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**【Review Article】**

## The Potential Effects of the Tokyo 2020 Olympic and Paralympic Games on Physical Activity Participation at the Population Level

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**ABSTRACT** The award of the Olympic and Paralympic Games to Tokyo in 2020 provides an opportunity for developing a Health and Physical Activity Legacy following this event. This review examines the published evidence that the Olympic Games or Paralympic Games lead to an increase in population levels of physical activity or participation in sport. Specific examples from the Sydney 2000 Olympic Games, the Vancouver Winter Olympics 2010, and preliminary data from the London 2012 Olympic Games failed to demonstrate increases in physical activity or sport participation amongst representative samples of adults or children, assessed using serial population surveys leading up to and subsequent to the event. The Tokyo Olympic and Paralympic Games offers an opportunity to develop partnerships between the health sector, sports promotion sector, the Olympics movement and exercise epidemiology specialists to develop, implement and evaluate a mass media communications campaigns and communitywide interventions to promote physical activity and sport. These programs should start several years before the Games, capitalise on the momentum provided by hosting the event, and can be assessed for their “legacy contribution” in the years following the Games. Standardised evaluation and monitoring surveillance systems are required to assess this potential impact in representative samples of the Japanese population.

**Key words:** physical activity, epidemiology, surveillance, Olympic Games

### The concept of Olympic “Legacy”

There is much interest in global sporting events including the Olympic and Paralympic Games (OPG), and in the effects these events have on the host country. The award of the Tokyo 2020 OPG offers an opportunity for Japan to use the Olympics to stimulate national growth and development. The “Olympic legacy”, defined as “*effects after the event that continue to benefit the host city and nation*”<sup>1)</sup>, is an important part of planning any OPG. There is some evidence that the “legacy” of OPG results in urban

development and growth, improvements in public transportation systems, increased tourism, and sometimes leaving a positive economic legacy. In addition, the Olympic legacy includes short term improvements in community pride, increased potential for volunteers and increased social capital. The provision of sporting facilities may provide for increased infrastructure that can be used by the community after the end of the Games.

A key health-related question is whether hosting these large-scale events result in increases in sports participation or in population-level physical activity? Although many OPG committees and Government agencies have reported “potential for positive impacts on sport and physical activity”, the actual evidence for this is much less clear. This commentary reviews the evidence that mass events increase physical activity, and proposes public health strategies for maximising

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these effects. These public health strategies may inform the planning of the Tokyo 2020 OPG, and should utilise the expertise of public health and exercise scientists to maximise the legacy on community sport and physical activity.

### **Evidence for an Olympic legacy on population sport participation or physical activity**

First, an evidence review failed to demonstrate any research that clearly identified population level physical activity effects resulting from the Beijing, Athens, or earlier Olympic Games<sup>2</sup>. Two specific studies examined the impact following the Sydney 2000 Olympic Games, and following the Vancouver 2010 Winter Olympic Games.

The Sydney 2000 evaluation used representative national population surveys in November each year, and showed no short-term (3 month) impact on adult physical activity participation was reported immediately following the Sydney Olympics<sup>3</sup>. There was a slight impact on intention – people thought they were more likely to become active, but without any effect on reported walking, moderate or vigorous physical activity. Further, there was no localised effect; people in the Sydney region showed no difference compared to adults across the rest of Australia<sup>3</sup>. Similar results were noted in time series analyses of sports participation before and after the Melbourne 2006 hosting of the Commonwealth Games (data not shown), although secular increases in sport participation started in the mid-2000s across Australia, but were not related to the 2000 Olympics or 2006 Commonwealth Games<sup>4</sup>.

Another study examined the effects of the 2010 Vancouver (Canada) Winter Olympics on objectively measured physical activity and reported sport participation amongst Canadian children. Physical activity was measured using pedometers to assess steps/day amongst Canadian children aged 5-19, and was collected several years before and after the 2010 Winter Olympics<sup>5</sup>. After adjusting for seasonal trends, there were no effects of the Winter Olympics on objectively measured physical activity or on reported sport participation, assessed up to two years post Olympics, and again there was no “local effect” observed for children living in the Vancouver region,

compared to the rest of Canada<sup>5</sup>.

