



SWISH

Schools Working to Improve Staff Health

FINAL REPORT



SWISH: SCHOOLS WORKING TO IMPROVE STAFF HEALTH

SWISH

Schools Working to Improve Staff Health

PARTNERS



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“Thank you to all principals and school staff who have volunteered to participate in SWISH and provided the data that have informed this evaluation.”

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EXECUTIVE SUMMARY

OVERVIEW

In 2019, there were almost 150,000 full-time equivalent teaching staff in Australian primary schools [1]. The evidence suggest that levels of overweight and obesity in educational staff are similar to, or higher, than the general population [2]. Health promotion initiatives in the workplace have great potential to contribute to the prevention of chronic diseases, including type-2 diabetes, heart disease and cancer [3-5]. Although freely accessible to workplaces, physical activity and/or dietary workplace programs appear to be under-utilised in school settings.

Schools Working to Improve Staff Health (SWISH) was a pilot program jointly funded by the Teachers Health Foundation and Hunter New England Population Health with additional in-kind support provided from the NSW Department of Education (DoE) School Sport Unit.

The primary aim of the SWISH pilot was to assess the feasibility and acceptability of a program to support schools to implement existing health promotion programs targeting physical activity and diet. The secondary aim was to evaluate the preliminary efficacy of SWISH, by examining potential changes in the physical activity and dietary behaviours of school staff.

"...levels of overweight and obesity in educational staff are similar to, or higher, than the general population"



To address these aims, we undertook a pilot randomised controlled trial with 18 schools from one NSW local health district (i.e., Hunter New England). Each school was supported by a health promotion officer to implement a number of physical activity and healthy eating initiatives that were freely available in the state, including:

- NSW DoE Premier's Sporting Challenge for Staff (a step count challenge)
- Energisers (short physical activity breaks)
- Crunch&Sip® (a vegetable and fruit program)
- Swap It (a healthy lunchbox program)
- SwitchUrSip (a sweetened drinks program)

To facilitate the implementation of these initiatives, participants were supported with the development and maintenance of action plans and received educational resources (e.g., posters), as well as weekly messages promoting physical activity and diet.

The study commenced with baseline data collection in Term 1 2019, with 311 staff from 18 schools consenting to participate. Following baseline data collection, nine of the schools were randomised to receive the program, which was delivered in Terms 2 and 3 2019. Follow-up data collection then took place in Term 4, 2019. The program was offered to the nine waitlist-control schools after follow-up data collection was completed.

To assess the acceptability and feasibility of the program, we collected self-reported data via pen-and-paper questionnaires from participating principals, teachers and school champions. In addition, we conducted qualitative interviews with school champions (i.e., one per school), to learn about their perceptions and experiences of the program. To assess the preliminary efficacy of SWISH, we collected accelerometer-measured physical activity data using wrist-worn devices, as well as data on dietary behaviours (in line with current guideline recommendations) via validated, self-reported measures included in the pen-and-paper questionnaires.

MAIN FINDINGS

Survey and interview feedback with staff showed that the SWISH project was feasible and acceptable to primary school staff, with the majority of staff indicating a high level of satisfaction with the program components and resources.

Participants in the intervention group showed a larger increase in daily minutes of walking- and running-type activities from baseline to follow-up, compared to those in the control group. Both groups reported an increase in their daily minutes of sedentary-type activities from baseline to follow-up, and a small decrease in daily minutes of stationary-type activities. Compared to control schools, staff in the SWISH intervention schools reported a greater increase in the proportion of staff meeting recommendations for the minimum amount of fruit (i.e., 2 or more serves) and vegetables (i.e., 5 or more serves) consumed each day.



RECOMMENDATIONS

Based on these findings, we recommend schools offer health promotion initiatives to improve fruit and vegetable consumption to all school staff. Offering a program that supports the uptake and engagement by staff in existing programs may be an acceptable and appropriate approach that requires limited cost and resources. However, large, randomised controlled trials are needed to evaluate the effect of the SWISH program on staff health behaviours. Future research should also focus more strongly on changes in physical activity at higher (i.e., moderate and/or vigorous) intensity, rather than just focusing on activity of light intensity.

SECTION 1: INTRODUCTION

A large number of Australian adults (i.e., 67%) are overweight or obese, with certain health behaviours contributing to this high prevalence [6]. Two key modifiable health behaviours that can help reduce this prevalence are physical activity and a healthy diet [6]. However, the majority of Australian adults report insufficient levels of physical activity and do not meet dietary behaviour guidelines, with approximately 55% not meeting physical activity guidelines [7] and less than 1 in 10 adults meeting the recommended daily amount of vegetables consumed [8].

Evidence suggests that staff employed in educational settings report poorer health and are less likely to meet guideline recommendations for health behaviours (e.g., physical activity, diet), than those in other occupations [2, 9]. With more than 60 million staff employed globally, educational settings have considerable potential to influence the health behaviours of a large number of adults. Improvements in staff health behaviours could also have positive effects on students, as school staff are in a position to act as role models for students and peers [10, 11]. However, only a small number of studies have targeted the health behaviours of school staff and most of these have only included classroom teachers without consideration of the broader spectrum of school staff (e.g., administrative staff, librarians, maintenance workers) [12-14]. To build an environment for staff and students that prioritises health and wellbeing through a whole-of-school approach, we propose that all school staff be included in health promoting programs.

The implementation of workplace health promotion initiatives has been recommended as a strategy to prevent chronic diseases, including type-2 diabetes, heart disease and cancer [3-5]. A number of jurisdictions in Australia offer free dietary

"With more than 60 million staff employed globally, educational settings have considerable potential to influence the health behaviours of a large number of adults."

and/or physical activity programs for workplaces. Nonetheless, the implementation of these programs in school settings appears to be low. Effective and scalable initiatives that can be delivered to the population are needed to improve the health and wellbeing of school staff [15]. Such initiatives may also prove beneficial to the education system by reducing staff absenteeism, sick leave and workplace injuries, thus reducing costs to both the health and education systems [16-18].

Therefore, the main aim of the SWISH pilot study was to assess the feasibility and acceptability of a program that supports primary schools to implement existing health promoting programs targeting staff members' physical activity and dietary practices. A secondary aim was to evaluate the preliminary efficacy of the SWISH program by identifying potential improvements in the physical activity levels and dietary behaviours in line with guideline recommendations of school staff following participation in the program.

