Physical Activity Promotion in Primary Care
Bridging the Gap Between Research and Practice

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Background: While a growing literature supports the effectiveness of physical activity interventions delivered in the primary care setting, few studies have evaluated efforts to increase physician counseling on physical activity during routine practice (i.e., outside the context of controlled research). This paper reports the results of a dissemination trial of a primary care–based physical activity counseling intervention conducted within the context of a larger, multi-strategy, Australian community-based, physical activity intervention, the 10,000 Steps Rockhampton Project.

Methods: All 23 general practices and 66 general practitioners (GPs, the Australian equivalent of family physicians) were invited to participate. Practice visits were made to consenting practices during which instruction in brief physical activity counseling was offered, along with physical activity promotion resources (print materials and pedometers). The evaluation, guided by the RE-AIM framework, included collection of process data, as well as pre- and post-intervention data from a mailed GP survey, and data from the larger project's random-digit-dialed, community-based, cross-sectional telephone survey that was conducted in Rockhampton and a comparison community.

Results: Ninety-one percent of practices were visited by 10,000 Steps staff and agreed to participate, with 58% of GPs present during the visits. General practitioner survey response rates were 67% (n =44/66 at baseline) and 71% (n =37/52, at 14-month follow-up). At follow-up, 62% had displayed the poster, 81% were using the brochures, and 70% had loaned pedometers to patients, although the number loaned was relatively small. No change was seen in GP self-report of the percentage of patients counseled on physical activity. However, data from the telephone surveys showed a 31% increase in the likelihood of recalling GP advice on physical activity in Rockhampton (95% confidence interval [CI]=1.11–1.54) compared to a 16% decrease (95% CI=0.68–1.04) in the comparison community.

Conclusions: This dissemination study achieved high rates of GP uptake, reasonable levels of implementation, and a significant increase in the number of community residents counseled on physical activity. These results suggest that evidence-based primary care physical activity counseling protocols can be translated into routine practice, although the initial and ongoing investment of time to develop partnerships with relevant healthcare organizations, and the interest generated by the overall 10,000 Steps program should not be underestimated.
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Introduction

That physical **inactivity** is a key public health issue[1,2] is brought into even sharper focus by recent attention to the obesity "epidemic."[3,4] It is also increasingly acknowledged that primary care physicians (known as general practitioners [GPs] in Australia) have a key role to play in population health.[5,6] Although there is some disagreement as to the quality of the evidence base,[7] a growing literature supports the efficacy of physical activity promotion in the primary care setting.[8–10]

Large-scale, methodologically sound, randomized clinical trials of primary care–based physical activity interventions have been conducted in the United States,[11–14] Australia,[15–17] the United Kingdom,[18–21] and New Zealand,[22,23] with the majority demonstrating short-term effectiveness. Typically these trials have been efficacy or effectiveness studies,[24,25] conducted according to controlled research protocols. Most have involved training GPs or allied health professionals (e.g., nurses, health educators, or exercise specialists) to conduct brief physical activity counseling, and have

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included print materials, and in some cases, follow-up visits or telephone calls. General practitioners involved in these studies were asked to alter their usual practice to implement the intervention and were alerted to their patient's willingness to be involved by a research assistant screening patients in the waiting room. These efficacy trials provide clear evidence that primary care–based interventions can work under controlled research conditions, but it is now time to investigate how this research evidence translates into the routine practice of primary care.[24–29]

