



# MONASH University

Knowledge, attitude and practice of parents and primary  
care providers in the prevention and management of  
respiratory tract infections in young children

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A thesis submitted for the degree of Doctor of Philosophy at

Department of General Practice

Faculty of Medicine, Nursing and Health Sciences

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# **Abstract**

## **Background**

Respiratory tract infections (RTIs) are most common in children aged  $\leq 5$  and create a significant health and economic burden. While most RTIs are mild and self-limiting, overseas research shows management varies according to the treating primary care provider (PCP), clinical presentation, and the anxiety of parents/carers. PCPs and parent/carers' knowledge and management of RTIs and the barriers to the use of preventative strategies in young children is currently not well documented in Australia.

## **Aim**

To investigate the current knowledge, attitude and practice of parents/carers and PCPs in the prevention and management of RTIs in young children, with particular focus on influenza vaccination, hand hygiene, and antibiotic prescribing.

## **Methods**

Using the UK Medical Research Council's (MRC) framework for the development and evaluation of complex interventions, four studies were conducted: (1) benchmarking Australian General Practitioner's (GP) management of RTIs in young children using a national longitudinal GP dataset; (2) documenting 30 PCPs and 50 parents and carers views on influenza vaccination, hand hygiene, and antibiotics using interviews and focus group discussions; (3) identifying pragmatic interventions to better prevent and manage RTIs in young children via a stakeholders' workshop and intervention mapping; and 4) applying the Theoretical Domains Framework (TDF) to assess barriers and enablers to RTI prevention and management in young children, and using the Capability, Opportunity and Motivation Behaviour model (COM-B) to identify targets for behaviour change interventions.

## **Results**

The quantitative study showed that while Australian GPs' rate of antibiotics use was comparable to some overseas data, it was still higher than recommended guidelines. GPs who were older and male were more likely to prescribed antibiotics for RTIs than GPs who were younger and female.

Diagnostic uncertainty, the desire to please parents, and miscommunication between GPs and parents were key factors that explained high rates of antibiotic prescribing. The parent/carer cohort expressed that they often wanted only reassurance rather than treatment recommendations, thus uncovering dissonance between what GPs perceived and what parents wanted in an RTI consultation. PCPs and parents/carers were also reluctant to recommend or use influenza vaccines, citing efficacies and cost of the vaccine as barriers. There was a lack of awareness regarding the severity of influenza and the effectiveness of influenza vaccination in the community. Similarly, while participants recognised hand hygiene was important, many factors were cited that hindered good hand hygiene and sustainability of practice.

Promoting hand hygiene interventions was considered to be most achievable and less complicated to effect behavioural change than reducing inappropriate antibiotic prescribing or increasing uptake of influenza vaccination in young children by stakeholders. Public campaigns and education on management and prevention strategies are needed to increase awareness for both PCPs and parents/carers of young children to reduce RTIs in young children.

## **Conclusions and implications**

Parents/carers depend on professional advice from their GPs and other PCPs, therefore it is imperative that PCPs and parents/carers work together to provide the best outcomes and preventative strategies in young children. Readily implementable interventions to improve the

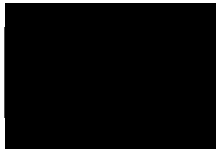


prevention and management of RTIs in young children include promoting uptake of the influenza vaccine, enhancing good hand hygiene practices in early childhood, and improving GP confidence around prudent antibiotic prescribing.

## Declaration

I hereby declare that this thesis contains no material which has been accepted for the award of any other degree or diploma at any university or equivalent institution and that, to the best of my knowledge and belief, this thesis contains no material previously published or written by another person, except where due reference is made in the text of the thesis.

Signature:



Print Name: .....Ruby Biezen.....

Date: ...12 September 2018.....

## **Thesis including published works declaration**

This thesis includes three original papers published in peer reviewed journals and two submitted publications. The core theme of the thesis is to explore the current knowledge, attitude and practice of parents and primary care providers in the prevention and management of respiratory tract infections in young children under five years of age. The ideas, development and writing up of all the papers in the thesis were the principal responsibility of myself, the student, working within the Department of General Practice, Monash University under the supervision of Dr Bianca Brijnath (Monash University), Associate Professor Danilla Grando (RMIT University) and Professor Danielle Mazza (Monash University).

In the case of chapters 4, 5, 6, 7 and 8, my contribution to the work included in the following table:

Thesis Chapter	Publication Title	Status	Nature and % of student contribution	Co-author name(s) Nature and % of co-authors' contribution	Co-author(s), Monash student Y/N
4	Respiratory tract infections among children younger than 5 years: current management in Australian general practice	Published	65%. Completed the background literature search, contributed to the study design, and data analysis, conceptualizing, drafting and revising the manuscript presented in chapter 4.	<b>Allan Pollack</b> (15%) Collection and analysis of data, contributed to methodology and result chapters, input into final stages of manuscript preparation <b>Christopher Harrison</b> (12%) Collection and analysis of data, contributed to methodology and result chapters, input into final stages of manuscript preparation <b>Bianca Brijnath</b> (2%) Conceptualisation of study and input into final stages of manuscript preparation <b>Danilla Grando</b> (2%) Conceptualisation of study and input into final stages of manuscript preparation <b>Helena Britt</b> (2%) Contributed to data analysis and input into final stages of manuscript preparation <b>Danielle Mazza</b> (2%) Conceptualisation of study and input into final stages of manuscript preparation	No
5	Management of respiratory tract infections in young children – A qualitative study of primary care providers' perspectives	Published	70%. Completed the background literature search, contributed to the study design, conducted all data collection and analysis, conceptualizing, drafting and revising the manuscript presented in chapter 5.	<b>Bianca Brijnath</b> (20%) Conceptualisation of study, analysis of the data, and provided critical feedback on manuscript <b>Danilla Grando</b> (5%) Conceptualisation of study and input into final stages of manuscript preparation <b>Danielle Mazza</b> (5%)	No

				Conceptualisation of study and input into final stages of manuscript preparation	
6	Dissonant views - GPs and parents' perspectives on antibiotic prescribing for young children with respiratory tract infections	Submitted to BMC Family Practice	70%. Completed the background literature search, contributed to the study design, conducted all data collection and analysis, conceptualizing, drafting and revising the manuscript presented in chapter 6.	<b>Bianca Brijnath</b> (20%) Conceptualisation of study, analysis of the data, and provided critical feedback on manuscript <b>Danilla Grando</b> (5%) Conceptualisation of study and input into final stages of manuscript preparation <b>Danielle Mazza</b> (5%) Conceptualisation of study and input into final stages of manuscript preparation	No
7	Why do we not want to recommend influenza vaccination to young children? A qualitative study of Australian parents and primary care providers	Published	70%. Completed the background literature search, contributed to the study design, conducted all data collection and analysis, conceptualizing, drafting and revising the manuscript presented in chapter 7.	<b>Bianca Brijnath</b> (20%) Conceptualisation of study, analysis of the data, and provided critical feedback on manuscript <b>Danilla Grando</b> (5%) Conceptualisation of study and input into final stages of manuscript preparation <b>Danielle Mazza</b> (5%) Conceptualisation of study and input into final stages of manuscript preparation	No
8	Visibility and transmission: Complexities around promoting hand hygiene in young children	Submitted to BMC Public Health	70%. Completed the background literature search, contributed to the study design, conducted all data collection and analysis, conceptualizing, drafting and revising the manuscript presented in chapter 8.	<b>Bianca Brijnath</b> (20%) Conceptualisation of study, analysis of the data, and provided critical feedback on manuscript <b>Danilla Grando</b> (5%) Conceptualisation of study and input into final stages of manuscript preparation <b>Danielle Mazza</b> (5%) Conceptualisation of study and input into final stages of manuscript preparation	No

## **Additional publications, presentations and awards**

### **Research outputs arising from this thesis:**

#### ***Peer-reviewed conference abstracts: oral presentations***

##### **International:**

**Biezen R**, Grando D, Brijnath B, Mazza D. Hand hygiene in young children: Perspectives from primary care providers and parents. 15<sup>th</sup> World Congress on Public Health, 3-7 April, 2017, Melbourne Convention & Exhibition Centre, Melbourne, Australia.

**Biezen R**, Grando D, Brijnath B, Mazza D. Barriers to the uptake of influenza vaccination in children under the age of 5 – primary care providers’ and parents’ perspectives. General Practice Research Infection Network (GRIN) Conference, 30 September – 1 October 2016, Lady Margaret Hall, Oxford, United Kingdom.

**Biezen R**, Grando D, Brijnath B, Mazza D. Dissonant views: comparing GPs’ and parents’ perspectives of common colds and antibiotics prescribing for young children. Society for Academic Primary Care Conference (SAPC), 6-8 July 2016, Dublin Castle, Dublin, Ireland.

##### **National:**

**Biezen R**, Grando D, Mazza D, Brijnath B. Dissonant views: GPs’ and parents’ perspectives on antibiotic prescribing for young children. Primary Health Care Research Conference, 1-3 August 2018, Pullman Melbourne on the Park, Melbourne, Australia.

**Biezen R**, Grando D, Mazza D, Brijnath B. Dissonant views: GPs’ and parents’ perspectives on antibiotic prescribing for young children. National Centre for Antimicrobial Stewardship, 16 May 2018, The Peter Doherty Institute for Infection and Immunity, Melbourne, Australia.

**Biezen R**, Grando D, Mazza D, Brijnath B. Dissonant views: GPs' and parents' perspectives on antibiotic prescribing for young children. School of Primary and Allied Health Care Showcase, 25 September 2017, Monash University, Caulfield, Australia.

**Biezen R**. Knowledge, attitude and practice of parents and primary care providers in the prevention and management of respiratory tract infections in young children. National Centre for Antimicrobial Stewardship, 15 March 2017, The Peter Doherty Institute for Infection and Immunity, Melbourne, Australia.

**Biezen R**, Grando D, Brijnath B, Mazza D. Barriers to the uptake of influenza vaccination in children under the age of 5 – primary care providers' and parents' perspectives. National Primary Health Care Conference 2016, 23-25 November 2016, Pullman Albert Park, Melbourne, Australia.

**Biezen R**, Grando D, Brijnath B, Mazza D. Dissonant views: GPs' and parents' perspectives on antibiotic prescribing for young children. National Primary Health Care Conference 2016, 23-25 November 2016, Pullman Albert Park, Melbourne, Australia.

**Biezen R**, Alexander K, Grando D, Brijnath B, Mazza D. Recommending influenza vaccination to children under the age of 5 – views of primary care providers. GP15, The General Practitioner Conference 2015, 21-23 September 2015, Melbourne Convention Centre, Melbourne, Australia.

**Biezen R**, Alexander K, Grando D, Brijnath B, Mazza D. Management of respiratory tract infections in young children – what are primary care providers saying? GP15, The General Practitioner Conference 2015, 21-23 September 2015, Melbourne Convention Centre, Melbourne, Australia.

**Biezen R**, Grando D, Brijnath B, Mazza D. Recommending influenza vaccination to children under the age of 5 – views of primary care providers. Population Health Congress, 6-9 September 2015, Hotel Grand Chancellor, Hobart, Australia.

**Biezen R**, Grando D, Brijnath B, Mazza D. Management of respiratory tract infections in young children – what are primary care providers saying? Population Health Congress, 6-9 September 2015, Hotel Grand Chancellor, Hobart, Australia.

**Biezen R**, Grando D, Brijnath B, Mazza D. Management of respiratory tract infections in young children – what are primary care providers saying? Primary Health Care Research Conference, 29-31 July 2015, Adelaide Convention Centre, Adelaide, Australia.

**Biezen R**, Pollack A, Harrison C, Brijnath B, Grando D, Britt H, Mazza D. Respiratory tract infections in children under the age of five: current management in Australian general practice. Primary Health Care Research & Information Service conference 2013, 10-12 July 2013, Hilton, Sydney, Australia.

**Biezen R**, Pollack A, Harrison C, Brijnath B, Grando D, Britt H, Mazza D. Respiratory tract infections in children under the age of five: current management in Australian general practice. Department of General Practice Showcase, 3 May 2013, RACV Club, Melbourne, Australia.

**Biezen R**, Grando D. Does hand hygiene matter? An evaluation of students' views and attitude towards hand hygiene after the delivery of a microbiology hand hygiene program. Academic Seminar Series 2013, Monash University, Clayton, Australia.

**Biezen R**. Knowledge, attitude and practices of parents and primary care providers in reducing respiratory tract infections in young children. Higher Degree Research Festival 2013, Monash University, Clayton, Australia.



### ***Peer-reviewed conference abstracts: Poster presentation***

**Biezen R**, Grando D, Mazza D, Brijnath B. Why do we not want to recommend influenza vaccination to young children? A qualitative study of Australian parents and primary care providers. Primary Health Care Research Conference, 1-3 August 2018, Pullman Melbourne on the Park, Melbourne, Australia.

### ***Awards***

2016: Delegate Sponsorship - General Practice Research Infection Network (GRIN) Conference in Oxford, UK, September 2016.

2016: Monash University Faculty travel grant - Society for Academic Primary Care (SAPC) Conference, Dublin, Ireland, June 2016.

2015: Delegate Sponsorship (conference registration) for the Primary Health Care Research Conference (PHCRIS) in Adelaide, July 2015.

2014: The National Health and Medical Research Council (NHMRC) Postgraduate Scholarship.

2013: The Australian Postgraduate Award (APA).

I have renumbered sections of submitted or published papers in order to generate a consistent presentation within the thesis.

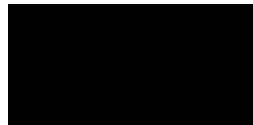
**Student signature:**



**Date:** 12 September 2018

The undersigned hereby certify that the above declaration correctly reflects the nature and extent of the student's and co-authors' contributions to this work. In instances where I am not the responsible author I have consulted with the responsible author to agree on the respective contributions of the authors.

**Main Supervisor signature:**



**Date:** 12 September 2018

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## Abbreviations

AMR	Antimicrobial Resistance
BEACH	Bettering the Evaluation And Care of Health
CDC	Centers for Disease Control and Prevention
GP	General Practitioner
ICU	Intensive Care Unit
LRTI	Lower Respiratory Tract Infection
MCHNs	Maternal Child Health Nurses
MRC	Medical Research Council
NHMRC	National Health and Medical Research Council
NPS	National Prescribing Services
OTC	Over-the-counter
RACGP	Royal Australian College of General Practitioners
PCPs	Primary Care Providers
PNs	Practice Nurses
RCT	Randomised Controlled Trial
RSV	Respiratory Syncytial Virus
RTIs	Respiratory Tract Infections
TDF	Theoretical Domain Framework
TIV	Trivalent Inactivated Influenza Vaccine
URTI	Upper Respiratory Tract Infection
WHO	World Health Organization

# Table of Contents

<b><u>COPYRIGHT NOTICE.....</u></b>	<b><u>II</u></b>
<b><u>ABSTRACT .....</u></b>	<b><u>III</u></b>
<b><u>DECLARATION .....</u></b>	<b><u>VI</u></b>
<b><u>ADDITIONAL PUBLICATIONS, PRESENTATIONS AND AWARDS.....</u></b>	<b><u>X</u></b>
<b><u>ACKNOWLEDGEMENTS.....</u></b>	<b><u>XV</u></b>
<b><u>ABBREVIATIONS.....</u></b>	<b><u>XVII</u></b>
<b><u>CHAPTER 1: INTRODUCTION AND OVERVIEW OF THESIS.....</u></b>	<b><u>1</u></b>
1.1 BACKGROUND .....	1
1.2 Aim .....	2
1.3 OUTLINE OF THESIS (BY CHAPTER) .....	3
<b><u>CHAPTER 2: LITERATURE REVIEW .....</u></b>	<b><u>7</u></b>
2.1 RESPIRATORY TRACT INFECTIONS – PREVALENCE, MANAGEMENT AND TREATMENT IN YOUNG CHILDREN .....	7
2.2 PREVENTION STRATEGIES .....	14
2.2.1 INFLUENZA VACCINATION .....	14
2.2.2 HAND HYGIENE.....	18
2.3 CONCLUSION.....	21
<b><u>CHAPTER 3: METHODOLOGY.....</u></b>	<b><u>23</u></b>
3.1 RESEARCH DESIGN .....	23
3.1.1 UK MEDICAL RESEARCH COUNCIL’S (MRC) FRAMEWORK.....	23
3.1.2 THEORETICAL APPROACH .....	26
3.2 DEVELOPMENT PHASE .....	30
3.3 DATA ANALYSIS .....	32
3.4 ETHICS.....	34
<b><u>CHAPTER 4: RESPIRATORY TRACT INFECTIONS AMONG CHILDREN YOUNGER THAN 5 YEARS: CURRENT MANAGEMENT IN AUSTRALIAN GENERAL PRACTICE .....</u></b>	<b><u>35</u></b>

<b>CHAPTER 5: MANAGEMENT OF RESPIRATORY TRACT INFECTIONS IN YOUNG CHILDREN – A QUALITATIVE STUDY OF PRIMARY CARE PROVIDERS’ PERSPECTIVES.....</b>	<b>41</b>
---	-----------

<b>CHAPTER 6: DISSONANT VIEWS - GPS AND PARENTS’ PERSPECTIVES ON ANTIBIOTIC PRESCRIBING FOR YOUNG CHILDREN WITH RESPIRATORY TRACT INFECTIONS .....</b>	<b>49</b>
--	-----------

ABSTRACT .....	51
BACKGROUND .....	53
METHODS .....	54
RESULTS.....	55
DISCUSSION .....	62
CONCLUSION.....	67
REFERENCES .....	70
APPENDIX 1: INTERVIEW AND FOCUS GROUP SCHEDULES.....	76
APPENDIX 2: PARENTS QUESTIONNAIRE .....	77

<b>CHAPTER 7: WHY DO WE NOT WANT TO RECOMMEND INFLUENZA VACCINATION TO YOUNG CHILDREN? A QUALITATIVE STUDY OF AUSTRALIAN PARENTS AND PRIMARY CARE PROVIDERS ...</b>	<b>79</b>
---	-----------

<b>CHAPTER 8: VISIBILITY AND TRANSMISSION: COMPLEXITIES AROUND PROMOTING HAND HYGIENE IN YOUNG CHILDREN .....</b>	<b>88</b>
---	-----------

ABSTRACT .....	90
KEYWORDS .....	91
BACKGROUND .....	92
METHODS .....	93
RESULTS.....	94
DISCUSSION .....	102
CONCLUSIONS .....	106
REFERENCES .....	109

<b>CHAPTER 9: RESEARCH OUTCOMES AND IMPLICATIONS: RESULTS FROM A STAKEHOLDERS’ WORKSHOP AND DESIGNING AN INTERVENTION USING THE THEORETICAL DOMAINS FRAMEWORK AND THE BEHAVIOURAL CHANGE WHEEL.....</b>	<b>117</b>
---	------------

<b>9.1 USING A STAKEHOLDERS’ WORKSHOP TO DISSEMINATE RESEARCH AND PRIORITISE DIRECTIONS FOR INTERVENTIONS.....</b>	<b>118</b>
9.1.1 BACKGROUND .....	118
9.1.2 METHODS.....	119
9.1.3 RESULTS FROM THE WORKSHOP.....	120
9.1.4 DISCUSSION .....	123
9.1.5 REFLECTIONS FROM THE STAKEHOLDERS’ WORKSHOP .....	125

9.2 DESIGNING AN INTERVENTION USING THE THEORETICAL DOMAINS FRAMEWORK AND CAPABILITY, OPPORTUNITY, MOTIVATION – BEHAVIOUR MODEL.....	126
9.3 NEXT STEPS .....	128
<b><u>CHAPTER 10: DISCUSSION, IMPLICATIONS AND FUTURE DIRECTIONS.....</u></b>	<b><u>131</u></b>
SUMMARY OF KEY FINDINGS.....	133
STRENGTHS AND LIMITATIONS .....	139
IMPLICATIONS AND FUTURE DIRECTION .....	140
CONCLUSION .....	143
<b><u>REFERENCES.....</u></b>	<b><u>144</u></b>
<b><u>APPENDIX .....</u></b>	<b><u>161</u></b>
APPENDIX 1: NEWSPAPER ARTICLE ON INFLUENZA VACCINATION.....	161
APPENDIX 2: BARRIERS, TARGET BEHAVIOUR, IMPACT AND LIKELIHOOD OF BEHAVIOUR CHANGE AND SUGGESTED INTERVENTIONS.....	165
APPENDIX 3: ADVERTISEMENT.....	176
APPENDIX 4: EXPLANATORY STATEMENT.....	180
APPENDIX 5: CONSENT FORM .....	190
APPENDIX 6: PRIMARY CARE PROVIDERS INTERVIEW SCHEDULE .....	192
APPENDIX 7: PARENTS AN CARERS QUESTIONNAIRE .....	201
APPENDIX 8: PARENTS AND CARERS FOCUS GROUP SCHEDULE .....	205



## Figures

<b>FIGURE 1. THESIS OUTLINE BY CHAPTERS.....</b>	<b>6</b>
<b>FIGURE 2. DEVELOPMENT OF THE INTERVENTION DESIGN USING THE UK MEDICAL RESEARCH COUNCIL FRAMEWORK .....</b>	<b>25</b>
<b>FIGURE 3. TDF DOMAINS LINKED TO COM-B COMPONENTS (MICHIE ET AL., 2015) .....</b>	<b>29</b>
<b>FIGURE 4. RELATIONSHIPS BETWEEN HAND HYGIENE AND RTIS IN THE COMMUNITY AND ITS EFFECTS .....</b>	<b>141</b>

## Tables

<b>TABLE 1. TYPES OF RESPIRATORY INFECTIONS INCLUDING TREATMENT AND MANAGEMENT .....</b>	<b>9</b>
<b>TABLE 2. THEORETICAL DOMAINS AND THEIR DEFINITIONS .....</b>	<b>28</b>
<b>TABLE 3. CHARACTERISTICS OF PRIMARY CARE PROVIDERS .....</b>	<b>31</b>
<b>TABLE 4. CHARACTERISTICS OF PARENTS AND CARERS .....</b>	<b>31</b>
<b>TABLE 5. MANAGING RESPIRATORY TRACT INFECTIONS IN YOUNG CHILDREN .....</b>	<b>165</b>
<b>TABLE 6. RECOMMENDING INFLUENZA VACCINATION TO YOUNG CHILDREN .....</b>	<b>168</b>
<b>TABLE 7. HAND HYGIENE IN YOUNG CHILDREN .....</b>	<b>172</b>

# **Chapter 1: Introduction and overview of thesis**

## **1.1 Background**

Respiratory tract infections (RTIs) are the most frequent illness in humans and a major cause of morbidity, with young children (<5 years) being particularly vulnerable (Leder, Sinclair, Mitakakis, Hellard, & Forbes, 2003; The Australian Lung Foundation, 2007). Although most RTIs are mild and self-limiting, the high prevalence of RTIs creates a significant health and economic burden, especially with carers' time away from normal activities (Lambert, O'Grady, Gabriel, Carter, & Nolan, 2004; Lambert, Allen, Carter, & Nolan, 2008; McCutcheon & Fitzgerald, 2001; Schuez-Havupalo, Toivonen, Karppinen, Kaljonen, & Peltola, 2017).