"Effective and scalable initiatives that can be delivered to the population are needed to improve the health and wellbeing of school staff"

SECTION 2: STUDY METHODS

ETHICS APPROVAL AND DATA STORAGE

Approval to conduct this study was obtained from the HNE Human Research Ethics Committee (No. 2018/ETH00356), the NSW Department of Education (No. 2018834) and the University of Newcastle Human Research Ethics Committee (No. H-2018-0480). All collected data were stored securely on the institutional network drive with access only provided to researchers involved in the project.

DESIGN

A cluster randomised controlled trial design was used, where schools were randomised to receive the SWISH intervention or serve as a wait-list control.

SETTING

The study was undertaken in the Hunter New England (HNE) region (see Figure 1 below). This region covers a large geographical area (i.e., more than 130,000 km²), has a socioeconomically and demographically diverse adult population and lists more than 400 primary schools.

SCHOOL SAMPLE

Government primary schools from the HNE region of New South Wales were considered eligible for participation unless they were currently participating in another physical activity or healthy eating intervention; central schools (i.e., had both primary and secondary students); or catered exclusively for children requiring specialist care.



Figure 1: Hunter New England region within New South Wales
Source: <https://www.health.nsw.gov.au/lhd/Pages/default.aspx>

As SWISH was a pilot trial primarily focused on establishing acceptability and feasibility of the SWISH program, the number of schools invited to participate in the trial was limited to 20 schools. Based on high participation rates (i.e., 88-100%) in previous teacher physical activity trials [19], we expected approximately 200 staff would participate in the program, based on an estimated average of 11 staff per school, of which 90% were expected to consent. A sample of this size would allow us to assess the acceptability and feasibility of SWISH within schools, as well as conduct a preliminary evaluation of the effect of SWISH on staff health behaviours. In line with the objective of a pilot study [20], a trial of this size was not powered to detect a statistically significant difference in staff health behaviour outcomes between groups. Instead, it was conceptualised to provide important information regarding the variability in the outcome, which is required to inform the planning of a larger, fully powered effectiveness trial.

"A sample of this size would allow us to assess the acceptability and feasibility of SWISH within schools, as well as conduct a preliminary evaluation of the effect of SWISH on staff health behaviours"

SCHOOL AND STAFF RECRUITMENT

The principals of eligible schools were contacted by the research team and provided with written information describing the study. Principals who were interested in enrolling their school were asked to provide written consent. Following principal consent, school staff were provided with an information package outlining the purpose of the study and data collection procedures. Staff were then asked to provide written informed consent. Participation was voluntary.

RANDOMISATION

Following baseline data collection, schools were stratified based on geographic location (i.e., major cities vs. inner regional Australia). They were then randomly allocated to either the intervention group, which would receive the SWISH program, or serve as a wait-list control group. Schools allocated to the wait-list control did not receive any components of the SWISH program during the study period. However, once the study was completed, these schools were offered the program. Figure 2 below shows the geographic locations of participating schools across the HNE region.

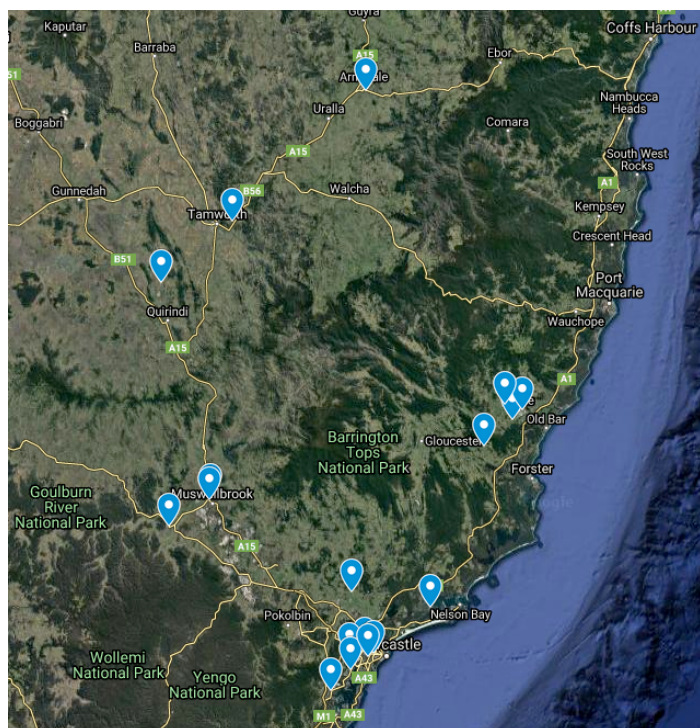


Figure 2
Map of participating schools across the Hunter New England region

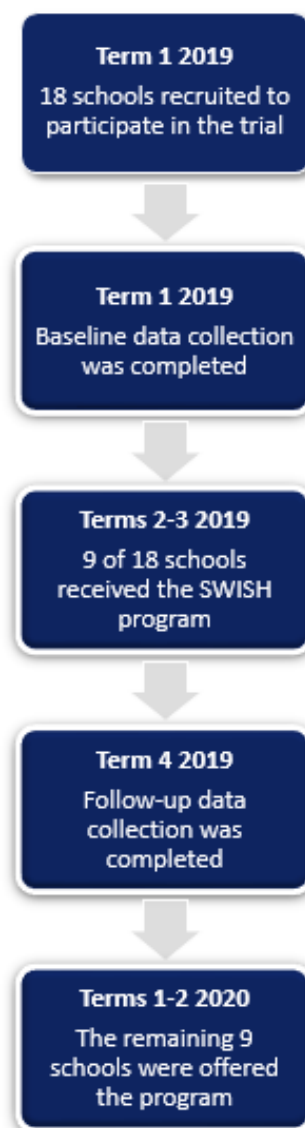


Figure 3
Overview of project milestones

PROJECT MILESTONES

Schools were recruited and all baseline data collected in Term 1, 2019. Schools that were allocated to the intervention group received the program during Terms 2 and 3 of 2019, and schools that were allocated to the waitlist-control group were offered the program during Terms 1 and 2 of 2020, after completion of follow-up data collection (see Figure 3 for a flow chart including further detail).

