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Adapting the Nutrition and Physical Activity Self-Assessment (NAPSACC): A cross-country case study of improving early childhood health environments in the United States, Australia, and the United Kingdom

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Running Title: Adapting NAPSACC across countries

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Abstract

Background: Child overweight and obesity is a critical global health issue with substantial individual and societal impacts necessitating early intervention to establish healthy habits. Health promoting early childhood education (ECE) settings are important as most young children attend ECEs in high- and middle-income countries. Nutrition and Physical Activity Self-Assessment for Child Care (NAPSACC) is an evidence-based approach to support improvements to ECE environment for improving child health. While adapting proven child obesity prevention interventions from other countries offers efficiency, the process is frequently underreported and insufficiently documented.

Methods: Guided by the ADAPT framework, this paper describes the adaptation of NAPSACC in the United States (US), Australia (AU), and the United Kingdom (UK) from 2012 to 2023. Contextual differences in ECE systems in the US, AU, and UK and reflections on the process of adaptation were explored.

Results: NAPSACC was successfully adapted, maintaining core theoretical components while allowing for implementation flexibility to meet varying contexts. The iterative adaptation process revealed that a flexible, dynamic approach was essential for maintaining the relevance and effectiveness of the NAPSACC intervention in different contexts.

Conclusions: Our experience highlights the importance of ongoing iteration, international collaboration, research, and responsiveness to evolving circumstances in adaptation processes. Strong and flexible leadership, such as that demonstrated by NAPSACC's founder, Dr. Dianne S. Ward, facilitates successful adaptation and continuous improvement of public health programs.

Impact Statement: Adapting effective health interventions is of global interest. This process demands flexibility to accommodate changes in context, while balancing the fact that the original intervention may also need to evolve as the context shifts over time. Strong collaboration, identifying core components and adherence to the underpinning theory are essential.

Introduction

The obesity epidemic transcends borders, with rising global prevalence leading to significant societal and economic burdens.¹⁻³ In high- and middle-income countries, many children are living with obesity by the time they start school; approximately 13% in the United States (US), 10% in the United Kingdom (UK), and 9% in Australia (AU).⁴⁻⁶ Recognizing the need to intervene early, efforts have been made to implement evidence-based standards, policies, and practices to support health and well-being in early childhood education (ECE) settings.⁷⁻¹⁷ Leading these efforts, the US launched one of the first ECE obesity prevention programs, The Nutrition and Physical Activity Self-Assessment for Child Care (NAPSACC) - an organizational tool providing a guided process for ECE improvements in nutrition and physical activity.¹⁸ Named as an innovative initiative to combat childhood obesity prevention in the 2010 White House Task Force on Childhood Obesity Report to the President, NAPSACC represents an improvement model that can be integrated and sustained within existing public health and ECE infrastructures.¹⁶ Over two decades since its inception, NAPSACC has been named as the best evidence for impact with the potential to prevent thousands of cases of childhood obesity, reduce healthcare costs, and improve health equity.^{19,20}

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In recent years, a growing body of research emphasizes the critical need to scale successful interventions to achieve widespread, sustainable improvements in population health.²¹⁻²⁴ The field recognizes that context-specific adaptations are crucial for maximizing the effectiveness of scaled interventions.^{25,26} Adapting and scaling NAPSACC across diverse contexts is a logical step given its success and potential societal health impact.²⁰ Over the past decade, NAPSACC has undergone essential adaptations to address scalability limitations, including its reliance on paper-based

implementation and its specific tailoring to US context. This paper provides a retrospective mapping of NAPSACC'S adaptations in the US, AU, and UK according to the ADAPT framework – a systematic model developed by the UK Medical Research Council for selecting, adapting, implementing, and evaluating evidence-information interventions.²⁷ This structured approach enhances our understanding of the adaptations made across various contexts and holds significant potential to advance the field of dissemination and implementation science in ECE settings.