As the majority of RTIs are caused by viruses, antibiotics are generally not effective as a treatment. Instead clinical guidelines recommend fluid and rest (National Health and Medical Research Council, 2012; The Royal Children's Hospital Melbourne, 2018; Therapeutic Guidelines Limited, 2018). However, studies have shown that clinical guidelines may not necessarily be followed and antibiotic prescriptions for young children with RTIs remain high (Adeli, Bender, Sheridan, & Schwartz, 2008; Anderson et al., 2017; Grossman et al., 2012; Linder, Schnipper, Tsurikova, Volk, & Middleton, 2010; McCullough et al., 2017). Reasons for this include diagnostic uncertainty, parental pressure on general practitioners (GPs) to prescribe antibiotics for their sick child, and physicians' perception that parents expect antibiotics and so would be more satisfied with the consultation if antibiotics were prescribed (Coenen et al., 2013; Fletcher-Lartey, Yee, Gaarslev, & Khan, 2016; Hansen, Hoffmann, McCullough, van Driel, & Del Mar, 2015; Hardy-Holbrook, Aristidi, Chandnani, DeWindt, & Dinh, 2013; Lucas, Cabral, Hay, & Horwood, 2015; Moro et al., 2009).

Preventive activities such as hand hygiene and influenza vaccination aimed at reducing infection transmission are thought to be most efficacious in reducing the prevalence of RTIs. However, such preventive programs have had limited success in young children. The reasons for this are not known. While influenza vaccination was recommended for all children under the age 5, in Australia, it was not publicly funded in most states until April 2018 (Aubusson, 2018) (Appendix 1).

As yet, there are few studies exploring the prevention and management of RTIs in the Australian primary care setting, and no studies have been identified that have explored the views of parents and carers of children <5 years, GPs and other primary care providers (PCPs) (e.g. practice nurses (PNs), maternal child health nurses (MCHNs) and pharmacists). Incorporating parent and provider perspectives is critical to the understanding of current prevention and management of RTIs in young children and to identify points of intervention that may reduce unnecessary prescription of antibiotics and increase preventative activities such as hand hygiene and influenza vaccination.

## **1.2 Aim**

The aim of this thesis was to explore the current knowledge, attitude and practice of parents and PCPs (GPs, PNs, MCHNs and pharmacists) in the prevention and management of respiratory tract infections in young children (<5 years).

The objectives of the research were:

1. To examine current GP management of RTIs in children under the age of 5;
2. To explore the knowledge, attitude and practice of parents and PCPs in the management of RTIs in young children;

3. To identify the barriers and enablers to the uptake of evidence-based methods aimed at preventing and minimising RTIs in young children;
4. To identify areas for interventions and strategies that will increase awareness and improve parents and PCPs' prevention and management of RTI's in young children in the Australian primary care setting.

### **1.3 Outline of Thesis (by chapter)**

To address the objectives outlined, this thesis begins with a literature review, followed by a methodology chapter (Figure 1).

*Chapter 2* presents a literature review on the current management and treatment of RTIs in young children, and barriers around appropriate prescribing of antibiotics. It also discusses prevention strategies in reducing RTI transmission such as influenza vaccination and hand hygiene and explains why they are important in primary care, especially in young children.

*Chapter 3* describes the methodology used in this PhD, basing the research on the UK Medical Research Council framework for the development and evaluation of complex interventions. A behaviour theory approach was used to develop the qualitative questions and inform the design of complex interventions.

Chapters 4, 5, 6, 7 and 8 comprise studies that addressed objectives 1, 2, 3. Chapter 9 addresses objective 4. For consistency, the result chapters 4, 5, 6, 7 and 8 include an introductory paragraph followed by the published or submitted paper (Figure 1).

*Chapter 4* presents the published paper resulting from research that focussed on the current GP management of RTIs in young children using the Bettering the Evaluation and Care of Health (BEACH) dataset (Study 1). It compares four common RTIs against six management options,

including GP antibiotic prescribing. It sets the baseline for the next stage of the research to understand the barriers and enablers of managing and prevention of RTIs in young children.

*Chapter 5* presents a paper resulting from qualitative research exploring PCPs perspectives on their decision-making process while managing and treating RTIs in young children (Study 2). It highlights the importance of a team care approach and consistent advice to improve communication between PCPs and parents and to better manage RTIs in young children.

*Chapter 6* explores further the issue of management and treatment by using a mixed methodology to explore GPs' and parents' views and knowledge of antibiotics as a treatment for RTIs (Study 2). Conflicting views are reported from the study participants emphasising the benefit of better communications between GPs and parents and carers to reduce inappropriate antibiotic prescribing for RTIs.

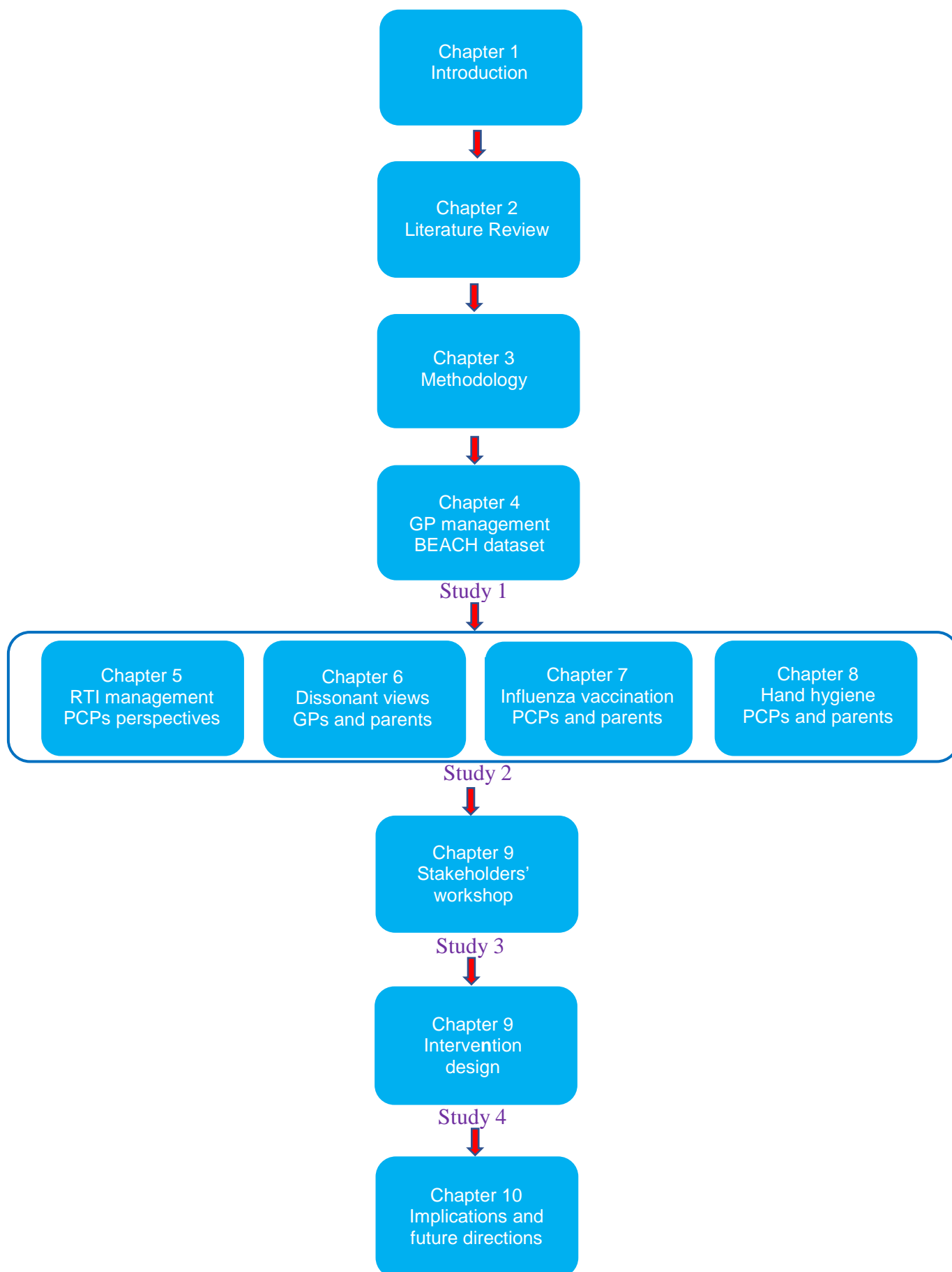
*Chapter 7* presents the published paper (January 2018) resulting from research exploring the reasoning behind PCPs' recommendation of influenza vaccination to young children and parental perception of the need for vaccination (Study 2). The results highlight issues concerning the views on safety and efficacies of the vaccine, the severity of the disease and the need to vaccinate in this cohort. The study concludes with recommendations that should be aimed at individuals (PCPs and parents), and more broadly at the organisation level (Government) in order to increase uptake of influenza vaccination in this cohort.

In Australia, more than 71,000 cases of influenza were reported in the 2017 influenza season, prompting the Australian Government to announce free influenza vaccines to all children under the age of five in most States and Territory in April 2018.

Apart from influenza vaccination, hand hygiene is considered as an important practice to reduce transmission of infectious diseases such as RTIs. **Chapter 8** explored the knowledge and practice of hand hygiene amongst PCPs and parents and carers of young children and describes the complexities around hand hygiene (Study 2). Even though hand hygiene is an important strategy, it is often not thought of or practiced by PCPs and parents and carers due to variation in compliance and emotional beliefs attached to this simple task. The research findings here show that complex interventions are needed in order to increase compliance.

**Chapter 9** describes how a stakeholders' workshop was used to disseminate research to participants who have an interest in this area of research (Study 3). Participants were asked to prioritise the findings presented, and discuss potential areas for intervention in order to better manage RTIs in young children. Complex intervention designs using the outcome from the studies and the stakeholders' workshop were summarised (Study 4).

Finally, **Chapter 10** draws conclusions from the data collected on the current management, treatment and prevention strategies of RTIs in young children, and presents recommendations and future research directions.



**Figure 1. Thesis outline by chapters**

## **Chapter 2: Literature Review**

### **2.1 Respiratory tract infections – prevalence, management and treatment in young children**

Acute respiratory tract infections (RTIs) are managed at over six million general practice visits each year in Australia and create a significant health and economic burden (The Australian Lung Foundation, 2007). They are most prevalent in young children under the age of five, especially when they attend preschools and/or day care centres (Chen, William, & Kirk, 2014; Sacri et al., 2014). For example, an Australian study of 7578 randomly selected respondents in 2008-2009 found the incidence of RTIs was 3.2 cases (95% CI 3.0-3.4) per person per year (Chen & Kirk, 2013), with respondents more likely to report having an RTI if someone in the household attends childcare (Chen & Kirk, 2013; Chen et al., 2014). Another Australian study that looked at respiratory episodes in the community, found that children under the age of two were more likely to have a greater number of episodes per person (mean = 5.0 episodes per person) and the longest episode duration (mean = 6.8 days) compared to all other age groups (Leder, Sinclair, Mitakakis, Hellard, & Forbes, 2003). It is estimated that children under the age of five have a cold 23% of the time (Carabin et al., 1999).

According to The Australian Lung Foundation, the direct costs of infections associated with the upper respiratory tract are more than A\$150 million per year (The Australian Lung Foundation, 2007). This figure does not include indirect costs associated with absenteeism and loss of productivity. Lambert and colleagues (2004) estimated the cost to the Australian community for managed acute respiratory illness in children aged between 12 and 23 months to be A\$241 per episode. Approximately 70% of the cost was carers' time away from normal activities (Lambert, O'Grady, Gabriel, Carter, & Nolan, 2004).



RTIs can be classified into upper respiratory tract infections (URTIs) e.g., the common cold, sinusitis, pharyngitis, tonsillitis, laryngitis, and otitis media; and lower respiratory tract infections (LRTIs) affecting the trachea and lungs e.g., bronchitis, bronchiolitis, and pneumonia (National Prescribing Service - MedicineWise, 2018). Many respiratory infections are initially caused by viruses and these infections occur when viruses are deposited onto the mucous membranes of the upper respiratory tract through inhalation of airborne droplets from sneezing and coughing and/or through touching infected mucous on contaminated surfaces or hands.

Within Australia, the main guidelines on preventing and managing RTIs and other infectious diseases in young children are provided by the National Health and Medical Research Council (NHMRC) and the Therapeutic Guidelines LTD (National Health and Medical Research Council, 2012; Therapeutic Guidelines Limited, 2018). Common signs and symptoms of RTI illnesses for young children are fever, headache, sneezing, and blocked or runny nose. More serious symptoms may include drowsiness, lethargy and decreased activity, breathing difficulty, poor feeding, red or purple rash, stiff neck or sensitivity to light and pain (National Health and Medical Research Council, 2012; The Royal Children's Hospital Melbourne, 2018; Therapeutic Guidelines Limited, 2018). Depending on the general condition of the child, and advice from the GP, treatment and management may differ (Table 1).

**Table 1. Types of respiratory infections including treatment and management**

<b>Respiratory Infections</b>	<b>Site(s) of infection</b>	<b>Common types of organisms</b>	<b>Treatment and management</b>	<b>Vaccine Available</b>
<b>Bronchiolitis</b>	Bronchioles	Viruses	Management including rest, increase fluid intake, and OTC medication.	No
<b>Bronchitis</b>	Bronchi	Viruses	Management including rest, increase fluid intake, and OTC medication. Antibiotics for bacterial infection.	No
<b>Chicken pox</b>	Skin via blood stream from mucous membranes	Varicella-zoster virus	Management including rest, increase fluid intake, and OTC medication. Complications may arise.	Yes
<b>Common cold</b>	Nose primarily, throat and sinuses	Viruses such as rhinovirus, adenovirus, respiratory syncytial virus, coronavirus	Management including rest, increase fluid intake, and OTC medication.	No
<b>Croup</b>	Trachea or windpipe (in children)	Bacteria and viruses (parainfluenza viruses, RSV, measles, adenovirus, influenza viruses)	Management including rest, increase fluid intake, and OTC medication. Complications may arise, especially in young children.	No
<b>Influenza</b>	Upper and lower respiratory tract (nose, throat, bronchi and lungs)	Influenza A, B and C	Management including rest, increase fluid intake, and OTC medication.	Available for seasonal flu
<b>Laryngitis</b>	Larynx	Viruses	Management including rest, increase fluid intake, and OTC medication.	No
<b>Measles</b>	Maculopapular rash over body, lungs	Paramyxovirus	Management including rest, increase fluid intake, and OTC medication. Complications may arise	Yes
<b>Otitis media</b>	Middle ear	Bacteria and viruses	Pain relief medication, antibiotics may be required if bacterial in origin.	No

<b>Pharyngitis</b>	Pharynx	Bacteria such as Group A streptococcus, viruses	Only use antibiotics for Group A streptococcus infection; for viral infection: management including rest, increase fluid intake, and OTC medication.	No
<b>Pneumonia</b>	Alveoli and surrounding lung tissues including bronchi in bronchopneumonia	Bacteria and viruses	Antibiotics are recommended for bacterial pneumonia (antibiotic type depends on cause) and rest, increase fluid intake, and OTC medication for viral pneumonia.	Available for <i>Streptococcus pneumoniae</i>
<b>Sinusitis</b>	Sinuses	Bacteria, viruses and fungi	Usually self-limiting, management including rest, increase fluid intake, and OTC medication. Antibiotics may be prescribed for some circumstances.	No
<b>Tonsillitis</b>	Tonsils	Bacteria such as Group A streptococcus, viruses	Only use antibiotics for Group A streptococcus infection; for viral infection, management including rest, increase fluid intake, and OTC medication.	No
<b>Whooping cough</b>	Lining of the airways	<i>Bordetella pertussis</i>	Antibiotics (e.g., Erythromycin).	Available for <i>Bordetella pertussis</i> .

Current guidelines on the treatment and management of acute respiratory infections in children include supportive management such as hydration, rest and supplemental oxygenation (as required) (National Health and Medical Research Council, 2012; Therapeutic Guidelines Limited, 2018). As it is often difficult to predict the clinical course of RTIs in young children (Butler et al., 2005), over-the-counter (OTC) medications such as analgesics and cough medications are frequently used to relieve symptoms of colds, however, they do not cure or prevent the illness. In fact, oral decongestants are no longer recommended for children under the age of two due to the lack of evidence that they are of any benefit and the possibility of side effects in this age group (Harnden et al., 2007; National Health and Medical Research Council, 2012). Although OTC cough and cold medications may be ineffective for managing the common cold in young children, products such as vapour rub, zinc sulphate or buckwheat honey may reduce the symptoms of cold in this age group (Fashner, Ericson, & Werner, 2012; KinyonMunch, 2011; Martinez-Estevez, Alvarez-Guevara, & Rodriguez-Martinez, 2016).

While family physicians and common cold experts agree that OTC medications do not prevent or reduce duration of the illness (Barrett, Endrizzi, Andreoli, Barlow, & Zhang, 2007), OTC medications are still widely used (Cohen-Kerem et al., 2006). It has been suggested that OTC medications are used by parents as a “social medication”, providing parents the control over children’s behaviour (Allotey, Reidpath, & Elisha, 2004) and possibly meet the ‘need’ to do something for the sick child.