SECTION 3: INTERVENTION DESCRIPTION

To target physical activity and dietary behaviours in school staff, SWISH incorporated existing freely available programs that were designed and developed to specifically promote the health and wellbeing of school students and adapted for school staff. In line with a whole-of-school approach, SWISH was designed to utilise student-focused programs that are suitable for staff to engage in and participate actively along with their students. The core programs utilised in SWISH included, the NSW Premier's Sporting Challenge (PSC), Energisers, Crunch&Sip®, Swap It and SwitchUrSip. These programs were selected on the basis that they aligned well with established theoretical frameworks (e.g., Social Cognitive Theory [21]) and incorporated evidence-based behaviour change techniques (e.g., goal-setting and self-monitoring). Moreover, the selected programs have potential to be scaled up in the future as they use cost-effective modes of delivery such as mobile phone apps, whilst being compatible with a wide range of individual needs and resources (e.g., school facilities, equipment).

"In line with a whole-of-school approach, SWISH was designed to utilise student-focused programs that are suitable for staff to engage in and participate actively along with their students. The core programs utilised in SWISH included, the NSW Premier's Sporting Challenge (PSC), Energisers, Crunch&Sip®, Swap It and SwitchUrSip."

To facilitate program adoption, schools were provided a range of support strategies from the HNE health promotion team:

- obtaining school executive support for program implementation,
- identifying and training of in-school champions,
- provision of resources (e.g., educational material and suggestions), and
- use of prompts and reminders.

Table 1 provides a detailed description of each of the program components.



Table 1
SWISH Intervention Components

PHYSICAL ACTIVITY PROGRAMS	
Premier's Sporting Challenge (PSC)	PSC is a 10-week multi-faceted app-based program. PSC encourages staff to work towards meeting physical activity guidelines by monitoring and recording their own physical activity "steps" through the 'PSC Tracker App', and also includes online resources to help participating staff achieve their physical activity goals. The research team provided staff with pedometers to keep track of their daily step count.
Energizers	Energisers are short bouts of physical activity that break up sitting time. Teaching staff were encouraged to implement these during class time and participate with their students by using freely available online platforms such as GoNoodle which offer a variety of physical activity videos. For non-teaching staff, they were encouraged to embed short activity breaks during their normal duties through activities such as regular energiser breaks, walking to a classroom instead of using the telephone, using printers, etc. that are farther away, taking the stairs where possible. Non-teaching staff were also encouraged to set up desktop activity reminders to prompt these activities.
NUTRITION PROGRAMS	
Crunch&Sip®	Crunch&Sip® is a time during class where students can consume a piece of vegetable and fruit they have brought from home and to drink water. Schools were encouraged to implement this program and teaching staff were encouraged to participate with their class while it was advised that non-teaching staff "break" at the same time to eat their vegetables and fruit.
Swap-It/ SwitchUrSip	SWAP IT is an evidence-based program that encourages 'swaps' from discretionary food items to healthier alternatives known as 'everyday' foods. SwitchUrSip is another existing program that was designed to reduce sugar-sweetened intake in adolescents. These programmes, use an existing school communication App (Skoolbag) to 'push' messages and resources to staff on how to make simple healthier swaps to their lunches and catering for staff gatherings etc. from 'less healthy' foods and beverages for 'healthier' everyday items. Messages were sent weekly to all staff who downloaded the app and joined the Staff Health group within the app. For schools that did not have access to Skoolbag, one weekly email was sent to respective schools including information that was identical to that in the Skoolbag messages for distribution via their usual communication channels. Staff also received a booklet to take home which included images of recommended food and drink swaps (from 'Sometimes' to 'Everyday' options) and images of food items that address identified barriers such as time, cravings and staff sharing occasions, a staffroom resource folder including recipes, staffroom posters, and a water bottle.
IMPLEMENTATION STRATEGIES	
Executive support	Principals were asked to actively participate in SWISH and to demonstrate support for the program through ongoing communication with staff.
Centralised technical assistance	A health promotion practitioner (School Support Officer) provided ongoing technical assistance, consultation and implementation and to help schools' overcome barriers as they arose.
Identification and induction of school champions	Each school nominated one in-school champion who were responsible for driving the implementation of SWISH in their school. To prepare the in-school champion for their role the school support officer delivered a 3hr training session which included; an overview of the program aims and objectives, provided education about the SWISH program, advice for timeline planning, and tools and resources to assist with program implementation (e.g., action plans). Further, in-school champions were encouraged to form a staff committee which was made up of participating school staff to help with the program implementation.
Induction of all school staff	School champions delivered a brief SWISH presentation to all staff during a staff meeting which overviewed; the different SWISH programs and relevant resources, how to download the PSC and Skoolbag App, the proposed school action plan. To maintain motivation for recommended practices, school champions were encouraged to include the SWISH program as a regular agenda item at staff meetings.
Distribution of resources	In-school champions and committees received an "intervention manual" which included templates, guidelines and intervention plans to support the development of an action plan for the implementation of the intervention in their school. All schools received all resources essential for each of the programs e.g. posters, water bottles etc.

SECTION 4: STAFF PERCEPTIONS OF THE FEASIBILITY AND ACCEPTABILITY OF THE SWISH PROGRAM

The primary aim of this trial was to assess the feasibility and acceptability of the SWISH program from the perspective of school staff. This section describes the methods and results relevant to this aim.

METHODS

SAMPLE

All consenting staff from the nine participating intervention schools were eligible to complete this survey. This included 9 school executives, 9 school champions and 132 staff.

DATA COLLECTION PROCEDURES AND MEASURES

Consenting school staff from intervention schools completed a self-administered pen-and-paper questionnaire at follow-up. A range of measures were used to assess the feasibility and acceptability of both the SWISH program and the implementation support provided by the research team. The research team also kept project records to monitor intervention fidelity (i.e., delivery of the program as intended) and reach.

Principal's perceptions of the feasibility and acceptability of the SWISH program

To determine school executive's perceptions of the implementation of the SWISH program, three measures drawn from a previously validated tool with a single item each assessing program acceptability, feasibility and appropriateness [22] were used. Principals were asked to indicate on a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree), to what extent to which they felt that a school program like SWISH (1) meets their approval, (2) seems fitting and (3) seems implementable.

Staff perceptions of the acceptability of the SWISH program

School staff were asked to indicate, using a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree), if they thought that adopting a program like SWISH as a long-term initiative to promote school staff health was important. Further, they were also asked to report how satisfied (extremely satisfied, very satisfied, moderately satisfied, slightly satisfied, not at all satisfied) they were with the various SWISH programs and resources they were provided.