Methods

While all three countries conducted their adaptations independently, Dr. Dianne S. Ward, NAPSACC's founder, was consulted to ensure that modifications were scientifically grounded and flexible to meet the unique needs of each country's ECE context. Authors (RB, RK, RL, CB, SY) were directly involved in the adaptation process. Prospective mapping using crosswalks, logic models, and adaptation checklist were utilized to ensure the core components of NAPSACC were retained.^{28–31}

Key contextual factors and adaptation framework

Understanding the ECE systems in the US, UK, and AU was crucial for adapting NAPSACC to diverse contexts. Each country's unique political agendas, regulatory bodies, and accreditation standards influence implementation. Adaptations addressing regional terminology were also key to encouraging uptake. Tailoring NAPSACC to these factors helped preserve its core evidence-based components while meeting each ECE system's needs, maximizing its impact on child health. While each country's adaptation was modified to reflect region specific terminology, for the purposes of this paper, we have used consistent terminology (e.g., "ECE program", "educator",

“childcare health professional”). Additional details on contextual factors and regional terminology are available in the supplemental materials.

The UK Medical Research Council released the ADAPT framework in 2021, offering a step-by-step guide for adapting evidence-based interventions to new context.²⁷ We have retrospectively outlined the NAPSACC adaption by country according to the four steps of the ADAPT framework: (1) Assess **rationale** for and consider context fit of existing interventions; (2) Plan and undertake **adaptations**; (3) Plan and undertake **piloting and evaluation**; (4) **Implement and maintain** adapted intervention at scale. Figure 1 depicts the adaptations made by each country from 2012 to 2023, highlighting key milestones in the adaptation processes for Go NAPSACC (US), Childcare Electronic Assessment Tool and Support (EATS, AU), and NAPSACC UK.

Core components of NAPSACC

Each country’s adaptations are grounded in NAPSACC’s core components – a 5-step organizational improvement process using evidence-based standards, and in Social Cognitive and Behavior Change theories.¹⁸ ECE administrators (i.e., individuals responsible for oversight of the ECE facility) seeking to improve their programs nutrition and physical activity environments would complete an organizational assessment (step 1) and compare their current practices to evidence-based standards. The standards were derived from extensive reviews of the scientific literature and authoritative regulations (e.g., Caring for our Children, Head Start, NAEYC), and distilled into nutrition and physical activity content areas (e.g. foods/beverages provided, teacher-led physical activity, screen time).³² Administrators selected evidence-based goals and created step-by-step action plans (step 2) for change. To support action steps, ECE administrators and staff

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participated in three education workshops (step 3) on childhood overweight, nutrition, and physical activity. Workshops were delivered by trained NAPSACC consultants, who are established childcare health professionals affiliated with ECE quality improvement organizations. These consultants offered ongoing technical assistance (step 4) to ECE administrators, helping facilitate action plans and address any challenges to success. Six months after step 1, ECE administrators conducted a re-assessment (step 5) of their organization's nutrition and physical activity environment to evaluate the progress achieved during the intervention period.

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Early evaluations of the NAPSACC program

Reliability and validity testing indicated that the NAPSACC self-assessment was an accurate and stable measure of the ECE environment recommended for use for public health researchers and practitioners.³³ Initial pilot testing showed the program to be accepted by ECE administrators, feasible for implementation in ECE settings, and effective in enhancing nutrition and physical activity environments.³⁴ Following the initial pilot, NAPSACC continued to be implemented and evaluated in North Carolina, and it was disseminated as a paper-based tool used in over 30 US states. The program has also been the focus of multiple independent evaluations. NAPSACC has consistently demonstrated significant improvements in ECE health environment audit scores and has also been found to enhance health knowledge among ECE staff and increase children's physical activity levels.³⁵⁻³⁷ In some cases, reductions in children's BMI z-score have also been observed.

Results

NAPSACC's adaptations to Go NAPSACC (US), Childcare EATS (AU), and NAPSACC UK are presented according to the Template for Intervention Description and Replication (TIDieR) checklist³⁸ (Table 1). The TIDieR 12 item checklist (brief name, why, materials, procedure, who

provided, how, where, when and how much, tailoring, modifications, how well planned/actual) aims to improve the reporting and replicability of interventions. Below, we outline key considerations and modifications made to NAPSACC's core elements - self-assessment, action planning, education, technical assistance, and re-assessment - to address the unique context of each country.