As the majority of RTIs are caused by viruses, most commonly rhinovirus, adenovirus, respiratory syncytial virus (RSV), coronavirus, para-influenza virus and influenza virus (The Australian Lung Foundation, 2007), antibiotics should only be prescribed for RTIs that are suspected to be bacterial in origin or have become complicated due to bacterial secondary infections. Indiscriminate prescribing of antibiotics is harmful as it can lead to possible side

effects, i.e., nausea, diarrhoea (Bailey et al., 2014; Kenealy & Arroll, 2013; Olson et al., 2015; Vandepitte, Ponthong, & Srisarang, 2015), and contribute to antimicrobial resistance (AMR) in the community (Australian Commission on Safety and Quality in Health Care, 2016; O'Neill, 2016; World Bank, 2016). Despite the availability of clinical guidelines, physicians' treatment and management of RTIs (in terms of antibiotic prescribing for young children) have been shown to be inconsistent (Ahmed et al., 2010; Cordoba et al., 2015; Dallas et al., 2015; Dallas, van Driel, van de Mortel, & Magin, 2014; Dekker, Verheij, & van der Velden, 2017; Grossman et al., 2012, McCullough et al., 2017). It is possible that physicians may not be familiar with guidelines and/or guideline compliance is not dependent on being familiar with current guidelines. A US study found only 63% of the 208 clinicians were extremely or moderately familiar with guidelines and that these clinicians prescribed higher number of antibiotics for RTIs than clinicians who reported being less familiar with guidelines (Linder et al., 2010). This study demonstrated that familiarity or reported familiarity with guidelines, did not necessarily equate to consistent guideline compliance.

Other overseas studies suggest that inconsistency in the use of antibiotics may also be due to other factors such as diagnostic uncertainty (Moro et al., 2009; Watson et al., 1999), physicians' perception that parents would be more satisfied with the visit if antibiotics were prescribed (Barden, Dowell, Schwartz, & Lackey, 1998; Stearns, Gonzales, Camargo, Maselli, & Metlay, 2009) and physicians' perception that parents expect to receive antibiotics for the visit (Barden et al., 1998; Ong et al., 2007).

Diagnostic uncertainty of URTI in children was the most frequent cause of inappropriate antibiotic prescribing in a study in Italy, with 38% of children with suspected RTI prescribed an antibiotic (Moro et al., 2009). The paediatricians in the study recognised this as the most crucial determinant of inappropriate antibiotics prescription and suggested that a rapid

diagnostic test (rapid antigen detection test for group A beta-hemolytic streptococcus) may reduce diagnostic uncertainty. Furthermore, it is often more difficult to diagnose clinical symptoms in a child, leading to an increase in ‘just in case’ prescribing of antibiotics (Arnold, To, McIsaac, & Wang, 2005).

Physicians also associate patients’ satisfaction with their consultation with receiving antibiotics (Brook, Elliott, Krogstad, Mangione-Smith, & McGlynn, 1999; Coenen et al., 2013; Ong et al., 2007; Stearns et al., 2009). Receiving antibiotics certainly may be seen as validating the medical seriousness of the visit, and in some cases, ‘satisfying’ parents by reassuring that something is being done for their sick child. Yet, this does not provide good evidence-based medicine in that antibiotics may not be needed (Stearns et al., 2009), possibly provide long term side effects to the individual (Bailey et al., 2014) and contributing to overall AMR (The Review on Antimicrobial Resistance, 2016; World Bank, 2016).

Research on physicians’ beliefs, prescribing practices and the attitudes of parents have found physicians generally agree that parental expectation was one of the major factors influencing their over prescription of antibiotics (de Jong et al., 2009; Fletcher-Lartey, Yee, Gaarslev, & Khan, 2016; Hansen, Howlett, Del Mar, & Hoffman, 2015; Hardy-Holbrook, Aristidi, Chandnani, DeWindt, & Dinh, 2013; Mangione-Smith, Elliott, Stivers, McDonald, & Heritage, 2006; Paluck et al., 2001; Stivers, Mangione-Smith, Elliott, McDonald, & Heritage, 2003). A study by Paluck and colleagues in Canada found that nearly 50% of physicians thought they would reduce antibiotic prescribing if they did not feel that parents were pressuring them to prescribe medication for their sick child (Paluck et al., 2001). In contrast, studies have found that parents did not necessarily expect to receive antibiotics, but just simply wanted reassurance that their child was not seriously ill (Adeli, Bender, Sheridan, & Schwartz, 2008; Ong et al.,

2007; Paluck et al., 2001; Shlomo, Adi, & Eliezer, 2003; Stivers et al., 2003; Watson et al., 1999).

These studies consistently show that there is a dissonance between providers' prescribing based on what they thought parents wanted, versus what parents reported they wanted. Studies have suggested communication between physicians and parents may possibly address this by taking into account the conflicting views of the physicians and parents and increasing the understanding between both parties on the appropriate use of antibiotics for RTIs (Cabral, Horwood, Hay, & Lucan, 2014; Mangione-Smith et al., 2015). In order for this to take place in the Australian primary care setting, there needs to be an understanding of both PCPs and parents' knowledge, beliefs and behaviours in order to develop interventions that can bridge the communication gap and improve the management of RTIs in young children.

## **2.2 Prevention Strategies**

Effective prevention strategies are therefore important to reduce the transmission of RTIs. Del Mar and Collignon (2017) argued that the most important strategies for reducing transmission of influenza and influenza-like illness are hand hygiene (consistent with the NHMRC guidelines on the prevention of the spread of infection that includes effective hand hygiene i.e., using soap and water, alcohol-based hand rubs, hand drying and hand care), sneeze and cough etiquettes and immunisation such as influenza vaccination.

### **2.2.1 Influenza vaccination**

Influenza is associated with high morbidity and mortality globally (World Health Organization, 2016). In Australia, children <5 years have the highest influenza notification rates - 98 per 100,000 population compared with a total rate of 39 per 100,000 population for all notifications (Australian Government The Department of Health, 2010). Influenza causes significant burden

on paediatric hospital services and the health system (Khandaker et al., 2014; Li-Kim-Moy et al., 2017; Yung et al., 2011). Recent studies have found that one in ten children with pandemic influenza A H1N1 present with neurologic complications such as febrile seizures (Ismail, Teh, & Lee, 2015), and children are more likely to require intensive care than adults with influenza (Yung et al., 2011).

Influenza vaccination has been showed to be safe and effective against seasonal influenza (Blyth et al., 2014; Flannery et al., 2015; Su et al., 2015). For example, a study in Taiwan estimated pooled vaccine effectiveness in children was 62% (95% confidence interval (CI) 48–83%) across 2004/2005 to 2008/2009 winter seasons (Su et al., 2015). However, due to influenza virus' ability to change its surface antigens, making the previous years' vaccine less effective for the next year's strain (The Australian Immunisation Handbook, 2018; The Australian Lung Foundation, 2007), the vaccine needs to be given once every year in the autumn months. There are currently two types of influenza vaccines available: the killed virus (inactivated) injection vaccine and the nasal spray weakened live virus vaccine. A study in the US found that the Trivalent Inactivated Influenza Vaccine (TIV) administered to children < 5 years of age has been effective in providing strong protection against laboratory-confirmed influenza (Joshi et al., 2009). However, a recent report showed a lowered effectiveness of the influenza vaccine in the 2017 Australian winter season (Sullivan et al., 2017).

The Immunise Australia Program provides free influenza vaccination as part of routine vaccination for older Australians (65 years of age and over), Aboriginal and Torres Strait Islanders over 15 years of age, pregnant women and individuals aged 6 months and over with medical conditions that can lead to severe influenza (The Australian Immunisation Handbook, 2018). Since early 2018, this has also included children less than 5 years of age in most states in Australia. Free workplace vaccinations are also provided for workers such as health care



workers in close contact with at-risk individuals, but only 50% of healthcare workers are vaccinated against influenza each year, raising concerns that transmission of influenza is high amongst this cohort (Caban-Martinez et al., 2010; The Australian Lung Foundation, 2007).

Children in the high-risk groups such as those with chronic diseases and those with asthma are particularly susceptible to serious complication from influenza (Bhat et al., 2005; Dombkowski, Leung, & Clark, 2008; Kramarz et al., 2000; Neuzil et al., 2002). Yet, the uptake of influenza vaccination by young patients with asthma remains low (Gnanasekaran et al., 2006; Keenan, Campbell, & Evans, 2007): the vaccination rate in a US study of 1058 children age 2-12 years with asthma was only 16% (Gnanasekaran et al., 2006). However, a more recent study in the US showed that the number of children with asthma vaccinated with influenza has increased, reaching 55% in 2012-2013 (Simon, Ahrens, & Akinbami, 2016). While this figure has increased in recent years, this number is still lower than recommended.

Reasons for children in the high-risk group not receiving influenza vaccination include the fear of side-effects of the vaccine (Keenan et al., 2007) and missed opportunities in primary care, i.e., vaccine-eligible children seen by a physician but no vaccine administered (Daley, Beaty, Barrow, & et al., 2005; Gnanasekaran et al., 2006). Studies in the US suggested that if all missed opportunity patients had been vaccinated at the first medical visit, the immunisation rates for this high-risk group would be doubled (Daley et al., 2005; Djibo, Peddecord, Wang, Ralston, & Sawyer, 2015; Dombkowski, Davis, Cohn, & Clark, 2006). These reports concluded that future studies should include interventions aimed at parents and physicians to improve awareness of the need for annual influenza vaccination in this cohort.

Additional barriers to the uptake of influenza vaccine include physician's failure to identify eligible children (Dombkowski et al., 2008; Rickert, Santoli, Shefer, Myrick, & Yusuf, 2006),

physician's perception that the child's asthma is not severe enough to warrant vaccination (Dombkowski et al., 2008; Rickert et al., 2006), and the child seeing a number of different physicians (Daley et al., 2005; Dombkowski et al., 2006; Dombkowski et al., 2008; Rickert et al., 2006). Some of these barriers could be overcome by educating parents and carers, as well as physicians on the importance of influenza vaccination in this cohort. Roemheld-Hamm and colleagues in New Jersey (2008) found that patients 65 years and over were more likely to be vaccinated in primary care practices where medical staff supported vaccination, promoted communication with parents, and actively identified eligible patients.

Parental barriers to the uptake of the influenza vaccine include: parental concerns that vaccinations are painful; distrust of those advocating vaccines and beliefs that vaccination is not needed when it is only a minor illness (Brown et al., 2010; Leask et al., 2012; Mills et al., 2005); poor communication between health care professionals and parents; and parents' lack of awareness of vaccination schedule (Mills et al., 2005). A study in the US that surveyed 828 parents with young children on their knowledge of influenza and vaccination found many misconceptions such as low likelihood of the child contracting influenza (47% of parents), the influenza vaccine could cause influenza (70% of parents), and that the influenza vaccine is unsafe for a one-year old child (21% of parents) (Daley et al., 2005).

Perhaps one of the biggest barriers to the low uptake of influenza vaccine are the possible side effects commonly associated with the vaccine such as mild fever, muscle tenderness or weakness (myalgia), soreness, redness and swelling at the site of injection (Centers for Disease Control and Prevention, 2017). In 2010, the Therapeutic Goods Administration received a report whereby 123 children were admitted to hospital with convulsions, vomiting and fever observed following their flu injection in Western Australia (Department of Health Therapeutic Goods Administration, 2010). This led to the suspension of the seasonal influenza vaccines

across Australia for children under the age of five. Although subsequent studies have found no safety concerns associated with influenza vaccines, this incident in Western Australia has meant that this particular influenza vaccine (Fluvax) is no longer given to children <5 years of age (Department of Health Therapeutic Goods Administration, 2010). The importance of the occurrence of complications associated with vaccines cannot be overlooked as this can be a traumatic experience for parents with young children and a key barrier to the uptake of the influenza vaccine.

### **2.2.2 Hand Hygiene**

Many intervention studies have demonstrated a causal link between hand hygiene and infection (Aiello & Larson, 2002; Aiello, Larson, & Sedlak, 2008; Bloomfield & Scott, 2003; Haas & Larson, 2007; Pittet et al., 2006; Sax et al., 2009). This preventive measure has been determined to be an effective method to control the spread of most infectious diseases among healthcare workers and patients and significantly reduce transmission of infectious diseases such as RTIs in the hospital settings (Backman, Zoutman, & Marck, 2008; Larson, Albrecht, & O'Keefe, 2005; Larson, Early, Cloonan, Sugrue, & Parides, 2000; Rosenthal, Guzman, & Safdar, 2005; Tromp et al., 2012), elementary school settings (Guinan, McGuckin, & Ali, 2002; Hammond, Ali, Fendler, Dolan, & Donovan, 2000; McKenzie et al., 2010; Sandora, Shih, & Goldmann, 2008; Snow, White, & Kim, 2008) and community settings including homes (Larson, Lin, Gomez-Pichardo, & Della-Latta, 2004; Sandora et al., 2005; Tamimi, Maxwell, Edmonds, & Gerba, 2015) and childcare centres (Julian, Pickering, Leckie, & Boehm, 2013; Kotch et al., 2007; Lee & Greig, 2008; Ponka, Poussa, & Loasmaa, 2004).

While hand hygiene practice is important, ongoing compliance plays a major part in reducing transmission of infectious diseases, especially in healthcare settings. In hospitals, the most

promising studies showed increased hand hygiene compliance was associated with organisation wide involvement (Larson et al., 2000; McGuckin, Waterman, & Govednik, 2009), availability of hand-washing materials (Aziz, 2013), and interventions that included education, training and performance feedback (McGuckin et al., 2009; Rosenthal et al., 2005; Stewardson et al., 2016). For example, results from a study on 306 hospitals across the US showed that hand hygiene compliance at baseline was 26% for intensive care units (ICUs) and 36% for non-ICUs. After 12 months of measuring product usage, monitoring and providing feedback, compliance increased to 37% for ICUs and 51% for non-ICUs (McGuckin et al., 2009). Similarly, providing hand-washing materials and alcohol hand rub at the entrance of the wards and inside wards increased compliance score from 80% to 95% (Aziz, 2013). A multidisciplinary study in the Netherlands investigated a multifaceted improvement program including hand hygiene education, feedback, reminders, role modelling, and improvement of hand hygiene facilities and saw an increase of hand hygiene compliance from 27% at baseline, to 83% post intervention, and 75% at follow-up after 6 months (Tromp et al., 2012). This study demonstrated the importance of a multidisciplinary team approach that included physicians and nurses, and a range of interventions that not only increased hand hygiene compliance, but also the ability to sustain the practice after a 6-month period.

Similarly, successful hand hygiene interventions that have increased hand hygiene compliance and reduced illness absenteeism in schools have involved teachers modelling hand hygiene to school children (Snow et al., 2008), improving educators' knowledge and attitude towards hand hygiene (Rosen, Zucker, Bordy, Engelhard, & Manor, 2009) and use of alcohol-based sanitizers (Guinan et al., 2002; Nandrup-Bus, 2011; Sandora et al., 2008). Studies using alcohol-based hand sanitizers have found significant decreases in absenteeism when a hand sanitizer is placed in the classroom as part of a hand hygiene program (Guinan et al., 2002; Hammond et al., 2000;

Sandora et al., 2008). This is perhaps due to the fact that facilities such as sinks, soap and drying mechanisms are not readily available in classrooms.

In the day-care environment, most hand hygiene interventions reported were centred around hand hygiene compliance of caregivers and supporting their ongoing practice rather than effective hand hygiene interventions on children attending day care. Some successful interventions included measuring transmission of respiratory and gastrointestinal illnesses (Julian et al., 2013), introducing an infection control program (Ponka et al., 2004) and education and monitoring (Ponka et al., 2004; van Beeck et al., 2016; Zomer et al., 2015; Zomer et al., 2016). Studies focusing on interventions to reduce infections in the home used interventions such as a website to encourage behaviour change (Ainsworth et al., 2017) and providing cleaning products (antibacterial or disinfectants) to households (Larson et al., 2004; Sandora et al., 2005; Tamimi et al., 2015). These studies have demonstrated some success in reducing illness transmission in the home, however, the greatest reduction was found in gastrointestinal infections rather than RTIs.

These studies have demonstrated that disease transmission such as RTIs can be reduced if hand hygiene practice is supported, whether at the work environment or in the home, and the key to sustaining good hand hygiene practices is ongoing compliance, especially among physicians, healthcare workers and adults in the home (Haas & Larson, 2008). However, issues such as lack of time, staff attitudes towards hand washing, sensitive skins, and lack of knowledge regarding hand hygiene are some of the barriers mentioned that need to be overcome before compliance can be sustained at a reasonable level (Boscart, Fernie, Lee, & Jaglal, 2012; Dyson, Lawton, Jackson, & Cheater, 2013; Haas & Larson, 2008; Larson et al., 2006; Loyland, Wilmont, & Larson, 2016).

Hand hygiene has been widely promoted within Australia in the healthcare setting (Hand Hygiene Australia, 2018), and incorporated into the school curriculum (Victoria State Government Education and Training, 2017). However, interventions for preventive measures and the efficacy and sustainability of this practice have not been well explored or assessed within the primary care setting. It is therefore unclear whether primary care providers (PCPs) and parents and carers are adhering to hand hygiene protocols in order to prevent RTI transmission, especially in young children.

## **2.3 Conclusion**

This literature review provided the background into the current management, treatment and prevention of RTIs in young children, with an emphasis on antibiotic use, influenza vaccination and hand hygiene. Much of the research relating to the treatment, management, and prevention strategies with RTIs in children has been undertaken in the US in hospital and school settings. To date there has been limited data exploring RTI prevention in young children in the primary healthcare setting in Australia. Yet primary care practitioners are an important source of preventive advice, especially GPs (Roxon, 2007). This is because GPs are often the first point of contact for patients in Australia (Keleher, 2001), they provide care over the life cycle (Australian Department of Health and Ageing, 2005) and they are accessed by a large proportion of the population (381,000 visits are made to a GP on an average day in Australia) (Australian Institute of Health and Welfare, 2016). Recent health reforms in Australia have focussed on improving preventive care through general practice, and is increasingly seen as a key aspect to securing Australia's future health, especially in young children (Roxon, 2007). The current research study will take a 'team care' approach by including other healthcare professionals such as maternal child health nurses (MCHNs), practice nurses (PNs) and pharmacists – these healthcare professionals often have frequent contact with the parents of

young children and at times, are the first point of contact if parents cannot get an appointment to see their GP. Accordingly, the current study aimed to explore the knowledge, attitude and practice of parents and PCPs in RTI prevention and management in young children, focussing on the Australian primary care setting. In addition, barriers and enablers were also identified to generate new management strategies to reduce RTIs in primary care.

## **Chapter 3: Methodology**

### **3.1 Research design**

The study design for this thesis was based on the UK Medical Research Council's (MRC) framework for the development and evaluation of complex interventions (Craig et al., 2008). The Theoretical Domains Framework (TDF) was applied to design the interview/focus group questions, to understand the theory behind the behaviour, which in turn allowed the development of an intervention to better manage RTIs in young children (Michie, Atkins, & West, 2015; Michie & Prestwich, 2010; Michie, Webb, & Sniehotta, 2010).

