

“Improving Population Wide Implementation of a Healthy Food Policy in Primary Schools”

Kathryn Louise Reilly BHSc (Nut & Diet)
(University of Newcastle)

A thesis submitted in fulfilment of the requirements for the
degree of Doctor of Philosophy in Behavioural Science

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STATEMENT OF ORIGINALITY

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The thesis contains published scholarly work of which I am a co-author. For each such work a written statement, endorsed by the other authors, attesting to my contribution to the joint work has been included.

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Signed:

Name: Kathryn Louise Reilly

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SUPERVISORS

Associate Professor Luke Wolfenden
Hunter New England Population Health
School of Health and Medicine
Faculty of Medicine and Public Health
University of Newcastle, Australia

Professor John Wiggers
Hunter New England Population Health
School of Health and Medicine
Faculty of Medicine and Public Health
University of Newcastle, Australia

Dr Serene Yoong
Hunter New England Population Health
School of Health and Medicine
Faculty of Medicine and Public Health
University of Newcastle, Australia

Dr Nicole Nathan
Hunter New England Population Health
School of Health and Medicine
Faculty of Medicine and Public Health
University of Newcastle, Australia

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CONFLICT OF INTEREST STATEMENT

Kathryn Reilly reports no conflict of interest.

LIST OF PUBLICATIONS FROM THESIS CHAPTERS

This thesis is presented as a series of five papers. At the time of submission, all five of these papers were either published or under editorial review in peer reviewed journals.

Table 1.1: Outline of Thesis Chapters and associated publications.

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Three	Economic analysis of three interventions of different implementation intensity of healthy school canteen policies in Australia: costs and incremental cost effectiveness.	Reilly K , Reeves P, Deeming S, Yoong S, Wolfenden L, Nathan N, Wiggers J. Economic analysis of three interventions of different implementation intensity of healthy school canteen policies in Australia: costs and incremental cost effectiveness. <i>BMC Public Health</i> . 2018 Dec;18(1):378.
Four	Validity of four different measures to assess compliance of school canteen menus with a State-based healthy canteen policy.	Reilly K , Nathan N, Wolfenden L, Wiggers J, Sutherland R, Wyse R, Yoong S. Validity of four different measures to assess compliance of school canteen menus with a State-based healthy canteen policy. <i>Health Promotion Journal of Australia</i> . 2017 Jan 11;27(3):215-21.
Five	Scale up of a multi-strategic intervention to increase implementation of a school healthy canteen policy (healthyfood@school).	Reilly K , Nathan N, Wiggers J, Yoong S, Wolfenden L. Scale up of a multi-strategic intervention to increase implementation of a school healthy canteen policy. <i>BMC Public Health</i> . 2018 .Dec;18(1):860.
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CO-AUTHOR STATEMENTS FOR CHAPTER 2

I attest that Research Higher Degree candidate **Kathryn Reilly** contributed to the paper/publication entitled:

Effectiveness of a multi-component intervention to enhance implementation of a healthy canteen policy in Australian primary schools: a randomised controlled trial.

By:

- Contributing to the research question
- Contributing to the research design
- Development of measures to be used
- Developing and delivering intervention delivery
- Carrying out data collection
- Assisting in the analysis and interpretation of the data
- Assisting in the writing of the manuscript

FULL NAME OF CO-AUTHOR	SIGNATURE OF CO-AUTHOR	DATE
Nicole Nathan		17 th April 2018
Sze Lin Yoong		10 th May 2018
Rachel Sutherland		26 th April 2018
Tessa Delaney		13 th April 2018
Lisa Janssen		13 th April 2018
Katie Robertson		12 th April 2018
Renee Reynolds		13 th April 2018
Li Kheng Chai		12 th April 2018

Christophe Lecathelinais

12th April 2018

John Wiggers

17th April 2018

Luke Wolfenden

16th April 2018

Signature of Assistant Dean (Research Training (ADRT))
Full Name of ADRT: Robert Callister
Date: 15/05/18

CO-AUTHOR STATEMENTS FOR CHAPTER 3

I attest that Research Higher Degree candidate **Kathryn Reilly** contributed to the paper/publication entitled:

Economic analysis of three interventions of different intensity in improving school implementation of a government healthy canteen policy in Australia: costs, incremental and relative cost effectiveness.

