



ELSEVIER

ORIGINAL PAPER

# Dissemination of a community-based physical activity project: The case of 10,000 steps

W. Kerry Mummery<sup>a,\*</sup>, Grant Schofield<sup>b</sup>, Anetta Hinchliffe<sup>a</sup>,  
Kelly Joyner<sup>a</sup>, Wendy Brown<sup>c</sup>

<sup>a</sup> School of Health and Human Performance, Central Queensland University, Rockhampton, Qld 4702, Australia

<sup>b</sup> Centre for Physical Activity and Nutrition Research, Auckland University of Technology, New Zealand

<sup>c</sup> School of Human Movement Studies, University of Queensland, Australia

Received 4 April 2006; received in revised form 23 June 2006; accepted 24 June 2006

## KEYWORDS

Web-based  
interventions;  
Health promotion;  
Pedometers

**Summary** This paper describes the use of a web-site for the dissemination of the community-based '10,000 steps' program which was originally developed and evaluated in Rockhampton, Queensland in 2001–2003. The website provides information and interactive activities for individuals, and promotes resources and programs for health promotion professionals. The dissemination activity was assessed in terms of program adoption and implementation. In a 2-year period (May 2004–March 2006) more than 18,000 people registered as users of the web-site (logging more than 8.5 billion steps) and almost 100 workplaces and 13 communities implemented aspects of the 10,000 steps program. These data support the use of the internet as an effective means of disseminating ideas and resources beyond the geographical borders of the original project. Following this preliminary dissemination, there remains a need for the systematic study of different dissemination strategies, so that evidence-based physical activity programs can be translated into more widespread public health practice.

© 2006 Sports Medicine Australia. Published by Elsevier Ltd. All rights reserved.

## Introduction

Evidence supporting the benefits of regular physical activity for health and well-being is, at least, substantial.<sup>1,2</sup> However, scientific and public knowledge of the benefits of participation, and the detriments of inactivity, have not stemmed

the decline in activity levels in many countries.<sup>3–5</sup> Certainly knowledge alone is not sufficient to change behaviour. Although there is a large body of intervention research on increasing physical activity, most interventions have been targeted at small groups, or distinct sub-populations such as schools<sup>6</sup> or workplaces.<sup>7</sup> There remains a distinct lack of community-based intervention research targeting increased activity in whole population groups.

\* Corresponding author. Tel.: +61 7 49396749.  
E-mail address: k.mummery@cqu.edu.au (W.K. Mummery).

The development, implementation and evaluation of demonstration projects at the community level is essential if we are to address declining physical activity levels in the population. 10,000 Steps Rockhampton was a landmark project which applied a multi-level, multi-strategy approach to increasing physical activity levels in the adult population of a regional Australian community. The background and establishment of the project has been described elsewhere.<sup>8</sup> The basic approach was to develop a whole-of-community intervention using a social-ecological framework, focussing on strategies that promoted physical activity at the individual, population, environmental and policy level. The project included an over-arching media and marketing campaign using the 10,000 steps 'brand', the integrated promotion of physical activity by health professionals, and the development and implementation of project-themed environmental supports for physical activity. Key aspects were the use of the pedometer and the 'prescriptive' project name that encouraged the accumulation of activity in terms of steps-per-day. The initial project was developed over 2 years from 2001 to 2003, and showed positive outcomes in terms of various aspects of community engagement.<sup>9–11</sup> In addition, high levels of project awareness and modest increases in activity levels in women demonstrated initial project efficacy at the whole-of-community level.<sup>12</sup>

At the end of the 2-year intervention period, funding was provided by the state government to encourage individuals, organisations and communities outside Rockhampton to adapt and implement the ideas and materials developed for the original project, in other settings and communities across the country. This is important because a principal limitation of many health promotion and public health interventions is that, following the initial trials, they are rarely more widely disseminated and adopted.<sup>13,14</sup> At the most basic level, it has been noted that many studies fail to report on factors relating to external validity or generalisability of the intervention,<sup>15</sup> thus limiting the ability of health professionals to successfully adopt programs at the individual, setting, or community level. At a broader level of investigation, there is an acknowledged lack of dissemination studies that evaluate the diffusion of evidence-based projects to target wider populations.<sup>16</sup> There remains a need for dissemination research to inform translation of successful programs into improved health at the population level.

The aims of this paper are therefore, to describe the use of a website for dissemination of the 10,000 steps program throughout the state of Queensland

and across Australia, and to present data that illustrate the subsequent adoption and implementation of the program.