#### **3.1.1 UK Medical Research Council's (MRC) framework**

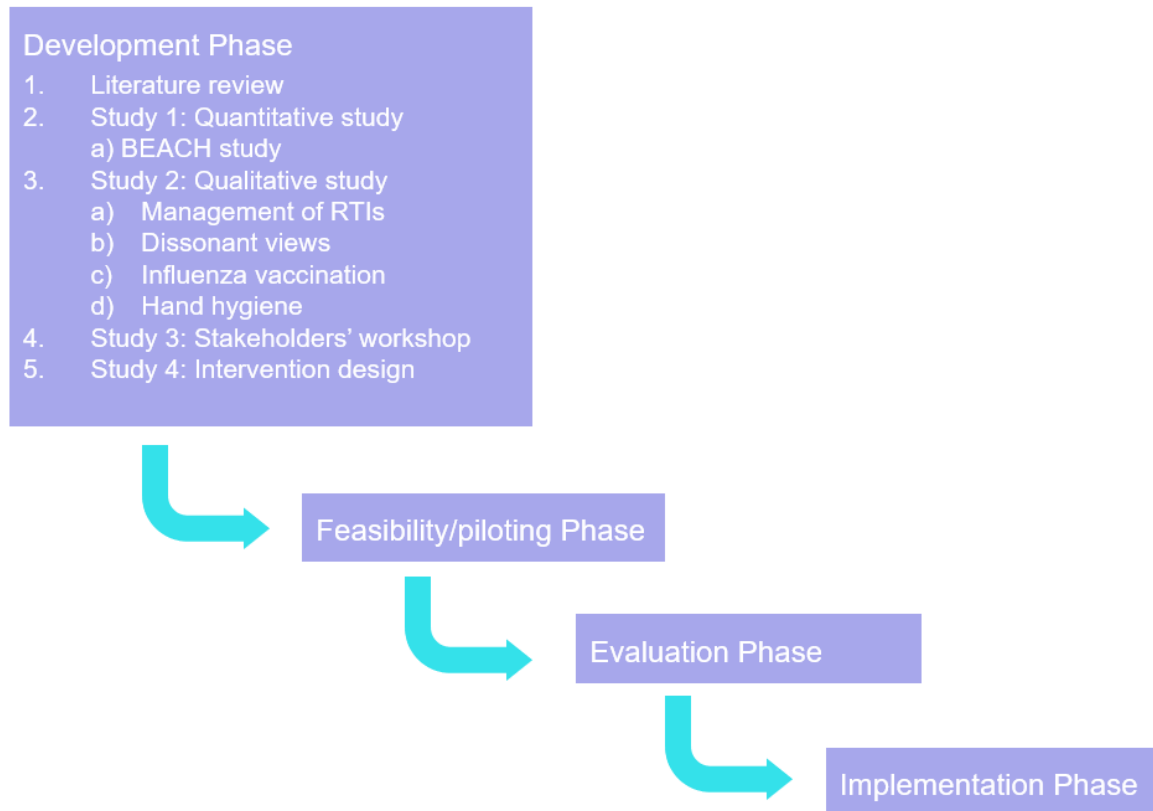
In April 2000, the UK MRC published a framework for the development and evaluation of conventional and innovative methods for complex interventions used in the health service (Craig et al., 2008). They argued that on the surface, some interventions may be simple and straight forward, however, intrinsic and complicated interactions can arise that researchers may not foresee in the initial development of the intervention. The MRC recognised the complexity of designing interventions, which involves not only the process of health care practice, but also factors that influence the behaviour and interactions between the primary care provider (PCP) and the patient (Craig et al., 2008; Moore et al., 2015). Recent studies have used the MRC framework to inform the development of interventions such as modifying infant feeding behaviour (Lakshman et al., 2014), promoting psychosocial well being following a stroke (Kirkevold et al., 2018), improving participation of nursing home residents with joint contractures (Saal et al., 2018), and establishing a perinatal education programme (Artieta-Pinedo et al., 2017).



The UK MRC framework includes four phases (Craig et al., 2008):

1. **Development phase:** The first step to developing a clinical intervention needs to define and understand the problem and identify the existing evidence base.
2. **Feasibility and piloting phase:** This phase include testing the intervention designed in the development phase, and determines the approximate sample size, locations, recruitment and retention of subjects and acceptability of the intervention. This phase further refines and addresses the main issues identified in the development phase.
3. **Evaluation phase:** This phase applies the intervention design and assesses the effectiveness of the study to a wider population in a range of different settings (e.g. via a large Randomised Controlled Trial or RCT). This provides insight into understanding the success and possible failure of the study design. Cost effectiveness is also assessed in this phase.
4. **Implementation phase:** This phase translates the research into practice. Information regarding the research study including design and intervention is disseminated and accessible to policy and decision makers to allow change in behaviour. This is also assessed long term to ensure sustainability of change.

This PhD consists of the development phase of the MRC framework. (Figure 2).



**Figure 2. Development of the intervention design using the UK Medical Research Council Framework**

The MRC defines complex interventions as containing several interacting components, including behaviour of persons delivering or receiving interventions, different groups or organisational levels, and number and variability of outcomes (Craig et al., 2008; Medical Research Council, 2000). In this study, the interacting components defined are parents and carers of children with RTIs, and their interactions with multiple PCPs such as GPs, PNs, MCHNs and pharmacists. It is anticipated that the behaviour of parents and carers of children with RTIs will vary depending on multiple factors. For example, parents will have different experiences of managing RTIs with their child(ren), and how they manage subsequent RTIs may be dependent on the positive or negative outcome of those experiences. Similarly, PCPs

have different roles in dealing with RTI symptoms and treatment in young children, and there is variation among practitioners in the same profession. All of these different experiences and situations will form a rich knowledge base to help understand the problem, identify the existing evidence, and develop an intervention to better manage and reduce RTIs in young children.

### **3.1.2 Theoretical approach**

This study utilised a behavioural theory approach (Theoretical Domains Framework (TDF)) to assess barriers and enablers to explore RTI prevention and management in young children, (Michie & Johnston, 2004; Michie et al., 2005) and the COM-B (Capability, Opportunity and Motivation) model to identify targets for behaviour change interventions for a future pilot study (Michie et al., 2015).

The benefits of using a behavioural theory approach are threefold: first, that theory can help identify key concepts that will lead to behaviour change in key areas, thus facilitating the selection of appropriate behaviour change interventions in practice. Second, data collected across different contexts, populations, and behaviours can be consolidated and compared using a common theoretical base. Third, theory-based approaches can inform the researchers about the effectiveness of interventions, thereby guiding future research to refine and develop better interventions (Huis et al., 2012; Michie et al., 2005; Michie & Prestwich, 2010; Michie et al., 2011).

#### **3.1.2.1 Theoretical Domains Framework - TDF**

The TDF was developed to simplify and integrate behaviour change theories into a set of domains that understands behaviour, leading to the development of behaviour change interventions (Michie et al., 2005). The TDF comprises 14 theoretical domains derived from 128 constructs from 33 health and social psychology theories that assists with the understanding

of behaviour change (Cane, O'Connor, & Michie, 2012; Michie et al., 2005). The 14 domains consist of knowledge, skills, social/professional role and identity, beliefs about capabilities, optimism, reinforcement, intentions, goals, memory, attention and decision processes, environmental context and resources, social influences, emotion, and behavioural regulation (Cane et al., 2012). The TDF has been used to understand behaviours by exploring barriers and enablers such as survivorship care plans (Birken, Presseau, Ellis, Gerstel, & Mayer, 2014); improve appropriate prescribing (Cadogan et al., 2015; Cullinan et al., 2015); comparing physicians' beliefs and behaviours (Islam et al., 2012); treatment pathways (Kramer, Schlößler, Träger, & Donner-Banzhoff, 2012; Scott, Walter, Webster, Sutton, & Emery, 2013); forecasting health expectancy (Majer, Stevens, Nusselder, Mackenbach, & van Baal, 2013); and diagnosis, management and treatment of diseases (Mirbaha, Shalviri, Yazdizadeh, Gholami, & Majdzadeh, 2015; Murphy et al., 2014; Penn, Dombrowski, Sniehotta, & White, 2014; Tavender et al., 2014). Table 2 displays the definition of each of the 14 theoretical domains in the qualitative component of the research derived from the literature review and the TDF (Cane et al., 2012; French et al., 2012; Michie & Prestwich, 2010; Squires et al., 2013).

In particular, the TDF was selected to inform the study design as previous studies relevant to this research have used the TDF to explore views and practices on antibiotic prescribing (Fleming, Bradley, Cullinan, & Byrne, 2014), improving hand hygiene compliance (Boscart, Fernie, Lee, & Jaglal, 2012; Dyson, Lawton, Jackson, & Cheater, 2013; Fuller et al., 2012; McAteer, Stone, Fuller, & Michie, 2014; Squires et al., 2016), and vaccination intervention (McSherry et al., 2012). These studies have used this validated integrative framework to encompass factors influencing behaviour in certain health settings. In addition, the TDF is not restricted to exploring barriers and enablers of behaviour in the development phase, it can also

be used in the piloting phase to evaluate the feasibility of implementing an intervention design (McAteer, Stone, Fuller, & Michie, 2014), which is the aim of my post PhD research.

***Table 2. Theoretical domains and their definitions***

<b>Theoretical Domain</b>	<b>Definition</b>
1. Knowledge	An awareness of the existence of something
2. Skills	An ability or proficiency acquired through practice
3. Social/Professional role and identify	A coherent set of behaviours and displayed personal qualities of an individual in a social or work setting
4. Beliefs about capabilities	Acceptance of the truth, reality or validity about an ability, talent or facility that a person can put to constructive use
5. Optimism	The confidence that things will happen for the best or that desired goals will be attained
6. Beliefs about consequences	Acceptance of the truth, reality or validity about outcomes of a behaviour in a given situation
7. Reinforcement	Increasing the probability of a response by arranging a dependent relationship, or contingency, between the response and a given stimulus
8. Intentions	A conscious decision to perform a behaviour or a resolve to act in a certain way
9. Goals	Mental representations of outcomes or end states that an individual wants to achieve
10. Memory, attention and decision processes	The ability to retain information, focus selectively on aspects of the environment and choose between two or more alternatives
11. Environmental context and resources	Any circumstance of a person's situation or environment that discourages or encourages the development of skills and abilities, independence, social competence, and adaptive behaviour
12. Social influences	Those interpersonal processes that can cause individuals to change their thoughts, feelings or behaviours
13. Emotion	A complex reaction pattern, involving experiential, behavioural and physiological elements, by which the individual attempts to deal with a personally significant matter or event
14. Behavioural regulation	Anything aimed at managing or changing objectively observed or measured actions

By exploring the barriers and enablers to understand how behaviours are shaped, behaviour change interventions can be developed to inform practice (French et al., 2012; Lipworth, Taylor, & Braithwaite, 2013).

### **3.1.2.2 COM-B Model**

A behaviour change theory was used to identify targets for interventions and was applied to the Behaviour Change Wheel (Figure 3). The COM-B model was developed by Michie et. al., (2011) as a new framework for a behaviour system (B) using three essential conditions: capability (C), opportunity (O) and motivation (M). For a given behaviour to exist, these three conditions must be met (Michie et. al., 2015). There are six components to the COM-B model: Physical capability; psychological capability; reflective motivation; automatic motivation; physical opportunity; and social opportunity. This framework helps researchers to understand behaviour and thereby characterises and designs behaviour change interventions (Abraham, Kelly, West, & Michie, 2009; Abraham & Michie, 2008; Michie et al., 2011; Srigley et al., 2015).



**Figure 3. TDF domains linked to COM-B components (Michie et al., 2015)**

### 3.2 Development Phase

To understand the behaviour in context, the study started with the development phase by exploring PCPs and parents' and carers' current management and treatment of RTIs in young children. In addition, PCPs' and parents' and carers' knowledge, views and practice of prevention strategies such as influenza vaccination and hand hygiene were explored to reduce transmission of infectious diseases.

After the initial review of the literature, and identification of important gaps in the management, treatment, and prevention with respect to RTIs in children <5 years of age, a mixed methods approach was used by first conducting a quantitative research study into current GP management of RTIs in young children in Australian general practice (Study 1), followed by a qualitative research study of PCPs and parents and carers on their knowledge, views and attitudes to the prevention and management of RTIs in young children (Study 2).

Study 1 (Chapter 4) was an analysis of GP management of RTIs in children <5 years of age, from April 2007 to March 2012, using the Bettering the Evaluation And Care of Health (BEACH) data. BEACH was a continuous, paper-based, national study of random sample of 1000 GP activity in Australia each year, providing information on GP-patient encounters including patient characteristics, reasons for encounter, number of problems managed and clinical actions initiated. (Britt, Miller, Charles, et al., 2012).

Study 2 (Chapter 5 – 8) was a qualitative study comprised of 30 semi-structured interviews with PCPs (20 GPs, two PNs, three MCHNs and five pharmacists) and five focus groups with a total of 50 parents and carers to explore their knowledge, attitude and practices in managing and prevention strategies of RTIs in young children (see Tables 3 and 4 for characteristics of PCPs, and parents and carers respectively). The interview and focus group guides in this study

were based on the TDF developed by Michie et. al. (2005). The TDF has previously been used by other studies to develop questionnaires (Huijg et al., 2014). The interview questions were piloted with two GPs, one PN, one MCHN, and one pharmacist, and the focus group questions were piloted with two parents with children under the age of 5, to check the validity of questions. See Appendix 6 and 8 for the interview/focus group guides respectively. All participants were provided with a gift voucher upon completion.

**Table 3. Characteristics of primary care providers**

	<b>GPs (n=20)</b>	<b>PNs (n=2)</b>	<b>MCHNs (n=3)</b>	<b>Pharmacists (n=5)</b>
Gender	6 F, 14 M	2 F	3 F	2 F, 3 M
Age	51-60 (45%)	31-40 (100%)	51-60 (100%)	25-30 (60%)
Years of experience	18 (4-37 years)	3 (1-5 years)	17.7 (9-30 years)	7.2 (3-13 years)

F – female      M - Male

GP – general practitioner

PN – Practice nurse

MCHN – Maternal child health nurse

**Table 4. Characteristics of parents and carers**

<b>Parents and Carers</b>	<b>N = 50</b>
<u>Gender:</u>	
Women	47 (94%)
Men	3 (6%)
<u>Age:</u>	
21-30yo	7 (14%)
31-40yo	31 (62%)
41-50yo	9 (18%)
>50yo (grandparents)	3 (6%)
<u>Income (per week):</u>	
<\$900	6 (12%)
\$900-\$1500	14 (28%)
>\$1500	24 (48%)
No data	6 (12%)



The next step was to use the evidence gathered from the literature review, quantitative and qualitative studies to develop a clinical intervention to better manage, treat, and reduce RTIs in young children. A stakeholders' workshop was conducted to first, disseminate the study result findings, and second, to receive feedback from study participants to identify research areas where interventions could be targeted (Study 3 – Chapter 9). Subsequently, the COM-B model was used to develop proposed interventions (Study 4 – Chapter 9).

### **3.3 Data Analysis**

Data from the interviews and focus groups were digitally recorded, transcribed verbatim and analysed using a thematic approach (Braun & Clarke, 2006). Thematic analysis has been shown to provide a flexible approach to the analysis of qualitative data and has been used in qualitative research as an analytical tool to identify, analyse and report themes or patterns within the data. For the purpose of this research, a deductive or 'top down' approach was used. This approach is driven by the researcher's theoretical or analytical interest in the topic and provides a more detailed analysis of the data. There are six steps used in the thematic analytical framework process and these are described in detail below (Braun & Clarke, 2006):

1. **Data familiarization:** The start to thematic analysis is by familiarising with the data, going through the data thoroughly, reading and re-reading the data, taking notes and marking ideas for coding. For accurate data analysis, it is recommended that maximum time is devoted to this phase.
2. **Generating initial codes:** After data familiarisation, the next phase involves the generation of initial codes from the data. The entire data set should be thoroughly and systematically analysed, to identify interesting areas that may form repeated patterns, or 'themes'. The data can then be organised into meaningful groups.

3. **Searching for themes:** Once the initial codes are coded and put into groups, they can then be sorted into potential themes, or broader levels of themes. Hence these codes can be analysed and combined to form overarching themes. Significant themes will then begin to emerge.
4. **Reviewing themes:** This phase is to ensure accuracy of data analysis. By reviewing and refining the themes of the data, some initial themes may be identified as not 'fitting' as a theme, and hence combined with other themes. Other themes can be separated into two or more themes, depending on the supporting data. It is important to make sure that the data within each theme support the theme, and meaningful and clear distinctions exist between the themes. The themes from the dataset will then form a coherent story.
5. **Defining and naming themes:** This phase is to define and refine the themes and be able to describe the content of each theme. Titles of the themes can be revised in this phase to give a more concise story of what the data is about.
6. **Producing the report:** When the data has been analysed, coded and put into groups, themes created, reviewed and refined, the final analysis and report can then be written. It is important to provide a concise and accurate picture of what the research/data is about and make a convincing argument for the research question.

In the current study, this framework of analysis enabled the search for core themes across data within each group and also across the different groups, involving constant comparison of codes and themes to address the research questions. Data management of all transcripts were managed in NVivo 10.

### **3.4 Ethics**

The BEACH program was approved by the University of Sydney Human Research Ethic Committee, and the qualitative and the stakeholders' workshop ethics were approved by the Monash University Human Research Ethics Committee (CF14/1384 - 2014000648).

## **Chapter 4: Respiratory tract infections among children younger than 5 years: current management in Australian general practice**

The literature review in Chapter 2 presented the prevalence of RTIs in young children, the importance of clinical management and the reasoning behind GPs' decision leading to treatment of RTIs in this cohort. However, much of this data had been published overseas and the management of RTIs in young children in Australia is unclear. It is also not known whether management of RTIs by GPs is aligned with recommended guidelines. This chapter focussed on exploring the current management of Australian general practitioners' management and treatment of RTIs in children less than 5 years of age using the BEACH dataset which provides a snapshot of GP activities in Australia. It was published in the Medical Journal of Australia in March 2015. Work arising from this study was also presented at Primary Health Care Research (PHCIS) Conference, 10-12 July 2013, Hilton Hotel, Sydney, Australia.

# Respiratory tract infections among children younger than 5 years: current management in Australian general practice

*Management of paediatric respiratory tract infections in Australia varied according to the clinical problem and with age and sex of the general practitioner*

**A**cute respiratory tract infections (RTIs) are managed at more than 6 million general practice visits each year in Australia.<sup>1</sup> RTIs such as the common cold (acute upper respiratory tract infection [URTI]), acute bronchitis/bronchiolitis, acute tonsillitis and pneumonia create a severe health and economic burden.<sup>1</sup> They are most prevalent among young children, especially when they attend preschools or day care centres. It is estimated that children younger than 5 years have a cold 23% of the time,<sup>2</sup> with 70% of the costs attributed to carers' lost time at work.<sup>3</sup>

Current guidelines on the treatment and management of RTIs in children include supportive management such as hydration and rest.<sup>4</sup> Over-the-counter (OTC) medications such as analgesics and cough medications may reduce the severity of symptoms, but they do not cure or prevent the illness.

As most RTIs are caused by viruses, antibiotics have limited therapeutic value and should only be prescribed if an RTI is suspected to be bacterial in origin. However, overseas studies suggest high rates of antibiotic prescribing for RTIs among young children.<sup>5,6</sup> Contributing factors include physicians' diagnostic uncertainty, parents' expectation of receiving antibiotics and physicians' perception of parents' satisfaction with the visit.<sup>7,8</sup>

The current management of RTIs among children in Australia, especially in general practice, is unclear. Much of the published data about the management of this cohort originated from the United Kingdom,<sup>9</sup> Canada,<sup>5</sup> and the United States.<sup>10,11</sup> Therefore, we aimed to explore the current management of RTIs in children under the age of 5 years in Australian general practice using data from the Bettering

## Abstract

**Objective:** To explore the current management in Australian general practice of common respiratory tract infections (RTIs) in children younger than 5 years.

**Design, setting and participants:** Analysis of data from a sample of 4522 general practitioners who participated in the Bettering the Evaluation and Care of Health (BEACH) cross-sectional survey, April 2007 to March 2012. Consultations with children younger than 5 years were analysed.

**Main outcome measures:** GPs' management of four common RTIs (acute upper RTI [URTI], acute bronchitis/bronchiolitis, acute tonsillitis, and pneumonia) in association with six management options: antibiotic medications; prescribed or supplied non-antibiotic medications; medications advised for over-the-counter purchase; referrals; pathology testing; and counselling.

**Results:** Of 31 295 encounters recorded, at least one of the four selected paediatric RTIs was managed at 8157 encounters. URTI was managed 18.6 times per 100 GP patient encounters, bronchitis/bronchiolitis 4.2 times, acute tonsillitis 2.7 times, and pneumonia 0.6 times per 100 encounters. Antibiotics were prescribed most frequently for tonsillitis and least frequently for URTI. Male GPs prescribed antibiotics for URTI significantly more often than female GPs, while older GPs prescribed antibiotics for URTI more often than younger GPs.

**Conclusion:** GP management of paediatric RTIs in Australia varied according to the clinical problem and with age and sex of the GP. Further research into parents' and health professionals' attitudes and practices regarding the role of antibiotics, over-the-counter medications, and hygiene will help maintain favourable management practices.

the Evaluation and Care of Health (BEACH) program.

## Methods

We analysed BEACH data collected from April 2007 to March 2012 inclusive. BEACH methods are described elsewhere in detail,<sup>12</sup> however, in summary, BEACH is a continuous, paper-based, national study of general practitioner activity in Australia. Every year, as part of a rolling random sample of 1000 GPs, each GP provides information on 100 consecutive GP-patient encounters with consenting, unidentified patients. BEACH collects GP characteristics and, for each encounter: patient characteristics, reasons for encounter, number of problems managed and clinical actions initiated.<sup>13,14</sup> Clinical actions may include

medication, referral, pathology testing, and non-pharmacological treatment (eg, counselling, giving advice, education or minor surgery). The BEACH program is approved by the University of Sydney Human Research Ethics Committee.