This paper describes the results of a primary care–based physical activity counseling dissemination trial conducted as part of the Australian 10,000 Steps Rockhampton project. In brief, 10,000 Steps Rockhampton was a 2-year, multi-strategy, community-based, physical activity intervention project funded by the state health department (see Brown et al.[30] for a detailed project description). The project involved significant collaboration with community stakeholders and the implementation of five key strategies: (1) media campaign; (2) engaging GPs and other health professionals in promoting physical activity; (3) work-site physical activity promotion; (4) working with local government on environmental supports (i.e., signage and walking trails); and (5) a small grants scheme for community groups. Outcomes of the overall project on community levels of physical activity will be reported elsewhere. This paper focuses on efforts to engage **all** Rockhampton physicians in the promotion of physical activity, with an emphasis on provider uptake and implementation. Consequently, the RE-AIM framework was used to guide the evaluation.[25,26] The RE-AIM framework includes five dimensions that address the potential for a health behavior intervention to achieve a population health impact: reach (the percent and representativeness of the target population that participates in the intervention); effectiveness (the extent to which the intervention achieves its anticipated outcomes, i.e., increased levels of physical activity among primary care patients); adoption (the percent and representativeness of healthcare settings or providers who agree to participate); implementation (the degree to which the intervention is conducted as intended); and maintenance (at the patient level, the extent to which intervention effects are sustained over time, and at the systems level, the extent to which the intervention becomes a part of routine practice).

Methods

Rockhampton is a typical, Australian regional city of 60,000 inhabitants with a primary agrarian economy. The 10,000 Steps Rockhampton GP strategy was developed and implemented in collaboration with the Rockhampton Division of General Practice. In Australia, Divisions are federally funded, regional bodies that provide support to physicians (e.g., continuing medical education), and facilitate the implementation of various federally funded healthcare initiatives (e.g., immunization, diabetes management guidelines) at the local level. In addition, a "champion" GP worked closely with the project team to develop and pilot intervention materials, as well as to actively promote the strategy to other GPs. The strategy only targeted GPs, because in Australia, no other health professional group works consistently as part of the primary care team (i.e., nurses are found in only 37% of Australian general practices).

The GP strategy had four major components:

Increasing GP awareness of the importance of physical activity promotion in primary care and of the 10,000 Steps Rockhampton program. GPs were exposed to the project's media campaign that ran throughout the project. This included paid television and radio spots, newspaper coverage of 10,000 Steps community events, and a weekly newspaper column describing project updates. In addition, a 10,000 Steps column was placed in the Division newsletter on a semiregular basis.

Training GPs in physical activity counseling techniques,[31–33] via two continuing medical education workshops related to the role of physical activity in the prevention and management of chronic diseases.

Practice visits to provide physical activity counseling materials and 10,000 Steps resources. Visits with all practices that agreed to participate enabled 10,000 Steps staff to discuss the GP's role in promoting physical activity, and explain how the 10,000 Steps resources could be used. The 10,000 Steps resources included a 10,000 Steps physical activity brochure specifically designed for the general practice setting; 10,000 Steps posters, laminated, physical-activity counseling tip sheets to remind the GP to "Ask, Advise, Assist, and Arrange"[33]; and pedometers.

Promotion of pedometer loans in general practice. Pedometers were a novel component of the 10,000 Steps project, and were incorporated, where feasible, into all key project strategies. Five pedometers were given to all participating GPs to loan to their patients. The suggested protocol was brief physical activity counseling, provision of the 10,000 Steps brochure (which explained how to use the pedometer to increase activity), and a month-long pedometer loan, with GP follow-up. A $5 deposit for the pedometer was suggested, and a pedometer loan tracking sheet provided.

Evaluation

As this was a dissemination trial, the primary focus of the evaluation was on GP and practice-level uptake and implementation, and not on patient-level changes in physical activity, as these have been extensively evaluated in previous trials.[8–10] The RE-AIM framework was used to guide the evaluation.[25,26] However, the RE-AIM indicators used in this study were revised in consultation with their author (Russell Glasgow, Kaiser Permanente Clinical Research Unit, Denver, CO, personal communication, March 2004) to suit the context of this dissemination trial. Each RE-AIM indicator as it applies to this trial is described below, along with the data sources used to evaluate them.

1. Reach refers to the percentage of the eligible population that participates in a given intervention. In this trial, "reach" was not an applicable dimension, as the focus was on engaging GPs, not patients.

