

# New models to support parents to pack healthy lunchboxes: Parents acceptability, feasibility, appropriateness, and adoption of the SWAP IT m-Health program

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## Abstract

**Objectives:** This report aims to evaluate the acceptability, appropriateness, feasibility, and adoption of a healthy lunchbox program (SWAP IT), from the parent perspective.

**Methods:** SWAP IT is an mobile health (m-Health) program aimed to support parents in swapping out discretionary foods for healthier alternatives. Following receipt of the program, parents completed validated scales assessing the Acceptability (AIM), Intervention Appropriateness (IAM), and Feasibility (FIM) via a computer-assisted telephone interview (CATI). Parents were asked about their awareness of strategies in SWAP IT and whether the program supported them to make lunchbox swaps from discretionary to everyday foods.

**Results:** Of the 679 parents who consented, 413 completed the CATI (61% response rate). Parent's mean AIM score (out of a total score of 5) was 4.22 (SD 0.48); FIM score was 4.27 (SD 0.54); and IAM score was 4.24 (SD 0.54). Most parents reported receiving the lunchbox messages (54%), with 45% reporting opening all 10 messages and 64% of parents reporting the program helped swap out discretionary foods.

**Conclusion:** The m-Health lunchbox program, SWAP IT, is highly acceptable, easy to adopt, appropriate, and feasible to parents.

**Implications to public health:** Not only is SWAP IT effective, but favourable implementation factors highlight the potential scalability of the program in improving child nutrition.

**Key words:** child nutrition, public health nutrition, child obesity prevention, implementation outcomes

## Introduction

Childhood nutrition plays an important role in the growth and wellbeing of children; however, poor nutrition continues to be a major public health concern.<sup>1</sup> The average primary school lunchbox contains 3000 kilojoules and 3.5 serves of discretionary foods,<sup>2,3</sup> well above recommended dietary guidelines, providing an opportunity for public health nutrition improvement.

We recently tested, via a series of randomised controlled trials, the effectiveness of the SWAP IT program, which aims to “swap” discretionary food items packed in children’s lunchboxes to healthier alternatives.<sup>4</sup> In a type I effectiveness-implementation

hybrid trial, SWAP IT was found to have a significant reduction in mean kilojoules from discretionary foods packed in school lunchboxes (−117.26 kJ; 95%CI −195.59 to −39.83;  $p=0.003$ ).<sup>5</sup> If implemented at scale, such effects may contribute to population-level dietary improvements.

Measures of intervention effectiveness are considered essential.<sup>6</sup> Important considerations to assess the suitability of interventions include information about their acceptability, adoption, appropriateness, and feasibility.<sup>6</sup> Implementation outcomes provide policy makers with important contextual information to explain the impacts on health outcomes across the population.<sup>7</sup> Despite these

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Table 1: Demographics of participants.

Characteristics	n (%)
Sex (n=406) <sup>a</sup>	
Male	42 (10)
Female	364 (90)
Age (n=378) <sup>b</sup>	
15–24 years	1 (0.3)
25–34 years	94 (25)
35–44 years	212 (56)
45–55 years	62 (16)
55–64 years	6 (2)
65+ years	3 (1)
Employment status (n=378) <sup>b</sup>	
Employed	285 (75)
Unemployed	9 (2)
Domestic/home duties	57 (15)
Student	15 (4)
Other	12 (3)
Educational level (n=378) <sup>b</sup>	
Some high school	41 (11)
Completed high school	32 (9)
Certificate or diploma	139 (37)
University or college degree	166 (44)
Reside in areas of (n=413):	
Lower socio-economic status	260 (63)
Higher socio-economic status	153 (37)
Remoteness (n=413)	
Inner regional	151 (37)
Major cities	262 (63)

<sup>a</sup>n=7 missing values due to no information provided on consent forms.

<sup>b</sup>n=34 missing values due to no information provided during CATI.

implementation outcomes providing rich context, they are rarely reported.<sup>8</sup>

This study aims to evaluate the acceptability, appropriateness, feasibility, and adoption of SWAP IT, from the perspective of parents of primary school aged children.

## Methods

### Design and setting

The study protocol and primary trial outcomes have been published elsewhere.<sup>4,5</sup> The study was conducted in 32 primary schools across New South Wales (NSW), Australia. For this study, all parents/carers at intervention schools (n=16) were invited to participate in a computer assisted telephone interview (CATI) conducted between August 2019 and January 2020.

### SWAP IT program

SWAP IT aimed to encourage lunchbox “swaps” from discretionary food items to healthier alternatives.<sup>4</sup> The SWAP IT lunchbox program consisted of four strategies: lunchbox nutrition guidelines; 10 weekly lunchbox messages delivered to parents mobile phones via the school’s existing communication app; physical resources for students

and parents (booklet, ice brick, water bottle); and curriculum resources for teachers.