BEACH study statistical analyses in SAS 9.3 (SAS Institute) are adjusted for clustering of encounters around each GP. Statistically significant differences are determined by non-overlapping 95% confidence intervals, equivalent to  $P < 0.006$ .

For this study, we identified all GP encounters with patients younger than 5 years (60 months) at the date of encounter. We analysed those encounters where at least one of the following four RTIs (by International Classification of Primary Care, second edition [ICPC-2] code) was recorded as problem managed:

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# 1 Demographics of general practice patients younger than 5 years, overall and with respiratory infections, 2007–2012

Demographics	All patients (n = 31 295)		Patients with at least one of the four specified respiratory tract infections* (n = 8157)	
	No.	% (95% CI)	No.	% (95% CI)
Sex				
Male	16 548	53.4% (52.7%–54.0%)	4 319	53.3% (52.2%–54.4%)
Female	14 468	46.6% (46.0%–47.3%)	3 782	46.7% (45.6%–47.8%)
Missing data†	279		56	
Age group in years				
< 1	9 730	31.1% (30.4%–31.8%)	2 056	25.2% (24.2%–26.2%)
1 to < 2	8 053	25.7% (25.2%–26.3%)	2 233	27.4% (26.4%–28.4%)
2 to < 3	4 917	15.7% (15.3%–16.2%)	1 559	19.1% (18.2%–20.0%)
3 to < 4	4 240	13.5% (13.1%–14.0%)	1 251	15.3% (14.5%–16.1%)
4 to < 5	4 355	13.9% (13.5%–14.3%)	1 058	13.0% (12.2%–13.7%)
Missing data†	0		0	
Indigenous status				
Aboriginal and/or Torres Strait Islander	699	2.5% (2.1%–2.9%)	160	2.2% (1.7%–2.7%)
Non-Indigenous	27 153	97.5% (97.1%–97.9%)	7 121	97.8% (97.3%–98.3%)
Missing data†	3 443		876	
HCC status				
HCC	7 380	25.9% (24.8%–27.0%)	2 042	27.4% (25.9%–28.9%)
No HCC	21 116	74.1% (73.0%–75.2%)	5 416	72.6% (71.1%–74.1%)
Missing data†	2 799		699	
Practice status				
New to practice	4 754	15.4% (14.7%–16.0%)	1 051	13.0% (12.1%–14.0%)
Seen previously	26 199	84.6% (84.0%–85.3%)	7 012	87.0% (86.0%–87.9%)
Missing data†	342		94	

HCC = Health Care Card. \* Acute upper respiratory tract infection, acute bronchitis/bronchiolitis, acute tonsillitis and pneumonia. † Missing data were removed from calculations. ♦

- upper respiratory infection, acute (“URTI”) [R74];
  - bronchitis/bronchiolitis, acute (“bronchitis”) [R78];
  - tonsillitis, acute (“tonsillitis”) [R76]; and
  - pneumonia [R81].
- These RTIs were selected on the basis of their frequency and importance in general practice paediatric management.

The management rate of each of these four RTIs per 100 paediatric encounters was compared in terms of: season (summer [December–February] v winter [June–August]); GP sex; and GP age group ( $\geq 55$  years v  $< 55$  years).

We further examined the use and rate (per 100 of each specified RTI) of six management (“clinical action”) options:

- antibiotic medications;
- prescribed or supplied non-antibiotic medications;
- medications advised for OTC purchase;
- referrals (to specialists and/or allied health professionals);
- pathology testing; and
- counselling (including advice/education) at the encounter.

## Results

From April 2007 to March 2012, there were 31 295 encounters (involving 4522 GPs) with children younger than 5 years. Of these children, 53.4% were boys, and 31.1% were aged under 1 year. One or more respiratory infections (ICPC-2 codes R71–R83) were managed at 9261 encounters — 29.6% (95% CI, 28.9%–30.3%) of these GP paediatric encounters.

Of these encounters, at least one of URTI, bronchitis or tonsillitis was recorded at 86.0% (results not shown), and at least one of URTI, bronchitis, tonsillitis or pneumonia was recorded at 88.1%. One or more of these four specified RTIs were managed at 8157 encounters, equating to 26.1% (95% CI, 25.4%–26.7%) of all GP paediatric encounters.

Box 1 presents patient demographics of all paediatric encounters and of those involving at least one of these four specified RTIs. For encounters where at least one of the four specified RTIs was recorded, there was a smaller proportion of patients in the  $< 1$  year and a greater proportion in the 1 to  $< 4$  years age groups and fewer patients new to the practice compared with all paediatric encounters. The characteristics of the two groups were otherwise similar.

## 2 Respiratory problems among children younger than 5 years per 100 encounters, by general practitioner age and sex, and by season, for the four specified respiratory tract infections, 2007–2012

	No. of encounters with patients < 5 years	Problems managed per 100 encounters (95% CI)				
		URTI	Bronchitis	Tonsillitis	Pneumonia	Total
Total	31295	18.64 (18.05–19.23)	4.15 (3.89–4.42)	2.72 (2.51–2.93)	0.61 (0.51–0.71)	26.13 (25.48–26.78)
GP age group in years*						
< 55	21947	18.51 (17.82–19.20)	3.96 (3.65–4.27)	2.42 (2.19–2.66)	0.61 (0.49–0.73)	25.51 (24.76–26.25)
≥ 55	9195	18.99 (17.84–20.14)	4.64 (4.12–5.17)	3.39 (2.96–3.83)	0.62 (0.43–0.81)	27.65 (26.34–28.96)
GP sex						
Female	14 410	16.99 (16.18–17.80)	3.71 (3.34–4.09)	2.46 (2.17–2.76)	0.73 (0.56–0.90)	23.89 (22.97–24.81)
Male	16 885	20.05 (19.20–20.90)	4.52 (4.16–4.89)	2.94 (2.65–3.24)	0.52 (0.40–0.63)	28.03 (27.12–28.94)
Season of consultation						
Summer	6571	14.35 (13.22–15.48)	2.48 (2.08–2.88)	2.71 (2.24–3.18)	0.41 (0.23–0.59)	19.95 (18.71–21.19)
Winter	8636	21.86 (20.60–23.12)	5.33 (4.72–5.93)	2.84 (2.43–3.25)	0.88 (0.65–1.11)	30.91 (29.47–32.34)

URTI = upper respiratory tract infection. Summer = December–February. Winter = June–August. \* Age was missing for 153 GPs; their data were removed from calculations. ♦

The management rate (per 100 paediatric encounters) of each of the four specified RTIs (and the combined total) is shown in Box 2. For all four specified RTIs combined, the management rate was higher among older GPs (≥ 55 years) than among younger, higher among male GPs than female, and higher in winter than summer. URTI was the most frequently managed respiratory infection (18.6), followed by bronchitis (4.2), tonsillitis (2.7) and pneumonia (0.6). The problem management rates of URTI, bronchitis and pneumonia were significantly higher in winter than in summer.

The management rate of URTI and bronchitis was significantly higher among male GPs than among female GPs (Box 2). The rate of tonsillitis management was higher among older GPs than younger GPs (Box 2). There was no significant seasonal difference in the rate at which each management option (“clinical action”) was recorded for each of the specified RTI problems (data not shown).

Box 3 illustrates the mean rate of management options recorded per 100 of each of the four specified RTI problems. The antibiotic prescribing rate for the management of tonsillitis (88.6), was statistically significantly higher than that for pneumonia (65.6), bronchitis (55.2) and URTI (20.2). URTI had the highest rate of OTC medications advised (29.5), compared with tonsillitis (13.0), bronchitis (9.2) and pneumonia (5.2). URTI also had the

highest rate of counselling/advice/education (35.6), compared with bronchitis (24.1), pneumonia (21.4) and tonsillitis (13.7). The highest rate of prescribing non-antibiotic medications was for bronchitis (21.6). The highest rate of referrals given (14.1) and pathology tests ordered (9.9) were for pneumonia.

The rate of antibiotic prescribing per 100 URTI problems was higher among male GPs (22.5; 95% CI, 20.6–24.3) than female GPs (17.2; 95% CI, 15.3–19.1) and similarly for prescribed non-antibiotic medication per 100 URTI problems (14.0; 95% CI, 12.3–15.7 v 10.7; 95% CI, 9.1–12.3). The rate of pathology tests ordered per 100 tonsillitis problems was significantly higher among female GPs than among male GPs (3.9; 95% CI, 1.6–6.3 v 0.6; 95% CI, 0.0–1.3). The rate of counselling/advice/education per 100 bronchitis problems was significantly higher among female GPs than among male GPs (31.2; 95% CI, 25.9–36.5 v 19.1; 95% CI, 15.7–22.5). No other significant differences were found on this GP sex comparison analysis.

The rate of antibiotic prescribing per 100 URTI problems was significantly higher among older GPs (≥ 55 years) than younger GPs (25.4; 95% CI, 22.8–28.0 v 18.0; 95% CI, 16.4–19.5). The rate of counselling/advice/education per 100 URTI problems was significantly higher among younger GPs than older GPs (38.1; 95% CI, 35.5–40.6 v 30.2; 95% CI, 26.4–33.9). The rate of advising OTC medications per 100 tonsillitis

problems was significantly higher among younger GPs than among older GPs (16.2; 95% CI, 12.3–20.0 v 8.0; 95% CI, 4.1–12.0). No other significant differences were found on this GP age group comparison analysis.

## Discussion

Our study provided insight into the current management of selected respiratory infections in children younger than 5 years by GPs in Australia.

Our study found that URTI was the most common RTI managed by GPs in this age group. This finding is similar to those reported from Australia, Malaysia and the UK.<sup>1,15,16</sup> Studies have shown that parental decisions to consult for a young child with the common cold are influenced by the age of the child, type of symptoms, parents’ education level and their perception of the severity of the symptoms.<sup>17</sup> Whereas 60% of parents would visit a GP if their child had a cold,<sup>11</sup> parents from a lower income group were 1.5 times more likely to seek advice from health services.<sup>18</sup>

Despite our analyses showing URTI having the lowest antibiotic prescription rate of the four specified RTIs, guidelines suggest this is beyond clinical requirement. Nonetheless, this result compared favourably with overseas studies,<sup>6,19,20</sup> where the reported antibiotic prescription rate for URTI was as high as 42%.<sup>6</sup> Similarly, those studies reported the

antibiotic prescription rate for bronchitis to be as high as 86%.<sup>6,19</sup>

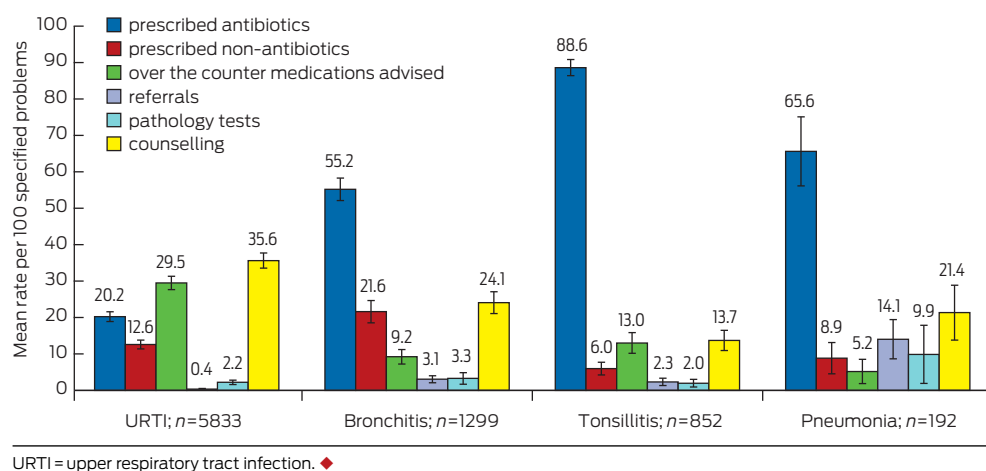
Several studies have suggested reasons why antibiotics might be prescribed unnecessarily for (non-bacterial) RTIs.<sup>7,15,18,19,21</sup> These include diagnostic uncertainty in children,<sup>7</sup> possibly poor medical knowledge of respiratory infections,<sup>21</sup> physicians' perception of parental satisfaction,<sup>8</sup> and parents' misconceptions and expectations regarding the treatment of RTIs, especially the perceived benefits of antibiotics.<sup>7,10,11,18</sup> Some of these studies have recommended education about RTIs and antibiotics for parents and carers,<sup>10,15</sup> and for physicians to aid decision making and optimal management.<sup>22</sup>

While URTIs had the lowest antibiotic prescription rate of the four RTIs in our study, they have the highest rate of OTC medications advised. Although physicians, researchers and paediatricians agree that common cold treatments and remedies do not reduce illness duration and offer little benefit,<sup>23</sup> GPs might still advise OTC medications (rather than prescribe antibiotics) to address some parents' expectations that medication will cure the common cold.

For each of the four RTIs, we found that the rate of pathology tests ordered was lower than the rate of antibiotic prescribing. Possible reasons for this include the technical difficulty of pathogen identification in RTIs; the invasive nature of throat swabs in young children; the cost; and the likelihood that management would not be altered by the microbiological results, which are often delayed.<sup>22,24,25</sup>

There were differences in the management of paediatric RTIs by GP age and

**3 Mean rate (95% CI) of treatment options recorded per 100 specified respiratory problems treated in general practice among children younger than 5 years, 2007–2012**



sex; male GPs prescribed medication (antibiotics and non-antibiotics) for URTI significantly more frequently than female GPs, and were less likely to provide counselling and education for bronchitis than female GPs. Older GPs prescribed antibiotics for URTI more frequently, but were less likely to provide counselling/advice/education for URTI than younger GPs.

In our study, antibiotic prescribing rates for URTI, bronchitis and tonsillitis were higher than recommended by the current *Therapeutic guidelines*.<sup>4</sup> However, our study was limited by a lack of data on patient comorbidities, which could have influenced GPs' diagnostic and management decisions. Similarly, the practice of "wait and see" before filling antibiotic prescriptions or buying OTC medications was not recorded, leading to possible overreporting of prescribed and OTC medications.

Nevertheless, the rigour of BEACH data has been well established, and

this study gives a detailed estimate of the frequency of and management options for specified paediatric RTIs. Our results open several promising avenues for further research into parents' and health professionals' attitudes and practices regarding antibiotic prescribing and OTC medications for managing RTIs in young children. Better understanding of these factors will help maintain favourable management practices.

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## **Chapter 5: Management of respiratory tract infections in young children – A qualitative study of primary care providers' perspectives**

In the previous chapter, we described the current management of RTIs in young children using the BEACH data set and concluded that GP management of respiratory tract infections in Australia varied according to the clinical problem managed, age and sex of the GP, and suggested further research into PCPs and parents' attitudes and practices regarding the role of antibiotics and prevention strategies such as hand hygiene to better manage RTIs in young children. Consequently, the next step was to conduct a qualitative study to explore PCPs and parents' knowledge, attitude and practice into the management and prevention strategies of RTIs in young children, and to compare findings from similar international studies. This chapter focussed on exploring the management of RTIs in young children from the perspectives of PCPs using the TDF and COM-B model to analyse the qualitative data. This paper was published in Nature Publishing Journals: Primary Care Respiratory Medicine in 2017. The paper was selected for and presented in the Highlighting Session at *GP15, The General Practitioner Conference 2015*, 21-23 September 2015, Melbourne Convention Centre, Melbourne, Australia.

## ARTICLE OPEN

# Management of respiratory tract infections in young children—A qualitative study of primary care providers' perspectives

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Respiratory tract infections in young children are the most common cause of general practice visits in Australia. Despite the availability of clinical practice guidelines, the treatment and management of respiratory tract infections in young children is inconsistent. The aim of the study was to explore the management of respiratory tract infections in young children from a multi-disciplinary perspective using across-sectional qualitative research design based on the theoretical domains framework and the Capability, Opportunity and Motivation-B model. In-depth interviews were conducted with 30 primary care providers to explore their knowledge, views and management of respiratory tract infections in young children. Interviews focused on symptomatic management, over-the-counter medications and antibiotic use, and data were thematically analysed. Our findings showed that factors such as primary care providers' time constraints, parental anxiety, general practitioners' perception of what parents want, perceived parental pressure, and fear of losing patients were some of the reasons why primary care providers did not always adhere to guideline recommendations. Primary care providers also provided conflicting advice to parents concerning over-the-counter medications and when children should resume normal activities. Overall, this study showed that complex interactions involving emotional and psychological factors influenced the decision making process of primary care providers' management of respiratory tract infections in young children. A team care approach with consistent advice, and improved communication between primary care providers and parents is vital to overcome some of these barriers and improve guideline adherence. The findings of this research will inform the development of interventions to better manage respiratory tract infections in young children.

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## INTRODUCTION

Respiratory tract infections (RTIs) are the most frequent reason for general practice presentation in Australia.<sup>1</sup> It is a major cause of morbidity, with young children (<5 years) being particularly vulnerable. Although the majority of RTIs are mild and self-limiting, the high prevalence of RTIs creates a significant health and economic burden,<sup>2</sup> especially when carers' time away from normal activities is taken into account.<sup>3</sup> Australian clinical guidelines recommend fluid intake and rest for the treatment and management of most RTIs, and paracetamol can be given to children to reduce fever over 38.5 °C.<sup>4, 5</sup> Oral decongestants and cough syrups are no longer recommended for children under the age of six due to the lack of evidence that they are effective and the possibility of side effects in this age group.<sup>4–6</sup> As the majority of RTIs are caused by viruses, antibiotics are not warranted as a treatment for most RTIs.

Despite available clinical guidelines,<sup>7</sup> general practitioners' (GPs) treatment and management of RTIs in young children have been shown to be inconsistent in Australia; recent analysis of GP management of RTIs in children <5 years of age showed management varied widely according to the presenting clinical problem and the age and sex of the GP.<sup>8</sup> Recent US studies have found that factors such as parental misconception regarding the symptoms of RTIs and their understanding of antibiotic use have

influenced physicians' management of RTIs in young children.<sup>9, 10</sup> While Australian antibiotic use for RTIs in children compares favourably with overseas data,<sup>8, 11, 12</sup> the rate of use is still higher than recommended guidelines.<sup>4, 13</sup> Overseas studies have suggested antibiotic prescribing may be complicated by factors such as physicians' diagnostic uncertainty, parents' expectation of receiving antibiotics, physicians' perception of what parents want, and parents' satisfaction with the visit.<sup>14–20</sup>

In Australia, the reasons for the inconsistency with guideline recommendations in the management of RTIs in children <5 years of age, especially regarding antibiotic prescribing habits, are unclear. In addition, there have been no studies identified in the literature that have explored views concerning the management of RTIs in children from other primary care providers (PCPs) such as practice nurses (PNs), maternal child health nurses (MCHNs) and pharmacists. This group of professionals are a potentially valuable untapped resource as they are most likely to have more contact with the parents of children <5 years of age and would often provide advice to parents independently from the GP regarding the child's health. By understanding the reasoning behind, the extent and how management of RTIs in young children differ from clinical guidelines, we may then be able to better manage RTIs in young children from both the

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parents and PCPs' perspective. Therefore, the aim of our study is to explore the views, attitude and practices of PCPs such as GPs, PNs, MCHNs and pharmacists in the management of RTIs in young children.

## RESULTS

Thirty PCPs including 20 GPs, two PNs, three MCHNs and five pharmacists participated in the study. Five major themes emerged from the PCP interviews as areas for change: (1) PCPs' advice on managing RTIs in young children; (2) System barriers leading to lack of adherence to guidelines; (3) Parental anxiety affecting PCPs' advice on treatment and management of RTIs; (4) Conflicting management advice between PCPs; and (5) Factors influencing GPs' advice regarding antibiotic prescribing.

### Capability: Knowledge and skills

**Theme 1: PCPs' advice on managing RTIs in young children.** All PCPs agreed that managing RTIs in young children should start with the management of symptoms, which includes rest, hydration, staying warm, and generally keeping the child comfortable. Paracetamol was advised if the child was irritable or uncomfortable or had a temperature above 38 °C. While some GPs recommended alternating paracetamol with ibuprofen in this age group, other GPs advised against using ibuprofen. Other ways of managing symptoms included saline nasal drops and vaporisers/steam inhalation to clear the nose. MCHNs also mentioned regular breastfeeding in a young baby to keep up fluids and advised going to see a GP if patients were generally unwell. Generally, PCPs commented that parents just wanted to be reassured that they were doing the right thing.