2. Adoption (also referred to as uptake) refers to the percentage of practices and GPs who agreed to participate in the 10,000 Steps Rockhampton project. Adoption was assessed using process data on the outcomes of practice visits (percent of practices accepting a visit and agreeing to participate, percent taking up brochures and posters, and percent taking pedometers).
3. Implementation refers to the extent to which practices and GPs used the 10,000 Steps resources and reported counseling patients on physical activity. Implementation was measured via a pre-post, mailed GP survey. The survey included demographic/practice characteristics; a question on GP awareness of the 10,000 Steps project; questions on GP use of 10,000 Steps brochures (not used, left in waiting room, given to patients, used to counsel patients on physical activity); use of pedometers (number loaned); and a question about the percentage of patients counseled on physical activity in an average week (0% to 100% rating scale, increasing in increments of 10, at 0%, 10%, 20%, etc.).
4. Effectiveness refers to the change in GP awareness of the 10,000 Steps program, and the extent to which GP involvement in the 10,000 Steps Rockhampton project had an impact at the population (i.e., community) level. Community-level change was evaluated using data collected by independent cross-sectional, random-digit-dial telephone surveys conducted with adult residents of Rockhampton and a comparison community. These surveys were conducted to assess the impact of the overall 10,000 Steps Rockhampton project,[30] and assessed self-reported recall of receiving GP counseling on physical activity in the past year.[30]
5. Maintenance refers to the extent to which GPs would continue to participate in the 10,000 Steps Rockhampton project beyond the period of the initial evaluation. This was assessed in the post-program mailed survey via GPs' intention to continue using program resources to counsel patients on physical activity.

Project Timeframe

The random-digit-dial, pre–post community telephone surveys were conducted in September 2001 and 2003. The pre–post GP surveys were conducted in February–March 2002, and March–April 2003. Practice visits were conducted in August–September 2002.

Data Analysis

Data from the GP surveys and practice visits were analyzed using SPSS, PC version 11.0 (SPSS Inc., Chicago, 2001). All data were cleaned, checked for outliers, and tested for assumptions of normality. Descriptive statistics were used to present results of the GP survey and the outcomes of practice visits. Changes in GP self-reported counseling were evaluated using chi-square tests for categorical variables and Mann–Whitney tests for continuous variables (due to non-normality). Changes in the independent community telephone survey respondents' self-reported receipt of GP advice on physical activity were analyzed using logistic regression.

General practitioner turnover in Rockhampton between the pre- and post-surveys was high (see Results section). Consequently, results of the pre–post GP survey were treated as independent samples. Data from the smaller sample who completed the survey at both time points (n =26) were analyzed as paired data. However, this did not change the results in any way; therefore, only results from the comparison of independent samples are presented.

Table 1. Characteristics of GPs completing the 10,000 Steps Rockhampton, pre- and post-mailed surveys

Characteristic	Baseline sample (n=44/66) Mean (SD) or %	Follow-up sample (n=37/53) Mean (SD) or %
% Male	70.5%	62.2%
Number of GPs in practice		
1–2	36.4%	42.9%
3–4	45.5%	48.6%
>5	18.2%	8.6%
Years in practice	15.5 (10.4)	17.7 (9.3)
Hours/week spent consulting	37.9 (12.5)	39.9 (11.5)
Patients/hour	4.6 (1.0)	4.5 (1.1)
Sessions/week nurse in practice	7.2 (4.2)	7.2 (4.7)

GP, general practitioner; SD, standard deviation.

Results

Setting

At the start of the 10,000 Steps Rockhampton project, there were 66 GPs in 23 general practices in Rockhampton. At post-test 14 months later, there were 52 GPs in 22 practices. During the project period, 6 new GPs took up practice, 19 GPs ceased practicing, and 1 practice closed.

GP Survey Response Rates and GP Characteristics

After two mailings and up to five follow-up telephone calls, GP response rates were 67% at baseline (44/66) and 70% at post-test (37/52). Table 1 shows the GP and practice characteristics at baseline and post-test. There were no significant differences in GP characteristics between the two samples (all chi-square and Mann–Whitney U test p values >0.05). General practitioner characteristics of both samples largely mirror those of the GPs in the local Division from which the samples were drawn, at least in terms of the percent of male GPs and number of GPs in the practice (both chi square p values >0.05), the only two GP characteristics tracked by the local Division.