United States: Go NAPSACC

Rationale

Nearly a decade after its launch, NAPSACC achieved its intended outcomes but faced scalability limitations due to its paper-based format and reliance on dedicated child health professionals. To address these, the US team adapted the intervention into a web-based application, Go NAPSACC, from 2012 to 2014 (Table 2).

Adaptation

Following 10 years of research growth, we conducted a comprehensive literature and guideline review to incorporate updated evidence. Given the expanded evidence and the need for user acceptance and ease-of-use, we opted for a modular approach to include Breast/Infant Feeding, Child Nutrition, Physical Activity, Outdoor Play/Learning, and Screen Time. All core elements of NAPSACC were preserved in the online adaptation, with modifications allowing ECE administrators to implement the program independently, requiring minimal technical support. Specifically, the online platform provides tailored self-assessment questions and evidence-based standards aligning with the ECE setting (e.g., centers, family childcare homes), and operation (e.g. full- and half-day programs). The platform provides real-time results and guides ECE

administrators through the 5-step process. Like the original NAPSACC, it allows goal selection based on self-assessment results, displaying goals according to scores and highlighting achievable evidence-based practices and those requiring more significant changes. Administrators then create action plans for each goal using customizable templates. A key departure from the original NAPSACC is in its education and technical assistance components, with a comprehensive library of evidence-based educational materials designed to streamline tasks previously managed by childcare health professionals. The platform captures program details (e.g., child ages, program type) and self-assessment responses to tailor the user experience with evidence-based goals, action plan templates, educational resources, and implementation support. As with NAPSACC, ECE administrators re-assess their program following the intervention period (varies across implementation projects) and are encouraged to select new goals.

Pilot and evaluate

A randomized pilot study conducted from 2015 to 2016 assessed the effectiveness of Go NAPSACC in improving health environments.³¹ ECE programs were randomly assigned to receive either immediate (intervention, n=17) or delayed (waitlist control, n=14) access to the online platform. Administrators used the system over four months, completing the 5-step process in the Child Nutrition module. The primary outcome was change in nutrition environment, assessed using the Environment and Policy Assessment and Observation Self Report tool. Results indicated that Go NAPSACC effectively adapted core elements from the original NAPSACC into online tools, with most nutrition score changes showing medium to large effects (Cohen's $d = 0.54-0.74$).

Implement and maintain

Since its launch in 2014, Go NAP SACC has continued to evolve, currently serving 23 states, reaching over 11,000 ECE programs.³⁹ The program has expanded to include two additional modules—Oral Health and Farm to ECE—along with 35 on-demand trainings and new interfaces to support childcare health professionals and state-level ECE administrators.^{40,41} As a result, nearly half of the nation has begun implementing systems-level changes to enhance the quality of care provided to children in ECE.⁴² Currently, Go NAPSACC is offered through state licensing agreements, where each state pays a fixed fee to offer the program to ECE programs statewide. A recent Harvard Childhood Obesity Intervention Cost-Effectiveness analysis projected that the integration of Go NAPSACC into each state’s ECE Quality Rating & Improvement System over ten years would result in a projected annual cost of \$9.10 USD (per person reached) and over 27,000 cases of obesity prevented.²⁰

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modules — Oral Health and Farm to ECE — along

Australia: Childcare EATS

Rationale

In response to national and state priority around obesity prevention, one state in Australia (New South Wales) launched a state-wide ECE program in 2010 called Munch & Move.¹² This initiative is delivered by health promotion teams across 15 health districts. Like NAPSACC, Munch & Move utilizes a multi-step nutrition and physical activity quality improvement framework focused on ECE assessment, implementation, education, and ongoing progress evaluation. The research team worked together with one local health district to undertake several trials to identify evidence-based implementation strategies. Although higher intensity multicomponent models were most effective, such approaches were limited in scalability.^{43–48} Given systematic reviews indicating the promise of NAPSACC in improving ECE environments, alignment with key elements of Munch & Move

and research indicating high acceptability of online approach,⁴⁹ the AU team elected to adapt the online version of NAPSACC in 2018 as a way of providing scalable implementation support, resulting in the Childcare EATS intervention (see Table 3).