## Methods

Given the relatively distant location of the initial demonstration project from other major population centres in Queensland and Australia, and the comparatively small budget allocated for dissemination, a dedicated website was used to disseminate program materials at little or no cost ([www.10000steps.org.au](http://www.10000steps.org.au)). The website was designed to provide information and support for two different consumer groups: (1) the general public, who can choose to register as program members for no cost; (2) health promotion professionals with an interest in or mandate to promote physical activity, who can also choose to register as members of a provider network for no cost. The web-based registration allows for maintenance of contact information for all individuals and organizations that become involved in the program.

Information was themed under three content areas, as described below.

### Active lifestyles

The general content of the *active lifestyles* pages of the website is available to all visitors, without the requirement of registration. The pages include information about the benefits of physical activity, information relating to the 10,000 steps program, a series of educational pages relating to goal-setting, and activities designed to engage visitors in the process of increasing their level of physical activity. There are links to Australia's National Physical Activity guidelines, and information about pedometers, with listings of retail locations throughout Australia that sell the 10,000 step-branded pedometers.

Visitors who wish to participate in the more interactive 'step-log' program are required to register as a member of the 10,000 step program. Registration consists of provision of a valid email address, establishment of a password to protect access to the interactive features of the website, and the completion of basic demographic information. The step-log allows individuals to enter and track their steps as measured by a pedometer, as well as convert other activities to step-counts, using data from the compendium of physical activity.<sup>23</sup> The interactive step-log allows participants to track daily, weekly and monthly

step totals, and provides access to a series of individual challenges designed to engage members in ongoing activity.

### Active workplaces

The *active workplaces* pages provide access to a series of team-based, pedometer-driven workplace challenges. Originally a paper-based 'virtual journey,' completed by logging total team steps, the workplace challenges are now available in interactive web- or paper-based format. The primary goals of the challenges are to increase individual awareness of physical activity levels, to increase overall physical activity in workplace 'teams', and to create awareness of the coincidental health benefits that can occur as a result of increasing incidental activity.

In order to access the workplace challenges and the supporting documentation and resources, a participant from each organisation has to become a registered 'provider' of the 10,000 steps program. The free registration provides access to both the *active workplaces* and *active communities* resources. All registered providers become members of the 10,000 steps provider listserve, which allows increased communication between professionals involved in physical activity promotion, and easy distribution of 10,000 steps program updates and materials.

### Active communities

These pages contain information and resources to aid the development and implementation of the 10,000 steps program in settings and communities across the state. As part of the original 10,000 steps Rockhampton project, a range of professionally developed print materials was developed for use in conjunction with a suite of strategies for promoting PA throughout the community. The website promotes the free availability of these materials and the 10,000 steps concept and 'brand'. The website also provides access to style guides, instructions and supporting materials for the development of a pedometer library loan scheme, information relating to walkway signage, and materials to support general practitioners and other health care providers.

Registered providers are given access to copies of all the original project materials, which may be adapted for local use, provided that the 'style guide,' which ensures consistent use of program logos, colours, and styles, is adhered to. Registered providers may also access the 'Train-the-Professional-Guide' for physical activity, an edu-

cational resource which aims to 'upskill' health professionals in knowledge about and promotion of health-related physical activity.

## Results

Data on website statistics and registration information have been collected on an ongoing basis since May 2004, and were used to evaluate the adoption and implementation of the program. 'Adoption' was defined as the number of website hits, the number of registered members, and the number of registered providers. 'Implementation' was assessed using registered members' step-log data, the number of workplace challenges, and the number of communities initiating a local 10,000 steps program.

### Adoption

#### Website hits

A web-based tracking program was initiated in May 2004 to gather data relating to the number of hits, visits and unique 'visitors' to the 10,000 steps webpage. Statistics were collected on a daily basis and summarised into monthly hits. In the 23-month period to March 2006, there were over 21 million hits on the webpage, which included more than a quarter of a million visits by more than 120,000 different individuals (see Table 1). This equates with an average of more than 900,000 hits, generated by an average of more than 5000 unique visitors per month.

#### Registered members

As registration is only required to access the interactive aspects of the program, not all visitors to the website are required to become registered members. As of March 2006, 18,388 members were registered on the 10,000 steps website. Two-thirds of these were women (12,132, compared with 6256 men). The age distribution of registered members is shown in Table 2. Mean age was 40.46 years (S.D. 11.74), with male registrants on average 2.6 years older than female registrants (mean age of men = 42.2 (11.37); women 39.6 (11.84);  $t_{16907} = 13.75$ ,  $p < 0.0001$ ).