*"... a lot of the time they don't necessarily need anything... a lot of them (parents) just say they want the reassurance that it's a cold, so they are quite happy that they don't necessarily want anything specific." GP3.*

*"...most of them, most of the time ... they just bring the kid in for reassurance..." GP7.*

PCPs recognised that other over-the-counter (OTC) medications such as decongestants and cough suppressants were no longer recommended for children under the age of 6 due to possible overdosing and/or sedation in this age group. Most GPs no longer recommended these OTC medications, however, some GPs mentioned that they did occasionally succumb to parental pressure:

*"...when the parents run in, they are driving me crazy... the nose doesn't stop, they are coughing at night, then I might say, "look, there is not really good evidence that these things work... but you can try using them..." GP3.*

While GPs were hesitant recommending OTC medications in this age group, pharmacists turned to natural and complementary medicine such as Prospan (for chesty cough), Little Coughs (for coughs), Kaloba (for bronchitis and sinusitis) and Sambucol (cold and flu relief) in place of decongestants and cough suppressants. Although not proven to be clinically effective, pharmacists mentioned that these products were "all natural", "had antiviral benefits" and "built the immune system".

*"...so there's a lot of things in my pharmacy such as the natural olive leaf extract, that I know I can give kids under 6..." PH2.*

*"...there are products now available on the market... something like Sambucol, they are black elderberries, so...yep, it's natural..." PH3.*

### Opportunity: Social/environment

**Theme 2: System barriers leading to lack of adherence to guidelines.** System barriers such as the lack of time for PCPs to discuss management options for parents regarding RTIs, lack of opportunities to educate parents, and the pressure to perform led to non-adherence to clinical guidelines.

Lack of consultation time to educate parents was another reason why GPs diverted their actions from recommended guidelines. GPs commented that they were more likely to prescribe antibiotics if it was the last session on a Friday, or a Saturday morning; fatigue due to long consultation hours; running behind schedule with added parental pressure; and not being able to review the child until Monday. In addition, part time GPs were more likely to prescribe antibiotics as they had less opportunity to ask parents to come back for a review:

*"... the reality is, if it's my last session, on a Friday, or on a Saturday morning, I might prescribe to them, but otherwise... I'll try to educate them..." GP2*

*"... probably the part time general practitioners who might be here for a session or two a week, don't have the luxury of a review within a short space of time... select to play it safe." GP9*

In addition, GPs who practised in time constrained clinics would write a script rather than spend time to educate the parents.

*"Time constraints, you know, force GPs to dish them out." GP14*

*"...I tend to prescribe more than it should be the case..." GP13*

Other PCPs thought GPs were generally time poor, however, they thought parents could obtain advice from other PCPs such as MCHNs and pharmacists as they are also trusted health-care professionals.

*"... through maternal child health nurses. I think that would be a good starting point, because ... they are trusted health-care professionals, and just the fact that they have the time with the parents, the mother, whereas the GPs usually not..." PH3.*

### Motivation: Emotion

**Theme 3: Parental anxiety affecting PCPs' advice on treatment and management of RTIs.** Parental anxiety coupled with the need to "do something" for the sick child was often mentioned as a key factor on PCPs' decision to disregard guidelines and recommend medications that might not be needed. GPs recommended OTC medication and/or prescribed antibiotics to "please" anxious parents. Pharmacists said they sometimes faced pressure from parents to override the GP's recommended medication treatment for their young child. Situations like this often made pharmacists feel uncomfortable.

*"... sometimes they (parents) come in and say that they are frustrated, they've just been to the doctor's, doctor didn't give them anything... they just want us to override the doctor's advice, sell them something, so ... we found ourselves in a position where we need to reinforce the message..." PH3*

Most GPs recognised that parents' anxiety could be minimised by reassuring anxious parents, explaining the nature of the fever, and writing down management plans so that parents felt like GPs were doing something for their sick child. A follow up review might be suggested if parents were overly anxious regarding their child's cold symptoms. On other occasions, GPs said they would

not disclose all the information to avoid increasing parents' anxiety and parents' expectation of treatment.

*"If you examine the child, sometimes you see the ears are a bit like pink or red, and if I don't think that's causing the child's symptoms... or I don't think I'm going to treat it, I don't tell the parents that ... cause... they would expect that you're going to give them something for that, so I usually say it's normal, just a bit congested or something." GP5*

**Theme 4: Conflicting management advice between PCPs.** While the lack of evidence and possible side effects and sedation were the reasons some PCPs cautioned the use of OTC medications for young children, for other PCPs, it was more about the fact that they were no longer recommended for children under the age of 6 due to regulations. GPs commented that they generally discussed with parents that these medications lacked evidence, were a waste of money and had possible side effects in contrast to the minimal benefit they might provide. Pharmacists reported that their strategy was simply to comment that these products were no longer recommended for children under 6, rather than citing a lack of evidence for their use. One pharmacist even queried the reasoning behind the recommendation:

*"I guess the thing with that then is, why do they have the same ingredients for kids over 6s...?" PH1*

When asked, PCPs would make specific recommendations to families about when children could resume normal activities, recognizing that parents would require time off work while their child was deemed "sick". There was tremendous variability in terms of this advice; some PCPs advised to keep the child home until completely asymptomatic, while others recommended resuming normal activities if the child felt well enough to attend.

*"... if their child is having a minor cold, they are going to school or child care, or kinder.... it's just going to... spread..." PN2*

There was even disagreement among PCPs, where a couple of PCPs advised parents to keep their child at home but would themselves send their own child back to childcare in the same circumstance due to the pressure of having to go back to work.

*"I do send them if they've got a snotty nose, as long as they don't have a temperature... As a parent, if they don't have a temperature, they go to school or childcare... As a GP? If they have a snotty nose, hmm probably not recommended!" GP8*

**Motivation:** Belief about consequences, professional role and identity, emotion

**Theme 5: Factors influencing GPs' advice regarding antibiotic prescribing.** In terms of antibiotic prescribing, GPs were mostly reluctant to prescribe unnecessarily—i.e., in situations where they believed the illness was viral and uncomplicated. However, extra-clinical factors such as perception of what they thought parents wanted, parental pressure, and concerns that parents would seek antibiotics elsewhere influenced antibiotic prescribing.

GPs also commented that they were sometimes guided by parents in prescribing antibiotics. Some GPs had the perception that parents expected antibiotics as a treatment for RTI even before coming in for the consultation. Some GPs succumbed to parental pressure if parents were absolutely insistent, concerned that if they did not prescribe, parents would go elsewhere to obtain a prescription from another doctor. As they want to "please" the parents, it was "easier to write a script."

*"... if they say 'I do want antibiotics', unless it's really late in the day, and I'm really tired and I've had enough, I will try and explain why..." GP2*

*"Sometimes they are quite demanding for antibiotics. Then probably you've got less threshold ... cos you've got to make them happy... you try and explain to them the pros and cons of antibiotics, but in the end, you just have to please them..." GP8*

*"...if they are absolutely insistent and I know they are pretty much going to walk out of the door and request for another doctor, I'd give them a script..." GP13*

Delayed prescribing was often mentioned as a strategy for GPs to deal with demanding parents who wanted antibiotics for viral RTIs. Of the 20 GPs interviewed, 18 said they have previously provided antibiotic scripts to anxious parents but cautioned the parents not to start until it was necessary.

*"... the ones who do sort of push, sometimes I leave an open gap, I explain to them, look, I'll give you a script, but see how the child goes over the next two or three days, if things aren't getting better... then you can try it, may help, may not." GP14*

*"... sometimes parents feel happier that they have the prescription because we're not always open on the weekends, they feel comfortable to have that prescription... instead of going and waiting in the emergency..." GP16*

Although GPs were the only PCPs in this study that could prescribe antibiotics, they were not the only health professionals parents would ask for advice regarding antibiotics. While pharmacists discussed the aetiology of the common cold and the use of antibiotics with anxious parents, MCHN said they would advise parents to query their GPs as to why antibiotics were prescribed in the first place.

*"So I say to them, that if the GP does prescribe you antibiotics, you need to ask the GP, 'Why has my child got antibiotics?'" MCHN1*

However, there appears to be a hierarchy where GPs have the "final say" on the management and treatment of RTIs in young children. While PNs, MCHNs and pharmacists provided specific advice such as symptomatic management of RTIs, OTC medication and sometimes even antibiotics, they commented that they would always advise parents to see a GP if the symptoms were severe and/or worse after a couple of days.

## DISCUSSION

### Main findings

Our study applied a systematic approach using the theoretical domain framework (TDF) and Capability, Opportunity and Motivation (COM-B) model to explore PCPs' attitudes and practice in managing RTIs in young children. From the qualitative interviews, it appears that the management of RTIs is a consultation process involving PCPs and parents of the sick child, however, many extra-clinical factors such as time constraints on PCP; parental anxiety; GPs' perception of what parents want; fear of losing patients; and the perception of parental pressures influenced the management and treatment of RTIs in young children. GPs providing an antibiotic script and asking parents not to fill it for a couple of days was often addressed as a strategy to deal with anxious parents wanting unnecessary antibiotics. Conflicting management advice between PCPs on OTC medication and when a young child should resume normal



activities were also seen as a barrier to the management of RTIs in this age group. As the management of RTIs in young children involves combined input from PCPs and parents, education strategies should include all PCPs and parents so that consistent advice is provided to parents to better manage RTIs in young children.

Interpretation of findings in relation to previously published work Our study has found that the management of RTIs in young children is a complex interaction consisting of not only symptomatic and/or medical treatment, but also emotional and psychological factors involving decisions from both parents with a sick child and PCPs advising those parents. While guidelines were mostly followed by GPs and other PCPs, many factors were shown to influence the PCPs' decision making in regards to managing both parents and their sick child.

Our finding that parental anxiety can influence the decision of both PCPs and parents in the management of RTIs in young children has not previously been well documented. Our study showed that GPs perceived a level of anxiety in parents who present with a sick child during consultations and that management was dependent on the level of anxiety and what parents expected from the consultation. While most PCPs tried to reassure the parents that their child was fine and discussed what symptoms to expect from the RTI, parental anxiety (especially with young children) led to unnecessary OTC medication and antibiotics being advised and/or prescribed. Further studies with parents of young children could reveal the degree of anxiety regarding their sick child and the impact that this has on GPs' decision to prescribe medications including antibiotics.

International studies have shown that parental concerns for the sick child and seeking additional information might be misinterpreted by physicians as pressure to prescribe medication, especially antibiotics.<sup>15, 18, 21</sup> Our study supported these findings as GPs commented that parents did have an expectation of antibiotics and that GPs did not want to "disappoint" parents. Our study also noted that time was lacking during consultation in order to educate parents regarding the appropriateness of antibiotics for RTIs and that this contributed to unnecessary prescriptions. It has been suggested that better communication between GPs and parents,<sup>21, 22</sup> education to improve parents' understanding of RTIs and management options,<sup>10, 23</sup> and enabling GPs to have sufficient time to consult might reduce the unnecessary prescribing of antibiotics.

Delayed prescribing has been shown to be effective in reducing the rate of antibiotic use by up to half<sup>24, 25</sup> and is a strategy that is preferred by both patients and GPs.<sup>26</sup> GPs like to use this method to please their patients and encourage shared decisions, which can result in patients feeling empowered to make their own decision regarding antibiotic use.<sup>27</sup> GPs in our study also mentioned that delayed prescribing is an acceptable method to possibly reduce antibiotic use while simultaneously giving parents something so they feel like therapeutic action is being taken for their sick child. While this approach may be favourable to both patients and GPs, it does not educate patients on the rationale of delaying antibiotic prescribing, and may result in a continued pattern of return visits with the expectation of an antibiotic prescription.<sup>19, 28</sup> Educating parents to look for certain RTI symptoms in their children, as well as understanding the unnecessary use of antibiotics for a common cold might be a better approach than delayed prescribing.

One of the barriers to educating parents that we reported in our study was the lack of consulting time to educate parents on the management of RTIs, especially with decisions regarding the use of antibiotics. It was often easier and more efficient for GPs to write a script. A previous study involving children under 18 years of age with RTIs found no significant difference in time taken for a

physician to prescribe antibiotics or not, hence suggesting it did not take longer to *not* prescribe antibiotics in a consultation.<sup>29</sup> However, this study did not mention whether educating parents was conducted during the consultation for those physicians who did not prescribe antibiotics. GPs in our study mentioned their limited consultation time restrict opportunities to educate parents, it might be possible to involve other PCPs to discuss RTIs management options with parents.

Our study found differences in the management advice given by PCPs, especially in regards to the use of OTC medications, and opinions on when children can resume normal activities. While evidence is lacking on the effectiveness of OTC medication for the treatment of the common cold, especially in young children,<sup>6, 30</sup> studies have reported that these medications are still being recommended by physicians.<sup>5, 31, 32</sup> Our study found that most GPs do not recommend OTC cough and cold medications, but parental anxiety and the need to "do something" have led some GPs to deviate from existing guidelines. Perhaps due to the reasons that these medications are no longer recommended to children under that age of six, pharmacists have turned to natural remedies even though there is no evidence to support their effectiveness. Conflicting advice was also given by PCPs' regarding when to resume normal activities. While most PCPs agreed when a child should go back to childcare/daycare, the pressure of parents having to work could influence PCPs' advice to send the child back earlier.

This study has demonstrated that consistent advice from all PCPs is needed in order to better manage RTIs in this cohort. As decisions on how to better manage a young child with a common cold involve complex interactions with PCPs and parents, it is imperative that consistent messages are communicated to parents and that communication between parents and all health-care professionals involved in the child's well-being is improved.<sup>24, 33</sup>

#### Strengths and limitations of this study

As far as we are aware, this is the first study to apply the TDF and the COM-B model to explore practice and assess barriers of managing RTIs in young children. We were also able to comprehensively examine the management of RTIs in young children in primary health care by including the views of GPs, PNs, MCHNs and pharmacists. The overwhelming response we received from PCPs (especially GPs) to participate in this study allowed us to interview PCPs in a wider geographic location.

There are a couple of limitations to our study. All PCPs that we interviewed expressed a genuine interest in this topic and wanted to make a difference in the management of RTIs in young children; this may have led to selection bias. Most importantly, we lacked the views of time constrained PCPs who could not participate in this research. Their views and practices in terms of overcoming barriers such as time constraints are important to aid the development of effective intervention strategies that change management habits of PCPs in order to better manage RTIs in young children.

#### Implications for future research, policy and practice

In this study, we used the TDF and COM-B model to demonstrate PCPs' management of RTIs in young children. While guidelines for the management of RTIs were mostly followed, barriers such as parental pressure; PCPs' perception of what parents want; lack of consultation time; and parental anxiety could affect guideline adherence. By developing the study using the TDF and the COM-B model, we were able to understand the behaviour of PCPs and parents of young children regarding their management of RTIs and identify areas for change. This knowledge will enable us to undertake an informed approach to the future development of

interventions that are targeted towards improving the management of RTIs in young children.

## CONCLUSIONS

Many extra-clinical factors, including emotional and psychological factors, influence the decision making of PCPs and parents when it comes to a sick child with RTI. This study provided some reasoning behind the extent to which the management of RTIs in young children has diverted from national guidelines. Based on our findings, we believe that a team approach involving other health-care professionals and the delivery of consistent advice is paramount. Consequently, interventions such as team care approach, strategies that focus on improving communications between PCPs and parents, and educating parents regarding common colds and antibiotic usage should be developed to overcome these barriers to improve the management of RTIs in young children.

## METHODS

### Theory

In this study, we applied the TDF<sup>34</sup> and the COM-B model<sup>35</sup> (Fig. 1) to inform data collection and analysis.

A behavioural theory approach can be used to inform the development of complex interventions by identifying key concepts that will lead to behaviour change and providing a means to select appropriate interventions to behaviour change.<sup>34, 36–38</sup> Data can then be gathered and accumulated across different contexts, populations and behaviours to provide a comparable evidence base where the different barriers and facilitators to the design and uptake of an intervention can be assessed. This can inform researchers about the effectiveness of interventions and guide future research to refine and develop better interventions. The TDF

was developed to simplify and integrate behaviour change theories into a set of 14 theoretical domains derived from 128 constructs from 33 health and social psychology theories that assists with the understanding of behaviour change.<sup>34–39</sup> The 14 domains consist of knowledge, skills, social/professional role and identity, beliefs about capabilities, optimism,



**Fig. 1** TDF domains linked to COM-B components<sup>48</sup>

**Table 1.** Interview schedule using TDF and COM-B to determine themes

COM-B component identified in the behavioural analysis	Domains linking to COM-B component	Interview example questions	Themes
Capability—psychological	Knowledge (an awareness of the existence of something)	What OTC medications do you recommend, if any?	PCPs' advice on managing RTIs in young children
Capability—physical	Skills (an ability or proficiency acquired through practice)	How do you diagnose the infection? How do you manage the children's cold symptoms? Can you tell me the process of prescribing antibiotics for RTIs in this age group?	PCPs' advice on managing RTIs in young children
Motivation—reflective	Social/professional role and identity (A coherent set of behaviours and displayed personal qualities of an individual in a social or work setting) Beliefs about consequences (acceptance of the truth, reality or validity about outcomes of a behaviour in a given situation)	What if the parents still insist on antibiotics? When should you advise parents to send the child back to childcare, other normal activities?	Factors influencing GPs' management advice on antibiotic prescribing Factors influencing GPs' management advice on antibiotic prescribing
Motivation—automatic	Emotion (a complex reaction pattern, involving experiential, behavioural and physiological elements; by which the individual attempts to deal with a personally significant matter or event)	How do you handle the situation if parents are insistent in antibiotics? Why don't you recommend over the counter medication?	Parental anxiety affecting PCPs' advice on treatment and management of RTIs Factors influencing GPs' management advice on antibiotic prescribing
Opportunity—social	Social influences (those interpersonal processes that can cause individuals to change their thoughts, feelings or behaviours)	Are you guided by parents in terms of prescribing antibiotics?	Conflicting management advice between PCPs System barriers leading to lack of adherence to guidelines

reinforcement, intentions, goals, memory, attention and decision processes, environmental context and resources, social influences, emotion, and behavioural regulation.<sup>39</sup> The TDF has been used to design research studies such as improving hand hygiene compliance,<sup>40</sup> treatment pathways,<sup>41, 42</sup> forecasting health expectancy,<sup>43</sup> and improving the uptake of vaccination.<sup>44, 45</sup>

The COM-B model was also developed, as a new framework for a behaviour system (B) using three essential conditions: capability (C), opportunity (O) and motivation (M).<sup>38</sup> For a given behaviour to exist, these three conditions must be met. There are six components to the COM-B model: physical capability; psychological capability; reflective motivation; automatic motivation; physical opportunity; and social opportunity. This framework helps researchers to understand behaviour and, thereby, characterise and design behaviour change interventions.<sup>35</sup>

## Design

Cross-sectional qualitative research design comprising semi-structured interviews with PCPs.

## Recruitment

PCPs were recruited across metropolitan Melbourne to participate in this study. The contact details of GPs and PNs were generated from an existing general practice database at Monash University (Melbourne, Australia), while the contact details for MCHNs and pharmacists were obtained via the Maternal Child Health Services website<sup>46</sup> and the local business directory, respectively. Invitation letters and research project explanatory statements were sent to the practices, including the contact details of the researcher. The study was also advertised via a local primary health network in the south east region of Melbourne to facilitate recruitment. We included PCPs who see at least five children under 5 years of age per week. Recruitment was limited to one PCP per practice.

## Procedure

The interview questions were developed from a literature review and the TDF to identify the barriers and enablers of current practice aimed at preventing and minimising RTIs in young children. The data collected for analysis included questions regarding the diagnosis and management of RTIs in young children, treatment options such as OTC medications and antibiotics, and the appropriate time to return to normal activities after a RTI (Table 1). The interview questions were piloted with two GPs, one PN, one MCHN, and one pharmacist in order to validate the questions (this data was not included in the final analysis).

Interviews (approximately 1 h long) were conducted between June 2014 and January 2015 in-person by RB at the PCPs' work place or at a place convenient to the PCP during practice hours. All participants completed the consent form before the commencement of the interview and were reimbursed for their time with a gift voucher (valued at AUD\$120) upon the completion of the interview.