School champions perceptions of the acceptability of the implementation support

School champions were the conduit between the research team and the school for delivery of the SWISH program, as well as a key component of the implementation support. Details including the characteristics of participating school champions are provided above in Table 2. Given their key role in the program, school champions were asked to report how satisfied (extremely satisfied, very satisfied, moderately satisfied, slightly satisfied, not at all satisfied) they were with the various implementation support strategies the research team provided, i.e., obtaining school executive support, support from the school support officer, school champion training and intervention tools and resources.

Staff acceptability of use of school champions to support implementation of SWISH

To enable scalability of the SWISH program, school champions were trained to support their schools' implementation of SWISH rather than members of the research team visiting schools one on one. Thus, school staff were asked to report how satisfied (extremely satisfied, very satisfied, moderately satisfied, slightly satisfied, not at all satisfied) they were with the skills and knowledge, manner and dedication, communication and access to and contact with their school champion.

Indicators of program fidelity and reach

Aspects of fidelity and reach were appraised by evaluation staff who compared protocols for program delivery and conduct, as prepared by the research team prior to commencement of the study, against the project records that were kept by school support officers for the duration of the study. Fidelity of the SWISH program and implementation strategies were assessed via indicators recommended by the Treatment Fidelity Workgroup of the National Institutes of Health (NIH) Behavioral Change Consortium [23]. Indicators of program fidelity included:

1

Adherence to the randomised waitlist-controlled design of the trial: was assessed via calculation of the percentage of schools and staff who were maintained in the group they were originally randomised to.

2

Delivery of standardised training components to school support officers and school champions: The number of the planned training components that were delivered to school support staff and school champions was calculated.

3

Consistency of contact (e.g., correspondence, in-school visits): All correspondence between the research team/school support officers and members of participating schools (i.e., principals, admin staff, school champions) were recorded.

4

Delivery of intervention content to schools: All schools had to receive equal information (e.g., purpose, objective and target outcomes of SWISH), resources and materials (e.g., posters, water bottles) to facilitate the implementation of SWISH.

5

Implementation of the program by school champions: School champions were asked to record the extent to which they delivered the specified support strategies to staff within their school.

6

Measurement of outcomes (including compliance and completion of assessments) as per protocol: Participants completion rates were recorded.

ANALYSIS

Program acceptability, feasibility and fidelity were analysed using descriptive statistics, including frequencies and percentages for categorical data and means and standard deviations for continuous data. The response options related to measures of satisfaction were dichotomised as either satisfied ('extremely'/'very'/'moderately') or not satisfied ('slightly'/'not at all').

RESULTS**PARTICIPANTS**

Overall 8 of 9 principals, all 9 school champions and 107 of 132 (81%) school staff (exclusive of school executives and school champions) from intervention schools completed pen-and-paper questionnaires providing data regarding the feasibility and acceptability of SWISH. Participant characteristics are presented in Table 2.

PRINCIPAL'S PERCEPTIONS OF THE FEASIBILITY AND ACCEPTABILITY OF THE SWISH PROGRAM

The majority of principals agreed or strongly agreed that a school program like SWISH is implementable (7 of 8) and seems fitting (6 of 8). Most school principals (7 of 8) agreed or strongly agreed that the SWISH program met their approval.

STAFF PERCEPTIONS OF THE ACCEPTABILITY OF THE SWISH PROGRAM

The majority (70%) of school staff either strongly agreed or agreed that adopting a program like SWISH was important. The majority of staff were satisfied with the SWISH programs. Crunch&Sip® was the program most staff were satisfied with (80%). The resources that staff were most satisfied with were those that were made available in school staff rooms, i.e., folder including information and example strategies, such as exercises and healthy recipes (68%) and program posters (69%). Messages and prompts received through the Skoolbag app and email were the least used resource by staff, with almost a third indicating that they did not use this resource. Staff's level of satisfaction with each program and resource is shown in Table 3.

Table 2

Overview of characteristics of intervention group participants who provided data

Characteristics	School Executives (n=8)	School Champions (n=9)	School Staff (n=107)
Age in years, Mean (SD)	48.9 (8.10)	40.8 (13.67)	41.4 (11.86)
Gender, n (%)			
Male	1 (12.50)	4 (44.44)	13 (12.26)
Female	7 (87.50)	5 (55.56)	93 (87.74)
Employment status, n (%)			
Permanent full-time	8 (100.00)	3 (37.50)	27 (47.37)
Temporary full-time	0 (00.00)	3 (37.50)	24 (42.11)
Permanent part-time	0 (00.00)	0 (00.00)	2 (3.51)
Temporary part-time	0 (00.00)	2 (25.00)	4 (7.02)
Casual	0 (00.00)	0 (00.00)	0 (00.00)
Years of experience			
Mean (SD)	22.5 (6.37)	14.8 (12.45)	11.1 (8.52)
Range	12-30	1-30	0-42
Classroom teacher, n (%)			
Yes	2 (33.33)	5 (71.43)	42 (58.33)
No	4 (66.67)	2 (28.57)	30 (41.67)

Note. Not all participants answered all questions at follow-up. Therefore, the number of available responses ranges from 6-8 for school executives, 7-9 for school champions and 57-107 for school staff.

Table 3

Staff satisfaction with SWISH program components and resources

Level of satisfaction with...	Satisfied	Not satisfied	Did not do
Program components			
... NSW Premier's sporting challenge (n=67)	40 (60%)	14 (21%)	13 (19%)
... Energisers (n=64)	42 (66%)	12 (18%)	15 (23%)
... Crunch&Sip® (n=65)	52 (80%)	7 (11%)	6 (9%)
... messages/prompts through Skoolbag App or email messaging (n=67)	35 (52%)	11 (16%)	21 (31%)
Resources			
... water bottle (n=70)	66 (95%)	1 (1%)	3 (4%)
... staffroom folder (n=68)	46 (68%)	12 (18%)	10 (15%)
... posters (n=69)	43 (62%)	7 (11%)	11 (16%)
... fridge booklet (n=69)	40 (58%)	17 (25%)	12 (17%)
... action plans (n=67)	38 (57%)	11 (16%)	18 (27%)

Note. Number of responses may differ from the total sample size due to participants not giving valid answers for all questionnaire items.

SCHOOL CHAMPIONS’ PERCEPTIONS OF THE ACCEPTABILITY OF THE IMPLEMENTATION SUPPORT

Table 4 shows that all school champions were satisfied with all aspects of the implementation strategies delivered by the research team to support their adoption of the SWISH program.