#### Registered providers

Between August 2004 and March 2006, 529 individuals became registered providers of the 10,000 steps program, with access to materials for the workplace challenge(s) and to the community-based style guides and resources.

**Table 1** Summary of web-hits, visits and unique visitors to [www.10000steps.org.au](http://www.10000steps.org.au): May 2004 through March 2006

Month	Unique visitors (per month)	Number of visits (per month)	Web hits (per month)
May 2004	704	1309	224435
June 2004	1481	2742	344620
July 2004	1977	4007	1150760
August 2004	2247	4671	1107394
September 2004	4597	7395	798804
October 2004	2550	5260	570824
November 2004	2448	5902	559194
December 2004	3089	6099	500237
January 2005	2783	5683	461757
February 2005	2825	5460	470884
March 2005	4111	7917	701836
April 2005	6609	12577	1065685
May 2005	7697	14957	1277923
June 2005	8313	18032	1394958
July 2005	6683	15167	1018350
August 2005	7288	16611	1102338
September 2005	8709	19357	1468968
October 2005	9668	22654	2398387
November 2005	8102	18784	1293578
December 2005	5943	12664	797054
January 2006	7774	15721	989370
February 2006	7513	17135	957130
March 2006	9438	21296	1071021
23-Month totals	122549	261400	21725507
Mean monthly values	5328	11365	944587

## Implementation

### Steps logged

Between January 2004 and March 2006, over 8.41 billion steps have been logged by the 18,388 members, with an average of 457,000 steps per registered member. The cumulative step count logged from January 2004 until March 2006 is shown in Fig. 1. The marked increase in logged steps in August–September 2005 coincided with the uptake of the workplace challenge by a number of large corporations.

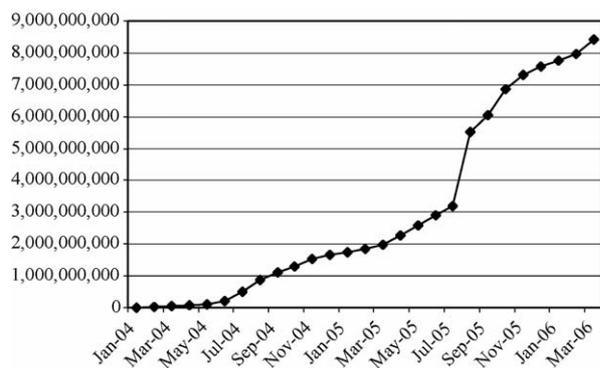
### Workplace challenges

Since 2004, 95 different workplaces have also implemented a workplace challenge with in excess of 50,000 employees participating. The majority of these (70/95) used the online materials and format for their projects. Workplaces adopting the program ranged in size from 3 to 17,000 employees (median size 200). The largest adopters of the workplace challenge were federal and state government departments (41.8%), and private corporations (37.4%). One-third of the workplaces adopted the program in multiple locations, with almost 20%

**Table 2** Age and gender distribution of registered participants (web-based)

Age group	Male		Female		Total sample	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
<20 years	90	1.6	299	2.7	389	2.3
20–29 years	771	13.4	2352	21.1	3123	18.5
30–39 years	1531	26.5	2983	26.8	4514	26.7
40–49 years	1748	30.3	2903	26.1	4651	27.5
50–59 years	1305	22.6	2158	19.4	3463	20.5
60 years and older	327	5.7	442	4.0	769	4.5
Mean ages (S.D.)	42.17	11.37	39.57	11.84	40.46	11.74

Note: 1479 participants declined to provide their age.



**Figure 1** Cumulative steps logged on 10,000 steps web-site January 2004–March 2006.

of participating organizations adopting the program at state- or nation-wide levels. The balance of organisations (53%) taking part in the program did so at a single site.

### Community initiation

Since 2004, 13 communities, ranging in size from 7000 to over 100,000 people, have initiated a 10,000 steps program. Ten of these communities are using the 10,000 steps community name, as developed for the original 10,000 steps Rockhampton project. Each participating community is responsible for its own evaluation. In Queensland, the *active communities* pages now support the work of 13 newly appointed physical activity officers, who have been employed by Queensland Health to promote physical activity in communities across the state.

### Discussion

This paper provides insights into the effectiveness of the website used to disseminate the 10,000 steps program across Queensland and throughout Australia in the 2-year period from 2004 to 2006. In view of their potential to reach large numbers of the population at moderate cost,<sup>17</sup> most internet approaches to health promotion have, to date, focused on delivering physical activity<sup>18,19</sup> or weight loss programs<sup>20,21</sup> to a dedicated, recruited sample. Little is known about the potential of the internet to disseminate health promotion ideas and resources for use beyond the site for which they were originally developed.