Adaptation

Guided by NAPSACC's core components and local priorities, Childcare EATS focused on creating a healthy eating self-assessment. The self-assessment was adapted to align with the Munch & Move program, including additional criteria for services where parents provided food from home, specific inclusions that aligned with the 2013 Australian Dietary Guidelines as well as ECE staff professional development requirements.¹² Similar to NAPSACC, Childcare EATS provides ECE administrators with the results of their self-assessment and then they select evidence-based goals and create an action plan, known as a formal implementation blueprint. To support implementation of the action plan, ECE administrators and staff are directed to e education opportunities that align with their selected goals. Technical assistance support is offered by childcare professionals via phone and email on a limited basis. ECE administrators are prompted to re-assess at least twice in a six-month period to ensure ongoing implementation and support with monitoring and reporting.

Pilot and evaluate

Among intervention ECEs in a pilot implementation RCT, the Childcare EATS program was reported as feasible and acceptable to ECE administrators and staff, there was high engagement, and the proportion of ECE programs implementing healthy eating practices increased (clinical trial

registry: [ACTRN12619001158156](#)).^{30,50} The average cost of Childcare EATS per program was below \$150 AUD / \$100 USD (approximate), indicating that it was a potentially affordable intervention. The collection of child outcomes was not possible due to COVID-19 related restrictions.

Implement and maintain

The development of Childcare EATS has built upon a series of trials of varying modality and intensity undertaken by the team since 2012,^{43,51–55} with this recent iteration prioritizing scalability.²⁹ Given challenges with assessing child outcomes and the pilot nature of the implementation evaluation, ongoing efforts to assess the impact of this program in the Australian context is needed. Most recently this has included an examination of how to undertake this process with infant feeding nutrition practices (The Tiny Bites intervention).⁵⁶

United Kingdom: NAPSACC UK

Rationale

In 2012, there was a national commissioned call for research to improve nutrition in ECE settings.⁵⁷ At the time there were limited evidence-based programs. Following a review of the scientific literature, NAPSACC was selected for its relevancy and evidence base. The contextual adaptations occurred from 2012-2019 and are outlined in Table 4.

Adaptation

NAPSACC UK was created in 2014, following adaptations for the UK through the feasibility trial, and further adaptations were implemented prior to a full trial commencing in 2019.⁵⁸ The

feasibility trial used a modified version of the NAPSACC self-assessment, excluding questions related to breastfeeding practice (i.e., trial did not include infants) and adding questions about oral health and active travel. Modifications were made to include a home-based intervention, but this was dropped prior to the full trial due to the lack of parental engagement. The term ‘self-assessment’ was renamed ‘review and reflect’ to avoid negative connotations with required regulatory inspections conducted by the Office for Standards in Education, Children’s Services and Skills. Evidence-based practices were reviewed by ECE administrators and staff, public health professionals, and parents. ECE administrators are instructed to select eight goals based on their self-assessment results, and with the assistance of a childcare health professional, develop an action plan. ECE staff participate in two education workshops led by trained childcare health personnel providing professional development on nutrition, oral health, and physical activity. These workshops were translated into pre-recorded online offerings in the full trial. Ongoing technical assistance was provided by trained childcare health professionals in both the feasibility and full trials. Following the intervention period (varies between trials from 5-12 months), ECE administers re-assess their program, review results with technical assistance staff, and select eight new goals.