Data following the London 2012 Olympics are not yet clear, but serial population surveys to monitor sport participation have been conducted by Sport England. These data suggests a recent decline in sports participation in people over the age of 14 years. Since the London Olympics, these representative Active People Surveys showed the proportion reporting “no sport participation” increased from 54.8% (2012-13), to 55.7% (2013-14) and to 56.7% (2014-15), suggesting no immediate positive effects of the London Olympics<sup>6</sup>. This contrasts with the pre-Games enthusiasm and expectations for physical activity change in England, which was not matched by sufficient investment and public health focus in promoting sport and community physical activity.

### **Next steps – building physical activity and community sports into Olympic and Paralympic Games planning**

Despite many social and infrastructure benefits that may result from hosting the OPG, the evidence is limited that these events result in increases in sport participation or health-enhancing physical activity. There is a need for more integration of public health strategies in OPG planning, so that an effective health-related legacy can be realised for the host population.

A comprehensive approach needs to start with partnerships between Health, Sport and the Olympic movement, and begin planning activities and programs several years before the OPG. It is not sufficient to assume a “trickle down” phenomenon will occur to motivate the population just by hosting the OPG themselves<sup>7</sup>. An integrated model of public health action is shown in Figure 1, to demonstrate what is required to implement a community physical activity strategy several years before the OPG. The first row shows the time frame, and the second row depicts the usual actions by Olympic host cities. The lower row, “public health actions” show the actions required for making physical activity outcomes more likely. This involves the development and implementation of a population physical activity strategy in the pre-Games period, and its maintenance after the Games.

**Figure 1** Planning for physical activity and sport change at the population level before, during and after the Olympic and Paralympic Games

Olympics Bid period	Award of OPG	Pre-Olympics phase *	OPG	Post-Olympics phase
<b>Time frame</b>				
Years ----->	“Start date”	Several years lead-up to OPG	→ 2 x 2 weeks	Years post OPG ----->
<b>Actions</b>				
Bid submission		Prepare for Games		Implement “Legacy”
Decision by IOC		Build infrastructure		Use of new facilities and services
Community engaged		Fund “elite sports” Develop “legacy plan”		
<i>Evaluation and research tasks</i>		<i>Develop planning {logic models}; plan for all legacy</i>		<i>Assess legacy on built environment, transport, economy, tourism</i>
<b>Public health actions</b>				
Develop public health focused partnerships, Health; Sport, IOC		Develop “health strategy” and PA national plan for increasing PA Implement national campaign Implement grassroots programs for sport participation and PA		Maintain PA and sport national campaign Maintain and build PA and sport programs for all
<i>Evaluation and research tasks</i>		<i>Develop implementation indicators for PA and sport programs Start monitoring surveys for PA (pedometer based and self report) for adults and children</i>		<i>Monitor implementation and maintenance of PA and sport programs Assess impact based on population monitoring surveys for PA among adults and children</i>

\*Several years between award of OPG and the actual Games; this is the critical period for policy and actions to be developed to ensure an OPG legacy.

IOC; International Olympic Committee, OPG; Olympic and Paralympic Games, PA; physical activity.

### The potential for Japan 2020: to create an evidence-based impact on physical activity

The Tokyo 2020 Games Foundation Plan<sup>8)</sup> outlines the vision for the Games, defines the planned expenditure (\$3.4 Billion) and focuses on community engagement, infrastructure development, inclusiveness and a future orientation. The five pillars of the action and legacy planning include “sport and health”, but there is no mention of, or clear objective for increasing physical activity (e.g., increase the proportion of adults who meet current physical activity recommendations). There are specific sport related values mentioned, and these include “valuing sport for tomorrow”, promotion of grassroots sport programs, increasing sport for older adults and increasing physical education in schools, and increased events to promote sport and use of infrastructure, improved environments and Olympic facilities by the community [the Tokyo 2020 Games Foundation Plan<sup>8)</sup>,

p.166].