## Analysis

Data from the interviews were digitally recorded and transcribed verbatim. They were then analysed using a thematic approach.<sup>47</sup> Two researchers (R. B. and B.B.) read the first three transcripts independently to generate initial codes and themes, which were then compared and refined until consensus was reached. A further three transcripts were coded, compared and refined. This process was repeated until all transcripts were coded. Emerging themes were further reviewed and refined to ensure precision of data analysis. After consensus was reached, the codes were matched to the domains within the TDF and mapped to the COM-B system, and the themes were generated within the model (Table 1). Data coded under a specific theme appeared across more than one domain in the TDF, but only appeared within one behaviour in the COM-B model. Data was managed using NVivo Ver.10. Study approval was obtained from the Monash University Human Research Ethics Committee (CF14/1384—2014000648).

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## AUTHOR CONTRIBUTIONS

R.B. completed the background literature search and R.B., B.B., D.G. and D.M. contributed to the study design. R.B. conducted and transcribed all interviews. R.B. and B.B. performed the analysis of the data. R.B. drafted the manuscript. All authors revised all drafts and approved the final version of the manuscript.

## COMPETING INTERESTS

The authors declare they have no conflict of interest.

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## **Chapter 6: Dissonant views - GPs and parents' perspectives on antibiotic prescribing for young children with respiratory tract infections**

In the last chapter, a qualitative approach was used to describe the current management of RTIs in young children from the PCPs' view point and described why some PCPs did not always adhere to guideline recommendations, and how these complex interactions involving emotional and psychological factors influenced the decision-making process of PCPs when it comes to managing RTIs in young children. PCPs may want to adhere to guidelines, but time constraints, parental anxiety, GPs' perception of what parents want, and fear of losing patients were some of the reasons mentioned in the interviews that they did not, especially when it comes to antibiotic prescribing for RTIs in this cohort. These views with parents and carers of young children were then compare and contrast using a mixed methods research approach. Currently, only a limited number of studies have explored the contrasting views between GPs and parents of young children with RTIs, and even fewer studies have explored this area using a mixed methods approach.

This chapter compared and contrasted the views of GPs with those of parents and carers of young children regarding antibiotic prescribing for young children with RTIs, focusing on the barriers to appropriate prescribing. This work was showcased as an oral presentation at an international conference: the Society for Academic Primary Care (SAPC) Conference, 6-8 July 2016, Dublin Castle, Dublin, Ireland. This paper is currently being considered for publication in BMC Family Practice.

# **Dissonant views – GPs’ and parents’ perspectives on antibiotic prescribing for young children with respiratory tract infections**

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## **Abstract**

### **Background**

Antibiotics are not recommended for treating uncomplicated respiratory tract infections (RTIs), despite this, antibiotic prescribing for this is widespread. General practitioners (GPs) report parental pressure and fear of losing patients if they do not prescribe antibiotics, however, parental views on antibiotics for RTIs are unclear. Therefore, this study examined GPs' and parents' perceptions regarding antibiotic prescribing for RTIs in young children.

### **Methods**

We conducted semi-structured interviews with 20 GPs, and a survey and focus groups with 50 parents and carers of children under the age of five between June 2014 and July 2015 in Melbourne, Australia. Qualitative data were thematically analysed using NVivo and quantitative data were analysed using SPSS.

### **Results**

GPs believed that parents expect antibiotics for RTIs and were more likely to prescribe them if parents were insistent. They believed parents would go elsewhere if they did not prescribe antibiotics. GPs suggested that there would be less conflict if parents were better educated on appropriate antibiotics use.

In contrast, parents demonstrated good knowledge of RTIs and appropriate antibiotic use. Their main expectation from GPs was to obtain a diagnosis, discuss management, and receive reassurance that the illness was not serious. Parental satisfaction with GPs was not dependent on receiving antibiotics ( $r=0.658$ ,  $p<0.001$ ), and they would not seek another GP if antibiotics were not prescribed ( $r=0.655$ ,  $p<0.001$ ).

## **Conclusion**

GPs and parents have dissonant views on antibiotic prescribing for RTI in young children. GPs perceived parents wanting a diagnosis and reassurance that their child is not severely ill as pressure to prescribe antibiotic. To overcome these barriers, targeted training for both GPs and parents to improve communication and reassurance that satisfaction is not related to receiving antibiotics may reduce unnecessary antibiotic prescribing for RTI in young children.

## **Keywords**

Antibiotic prescribing

Antimicrobial resistance

Respiratory tract infection

Children

General practitioners

Parents

Primary care

## Background

The overuse of antibiotics has led to antimicrobial resistance globally, posing immediate and long-term threats [1, 2]. It is estimated by 2050, most antibiotics will be useless against common bacterial infections, leading to an annual loss of 10 million lives [2]. Antibiotics are ineffective also in the combat of viral infections, have been shown to cause possible side effects such as diarrhoea and rash [3, 4], and do not appear to provide clinical benefits in the management of uncomplicated respiratory tract infections (RTIs), and may even cause harm to individuals [5, 6].

Recent research on antibiotic prescribing for RTIs in Australian general practice found rates 4-9 times higher than those recommended by national guidelines [7]. Similar rates were found from antibiotic prescribing for children in Australia [8], while studies from the UK have also shown higher than recommended rates of antibiotic prescribing in the community [9, 10]. Reasons identified for inappropriate prescribing for RTIs from physicians included parental misconception regarding indications for antibiotic use, parents' expectation of antibiotics, perceived parental pressure, and diagnostic uncertainty of RTIs especially in young children [11-18]. However, studies from parents' perspectives have found that parents mostly wanted a diagnosis and did not necessarily want antibiotics [19, 20]. There seems to be a discord between physicians' perception of what parents expect and what parents really want when it comes to prescribing and receiving antibiotics.

Currently, only a limited number of studies have explored the contrasting views between general practitioners (GPs) and parents of young children with RTIs, and fewer studies have been identified in the literature that have explore contrasting views using a mixed methods approach. Therefore, the aim of this study was to compare GPs and parents' views on antibiotics

for RTIs in young children, exploring barriers and contrasting views by using quantitative and qualitative methods.

## **Methods**

A mixed methods cross-sectional design was applied to understand GPs and parents' views on their knowledge and attitudes towards prescribing antibiotics for RTIs in young children. The qualitative component comprised semi-structured interviews with 20 GPs and five focus group discussions with 50 parents and carers of young children (see Appendix 1 for interview and focus group schedules). In addition, a short questionnaire was provided for parents who participated in the focus groups. For validity, interview questions were piloted with two GPs, and focus group questions were piloted with two parents of children <5. Data from the pilots were not included in the final analysis.

Detailed description of the recruitment and sampling framework applied have been described elsewhere [Reference withheld from review]. In brief, participants were recruited across metropolitan Melbourne, Australia. Interested participants contacted the researcher to organise a time and place suitable for the interviews/focus groups. A total of 20 interviews and five focus groups with 50 parents and carers were conducted by RB between June 2014 and July 2015. All participants gave written consent prior to data collection; GPs and parents were provided with a AUD\$120 and a AUD\$40 gift voucher respectively upon completion.

Interviews and focus group discussions were digitally recorded and transcribed verbatim. Data were analysed using a thematic approach [21]. Initially, two researchers (RB and BB) read three transcripts independently to generate initial codes and themes, which were then compared and refined until consensus was reached. A further three transcripts were coded using the schemata

and this process was repeated, three transcripts at a time, to incorporate emerging themes, until all transcripts were coded. Data were managed using NVivo10.

Parents were asked to complete the anonymous questionnaire (See Appendix 2) before taking part in the focus group discussions. Data were analysed using SPSS version 20 Statistics package. Logistic regression was used to analyse predictors of knowledge questions, and the strength and direction of the relationship between two variables were analysed using Spearman's Rank Order Correlation.

Study approval was obtained from the [Name withheld from review] University Human Research Ethics Committee (CF14/1384 - 2014000648).

## **Results**

A total of 20 GPs and 50 parents and carers participated in the study. Nearly half of all participating GPs were in the age range of 51-60 years (45%, n=9), with an average 18 years of experience (range 4-37 years). For participating parents and carers, 94% (n=47) were women, with 62% (n=31) in the age range of 31-40 years. Nearly half of participating parents and carers (48%, n=24) have a combined household income of >\$1500 per week, and over half (72%, n=36) have either a graduate or a postgraduate degree.

### **Results from parents' questionnaire:**

In terms of what parents expected from their GP visit during a RTI consultation, a third (66%, n = 33) responded that they wanted a diagnosis, management advice and/or reassurance that they were doing the right thing; while 22% (n = 11) wanted medication (over-the-counter medication, not antibiotics), only 8% (n = 4) sought and expected antibiotics. From the knowledge questions, the majority (84%, n=42) correctly answered that most cough, cold and



flu illness were caused by viruses, and that antibiotics were needed for bacterial and not viral infections (72%, n=36).

Neither parental age, profession, qualification nor income were found to associate with parental knowledge.

When we asked parents about what they expected from their GP, 86% (n=43) strongly disagree/disagree that they wanted antibiotics for their child's RTIs symptoms (Table 1). Parents' satisfaction of GP visits was not dependent on prescribing of antibiotics for their child's cough, cold and flu symptoms ( $r = 0.658$ ,  $n=50$ ,  $p<0.001$ ). Similarly, most parents (88%, n=44) strongly disagree/disagree that they would go to another doctor if antibiotics were not prescribed for their child's RTI symptoms ( $r = 0.655$ ,  $n = 50$ ,  $p<0.001$ ) (Table 1).

**Table 1. Parents' views on common colds, antibiotics and GP visits.**

Statements	Disagree or Strongly disagree		Neither agree or disagree		Agree or Strongly agree		No Response	
I will always want antibiotics for my child's cough, cold or flu symptoms	43	86%	4	8%	1	2%	2	4%
My child will be sick for a longer period if he/she does not receive an antibiotic for cough, cold or flu symptoms	40	80%	4	8%	5	10%	1	2%
I generally know if my child needs an antibiotic before seeing the doctor for cough, cold or flu symptoms	17	34%	9	18%	23	46%	1	2%
I will go to another doctor if my doctor does not prescribe antibiotics for my child for cough, cold or flu symptoms	44	88%	4	8%	1	2%	1	2%
I usually go to the doctors if my child has been unwell with cough, cold or flu symptoms for longer than 3 days	17	34%	7	14%	25	50%	1	2%
I am more satisfied with the doctor visit if I am prescribed antibiotics for my child with cough, cold or flu symptoms	36	72%	7	14%	6	12%	1	2%

I am always guided by what my doctor recommends for my child with cough, cold or flu symptoms	8	16%	6	12%	35	70%	2	4%
I always have to initiate the discussion of antibiotics before my doctor would be willing to prescribe antibiotics for my sick child with cough, cold or flu symptoms	32	64%	20	20%	6	12%	2	4%
I usually know what I want out of my doctor's appointment before I go	13	26%	17	34%	19	38%	1	2%
I will take my child to see a doctor if he/she has a high temperature (over 40°C)	4	8%	3	6%	41	82%	2	4%
I will take my child to see a doctor if he/she has a temperature (37°C - 40°C)	18	36%	12	24%	29	38%	1	2%

From the survey results, parents showed good knowledge and understanding of what antibiotic was used for. They also expressed they wanted a diagnosis of the child's illness in an RTI consultation and that they did not necessarily want antibiotics and would not go elsewhere if antibiotic was not prescribed. However, to further understand the views of GPs and parents and carers on their knowledge and practice on antibiotic prescribing for the common cold, we compared and contrasted findings from the interviews and focus groups.

### **Results from GPs and parents' interviews and focus groups:**

#### **Theme 1 - "...they don't understand the difference between viral and bacterial..."**

GPs' experience with parents coming in with a sick child for an RTI consultation varied according to the symptoms of the child, the anxiety level of the parent, and GPs' perception of parents' expectation of the visit. Amongst these variables, GPs thought the lack of knowledge in some parents forced some GPs to prescribe antibiotic unnecessarily.

*"... they probably think that it will fix the child, that's why they ask for antibiotics..."*

*GP12*

*“There’s poor understanding and they’re not scientifically equipped to really understand what it means.” GP6*

Due to the perceived lack of knowledge, GPs thought educating these groups of parents would greatly reduce the pressure and the need to prescribe antibiotics.

*“... if you educate them early and you have much less of a fight later on down the track.” GP13*

However, parent participants were knowledgeable on what antibiotics were used for and possible iatrogenic effects. Some insisted on no antibiotics even upon recommendations from their GP.

*“I know antibiotics are not good. It kills the good bacteria as well as the bad bacteria...” FG2*

While most parents showed good general knowledge of common colds and antibiotics, a small number did confuse bacteria with viruses, with some stating that viruses were not associated with infections. In addition, some parents misinterpreted GPs’ advice and recommendations, leading to miscommunication and further confusion for parents regarding antibiotics.

*“... we thought it was an infection and they’re like no, it’s a virus, but have antibiotics. We’re like - he gave us the script, we just never got it filled... Because we were like well, if it’s a virus what’s the point of the antibiotics...” FG1*

## **Theme 2 – “... if they’re angry they might not come back...”**

GPs’ concern that patients would go elsewhere if antibiotics were not prescribed was a common barrier to appropriate antibiotic prescribing. GPs said they preferred to prescribe antibiotics to please the patients rather than seeing them go elsewhere:

*“... if they are absolutely insistent and I know they are pretty much going to walk out of the door and request for another doctor, I’d give them a script...” GP13*

In additions to the fear of losing patients, GPs commented that parental pressure and expectations of wanting antibiotics for their sick child influenced some GPs to prescribe antibiotics unnecessarily.

*“... some parents do have an expectation having antibiotics when they come along...” GP5*

Ultimately, it was about keeping parents happy:

*“...a lot of the GPs are trying to please the patients and I think they worry about the child, so you know, the person comes along and think they should give the child antibiotics...” GP5*

In contrast, parents expressed that they did not expect antibiotics for a child with a common cold, instead preferring a diagnosis and reassurance that their child would recover.

*“I’ve seen a doctor before and she’s prescribed, for my daughter who was seven months at the time, to have antibiotics. She didn’t need antibiotics. I knew what she had was viral, I just wanted... the reassurance.” FG5*

*“I think the only reason that we would go to doctors is simply to make sure there's no infection in the chest or ears, throat, anything like that...” FG1*

Hence while GPs were worried about pleasing and satisfying parents, most parents only needed reassurance that their child was not seriously ill.

**Theme 3 - “... there are two ways to do this [antibiotic prescribing], there is the quick way, and the right way...”**

One of the biggest barriers to appropriate antibiotic prescribing was the misconception that it took longer to prescribe. GPs thought while the conversation with parents was important, it was easier to prescribe if they were running behind and leave the conversation for ‘next time’.

*“... it takes a very long time. Much easier to write a script.” GP1*

*“...if I’m 40 mins behind, and I want to catch up, and they (parents) are naggy, there might be something that I would prescribe this time around, and readdress that for the next time...” GP13*

In addition, diagnostic uncertainty, especially in a young child, as well as a fear of possible litigation, forced GPs to ‘play it safe’ when it came to prescribing antibiotics to a young child with an RTI.

*“...sometimes you’re influenced by... it’s the third time this week, and you feel they (parents) want you to do something and you feel that you should do something and you think well, you know, it is the third time this week, maybe it isn’t viral, maybe it’s something serious...” GP7*

Therefore, GPs faced many barriers leading to the decision to prescribe or not to prescribe antibiotics to a young child with an RTI. However, parents reported generally placed their trust in their GPs and hence happy for the discussion to take place within the consultation.

*“I’m really guided by my GP... I really go by what they say...” FG4*

*“I don’t understand any of the science behind it and I would go ‘Okay, if that’s what you recommend, you’re the professional’. I wouldn’t even question it.” FG5*

**Theme 4 –“...everyone knows, right? Whether you practice it or not, that’s the main thing...”**

Analysis of the qualitative data highlighted some enablers to reduce inappropriate antibiotic prescribing: GPs strongly thought that parents needed to be educated to increase their knowledge of common colds and usefulness of antibiotics, therefore minimising the need for parents to demand antibiotics and GPs having to deal with difficult situations.

GPs also recognised that educating GPs on how to handle difficult parents and situations would improve the communication between both parties.

*“[Educate GPs on] how to say no, how not to offend somebody, how to educate them at the same time, in a short space of time, so I do think there is a need for that...” GP1*

Most GPs reported using delayed prescribing as a common method to address inappropriate antibiotic prescribing.

*“I would say to them, “I firmly believe that it is not bacterial and that your child doesn’t need antibiotics, and by giving it, you’re not helping [him or her], you’re actually reducing their immunity and creating resistance.”. However, they are the parents and guardians of the child, I do not want to not give them the script, I would give it to them and say, “Please use it vigilantly.”. I would explain to them what the symptoms are... I’m not going to totally not give the script, and go against them head on...” GP12*

Ultimately, GPs believed that constant reminders on appropriate prescribing and the harm of over prescribing would sustain good prescribing behaviour.

Parents, on the other hand, said they would welcome information on what to look for in terms of common cold symptoms, and when antibiotics should be prescribed. They expressed this approach would provide parents with the knowledge and confidence to refuse antibiotics even if antibiotics were to be prescribed.

*“Just talk about the common cold and things that these mothers might come across with their children and then suggest the possible antibiotics they can possibly choose from and talk about the illnesses themselves first before the cures...” FG3*

*“I think education, like first time Mums is key, helping them to understand... If they understand their child’s experience... [including] symptoms and a range of degrees of unwellness, it would be good...” FG2*

In the end, both parents and GPs agreed that better communication would be the best strategy to increase understanding between parents and GPs to best reduce antibiotic prescriptions in the community. Parents wanted GPs to discuss management options instead of just prescribing antibiotics.

## **Discussion**

This is the first study using a mixed methods approach to compare and contrast views from GPs and parents in regards to antibiotic prescribing for RTIs in young children. GPs identified many barriers to reducing inappropriate prescribing including parental lack of knowledge regarding the common cold and antibiotics, parental pressure and expectation, diagnostic uncertainty of RTIs in young children, and time constraints in an RTI consultation. GPs felt this forced them to prescribe antibiotics at times deemed inappropriate. In contrast, our parent cohort showed good knowledge of common colds and what antibiotics were used for, and they

mostly just wanted a diagnosis and reassurance that their child was not seriously ill rather than wanting or expecting antibiotics. From both the parent qualitative and quantitative findings, it was clear that parents do not always want antibiotics; satisfaction with their GP visit was not dependent on receiving antibiotics; and they would not go elsewhere if they were not prescribed an antibiotic for their child with an RTI.

Parental knowledge has been identified as an important influence on when and how to use antibiotic for RTIs in young children [22, 23]. GPs in our study expressed that parents did not understand antibiotic use, often linking antibiotics as a cure for the common cold. In contrast, our quantitative analysis showed that our parents scored high on the knowledge questions on what caused the common cold, what antibiotics were used for, and were knowledgeable in this area. This study highlighted contradicting insights regarding knowledge of common colds and antibiotics among GPs and parents.

Previous studies have shown that GPs believed parents have an expectation of antibiotics before coming in for an RTI consultation [16, 24-30]. This belief often led to inappropriate prescribing and/or 'just in case' prescribing, even when GPs knew antibiotics were not warranted. Mangione-Smith et. al. suggested that physicians interpret parental questioning of a treatment plan as wanting antibiotics for their sick child [16], therefore the perception of patients' desire for antibiotics was strongly associated with antibiotic prescribing [26, 29]. This is consistent with our findings that GPs interpreted parents wanting an antibiotic, while both the quantitative and qualitative data suggested that parents merely wanted a diagnosis and confirmation that their child was not seriously ill.

Our study also demonstrated that some GPs were concerned if antibiotics were not prescribed, parents might seek them elsewhere. However, both the quantitative and qualitative data



confirmed that parents' satisfaction was not dependent on receiving antibiotics and that they would not go to another GP if antibiotics were not prescribed. Studies have shown that clinicians' perceptions did not always match patient views, in that patients were generally satisfied with care [31], and sought medical evaluation and decisions, while clinicians wanted satisfied parents and short consultations [25]. It is therefore important to emphasise communication between GPs and parents is paramount if inappropriate prescribing is to be reduced.

A possible barrier mentioned by GP participants to effective communication was the lack of consultation time needed to educate parents on appropriate antibiotic treatment for RTIs. GPs commented if they were running behind, or if it was late in the afternoon or on the weekend, they were more likely to prescribe and less likely to counsel patients. However, since some studies have shown that it does not take longer to counsel and educate patients than to prescribe an antibiotic [32, 33], this issue needs to be explored further with GPs.