RE-AIM Indicators

Adoption (uptake). Twenty-one of 23 practices (91%) accepted a practice visit from 10,000 Steps staff and agreed to participate in the project. The visits averaged 20 minutes (range 5 to 60 minutes) and were most

frequently attended by GPs, followed by other health professionals (e.g., nurses), and office managers. Of the 55 GPs practicing in Rockhampton at the time of the practice visits, 32 GPs (58%) participated in the meetings, with at least one GP in attendance at 19 (90%) of the 21 practices visited. During the visits, all 21 practices agreed to display the 10,000 Steps resources and 20 (95%) took pedometers to loan to their patients. In terms of individual practitioners, 38 (69%) of the 55 GPs in Rockhampton took a bank of five pedometers to loan to their patients.

Implementation

10,000 Steps posters and brochures. Data from the pre- and post-GP surveys showed an increase in the proportion of GPs who displayed physical activity posters in their practice (32% to 81%; $\chi^2=19.7$, df=1, $p<0.001$). Of those with posters displayed at post-test, 78% were 10,000 Steps posters. At post-test, 81% of GPs reported using the 10,000 Steps brochures, with 47% of these leaving them for patients to take on their own, 37% making a point of giving them to patients, and 33% using them to counsel patients on physical activity. (Percentages total more than 100% because multiple responses were possible.)

Physical activity counseling. At baseline, GPs reported that they counseled approximately 30% of their patients about physical activity in a week (range 0% to 80%). This did not increase significantly at post-test (median=30%; range 5% to 80%; Mann–Whitney U test, $p>0.05$). The rating scale for this item, which increased in increments of 10%, may not have been sensitive enough to detect the smaller increases in counseling as reported by the community respondents in the cross-sectional telephone surveys (see below).

Pedometer loans. The implementation of pedometers loans in the practice was difficult to assess, as the pedometer loan tracking sheets provided to each practice were generally not used. In the post-program GP survey, GPs were asked how many pedometers they had loaned out since receiving them. Each consenting GP received a bank of five pedometers, with approximately 7 months between distribution of pedometers and the post-program survey. Thus, at a maximum, each GP could have completed 35 pedometer loans. Seventy percent ($n=26$) of the 37 GPs who completed the post-program survey indicated that they had loaned pedometers to patients. Of these, 11 (42%) had loaned each pedometer once or less, while 8 (31%) had loaned each pedometer at least three times (see Figure 1).

Effectiveness

General practitioner awareness of the 10,000 Steps project increased significantly from 46% at baseline to 97% at the 14-month follow-up ($\chi^2=25.3$, df=1,

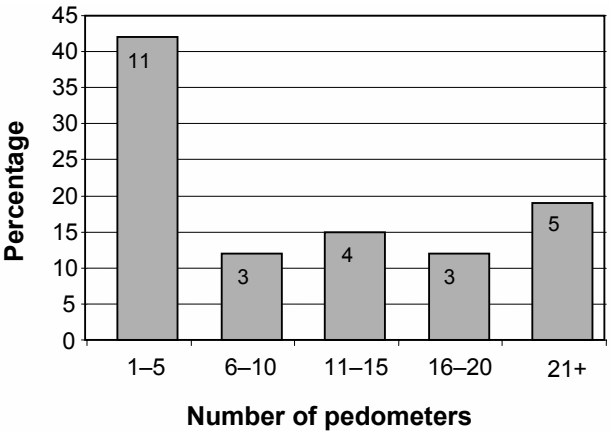

Figure 1. Proportion of general practitioners who loaned pedometers over 7-month project period ($n=26$).