In order for these sport and physical activity changes, substantial planning and resources need to be deployed in the pre-Games period. The opportunity provided by the Tokyo 2020 OPG requires the development and implementation of a national social marketing campaign, targeting the general community to engage with the OPG through understanding the importance of physical activity and starting to increase their participation in physical activity and sport. Further, widescale community-based physical activity programs are required [similar to Kamada, et al<sup>9)</sup>], which are implemented at a national scale [for example, the Brazil Dept of Health has the *Academia da Saúde* project, funding physical activity interventions in hundreds of communities]<sup>10)</sup>. There may be the need for national competitions, for example between workplaces or schools, to as “worker challenges” to meet their own “Olympic goals”. There could even be international competitions or award as

proposed as “Sport for All” Prize by Homma<sup>11)</sup>, building on data in the national physical activity report cards<sup>12)</sup>, to achieve national medals for improvements in physical activity levels.

Overall, this initiative needs to be monitored by existing and new population surveys. Figure 1 shows the evaluation and research framework that is needed. For example, impact evaluation could be monitored by routine population surveys in Japan. The average step count per day based on pedometer data and exercise participation rate measured annually in nationally representative samples in the National Health and Nutrition Survey can be used as evaluation parameters<sup>13)</sup>. In addition, some periodic sports participation surveys for adults and younger generations by Ministry of Education, Culture, Science and Technology<sup>14)</sup>, and Sasakawa Sports Foundation<sup>15)</sup> are available to track national trends. Establishment of objective monitoring of physical activity in children would enrich the evaluation framework, similar to the CANPLAY surveillance system using pedometers that monitors activity among Canadian children<sup>5,16)</sup>.

Further, there needs to be implementation research, to monitor the number and location of sport and physical activity programs delivered to communities, schools and older adults, to assess progress towards the vision of the Tokyo 2020 Games Foundation Plan. Figure 1 demonstrates the timescale for possible community level and physical activity effects of the Tokyo 2020 OPG. Initial population effects will be awareness of the event [pre-Olympic phase, Figure 1], and would be followed by social-marketing and national campaigns that would increase specific physical activity message awareness and understanding [pre-Olympics phase]. Process evaluation would assess the implementation of programs and policies in this phase. Longer term surveillance would be required to show changes in population-level increase in physical activity [over several years, in the post-Olympic phase, Figure 1], and an even longer time is necessary for observing health-related outcomes.

In conclusion, there is an excellent opportunity for the Tokyo 2020 Games to lead to a more active and healthier society, and for exercise and public health professionals (such as the Japanese Association of

Exercise Epidemiology) to assist in implementing and evaluating this initiative. However, only sustained and coordinated efforts, in partnership between Health, Sport and the Tokyo 2020 OPG committee, can produce the resources, commitment and effort to make the health component a reality in the pre and post-Tokyo 2020 Games periods.

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【総 説】

## 2020年東京オリンピック・パラリンピックが国民の 身体活動量に与え得る効果

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【要旨】2020年に東京でオリンピック・パラリンピック（以下、五輪）が開催されることは、そのレガシー（長期にわたる、特にポジティブな影響）として、健康・身体活動レガシーを創出する機会となる。本稿では、まず先行研究をもとに、過去の五輪が開催国の身体活動およびスポーツの実施率向上につながったかを検証する。2000年夏季シドニー大会および2010年冬季バンクーバー大会に関する研究と、2012年夏季ロンドン大会に関する予備的検証では、国民代表サンプルの成人もしくは子どもを対象として、大会開催前後の複数回にわたる連続的な調査をもとに評価されたが、いずれも身体活動またはスポーツ実施率の増加は認められなかった。2020年東京大会の開催は、健康分野、スポーツ分野、オリンピック・ムーブメント、そして運動疫学の専門家が一体となって、身体活動・スポーツの促進に向けてマス・メディア・キャンペーンや地域社会全体を巻き込んだ複合的な介入を計画・実施・評価する機会となり得る。こうした取り組みは五輪開催の数年前から開始する必要がある、大会開催の契機を十分に生かさなければならない。レガシー実現の達成度について、その潜在的な効果を評価するには、日本国民の代表サンプルを対象とする標準化された評価方法に基づくモニタリング・システムが必要である。

**Key words:** physical activity, epidemiology, surveillance, Olympic Games

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