Table 4
School champions’ satisfaction with implementation support

Level of satisfaction with...	Satisfied	Not satisfied
... support from executives	7 (100%)	0 (0%)
... support officer’s skills and knowledge	7 (100%)	0 (0%)
... support officer’s manner and dedication	7 (100%)	0 (0%)
... the quality of the school champion training day	7 (100%)	0 (0%)
... the quality of the intervention materials	7 (100%)	0 (0%)
... the choice of resources	7 (100%)	0 (0%)
<i>Note.</i> Number of responses may differ from the total sample size due to participants not giving valid answers for all questionnaire items.		

STAFF ACCEPTABILITY OF USE OF SCHOOL CHAMPIONS TO SUPPORT IMPLEMENTATION OF SWISH

Table 5 outlines staff satisfaction with the school champion. More than two-thirds of staff were satisfied with the delivery of SWISH by the School Champion. The top three components rated by staff were: the skills and knowledge of their school champion (94%), the school champion’s manner and dedication (89%), and their communication (79%).

Table 5
Staff ratings of their level of satisfaction with the delivery of the program through their School Champion

Level of satisfaction with ...	Satisfied	Not satisfied	Did not use
... skills and knowledge of SC (n=70)	66 (94%)	1 (1%)	3 (4%)
... manner and dedication (n=71)	63 (89%)	8 (11%)	N/A
... communication with SC (n=71)	56 (79%)	15 (21%)	N/A
... contact with SC (n=67)	44 (66%)	12 (18%)	11 (16%)
<i>Note.</i> Number of responses may differ from the total sample size due to participants not giving valid answers for all questionnaire items.			



PROGRAM FIDELITY AND REACH

The review of project records against in situ protocols showed satisfactory levels of program fidelity and reach for most of the indicators. Specifically:

1

Adherence to the randomised waitlist-controlled design of the trial: was adhered to, with all staff and schools remaining within the groups they were originally randomised to. However, one of the control schools (out of five control schools who provided data on this aspect) indicated that staff partook in the Premier's Sporting Challenge while participating in SWISH. This may have resulted in an increase in physical activity (i.e., daily step counts) for this particular school.

2

Delivery of standardised training components to school support officers and school champions: school support officers and school champions were trained without any significant deviations from the original protocol.

3

Consistency of contact: The amount, frequency and intervals at which all correspondence and in-school visits occurred were consistent between schools (i.e., none of the schools skipped any of the scheduled contacts and rescheduling of contacts was kept within reasonable timeframes).

4

Delivery of intervention content to schools: Staff at intervention schools received equal information about the objective, purpose and target outcomes of the program. During school champions training days, each intervention school received the same materials and resources required to implement the SWISH program. However, in two schools, materials and resources were misplaced or not accessible for staff when needed.

5

Implementation of the program by school champions: School champion feedback to school support officers was inconsistent and it was difficult to determine the extent to which they fulfilled the necessary trial components to support delivery of the SWISH program to staff.

6

Measurement of outcomes (including compliance and completion of assessments) as per protocol: A large proportion of consenting participants provided data via baseline (89%) and follow-up (77%) pen-and-paper questionnaires. However, staff compliance with accelerometers was poor, with only 60% of staff providing valid data at baseline and follow-up.

SECTION SUMMARY

- Most principals and school staff believe that staff health programs like SWISH are important.
- Overall, the majority of teachers, school champions and school staff reported that the SWISH program was acceptable and feasible to deliver.
- Educational resources that focused on information delivery only appeared to be the most acceptable. However, research suggests that such strategies do not lead to behaviour change. Therefore, such resources should be delivered alongside other approaches that use evidence-based active strategies that are effective in promoting behaviour change, such as tailored or targeted messaging.
- Selection of the right school champion is essential to ensuring a program like SWISH is well received by staff and the support strategies are delivered.
- Election of more than one school champion may help overcome issues with delivery of support strategies to staff, as it could help address issues such as absence of the primary school champion and provide an additional avenue to ensuring all materials are received and delivered to staff.
- Strategies to increase participant compliance with accelerometers are warranted. While including additional alternate measures of physical activity may help to reduce missing data and assess reliability of the activity levels reported.

SECTION 5: PRELIMINARY EFFICACY OF SWISH

The secondary aim of this trial was to explore the potential effect SWISH had on teacher's health behaviours. Specifically, we aimed to assess the difference between the control and intervention groups change in:

- Physical activity, and
- Fruit and vegetable intake

METHODS

SAMPLE

All 311 staff members who agreed to participate by giving written consent were eligible to participate in this part of the trial evaluation.

DATA COLLECTION PROCEDURES AND MEASURES

Staff physical activity

Wrist-worn accelerometers (ActiGraph Model GT9X Link, ActiGraph Corporation, Pensacola, FL) were used to measure participants' average daily minutes in physical activity during school hours at baseline and follow-up. Accelerometry is valid and reliable, and the most widely accepted alternative to measuring physical activity using self-report [24]. Participating school staff were asked by trained research assistants, blinded to group allocation, to wear the accelerometers on their non-dominant wrist for seven consecutive days, at both baseline and follow-up, except during water-based activities and showering, and during contact sports such as rugby or martial arts.

School day data were classified as valid if staff wore the accelerometers for at least 75% of the school day (defined as the total time between each schools' individual bell times). Non-wear periods were identified according to established procedures [25]. Wear time was calculated by subtracting non-wear time from the total monitoring time for the school day.

To account for the variation in movement behaviours and potential change in movement behaviours at a particular intensity, we examined changes in four individual activity segments:

- 1 sedentary activities (i.e., sitting still),
- 2 stationary activities (i.e., sitting actively, standing still and standing actively),
- 3 walking activities (i.e., corresponding to activities of light intensity) or
- 4 running activities (i.e., corresponding to activities of moderate and vigorous intensity)

To obtain these four segments, accelerometer-measured data were scored by a Random Forest Activity Classification Model [24], which assigns each 10 second window to one of the four segments based on the patterns within the data.

Fruit and vegetable intake

Changes in dietary behaviours were measured via self-administered pen-and-paper questionnaires at both time points (i.e., baseline and follow-up). Participants answered two items from the NSW Population Health Survey asking the number of daily serves of vegetables and fruit they usually consume per day. National guidelines state adults should consume two or more serves of fruit and five or more serves of vegetables per day [26].

311

staff members agreed to
participate in the evaluation.