$p<0.001$). Data from the community cross-sectional telephone surveys showed a slight increase in the proportion of Rockhampton residents reporting receipt of advice on physical activity from their GP in the past year between the baseline (23.2%) and follow-up (27.1%) surveys (Figure 2). Meanwhile, in the comparison community, recall of receipt of GP advice decreased from 23.4% at baseline to 20.6% at follow-up. Logistic regression analysis adjusting for age and gender showed that Rockhampton residents were 31% more likely to receive advice from their GP on physical activity in 2003 than in 2001 (odds ratio [OR]=1.31, 95% confidence interval [CI]=1.11–1.54), while in the comparison community, there was a nonsignificant 16% decreased likelihood of receiving advice (OR=0.84, 95% CI=0.68–1.04). (Response rates for the 10,000 Steps project telephone surveys were 46% ($n=2333$) at baseline and 44% ($n=2469$) at follow-up.[30]

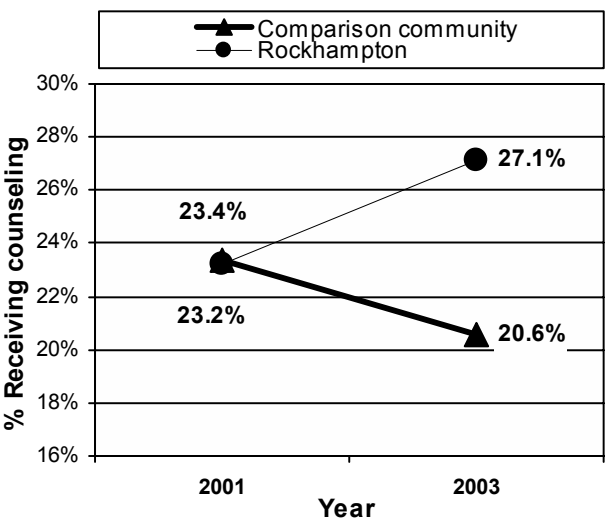

Figure 2. Percentage of community sample reporting receipt of general practitioner advice on physical activity and associated odds ratios adjusted for age and sex.

Maintenance

In the post-program survey, 81% of GPs surveyed indicated that they planned to continue using the 10,000 Steps brochures and 68% planned to continue using the pedometers. The Division of General Practice also indicated its continuing interest in working with 10,000 Steps on the promotion of physical activity within the region.

Discussion

Evaluation of the 10,000 Steps Rockhampton GP strategy provided an opportunity to bridge the gap between research and practice on primary care–based physical activity promotion. To our knowledge, it is one of the first attempts to evaluate the level of program implementation that GPs can achieve outside the context of a prescribed/controlled research study. Furthermore, this dissemination trial is the first attempt to evaluate the use of pedometers for promoting physical activity in primary care.

This real-world endeavor is both a strength and a limitation, as the evaluation did not include a nonintervention group of GPs/practices, and relied on GP and practice staff self-reports for many of the outcomes. In addition, sample size was too small to analyze results by practice in order to assess the effect of clustering.

Using the RE-AIM framework to guide the evaluation, a high rate of **adoption** (uptake) of the intervention was found (i.e., 91% of practices and 58% of GPs). Participation rates of GPs in randomized trials of physical activity promotion in primary care, when reported, have ranged from 35% to 100% (median=74%), although for the majority of these trials, the denominator was rarely all GPs in a given region, as in the current investigation.[9]

Acknowledging that direct observation is a more reliable and valid means of assessing GP behavior,[34] GP **implementation** of the 10,000 Steps resources (i.e., posters, brochures, pedometers) was reasonably good. The majority of GPs reported using the brochures (81%), and of these, 70% gave the brochure to patients and/or assisted the patient to complete the physical activity prescription page at least some of the time. While no increase in GPs' self-reported physical activity counseling was found, the response scale for this survey item (10% increments) may not have been sensitive enough capture the small magnitude of change, as observed in the telephone survey of community residents.

The number of GPs who agreed to loan pedometers to their patients was higher than anticipated, with 69% of GPs and 87% of practices accepting them. General practitioners viewed pedometers as a novel device that could be used to more accurately track patients' physical activity. However, only about one third of GPs reported loaning pedometers on an ongoing basis. While anecdotal, it was observed during the practice visits that practices with systems and teams in place to handle patient education and other preventive counseling activities[6,35] were better able to incorporate the pedometer loans into practice procedures (e.g., generally with one staff member, such as the nurse or receptionist taking responsibility for the loans). More work needs to be done to further evaluate the potential of pedometer loans in the general practice setting, including the provision of a larger number of pedometers, and potentially outsourcing pedometer loans to community-based organizations such as libraries (to which patients could be referred).