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Pilot and evaluate

The NAPSACC UK feasibility study (trial registration ISRCTN16287377) was conducted between 2014-2017 and involved 12 ECE programs.^{28,59} NAPSACC UK was delivered in five out of six intervention programs, with high levels of fidelity and acceptability. Staff providing technical assistance found it feasible but had concerns about workload. The feasibility study was underpowered to establish effectiveness, but there were suggested improvements in some

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measures of nutrition, physical activity, and mediators. The average cost of NAPSACC UK per program was £1184/ \$1300 USD (approximate) and £27/ \$30 USD (approximate) per child. A comprehensive trial (trial registration ISRCTN33134697) to evaluate the effectiveness and cost-effectiveness of NAPSACC UK began in 2019 with 52 ECE programs, focusing on objectively measured activity, nutritional intake, and obesity, alongside process evaluation.⁶⁰

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Implement and maintain

The iterative adaptation has taken 11 years, during which the ECE sector has changed, with more ECE government funding, and a focus on the first 1000 days. The trial results will inform future implementation.⁶¹

Discussion

Many public health programs are adapted and implemented into different contexts; however, the specific adaptation process and reflections are often poorly documented.^{62,63} Using the ADAPT framework, we detailed the adaptation of the evidence-based early childhood health promotion program NAPSACC across three countries, illustrating how the program was tailored to each country's ECE context while preserving its essential core components. While Go NAPSACC (US), Childcare EATS (AU), and NAPSACC UK are each unique, they were all developed with the shared goal of enhancing the environments where children spend their formative years to promote lifelong health and well-being. The adaptations reported in this paper align closely with the three key principles proposed by Handley and colleagues to bridge the gap between evidence and practice: (1) understanding the role of behavior change, (2) engaging key partners throughout the adaptation process, and (3) allowing flexibility for real-world implementation.⁶⁴

First, the significance of specifying and retaining NAPSACC's theory informed core components (self-assessment, action planning, education, technical assistance, and re-assessment) supported the adaptation process. Defining these components and creating logic models helped maintain fidelity to the original NAPSACC model while accommodating essential context-specific modifications for branding, content, and implementation. Second, each country involved NAPSACC developers, ECE professionals, and content experts, highlighting the importance of collaboration in creating a tool that is relevant and beneficial for the intended beneficiaries.

Lastly, a key lesson learned from this adaptation process, spanning over ten years, is the importance of an iterative and dynamic approach to learning. This aligns with implementation science frameworks, which stress the importance of continual, flexible adaptations to ensure real-world impact and sustainability. When adapting an intervention for new context or scaling, it is essential to consider fidelity, flexibility, and cost-effectiveness. Adaptations must respond to changes in local context, policies, environment, and funding, while maintaining the core theory of change. Tailored modifications were made for each country, including alignment with national standards (AU, UK), regional terminology (AU, UK), and online implementation methods to reduce staffing needs and expand reach (US, AU). Significant contextual differences and shifting government priorities require balancing model fidelity with local flexibility to ensure both effectiveness and scalability.

Conclusion

Developing and embedding effective policies and practices to promote health in ECE settings is a priority in many countries. As interventions evolve over time, they encounter challenges in adapting to changing contexts, resulting in a tension between maintaining consistency and ensuring responsiveness. Our experience, supported by the ADAPT guidance, shows that effective adaptation requires collaboration and flexibility to fit local contexts. NAPSACC founder, Dr. Dianne Ward led by example with her strong and generous approach, believing that our collective effort holds greater power for generating meaningful impacts on child well-being than any individual action alone.

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Figure 1. NAPSACC Adaptation Timeline for United States, Australia, and the United Kingdom

NAPSACC = Nutrition and Physical Activity Self-Assessment for Child Care; UNC – University of North Carolina; US = United States; AU = Australia; UK = United Kingdom; HER = Healthy Eating Research; HE = Healthy Eating; PA= Physical Activity; Childcare-EATS = Electronic Assessment Tool and Support; NIHR = National Institute for Health and Care Research; RCT = Randomized Controlled Trial

Supplementary File 2 **Figure 1.** Sample Go NAPSACC Images

NAPSACC = Nutrition and Physical Activity Self-Assessment for Child Care

Supplementary File 2 **Figure2.** Sample Childcare EATS Images

EATS = Electronic Assessment Tool and Support

Supplementary File 2 **Figure3.** Sample NAPSACC UK Images

NAPSACC = Nutrition and Physical Activity Self-Assessment for Child Care; UK = United Kingdom