ANALYSIS

Differences between the intervention and control schools in the change in school staff's health outcomes, from baseline to follow-up, were analysed using mixed regression models. Physical activity outcomes were compared using generalised linear mixed models with a Gaussian distribution and an identity link function, while the proportion of staff meeting recommended amounts of fruit and vegetable intake were compared using generalised linear mixed models with a binomial distribution and logit link function. Models were fitted separately for each outcome and included: a random intercept for schools to account for clustering by school, a participant-level random intercept nested within schools to account for repeated measurements taken on staff, and fixed effects for experimental group (control or intervention), time (baseline or follow-up), as well as a time by group interaction term. The interaction term provides an estimate of the difference between the two groups with regards to the average change in the outcome from baseline to follow-up, and is thus used to evaluate the effect of the SWISH program on the target outcomes. Each model was also controlled for important prognostic factors and factors associated with missing follow-up data by including them as fixed effects in the model. These prognostic factors included: age, sex, employment status and SEIFA. Models of physical activity outcomes also included a fixed effect for wear time. Coefficients from the group by time interaction term and 95% confidence intervals are presented in the results. As this is a pilot study and thus, not powered to detect statistically significant differences, p-values are not interpreted.

RESULTS

Sample

Of the 311 consenting staff, 289 provided valid school day accelerometer data at baseline and 188 at follow-up. For the pen-and-paper questionnaires, 276 staff provided data at baseline and 238 at follow-up.

Characteristics of the 276 participants who provided baseline survey data are presented in Table 6.

Physical activity

Both the intervention and control groups increased their average minutes of school-based activity (i.e. walking and running) from baseline to follow-up, with the intervention group recording a larger increase than the control group of approximately 4.15 minutes and 0.19 minutes, respectively. Both groups also reported a decrease in their average

minutes of school-based stationary behaviour, again with a larger decrease recorded in the intervention group (-4.42 minutes; 95% CI: -14.04, 5.20). Despite these differences being in the anticipated direction, the 95% confidence intervals are large and span both negative and positive values, highlighting the inconclusive nature of these results. Furthermore, both the control and intervention groups increased their average minutes of school-day sedentary behaviour, with a slightly smaller, but negligible increase in the intervention group (-0.05 minutes, 95% CI: -10.20, 10.10). Again, these results are inconclusive with the 95% confidence intervals spanning both negative and positive values. Table 7 shows the differences between intervention and control groups in mean minutes of accelerometer-measured physical activity on school days.

FRUIT AND VEGETABLE INTAKE

The percentage of staff from the intervention group meeting guideline recommendations increased from baseline to follow-up for both vegetable consumption (12.5% vs 21.74%) and fruit consumption (61.81% vs. 71.74%). This is compared to the control group who reported a decrease in vegetable consumption (19.83% vs. 10.00%) and fruit consumption (70.25% vs. 67.14%). The difference in the odds of staff consuming vegetables and fruit according to guidelines was larger in the intervention group with the ratio of odds ratios from the time by group interaction term being above 1 for both outcomes (4.27 and 1.71, respectively). Furthermore, the result from the interaction term for vegetable consumption was particularly high and all values of the 95% confidence intervals were above one (OR = 4.27; 95% CI: 1.20, 15.28), highlighting the positive difference between the intervention and control groups for this outcome. Table 8 shows differences between intervention and control groups in the change from baseline to follow-up in the proportion of staff meeting nutritional guidelines (based on pen-and-paper questionnaires).

Table 6
Baseline characteristics of participating school staff by group

Characteristics	Intervention (n = 149)	Control (n = 127)
SEIFA^a (based on school post code). n (%)		
Most disadvantaged [NSW 2016]	38 (25.33)	41 (32.54)
Least disadvantaged [NSW 2016]	112 (74.67)	85 (67.46)
ARIA^b (based on school post code). n (%)		
Inner regional Australia	106 (70.67)	85 (67.46)
Major cities of Australia	44 (29.33)	41 (32.54)
Age. Mean (SD)	41.3 (11.48)	43.3 (11.95)
Gender. n (%)		
Male	20 (13.70)	19 (15.57)
Female	126 (86.30)	103 (84.43)
Employment status. n (%)		
Permanent full-time	67 (46.53)	48 (40.00)
Temporary full-time	51 (35.42)	33 (27.50)
Permanent part-time	9 (6.25)	19 (15.83)
Temporary part-time	15 (10.42)	17 (14.17)
Casual	2 (1.39)	3 (2.50)
Main role. n (%)		
School executive (i.e., principal)	9 (6.16)	8 (6.56)
Deputy/assistant/executive principal	11 (7.53)	3 (2.46)
Classroom teacher	71 (48.63)	54 (44.26)
Learning and Support Teacher (LAST)	3 (2.05)	7 (5.74)
Teacher's aide	19 (13.01)	18 (14.75)
Relief from face-to-face (RFF) teacher	7 (4.79)	8 (6.56)
Librarian	3 (2.05)	4 (3.28)
Student teacher	0 (0.00)	0 (0.00)
Groundskeeper/maintenance staff	2 (1.37)	1 (0.82)
Administration staff	14 (9.59)	13 (10.66)
Aboriginal education officer	2 (1.37)	1 (0.82)
Other*	5 (3.42)	5 (4.10)
Years of experience in role. Mean (SD)	12.0 (9.03)	14.0 (10.95)
<i>Note.</i> ^a schools were classified as residing in either a least or most socially disadvantaged area based on their postcodes using socio-economic indexes for areas (SEIFA) as per Australian Bureau of Statistics (ABS) [27]. The ABS defines relative socio-economic advantage and disadvantage based on access to material and social resources, and the ability to participate in society [27]. Schools that were located in the top 50% of NSW post codes based on their 2016 SEIFA were classed as the least socially disadvantaged and those in the bottom 50% of NSW post codes were classed as the most socially disadvantaged; ^b school post codes were also used to categorize their location as either 'inner regional Australia' or 'Major cities of Australia' based on the 2016 Accessibility/Remoteness Index of Australia [28]; * the 5 'other' roles staff listed were instructional leader, Schools as Community Centres (SACC) facilitator, school counsellor, intervention teacher and intern. Not all participants answered all questions and therefore, the number of answers available for analysis ranged from 237 to 268.		

Table 7

Differences between intervention and control groups in mean minutes of accelerometer-measured physical activity on school days.