This is important, because large scale public health interventions are often complex and context dependent,<sup>24</sup> and require significant investment in their development. By making the 10,000

steps ideas and resources more widely available, at least 13 additional communities and 95 workplaces have initiated physical activity promotion programs based on the 10,000 steps concept. By building on existing and tested strategies, it is likely that these communities have benefited from significant time and cost savings in the development of their interventions.

In terms of promoting increased awareness and behaviour change to individuals, the data from this project demonstrate the remarkable capacity for web-site strategies to reach large numbers of people. A previous example of a population-wide program which aimed to increase population awareness of and participation in physical activity is 'Canada-on-the-Move' which used a web-based platform that supported the free distribution of pedometers in cereal boxes.<sup>22</sup> The website, launched in December 2003, captured self-report data from individuals willing to 'donate their steps' to health research and included information about pedometer use. Compared with the Canada-on-the-Move website,<sup>22</sup> which recruited 3173 people to log their steps in the first 10 months of existence, the web-based approach to dissemination of our 10,000 steps program is notable for its remarkable reach, with over 120,000 unique visitors to the website, and over 18,000 registered members over a 2-year period. The high number of 'hits' made by each visitor is evidence that the website content is of interest, and, at the time of publication, it remains as an evolving entity, with modifications being initiated on a regular basis to retain interest and relevance to the target user-groups – inactive and low-active adults across Queensland and throughout Australia.

The data presented are consistent with previous findings relating to the 10,000 steps project, which suggest that women were more likely than men to become involved with the program.<sup>12</sup> The Canada-on-the-Move website also found significantly more women than men registered for their program.<sup>22</sup> These findings suggest a need for further research into gender differences in the adoption of population based physical activity programs.

As this paper describes the evaluation of a dissemination strategy, it does not provide evidence to support of the use of pedometers and related support materials for behaviour change outcomes. It is not possible to tell whether people made significant changes to their behaviour as a result of their engagement with the web-site, although the step-log indicates an increase in activity in the sub-sample of users who are tracking their steps (data not shown here). At the time of writing, a detailed

follow-up survey of regular step-log users is underway.

In general, the internet provides a relatively efficient way to disseminate health promotion information and program resources. It must however be acknowledged that socially disadvantaged individuals and groups may not have access to the internet, and may not belong to workplace groups or other organisations that might participate in this type of health promotion program. It is therefore plausible that this approach to dissemination reaches only a relatively advantaged section of the population, and more work is required to examine cost-effective strategies for disseminating the 10,000 steps program to socially disadvantaged and hard to reach portions of the population.

## Conclusion

On the basis of the data presented here, it would appear that the internet can be used effectively for the widespread dissemination of the ideas and resources developed in a 'demonstration' project, so that other communities do not have to 're-invent the wheel' for physical activity promotion. While every community will be different, widespread dissemination of resources which can be adopted and adapted for local application might assist in 'activating' communities, beyond the geographical boundaries of the original project. In order to have a positive impact on public and population health, there remains a need to systematically study dissemination methods such as the one described here, to ascertain whether this type of dissemination results in any sustained changes in physical activity levels in populations.<sup>13,15,25</sup>

## Practical implications

- Improved understanding of the dissemination of evidence-based activity promotion initiatives will help us to better translate research into practice.
- The internet can be an effective way of providing information and support materials in the dissemination of community-based programs.
- More systematic approaches to the study of dissemination of existing programs are required to ascertain whether dissemination efforts result in any sustained changes in physical activity levels in populations.

## Acknowledgments

Funding for the 10,000 steps Rockhampton implementation and dissemination projects was provided by Queensland Health. We are grateful to Dr. Nicola Burton for her helpful comments on an earlier version of this paper.