Overall, the most important outcomes of this dissemination trial are the population-level effects.[36] Residents in Rockhampton were 31% more likely to receive GP advice on physical activity across the project period, compared with a nonsignificant 16% decrease in the comparison community (**effectiveness**). The translation of this intervention to other communities or healthcare settings should consider the context in which the GP strategy was implemented, as well as the resources required. The GP strategy was supported by a community-based project involving a mass media campaign (i.e., TV, radio, Internet, newspapers, posters, brochures) to promote the 10,000 Steps message repeatedly over 18 months. Other activities included 10,000 Steps signage placed along walking paths throughout the community, 10,000 Steps workplace promotional activities, and involvement of other health professionals (i.e., pharmacists, mental health specialists, physical therapists, dietitians, and veterinarians). While it is not possible to quantify the impact of the wider community-based project on the outcomes achieved by the GP strategy, the health promotion literature and models such as the social ecological framework that guided this work[27] suggest that these multilevel activities would have a synergistic effect.[26–30]

The time spent to engage the local Division of General Practice as a partner in the GP strategy and the importance of its support are also important factors to consider. Division support was solicited at the inception of this project, and Division representatives participated in all aspects of the project, from the writing of the project proposal, to Rockhampton-specific tailoring and pilot testing of GP intervention materials, to the endorsement of the project that the Division communicated to its member GPs over the course of 18 months. Maintaining Division support throughout the project, while an important factor in the project's success, was also a challenge. The Division had a high level of staff turnover, which required reestablishing of the relationship with them at least three times during the course of this project. The only other published GP physical activity counseling dissemination trial is an Australian program

What This Study Adds . . .

This paper contributes to the literature on physical activity promotion in primary care by addressing the translation of research into practice.

It reports the results of a dissemination trial that demonstrated that primary care physicians in an Australian regional city could routinely counsel their patients on physical activity.

The trial took place as part of a larger, multicomponent, community-based physical activity intervention project called 10,000 Steps Rockhampton.

(Active Script) that promoted the use of a physical activity prescription pad and targeted Divisions of General Practice (rather than individual practices). Sims et al.[37] were unable to track the exact number of participating GPs, but estimated that approximately 43% of GPs within the participating 35% of Divisions took part. They also describe the significant investment of time required to develop relationships with their participating Divisions, and attribute the strength of these relationships to their outcomes.

The ability of the evaluation to inform the issue of **maintenance** is minimal, as the timeframe involved was relatively short. The initial dissemination effort may be able to achieve greater long-term effects through continued work with the local Division to advance physical activity as a priority in its continuing medical education program, in conjunction with other ongoing aspects of the community-wide project.

Future Directions

More dissemination studies are needed in this area.[28,38] Future work should investigate methods for improving the uptake and sustained delivery of physical activity counseling in primary care. This might include evaluating the role of nonphysician members of the primary care team in intervention delivery,[6,35] and the impact of targeting the primary care team to improve their own physical activity levels,[39] as well as the use of technological tools (e.g., computers, pedometers) to enhance program delivery.[40] Future efforts should also evaluate the impact of improving links between primary care and community supports for physical activity.[41] The importance of engaging local and state health organizations as well as nongovernmental organization partners should not be underestimated, as it is these bodies who may have the greatest potential to both initiate and provide ongoing support for the promotion of physical activity in the primary health care setting. Local media may also be an important partner in this regard, both in terms of its ability to widely broadcast information on the importance of physical activity, as well as highlighting the role of primary care in promoting physical activity (e.g., "Want to get active? Your doctor can help!").

We are especially grateful to the Capricornia Division of General Practice (Rockhampton, Australia) for their continued support of this project, and to the general practitioners in Rockhampton who have made it a priority to promote physical activity to their patients, and especially to Ingrid Frances, MD, our "GP champion." Thanks also to the entire 10,000 Steps Rockhampton team and the many community partners who helped translate the evidence base into action. Finally, thanks to Kate Troy for her enthusiastic assistance with data management and analysis, and for assistance with manuscript preparation. We gratefully acknowledge the funding support of this project from Queensland Health.

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