Physical activity (in minutes)	Intervention				Control					
	Baseline (n=594*)	Follow-up (n=381*)	Time effect		Baseline (n=499*)	Follow-up (n=295*)	Time effect		TimexGroup effect	
	Mean (SD)	Mean (SD)	Mean difference (95% CIs)	p-value	Mean (SD)	Mean (SD)	Mean difference (95% CIs)	p-value	Differential effect (95% CIs)	p-value
Sedentary activities	130.33 (55.69)	135.15 (55.18)	6.30 (-0.36; 12.95)	0.06	119.18 (51.50)	124.45 (49.47)	6.35 (-1.31; 14.01)	0.10	-0.05 (-10.20; 10.10)	0.99
Stationary activities	198.42 (52.77)	187.32 (52.43)	-12.18 (-18.49; -5.88)	<0.001	208.94 (49.09)	201.19 (48.57)	-7.76 (-15.03; -0.50)	0.038	-4.42 (-14.04; 5.20)	0.37
Walking activities	30.29 (18.21)	36.20 (25.33)	5.50 (2.49; 8.51)	<0.001	29.00 (14.71)	30.92 (18.80)	1.35 (-2.14; 4.85)	0.45	4.15 (-0.46; 8.76)	0.08
Running activities	0.40 (1.35)	0.52 (1.45)	0.11 (-0.16; 0.39)	0.42	0.63 (2.26)	0.58 (2.00)	-0.08 (-0.40; 0.24)	0.63	0.19 (-0.23; 0.61)	0.37

Note. Models were adjusted for age, gender, employment status and SEIFA and included clustering effects for schools and individuals. *The n available for these outcomes reflect days of valid data that were available for analysis, where individual participants have contributed between 1 and 7 days of data.

Table 8

Differences between intervention and control groups in the change from baseline to follow-up in the proportion of staff meeting nutritional guidelines (based on pen-and-paper questionnaires).

Meeting recommendations	Intervention				Control					
	Baseline	Follow-up	Time effect		Baseline	Follow-up	Time effect		TimexGroup effect	
	n (%)	n (%)	OR (95% CIs)	p-value	n (%)	n (%)	OR (95% CIs)	p-value	OR (95% CIs)	p-value
Vegetable intake (i.e., 5 or more serves per day)	18 (12.5%)	20 (21.74%)	1.94 (0.91; 4.13)	0.09	24 (19.83%)	7 (10.00%)	0.45 (0.16; 1.26)	0.13	4.27 (1.20; 15.28)	0.025
Fruit intake (i.e., 2 or more serves per day)	89 (61.81%)	66 (71.74%)	1.76 (0.94; 3.28)	0.08	85 (70.25%)	47 (67.14%)	1.03 (0.50; 2.10)	0.94	1.71 (0.66; 4.42)	0.260

Note. OR = Odds ratio; models were adjusted for age, gender and the clustering effects of school and using multiple observations per participant.

SECTION SUMMARY

- Following participation in the SWISH program, the change in the odds of staff in the intervention schools meeting guideline recommendations for fruit and vegetable intake was higher than those from the control school.
- Results showed a significant impact on staff vegetable intake, highlighting the potential of SWISH to change staff behaviour.
- Promising results were also seen with regards to staff physical activity, where the observed effects occurred in the hypothesised direction and favoured the intervention group for most outcomes, except sedentary behaviour. However, these differences were small and the 95% confidence intervals contained both negative and positive values, reflecting the uncertainty of the effect of SWISH on these outcomes.
- Due to the pilot design of this study, future, large-scale evaluations should be undertaken to realise the true impact of the SWISH program on staff health behaviours.



SECTION 6: SCHOOL CHAMPIONS PERCEPTIONS OF SWISH

School champions are an important component of the implementation strategies used to support the SWISH program. They were trained to deliver and encourage staff engagement with the program at their school. Due to their importance in the sustained delivery of the program, we conducted in-depth qualitative interviews with school champions to learn more about their experience with delivering SWISH to school staff. This section describes the methods and results of these interviews. These data will be used to inform future improvements to the program.

METHODS

Sample

All nine school champions in participating intervention schools were invited to complete interviews.

Data collection procedures

SWISH research staff invited in-school champions from each school to participate in a 15-20 minute face-to-face interview during the follow-up data collection period. Two research staff members who had no prior contact with schools, conducted semi-structured interviews with consenting in-school champions. The interviewers were trained in qualitative interviewing techniques and were not involved in the research project. Interviews were recorded using a digital voice recorder, and written notes were also taken. If participants declined consent for their interview to be recorded, only written notes were taken. The purpose of these interviews was to facilitate a more comprehensive assessment of SWISH than solely quantitative data would provide.

Measures

A semi-structured interview guide was developed by the research team. It was piloted with research staff who have expertise in qualitative research methods. The interview guide was structured by subtopics, with similar questions grouped together to ensure a coherent flow for discussion. Interview questions related to the experiences of in-school champions during the implementation of SWISH.

Analysis

A multistep process was used to analyse qualitative data. Each audio-recorded interview was de-identified, transcribed and any identifiable comments were anonymised. Transcripts were then entered into the qualitative analysis program NVivo. Analysis was performed according to Braun & Clarke's framework for thematic analysis [29]. This procedure involves (1) becoming familiar with the data, (2) generating initial codes, (3) searching for key themes, (4) reviewing key themes, (5) defining the key themes and (6) writing up the findings [29, 30].

Two researchers independently read each interview transcript and assigned codes to responses and notable comments made by in-school champions. Similar codes were then grouped, assigned more broadly to themes and placed into pre-determined categories (i.e., enablers to program implementation, challenges to program implementation, recommendations for improvement, recommendations for sustainability) or new ones that emerged.



RESULTS

Sample

Of the nine school champions from intervention schools, five provided consent and took part in interviews. Their characteristics are presented in Table 9.

Factors that enabled the adoption of the SWISH program in schools

School champions identified a number of factors that were enablers to the adoption of the SWISH program. The most consistently reported motivator was increased awareness of current health behaviours by staff.

“It’s been great giving us an opportunity to get more active I suppose or especially at realizing how active or inactive you are ... just a little reminder that you should get out and do an hour today ... it gets people thinking about their health and fitness. And too often we teachers don’t do that”

Other enabling factors included: school executive support, program simplicity, school officer support from the research team and motivation to be a role model to the students. Examples of statements supporting these identified enablers are outlined in Table 10.

Factors that hindered the adoption of the SWISH program in schools

The most consistently reported barrier to adoption of SWISH was competing priorities (e.g., a heavy workload, responsibilities in personal life, and hindrance of participating in physical activities due to pregnancy or injury).