By:

- Developing the research question
- Assisting the research design
- Development of measures to be used
- Assisting in development of measures to be used
- Overseeing data collection
- Assisting in interpretation of the data
- Leading the writing of the manuscript

FULL NAME OF CO-AUTHOR	SIGNATURE OF CO-AUTHOR	DATE
Penny Reeves		12 th April 2018
Simon Deeming		2 nd May 2018
Serene Yoong		10 th May 2018
Nicole Nathan		13 th April 2018
Luke Wolfenden		16 th April 2018
John Wiggers		17 th April 2018

Signature of Assistant Dean (Research Training (ADRT))
Full Name of ADRT: Robert Callister
Date: 15/05/18

CO-AUTHOR STATEMENTS FOR CHAPTER 4

I attest that Research Higher Degree candidate **Kathryn Reilly** contributed to the paper/publication entitled:

Validity of four different measures to assess compliance of school canteen menus with a State-based healthy canteen policy.

By:

- Developing the research question
- Determining the research design
- Development of measures to be used
- Overseeing data collection
- Assisting in the analysis and interpretation of the data
- Leading the writing of the manuscript

FULL NAME OF CO-AUTHOR	SIGNATURE OF CO-AUTHOR	DATE
Nicole Nathan		17 th April 2018
Luke Wolfenden		16 th April 2018
John Wiggers		17 th April 2018
Rachel Sutherland		26 th April 2018
Rebecca Wyse		16 th April 2018
Sze Lin Yoong		10 th May 2018

Signature of Assistant Dean (Research Training (ADRT))
Full Name of ADRT: Robert Callister
Date: 15/05/18

CO-AUTHOR STATEMENTS FOR CHAPTER 5

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By:

- Developing the research question
- Determining the research design
- Development of measures to be used
- Developing, delivering and overseeing intervention delivery
- Overseeing data collection
- Assisting in the analysis and interpretation of the data
- Leading the writing of the manuscript

FULL NAME OF CO-AUTHOR	SIGNATURE OF CO-AUTHOR	DATE
Nicole Nathan		17 th April 2018
John Wiggers		17 th April 2018
Sze Lin Yoong		10 th May 2018
Luke Wolfenden		16 th April 2018

Signature of Assistant Dean (Research Training (ADRT))
Full Name of ADRT: Robert Callister
Date: 15/05/18

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- Developing, delivering and overseeing intervention delivery
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- Assisting in the analysis and interpretation of the data
- Leading the writing of the manuscript

FULL NAME OF CO-AUTHOR	SIGNATURE OF CO-AUTHOR	DATE
Nicole Nathan		17 th April 2018
Jason Wu		12 th April 2018
Tessa Delaney		12 th April 2018
Rebecca Wyse		16 th April 2018
Megan Cobcroft		14 th April 2018
John Wiggers		17 th April 2018
Rachel Sutherland		26 th April 2018

Kym Buffet

2nd May 2018

Sze Lin Yoong

10th May 2018

Luke Wolfenden

16th April 2018

Signature of Assistant Dean (Research Training (ADRT))
Full Name of ADRT: Robert Callister
Date: 15/05/18

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Lee H, Hall A, Nathan N, **Reilly KL**, Seward K, Williams CM, et al. Mechanisms of Implementing public health interventions: a pooled causal mediation analysis of randomised trials. *Implementation Science*. 2018;13(1):42.

Wolfenden L, Nathan N, Janssen LM, Wiggers J, **Reilly K**, Delaney T, et al. Multi-strategic intervention to enhance implementation of healthy canteen policy: a randomised controlled trial. *Implement Science*. 2017 Dec;12(1):6.

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Williams CM, Nathan N, Yoong SL, Delaney T, Wiggers J, Preece S, Lubans N, Sutherland R, Pinfold JA, Smith K, Small T, **Reilly K**, Wyse R, Wolfenden L. CAFE - a multi-component audit and feedback intervention to improve implementation of healthy food policy in primary school canteens: design of a randomised controlled trial. *BMJ Open* 5(6): e006969 (June 2015)

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ABSTRACT

BACKGROUND AND AIMS

Nutrition risk factors are the leading cause of the global disease burden. To reduce this burden, the World Health Organization recommends the population-wide implementation of policies to improve the relative availability of healthy foods at schools. To ensure the potential benefits of school healthy eating policies are realised, identification of strategies that are effective in improving implementation of healthy school canteen or nutrition policies is required. While a number of relevant theories and frameworks exist to guide efforts to implement effective interventions at scale, at present, the evidence base regarding the impact of strategies to increase school implementation of healthy eating policies is limited. This thesis sought to address a number of evidence gaps to better guide efforts to improve the implementation of school nutrition policies. Specifically it aimed to:

- Assess the effectiveness of a theoretically designed multi-strategy intervention in increasing the implementation of a healthy canteen policy in Australian primary schools.
- Evaluate the most effective and cost-effective means of implementing a healthy school canteen policy through pooling data from three random controlled trials (RCTs) of implementation interventions.
- Describe the validity of four methods of assessing school menu compliance with canteen policies and report the direct cost and time to administer each. Such information is required to support rigorous research in the field and facilitate implementation monitoring.
- Assess the effectiveness of an intervention to support implementation, at scale, of a healthy canteen policy in Australian primary schools.
- Assess the potential impact of front-of-pack labelling on canteen manager's intentions regarding products they would make available for sale in their canteen.