## References

1. Bauman AE. Updating the evidence that physical activity is good for health: an epidemiological review 2000–2003. *J Sci Med Sport* 2004;7(1 Suppl.):6–19.
2. Brown WJ. Physical activity and health: updating the evidence 2000–2003. *J Sci Med Sport* 2004;7(1 Suppl.):1–5.
3. Wareham NJ, van Sluijs EM, Ekelund U. Physical activity and obesity prevention: a review of the current evidence. *Proc Nutr Soc* 2005;64(2):229–47.
4. Brownson RC, Boehmer TK, Luke DA. Declining rates of physical activity in the United States: what are the contributors? *Annu Rev Public Health* 2005;26:421–3.
5. Craig CL, Russell SJ, Cameron C, Bauman A. Twenty-year trends in physical activity among Canadian adults. *Can J Public Health* 2004;95(1):59–63.
6. Stone EJ, McKenzie TL, Welk GJ, Booth ML. Effects of physical activity interventions in youth. Review and synthesis. *Am J Prev Med* 1998;15(4):298–315.
7. Proper KI, Koning M, van der Beek AJ, Hildebrandt VH, Bosscher RJ, van Mechelen W. The effectiveness of worksite physical activity programs on physical activity, physical fitness, and health. *Clin J Sport Med* 2003;13(2):106–17.
8. Brown WJ, Eakin EG, Mummery WK, Trost SG. 10,000 steps Rockhampton: establishing a multi-strategy physical activity promotion in a community. *Health Promot J Austr* 2003;14(2):95–100.
9. Schofield G, Mummery K, Steele R, Brown W. Engaging a local council to promote physical activity: the case of dog walking in the 10,000 steps Rockhampton project. *Health Promot J Austr* 2004;15(1):78–81.
10. Eakin EG, Brown WJ, Marshall AL, Mummery K, Larsen E. Physical activity promotion in primary care Bridging the gap between research and practice. *Am J Prev Med* 2004;27(4):297–303.
11. Pickering K, Eakin EG. Using pedometers to increase physical activity in a family planning clinic: a feasibility study. *Health Promot J Austr* 2003;14:165–70.
12. Brown W, Mummery K, Eakin EG, Schofield G. 10,000 steps Rockhampton: evaluation of a whole community approach to improving population levels of physical activity. *J Phys Act Health* 2006;3(1):1–14.
13. Kerner J, Rimer B, Emmons K. *Introduction to the special section on dissemination: dissemination research and research dissemination: how can we close the gap?* *Health Psychol* 2005;24(5):443–6.
14. Sorensen G, Emmons K, Hunt MK, Johnston D. Implications of the results of community intervention trials. *Annu Rev Public Health* 1998;19:379–416.
15. Dzawaltowski DA, Estabrooks PA, Glasgow RE. The future of physical activity behavior change research: what is needed to improve translation of research into health promotion practice? *Exerc Sport Sci Rev* 2004;32(2):57–63.
16. Ellis P, Robinson P, Ciliska D, Armour T, Brouwers M, O'Brien MA, et al. A systematic review of studies eval-

- uating diffusion and dissemination of selected cancer control interventions. *Health Psychol* 2005;24(5):488–500.
17. Evers KE. eHealth promotion: the use of the Internet for health promotion. *Am J Health Promot* 2006;20(4 Suppl.):1–7, iii.
  18. Napolitano MA, Fotheringham M, Tate D, Sciamanna C, Leslie E, Owen N, et al. Evaluation of an internet-based physical activity intervention: a preliminary investigation. *Ann Behav Med* 2003;25(2):92–9.
  19. McKay HG, King D, Eakin EG, Seeley JR, Glasgow RE. The diabetes network internet-based physical activity intervention: a randomized pilot study. *Diabetes Care* 2001;24(8):1328–34.
  20. McCoy MR, Couch D, Duncan ND, Lynch GS. Evaluating an internet weight loss program for diabetes prevention. *Health Promot Int* 2005;20(3):221–228. Epub 2005 Mar 29.
  21. Tate DF, Wing RR, Winett RA. Using Internet technology to deliver a behavioral weight loss program. *JAMA* 2001;285(9):1172–7.
  22. Plotnikoff RC, Spence JC, Tavares LS, Rovniak LS, Bauman A, Lear SA, et al. Characteristics of participants visiting the Canada on the move website. *Can J Public Health* 2006;97(1 Suppl.):S28–35, S30–8.
  23. Ainsworth BE, Haskell WL, Whitt MC, Irwin ML, Swartz AM, Strath SJ, et al. Compendium of physical activities: an update of activity codes and MET intensities. *Med Sci Sports Exerc* 2000;32(9 Suppl.):S498–504.
  24. Rychetnik L, Frommer M, Hawe P, Shiell A. Criteria for evaluating evidence on public health interventions. *J Epidemiol Commun Health* 2002;56(2):119–27.
  25. Glanz K, Steffen A, Elliott T, O’Riordan D. Diffusion of an effective skin cancer prevention program: design, theoretical foundations, and first-year implementation. *Health Psychol* 2005;24(5):477–87.

Available online at [www.sciencedirect.com](http://www.sciencedirect.com)