“all the staff are pretty busy ... it wasn’t a main priority ... it wasn’t put as a really high priority because we’ve got a lot of other things we need to do that was probably the biggest challenge, just another thing on top of our workload”

Other identified barriers included: the level of engagement by staff, lack of time, wavering interest by staff and limited exposure by some staff to the program. Supporting statements are outlined in Table 11.

Table 9

Overview of characteristics of school champions participants who provided interview data

Characteristics	School Champions (n=5)
Age in years. Mean (SD)	34.6 (14.22)
Gender. n (%)	
Male	3 (60.00)
Female	2 (40.00)
Employment status. n (%)	
Permanent full-time	2 (50.00)
Temporary full-time	1 (25.00)
Permanent part-time	0 (00.00)
Temporary part-time	1 (25.00)
Casual	0 (00.00)
Years of experience	
Mean (SD)	10.2 (12.99)
Range	1-30
Classroom teacher. n (%)	
Yes	2 (50.00)
No	2 (50.00)
<i>Note.</i> Not all participants answered all questions at follow-up. Therefore, the number of available responses ranges from 4-5.	

Recommendations for future improvements to the SWISH program

School champions identified a number of improvements that could be made to the SWISH program. The most consistently reported recommendations were related to communication methods, the scheduling and availability of opportunities to be physically active or eat healthily and utilisation of the collegium as a social support system. The latter suggestions were in line with the findings from previous focus group research in 82 Australian school staff, which identified that available opportunities as well as the overall culture of health behaviours among staff are key factors that influence physical activity and diet in school staff [15]. Therefore, the SWISH program may be improved by incorporating strategies that address these factors within the social and physical environment of school staff.

Table 10

Example statements supporting identified enablers

Theme	Supporting quote
Executive support	<i>"So my assistant principal has been a school champion and been really good with it. We've driven it ourselves. She's been awesome ... so having an executive in the program and pushing it really helped"</i>
Program simplicity	<i>"I think it's a pretty straightforward thing the way you've set it up so far"</i>
School officer support	<i>"If I needed anything, I knew that I could just contact [school officer] and she sort things out ... she's really enthusiastic and know it's helping out"</i>
Role model to students	<i>"Think about yourself as well and try and put your own health first because if you're not healthy then you're not going to be coming to school anyway. And then at the end of the day the kids are watching us and everything we do they just see. If we're being good role models, we're showing them stuff without even really needing to put in much effort."</i>

Table 11

Example statements supporting identified barriers

Theme	Supporting quote
Executive support	<i>"The only real difficulty was getting the staff super engaged in the program"</i>
Program simplicity	<i>"The app made it hard for people as well, finding time to get in and put their details in"</i>
School officer support	<i>"I think it motivated us to start within those first few weeks ... motivation initially to start, was good ... but I think time just weighed on us all and we, I suppose we just kind of fell off the wagon as you would say, some of us"</i>
Role model to students	<i>"One of the ladies is only here one day so she didn't really know much about it"</i>

RECOMMENDATIONS FOR PROGRAM IMPROVEMENT



MORE PROMPTS FOR IN-SCHOOL CHAMPIONS TO PROMOTE TO STAFF



COMMUNICATE DIRECTLY TO STAFF USING EMAIL (E.G., HEALTH REMINDERS)



AVOID REMINDERS VIA APPS WHICH ARE INFREQUENTLY USED BY STAFF



PROVIDE STAFF WITH STATISTICS/OUTCOMES FROM ACCELEROMETER DATA



PROVIDE STAFF WITH REMINDERS AND/OR WAYS TO INCREASE AWARENESS OF THEIR CURRENT HEALTH-RELATED BEHAVIOURS



TIMETABLE PHYSICAL ACTIVITY INTO THE SCHOOL-DAY



CONSISTENT USE OF ENERGISERS AT STAFF MEETINGS (MAKE THIS THE NORM)



PROVIDE FURTHER IDEAS OF NEW AND NOVEL ACTIVITIES TO AVOID BOREDOM

SECTION SUMMARY

- Organisational and external support is important to ensure the success of the SWISH program.
- Strategies that are simple and easy to integrate into staff schedules are likely to result in greater uptake of the program. They may also help to overcome some of the main barriers to participating in SWISH, such as competing priorities and lack of time.
- There are several aspects of the SWISH program that could be amended, enhanced or removed that would potentially improve staff engagement with the program and help sustain practices in the school.

SECTION 7: RECOMMENDATIONS

SWISH is a feasible and acceptable program to address the physical activity and dietary practices of school staff. Based on the findings and learnings from this pilot study, we recommend that the following points are considered and the effect of the program is evaluated in a fully powered randomised controlled trial:



- 1 The components and delivery of the SWISH program be amended to address the specific expectations, barriers and enablers identified by school staff. Some suggestions include: improving some of the program resources that staff were least satisfied or engaged poorly with, such as the take home resource (i.e., fridge booklet) and prompts from the Skoolbag app; and identification and/or creation of opportunities to be physically active and follow a healthy diet.
- 2 Future updates of the SWISH program should continue to be founded on evidence-based behaviour change strategies to ensure optimal impact.
- 3 Future evaluations should include strategies to increase staff adherence to data collection measures, including wearing of the accelerometers and completing study surveys. Some strategies to consider include reminders, additional education and advice on how to wear the accelerometers comfortably.
- 4 Multiple measures of physical activity (e.g. accelerometer and self-report) should be considered.
- 5 The complexity of dietary intake should be acknowledged by using different measures that assess both the frequency and amount of foods consumed.
- 6 Future evaluations to assess the mechanisms through which the SWISH program is impacting staff physical activity and fruit and vegetable consumption. This will allow for optimisation of the program by identifying the most important components to be identified and the most cost-effective program to be delivered.
- 7 Additional measures of health and wellbeing (e.g., quality of life) that have evidence of being related to physical activity and/or diet may capture the extent to which school staff benefit from improved physical activity and diet over time.

CONCLUSIVE REMARKS

The *Schools Working to Improve Staff Health* (SWISH) was a feasible, appropriate and highly accepted program to address school staff physical activity and fruit and vegetable consumption. Its use of existing programs ensured that little to no additional resources or costs were incurred by schools, increasing its ability to be easily operationalised within the school structure. SWISH also illustrated potential to improve school staff's physical activity levels and fruit and vegetable consumption, although the impact of SWISH on these outcomes does require further evaluation in fully powered randomised control trials.

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