- Provide recommendations for future research and practice regarding increasing the implementation of healthy canteen policies in primary schools.

RESULTS

A small randomised control trial with 53 schools found that a multi-strategic intervention involving training, performance monitoring and feedback, telephone and text messaging support can improve schools' implementation of a healthy school canteen policy (intervention vs comparison: RR 4.29; 95% CI 1.04-17.68, $p=0.02$). An economic evaluation of three RCTs of different implementation interventions of various intensity levels, identified that both 'medium' and 'high' intensity interventions were potentially more cost-effective in supporting schools to improve implementation of a healthy canteen policy than a 'low' intensity approach. The thesis demonstrated that a quick menu audit represents an inexpensive pragmatic and valid method to assess healthy canteen policy implementation on a large scale. Using this quick menu audit approach the thesis found that the effectiveness of a multi-strategic implementation intervention can be maintained when delivered at scale across an entire region covering over 150 schools (baseline vs follow-up: OR 2.7; 95% CI 1.6-4.7, $p<0.001$). Finally, through an additional RCT, the thesis found that the inclusion of product nutritional rating information has the potential to improve the availability of 'healthier' items on canteen menus and contribute to improving implementation of a healthy canteen policy.

CONCLUSION

This thesis provides a comprehensive suite of implementation-focused research on improving implementation of a state based healthy canteen policy with the aim of reducing childhood obesity. Furthermore, it provides a framework of implementation strategies proven to improve policy implementation at a population level.

CONTRIBUTION STATEMENT

I was the sole PhD student on this study and was intricately involved in all aspects of the study conceptualization, design, development, implementation, and evaluation. I was the contact person for schools, principals and canteen managers throughout the study and was responsible for managing all enquiries. A summary of the various contributions I made to the studies reported in this thesis is provided below.

PROGRAM DESIGN AND DEVELOPMENT

I took a lead role in program design and development and was responsible for a team of staff involved in the implementation of the '*healthy food@school*' trial. With guidance from my supervisors, I led the development of the '*healthy food@school*' trial. This required the creation of a range of program components and resources. The trial included: the development and delivery of canteen manager training workshops, development of tools and resources for canteen managers, development of SMS text messaging schedule, development and maintenance of an online canteen product database, development of a menu feedback report, and a suite of resources designed to monitor the implementation of the trial.

ETHICS APPROVAL AND CLINICAL TRIAL REGISTRY

I was responsible for correspondence with the Hunter New England Local Health District Human Research Ethics Committee (06/07/26/4.04), the University of Newcastle's Human Research Ethics Committee (H-2008-0343), the NSW Department of Education State Education Research Applications Process (SERAP) and the relevant Catholic School Offices' Ethics Committees, including drafting applications and addressing feedback from committees. I was responsible for completing all ethics forms, designing the program recruitment material and developing the information statements.

STUDY MEASURES

In consultation with my supervisors, I selected the menu and survey assessments for this study. I developed and validated the quick menu audit tool and developed the canteen manager and principal survey items.

DATA COLLECTION, ENTRY, AND MANAGEMENT

I was responsible for planning and coordinating the data collection procedure for menu audits and the canteen manager and principal Computer Assisted Telephone Interviews (CATI). This involved developing the training protocols and training a team of Dietitians at three time points to collect canteen menus, conduct menu audits and generate feedback reports. I managed two dietitians and a project officer assisting with aspects of the data management. I also trained CATI staff and coordinated the canteen manager and principal CATIs over two time points. Data collection was undertaken over an 18-month period on three separate occasions.

PROGRAM IMPLEMENTATION

With support from my supervisors and the project team, I oversaw the implementation of the '*healthy food@school*' intervention. I was responsible for managing the intervention delivery.

DATA CLEANING AND ANALYSIS

In correspondence with my supervisors, the methods of statistical analysis were decided upon and I led the data analysis process. I was also responsible for interpreting the results and presenting the data in either text, table or figure formats.

PRESENTATION OF STUDY RESULTS

During my candidature, the results of the research have been presented at four international and three national conferences. In 2017, the '*healthy food @school*' program was awarded the 2017 Hunter New England High Value Health Care Awards (Prevention), was a finalist in the 2017 NSW Health Awards – 'Keeping People Healthy' category and a finalist in the 2017 NSW Premier's Awards – 'Tackling Childhood Obesity'.