supervision. The success of the walk-to-school schemes may be related to the fact that Japan is considered to be safer than many countries. Crime does occur, and children face similar threats to their safety as they would in any country if the same basic precautions were not taken, including carrying a personal alarm in easy reach at all times in public, always traveling in a group to and from school, walking on well-lit and busy routes, knowing how to react if threatened or approached by a stranger, never entering a car or any other private or secluded area with a stranger or suspicious person, and always ensuring parents know where students are and where they are headed.41 Another factor that may support walk-to-school schemes is that there is a greater number of mothers staying at home in Japan, according to the Labor Force Survey 2004. The Organization for Economic Cooperation and Development’s Employment Outlook 2002 showed that countries such as the United States, United Kingdom, and Germany had a much greater proportion of mothers who were employed.42 Therefore, there seem to be some background factors that help to support the feasibility of walking to school.

Conclusions
The Japanese experience may be useful for cities and countries elsewhere that are promoting similar interventions to prevent childhood obesity, given how a walk-to-school policy may contribute to increased activity levels among children. We summarize the lessons that may be useful from the Japanese experience:

1. Base interventions on the existing network of schools and adapt the provision to other local organizations. The district should be allocated by the local governmental body in each municipality, as well as the determination of the school that each child should attend. The range of distance should be within 2 to 4 kilometers for elementary schools, and 3 to 6 kilometers for junior high schools for reasons of feasibility. Sufficient availability of schools within this walking distance is an important factor; however, in more spread-out cities, cycling combined with public transport may be considered to encourage physical activity.

2. Establish a set of safety measures for schoolchildren. Each school in Japan is responsible for its respective security initiatives; in some cases, the board of education has been involved to make the walk-to-school scheme effective. Initiatives should depend on the characteristics of the particular district. School staff, volunteers from local community, parent-teacher associations, and local governmental institutions such as police stations can all cooperate to make commuting to school safer. Examples of possible measures are listed in Table 2.

3. Respond specifically to adapt to local characteristics. Local government bodies can respond specifically to each characteristic of the municipality by dealing with the varied geographic, climate, and transport situations of the municipality to make decisions with the school district, the walking distance to school, etc. Some boards of education may pay more attention to commuting time than distance.

In addition to the well-established safety interventions, the reasons for the success may also include Japan’s low crime rate as well as the large proportion of mothers who stay at home compared with other similar countries.

In conclusion, we have also come up with some recommendations to improve Japan’s walk-to-school scheme:

1. Publicize the level of childhood obesity to the nation by using statistics to increase the
public’s awareness of the fact that obesity is increasing gradually.  

2. Promote the beneficial effects of walking to school as a part of the daily routine especially for those prefectures with a higher rate of childhood obesity (e.g., Akita and Iwate). For instance, the advice from Hiraizumi Town Elementary School in Iwate, for school bus users to get off at 1 stop early and walk home from there, should be acknowledged. ■

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Note. The views presented in this article are those of the authors and do not necessarily reflect the decisions, policies, or views of the World Health Organization.

Contributors
N. Mori wrote the draft and is responsible for the content’s integrity. F. Armada wrote the draft and contributed technical advice. D. C. Wilcox contributed critical intellectual content to the article.

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Because this study did not involve humans, institutional review board approval was not needed.

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