## Measures

### Acceptability, appropriateness, and feasibility

At follow-up, parents were asked to complete via CATI, the Acceptability of Intervention Measure (AIM), the Intervention Appropriateness Measure (IAM), and the Feasibility of Intervention Measure (FIM),<sup>9</sup> a valid and reliable scale, developed by Weiner et al.<sup>9</sup> On a scale from 1 to 5, parents were asked to report whether SWAP IT was welcomed, appealing, liked, and met their approval (AIM); a good fit, suitable, applicable, and fitting (IAM); possible, easy to use, do-able, and implementable (FIM).<sup>9</sup> In addition, parents were asked about the acceptability of the frequency, timing and quantity of the weekly lunchbox messages.

### Adoption

Parents were asked to report their awareness of the four SWAP IT strategies and identify whether SWAP IT helped them swap from discretionary to healthier alternatives in the lunchbox. Participants also recalled the number of messages that they opened via the existing communication app.

**Statistical analysis.** All statistical analyses were performed using SAS (version 9.3) statistical software. Descriptive statistics were used for all data. The AIM, IAM, and FIM was aggregated to yield an average score, where the highest score that could be obtained was 5. Linear mixed models were used to examine whether subgroup characteristics (parent gender, parent age, employment status, educational level, socioeconomic status and remoteness) were associated with each score, where all models included a random school intercept to adjust for potential clustering.

## Results

### Sample

Of the 679 parents, from intervention schools, who consented to participate in the CATI, 413 completed the CATI (61% response rate). Characteristics of consenting participants are shown in Table 1.

### Acceptability, appropriateness, and feasibility

Parent’s mean AIM score was 4.22 (SD 0.48). The majority of participants reported that the frequency (95%), timing (89%), and number of messages in one school term (87%) were acceptable. Parent’s mean IAM score was 4.24 (SD 0.54) and mean FIM score was 4.27 (SD 0.54), showing parents rated the appropriateness and feasibility of the SWAP IT program highly. Scores for acceptability, appropriateness, and feasibility were consistent across all subgroups except for remoteness versus appropriateness, where those residing in major cities had lower appropriateness scores on average than those residing in inner regional areas ( $p=0.047$ ).

### Adoption

In adopting the SWAP IT intervention, 64% of parents reported that the program helped swap out discretionary foods for healthier

alternatives. The majority of parents recalled receiving the individual components of the program; however, parents reported the physical resources (water bottle (63%) and ice brick (56%)) were not helpful in supporting them swap out discretionary foods for healthier alternatives. Parents did however agree or strongly agree that the lunchbox messages (61%), lunchbox guidelines (74%), parent booklet (76%), and website (90%) were appropriate in making swaps to healthier alternatives. More than half of parents reported receiving the lunchbox messages (54%), with 45% of parents reporting opening all 10 messages, and the majority of parents (72%) opening 2–6 messages.

## Discussion

The study findings indicate that SWAP IT is highly acceptable, easy to adopt, appropriate, and feasible to parents. SWAP IT achieved high AIM, IAM, and FIM scores from parents, in addition to positive scores relating to the appropriateness of lunchbox messages, lunchbox guidelines and the parent booklet, providing a rationale for retaining these components should SWAP IT be scaled-up.

Open rates of lunchbox messages were considered to be higher than other m-Health interventions, with 45% of parents reporting opening all 10 messages, and the majority of parents opening between two and six messages, significantly higher than other m-Health interventions. An exploratory study conducted in the UK to improve stress management in adults found that of the 10 daily push notifications, the average number of views was 2.63.<sup>10</sup> Additionally, a study in parents relating to infant feeding found that of the three push notifications sent each week, only 8% of all notifications were opened.<sup>11</sup> The successful engagement of parents with the SWAP IT messages compared to other m-Health interventions may be due to the model of embedding SWAP IT into an existing school communication app, already regularly used by parents, highlighting a promising approach for m-Health interventions.

The physical resources (water bottles, ice bricks) were not deemed useful by parents in improving lunchbox packing, indicating the potential to remove this strategy. Our recent cost-effectiveness analysis on the SWAP IT program has highlighted that the provision of physical resources was the most costly intervention component in implementing the intervention.<sup>12</sup> When assessing the scalability of SWAP IT, the cost of the physical resources could be a limiting factor. The removal of these physical resources that were not deemed useful by parents and are considered costly could be considered without adversely impacting the effects of the intervention.

SWAP IT is effective in reducing the discretionary foods packed in school lunchboxes but is also considered highly acceptable, appropriate, feasible, and easy to adopt by parents. In particular, the highest regarded components, which were also the most scalable, included the lunchbox guidelines and text messages sent directly to the parents. This m-Health lunchbox program has considerable potential for scale-up, which may result in population wide effects on child nutrition.

## Ethical statement

Approval to conduct this study was obtained from the Hunter New England Human Research Ethics Committee (reference #06/07/26/4.04), University of Newcastle (reference #H-2008-0343) and the New South Wales (NSW) State Education Research Applications Process (#2018247).

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## Conflicts of interest

The authors have no competing interests to declare.

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