One of the methods GPs used to combat barriers such as parental pressure, expectations and time constraint was delayed prescribing. The process of supplying a script to parents and telling them to only fill it if the symptoms did not get better after a couple of days, have certainly been shown to reduce antibiotics use [34-36], and this was also mentioned as part of a strategy to overcome parental pressure and expectations in our study. However, our study also showed that it confused our parents as to why a script was provided while GPs suspected the RTI was viral in origin. Even though this has been a preferred method for many primary care physicians, studies have emerged that delayed prescribing may provide opportunities for patients to store antibiotics and/or unfilled scripts at home for later use [23, 37] leading to inappropriate use, and possible antimicrobial resistance (AMR). A recent study suggested that delayed prescribing may also give GPs 'permission' to prescribe, which may increase overall antibiotic prescribing

[38]. While delayed prescribing might be used as a ‘safety net’ for GPs to overcome patient pressure and expectations, and increase patients’ ‘shared decision making’, this approach will pass the responsibility back to the parents. Given that GPs thought parents were not ‘knowledgeable’, expecting parents to do the ‘right’ thing with an antibiotic script would seem unreasonable. It should then be argued, that educating parents in the first place, and further emphasising the importance of communication between GPs and parents, and for GPs to take the time to explain to parents as to why antibiotic was not necessary for RTIs, would be the preferred option to delayed prescribing.

Our study demonstrated that parents mainly placed their trusts in their GPs, whether they agreed with the GPs’ treatment decision and would accept the script instead of questioning the GP. A recent study found that the majority of their parents would accept their clinicians’ management decisions regardless of whether antibiotic was prescribed [39]. If GPs can accept that parents do not expect or want antibiotics, and also parents will trust them with the treatment management for their sick child, they should be reassured that parents are satisfied and will not seek antibiotics elsewhere.

Communication between GPs and parents is therefore a vital component to reducing antibiotic prescribing in general practice. Having a conversation to discuss why antibiotic was or was not needed and involving parents in the decision-making process of treatment management, may further reduce inappropriate antibiotic prescribing [40-42].

The high income and level of qualifications of our parent participants was one of the limitations of our study. This group of parents were not a true representation of socio-economic status of the average Australian family, therefore this may have biased and overrated the knowledge component of this study. These parent participants represented a convenient/opportunistic data

set rather than a true sample size needed for a significant representation. In addition, providing incentives to participants may have led to a possible source of bias, although these incentives are aligned with similar work with estimated earnings and average Australian wage [43, 44]. However, providing incentives to parents with high income and qualifications may have minimised the risk of bias of incentive payment. Finally, parents' views may have been vastly different if they were recruited at a general practice with a sick screaming child as opposed to a calmer and happier playgroup/mothers' group environment.

One of the strengths in our study was the ability to obtain views from both parents and GPs and comparing and contrasting their knowledge and practice using a mixed methods approach. Using this approach, we were able to identify areas of discord between these two groups and guide the development of interventions that could bridge the communication gap between GPs and parents.

This study has identified a number of areas where interventions can be targeted to better manage RTIs in this cohort. In order to assist GPs in appropriate antibiotic prescribing decisions and increase parental knowledge and better understanding of the use of antibiotics, the following interventions should be considered: 1) implement public health campaigns to raise awareness and increase knowledge of antibiotic use for parents; 2) provide support for GPs to improve better communication with parents, hence reaching the understanding that parents want reassurance rather than antibiotics; and 3) reassure GPs that prescribing antibiotics is not necessarily associated with satisfaction of the visit, and parents will not necessarily go elsewhere if antibiotic was not prescribed. Ultimately, parents mainly place their trust in GPs and appropriate antibiotic prescribing can be accomplish with better communications between GPs and parents to achieve better understanding of what parents really want, hence over all, reducing inappropriate antibiotic prescribing.

## **Conclusion**

Our study demonstrated dissonant views exist between GPs and parents around antibiotic prescribing and use for RTIs in young children, contributing to unnecessary prescribing and use of antibiotic in this cohort. Both qualitative and quantitative studies demonstrated that parents showed good knowledge of common colds and antibiotic use, did not expect or wanted antibiotics, and will not go elsewhere if antibiotics were not prescribed. However, dissonance emerged as GPs perceived parents wanting antibiotics, satisfaction was linked to antibiotic prescribing, and that parents would go elsewhere if antibiotic was not prescribed. GPs should be reassured that parents do not necessarily want antibiotics, and they generally place their trust in their clinical judgement. Training on how to handle anxious parents may also be beneficial to GPs to alleviate their concerns. Better communication between GPs and parents is needed to minimise this discord in order to achieve appropriate prescribing of antibiotics and increase better health outcome for RTIs in young children.

## **Abbreviations**

GP	General Practitioner
PN	Practice nurse
MCHN	Maternal and child health nurse
PCP	Primary care providers
FG	Focus groups
RTIs	Respiratory tract infections

## **Declarations**

### **Ethics approval and consent to participate**

All participants were provided with a plain language statement explaining the study and gave written consent prior to interview/focus group. The study was approved by [name withheld from review] University Human Research Ethics Committee (CF14/1384 - 2014000648).

### **Consent for publications**

Not applicable.

### **Availability of data and material**

Not applicable.

### **Competing interests**

We declare that we have no conflicts of interest.

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### **Authors' contributions**

RB completed the background literature search and RB, BB, DG and DM contributed to the study design. RB conducted and transcribed all interviews. RB and BB performed the analysis of the data. RB drafted the manuscript. All authors revised all drafts and approved the final version of the manuscript.

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## **Appendix 1: Interview and focus group schedules**

### **GPs' interview schedule:**

1. How do you manage children's cold symptoms?
2. What do you recommend to the parents/carers?
3. Can you tell me the process of prescribing antibiotics for respiratory tract infections in this age group?  
Prompts:
  - Recommend over the counter medications, type of over the counter medications recommended
  - Under what circumstances is antibiotics prescribed?
  - Referring patients to specialists
4. Are you guided by parents (re. antibiotics)?  
Prompts:
  - In terms of counselling
5. Do you think it is worthwhile having an education program for parents on antibiotics?  
How would you like to see it implemented?
6. Do you see a need for an education program for GPs and practices on antibiotics? How would you like to see it implemented?

### **Parents' focus group schedule:**

1. What do you do when a child has a cold?
2. How would you manage a child's cold symptoms?  
Prompts:
  - Over the counter medications
  - Antibiotics
3. What do GPs recommend? Would you consider asking for medications?  
Prompts:
  - Over the counter medications
  - Antibiotics
4. Do you think it is worthwhile having an education program for parents on antibiotics? Do you think it is possible?

## Appendix 2: Parents questionnaire

1. Most cough, cold and flu illnesses are caused by:

- ☐ Bacteria ☐ Virus

2. Antibiotics are needed for:

- ☐ Bronchitis
- ☐ Runny nose with green mucus
- ☐ Runny nose with yellow mucus
- ☐ Cough, cold and flu symptoms
- ☐ Middle ear infection

3. Antibiotics are needed for:

- ☐ Bacterial infections ☐ Viral infections

Please tick only one box for each statement:

	Statements	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
1.	I will always want antibiotics for my child's cough, cold or flu symptoms					
2.	My child will be sick for a longer period if he/she does not receive an antibiotic for cough, cold or flu symptoms					
3.	I generally know if my child needs an antibiotic before seeing the doctor for cough, cold or flu symptoms					
4.	I will go to another doctor if my doctor does not prescribe antibiotics for my child for cough, cold or flu symptoms					
5.	I usually go to the doctors if my child has been unwell with cough, cold or flu symptoms for longer than 3 days					

6.	I am more satisfied with the doctor visit if I am prescribed antibiotics for my child with cough, cold or flu symptoms					
7.	I am always guided by what my doctor recommends for my child with cough, cold or flu symptoms					
8.	I always have to initiate the discussion of antibiotics before my doctor would be willing to prescribe antibiotics for my sick child with cough, cold or flu symptoms					
9.	I usually know what I want out of the doctor's appointment before I go					
10.	I will take my child to see a doctor if he/she has a high temperature (over 40°C)					
11.	I will take my child to see a doctor if he/she has a temperature (37 °C - 40°C)					

Please tick only one box for each answer:

I get my advice from:	Never	Rarely	Sometimes	Very Often	Always
My doctor					
Previous experience					
Next door neighbour					
My mother/relative					
Internet					

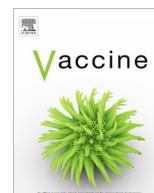
## **Chapter 7: Why do we not want to recommend influenza vaccination to young children? A qualitative study of Australian parents and primary care providers**

Influenza vaccination lessens the impact of influenza, hence reducing the possibility of contracting secondary RTI infections complicated by influenza (Cromer et al., 2014; Jules et al., 2015; Khandaker et al., 2014; Yung et al., 2011). While influenza vaccination has been shown to be safe and effective against influenza and is recommended to all age groups in Australia, it is only publicly funded for older Australians adults (65 years of age and over), Aboriginal and Torres Strait Islanders over 15 years of age, pregnant women and individuals aged 6 months and over with medical conditions that can lead to severe influenza (Australian Government Department of Health, 2013). These recommendations are in stark contrast to the fact that young children have the highest influenza notification rates and hospital admission rates than other age groups (Australian Government The Department of Health, 2010; Cromer et al., 2014; Li-Kim-Moy et al., 2017; Yung et al., 2011).

This study focussed on PCPs' and parents and carers' views, knowledge and recommendation of influenza vaccination to young children. What started off as an exploratory study to understand participants' view on influenza vaccination for young children, became a study exploring the barriers as to why PCPs did not recommend influenza vaccination to young children and parents' reluctance to immunise their young children. Increased uptake of influenza vaccination would be difficult without interventions that alleviate parents' fears and address PCPs concerns regarding influenza vaccination in this cohort. This work was presented at the international conference General Practice Research Infection Network (GRIN) conference in Oxford, UK in 2016 and published in the journal Vaccine in early 2018.



In the winter of 2017, Australia was hit by the ‘worst flu outbreak’ on record with more than 71,000 infected with influenza (Australian Government Department of Health, 2017; Dunlevy, 2017). Since the publication of this paper in *Vaccine* at the end of January 2018, I was interviewed by The Herald Sun in February. The Herald Sun then published an exclusive on “State Government offers free flu vaccination for all children under the age of 5” (Appendix 1), and my interview was included in the publication. Subsequently, I was approached and interviewed by two TV channels (Channel 7 and Channel 9) on my research and my views on the Government’s decision. This was followed by two national radio station interviews in Queensland, Australia. By April 2018, Australia was publicly funding influenza vaccines to all children under the age of 5 in all States except for South Australia and the Northern Territory (Australian Government Department of Health, 2018a).



# Why do we not want to recommend influenza vaccination to young children? A qualitative study of Australian parents and primary care providers

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## ABSTRACT

**Introduction:** Influenza vaccination has been shown to be safe and effective against influenza and in the prevention of complicating secondary respiratory illnesses. However, its uptake in young children remains low. This study explored the views, attitudes and practices of parents and primary care providers (PCPs) on their knowledge and acceptance of influenza vaccination in children under 5.

**Methods:** Using a cross-sectional qualitative research design, we conducted 30 in-depth interviews with PCPs (i.e., general practitioners, practice nurses, maternal and child health nurses, and pharmacists) and five focus groups with parents (n = 50) between June 2014 and July 2015 in Melbourne, Australia. Data were thematically analysed.

**Results:** Parents thought the vaccine could cause influenza, and influenza vaccination was not necessary for their children as they needed to build their own 'immunity'. Parents said that they would consider vaccinating their children if recommended by their GP and if the influenza vaccine was part of the immunisation schedule. PCPs also expressed concerns regarding the efficacy of the vaccine as well as out-of-pocket costs incurred by families, and uncertainty regarding the mortality and morbidity of influenza in otherwise healthy children. However, they said they would recommend the vaccine to high-risk groups (e.g. children with chronic disease(s), and asthma).

**Conclusion:** Despite the established safety of influenza vaccines, barriers to uptake include concerns regarding the iatrogenic effects of vaccination, its administration schedule, and knowledge of influenza severity. Updated information on influenza and the efficacy of the vaccine, and incorporating influenza vaccination into the immunisation schedule may overcome some of these barriers to increase influenza vaccination in this vulnerable cohort.

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## 1. Introduction

Globally, influenza is associated with up to 500,000 deaths annually [1] and young children (those <5 years) are particularly vulnerable. In Australia, the highest influenza notification rates occur in the age group of 0–4 years (98 per 100,000 population compared with a total rate of 39 per 100,000 population for all

notifications) [2], and cause substantial burden on paediatric hospital services [3,4]. A recent study in England found that healthy children <5 had the highest influenza hospital admission rate of 1.9 per 1000, in particular, infants under 6 months had the highest consultation and admission rates of influenza [5]. Despite the higher rates of influenza reported in children, expert consensus is that this figure is an underestimate as virological confirmation is not universally performed in young children [6].

Influenza vaccines have been shown to be effective against seasonal influenza [7–11] and to reduce overall healthcare costs [12]. However, a study in Western Australia (WA) showed a significant decrease in the uptake of influenza vaccine in the <5 cohort in recent years (42% in 2008–2009 to 7.1% in 2010–2014) [10]. Arguably one of the biggest setbacks to the promotion and uptake

Abbreviations: COM-B, Capability, Opportunity, Motivation – Behaviour; FG, focus group; GP, general practitioner; MCHN, maternal and child health nurse; PCP, primary care provider; PN, practice nurse; RTIs, respiratory tract infections; TDF, theoretical domains framework; WA, Western Australia.

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of influenza vaccination in young children in Australia occurred in 2010 when the Therapeutic Goods Administration (TGA) received 123 reports of convulsions in children following their flu injection from WA [13]. Although neither severe morbidity nor mortality was associated with this incident, there was widespread negative media coverage leading to confusion over the efficacy and side effects of influenza vaccines in the <5 age group [14]. Moreover, the WA incident underscored that complications associated with vaccines cannot be downplayed as experiencing these iatrogenic effects can be a traumatic experience for parents of young children and a key barrier to the uptake of the influenza vaccination [14].

In addition to negative publicity and community uncertainty around influenza vaccination, cost of vaccination maybe an issue, because Australia is one of few developed countries where influenza vaccination is only publicly funded for children with co-existing risk factors (i.e. chronic diseases and asthma). However, other countries where influenza vaccination is publicly funded for all children have showed that influenza vaccination in this cohort is still less than optimal [15–17]. Overseas research from countries including the United States and in Europe and the United Kingdom, have reported many barriers to vaccination uptake including; fear of vaccine side-effects [18], missed opportunities (e.g. vaccine-eligible children seen by a physician but no vaccine being administered) [19–21], physicians not recommending the vaccines [22,23], parental beliefs that influenza vaccination causes the disease [24,25], parental concerns that vaccinations are painful, distrust of those advocating vaccines, beliefs that vaccination is not needed when it is only a minor illness [26–28], poor communication between health care professionals, and parents' lack of awareness of the vaccination schedule [26].

Interventions can play an important role in facilitating the increased uptake of the influenza vaccine in this cohort, both for parents and primary care providers (PCPs). However, the views of PCPs and parents in Australia regarding influenza vaccines remain unclear. A clear understanding of the factors that influence PCPs' decisions to recommend influenza vaccination and parents' barriers to the uptake of influenza vaccination may facilitate the design of more robust interventions and overcome existing barriers. Therefore, the aim of our study was to examine the views, attitudes and practices of PCPs and parents of young children regarding influenza vaccination for children <5.

## 2. Materials and methods

### 2.1. Study design

We utilised a qualitative cross-sectional design comprising semi-structured interviews with 30 PCPs and focus group discussions with 50 parents and carers of young children to explore their views, knowledge and attitudes towards influenza vaccination in children <5 years of age. The Theoretical Domains Framework (TDF) [29] and its derivative, the Capability, Opportunity and Motivation (COM-B) model [30] were used to guide interviews and discussions, and informed the analysis of the study, as reported in a previous study [31]. Questions regarding knowledge, uptake, understanding of influenza and the vaccine, advice on recommending influenza vaccine to children <5 and the barriers and enablers to uptake of influenza vaccine reflected the domains in the TDF (Table 1). For validity, interview questions were piloted with two general practitioners (GPs), one practice nurse (PN), one maternal and child health nurse (MCHN) and one pharmacist, and focus group questions were piloted with two parents of children <5. Data from the pilot were not included in the final analysis.

#### 2.1.1. PCP interviews

PCPs were recruited across metropolitan Melbourne, Australia. The contact details of GPs and PNs were generated from an existing general practice database at Monash University (Melbourne, Australia). Contact details for MCHNs and pharmacists were generated from the Maternal Child Health services website [32] and the local business directory, respectively. Recruitment was limited to one PCP per practice site.

Interviews (approximately 1 h long) were conducted between June 2014 and January 2015 by RB at the PCPs' work place or at a place convenient to the PCP during practice hours. All participants gave written consent before the interview commenced, and were provided with a gift voucher valued at AUD\$120 upon completion.

#### 2.1.2. Parent focus groups

Five focus groups were conducted across metropolitan Melbourne, Australia. Advertisements for the study with contact details of the researcher were sent to playgroups and mothers' groups to recruit parents and carers. For validity of the focus group, a minimum of six parents and carers were recruited per focus group.

Focus groups (approximately 1 h long) were conducted between October 2014 and July 2015 by RB at the play group centres or at the scheduled mothers' group meetings. All participants gave written consent and completed a brief questionnaire on current knowledge and management of respiratory tract infections in young children before focus group discussions began and were provided with a gift voucher (AUD\$40) upon completion.

### 2.2. Data analysis

Interviews and the focus group discussions were digitally recorded and transcribed verbatim. Data were analysed using a thematic approach [33] to provide a flexible approach to identify, analyse and report themes or patterns within the data. Initially, two researchers (RB and BB) read three transcripts independently to generate initial codes and themes, which were then compared and refined until consensus was reached. A further three transcripts were coded using the schemata and this process was repeated, three transcripts at a time, to incorporate emerging themes, until all transcripts were coded. Data were matched to the domains within the TDF and mapped to the COM-B system. Data were managed using NVivo10. Study approval was obtained from the Monash University Human Research Ethics Committee (CF14/1384 – 2014000648).

## 3. Results

A total of 30 PCPs comprising 20 GPs, two PNs, three MCHNs and five pharmacists, and 50 parents and carers participated in the study. Participant characteristics are presented in Tables 2 and 3. PCP interviews and parents focus groups were analysed and results have been presented together where similar, with differences highlighted where present.

Themes were broken down into capability, opportunity and motivation aligning with the TDF/COM-B model (Fig. 1). In terms of capability, understanding and having the knowledge about influenza and influenza vaccination was an important factor as to whether PCPs and parents would consider recommending influenza vaccination in this cohort. Environmental constraints such as lack of consultation time to discuss influenza vaccination, and the cost of the vaccine were factors that limited opportunities for vaccine uptake. Social influences such as negative publicity were additional opportunity constraints. Finally, emotional decisions

**Table 1**

Interview schedule using the Theoretical Domains Framework (TDF).

Domain	Interview example questions
<b>Knowledge</b> (an awareness of the existence of something)	What do you see as good prevention strategies to reduce RTIs? (PCPs) Do you know about the influenza vaccine or the schedule? (parents) Do you know any influenza facts or websites that you can go find out more regarding the disease and the vaccine? (parents)
<b>Skills</b> (an ability or proficiency acquired through practice)	Do you give children in high risk groups influenza vaccination? (PCPs)
<b>Memory, Attention and Decision Processes</b> (The ability of retain information, focus selectively on aspects of the environment and choose between two or more alternatives)	Do you or your practice promote influenza vaccination? (PCPs) What prompt you to take the influenza vaccination? (parents) Is this something you do every year? (parents) Was influenza vaccination recommended by your GP? (parents) Would you go to your GP for advice? What about other primary care providers? (parents)
<b>Behaviour Regulation</b> (Anything aimed at managing or changing objectively observed or measured actions)	Is promoting influenza vaccination proactive? (PCPs) Do you have a recall and reminder system? (PCPs)
<b>Social/Professional Role and Identity</b> (A coherent set of behaviours and displayed personal qualities of an individual in a social or work setting)	What are your thoughts on recommending influenza vaccine to all children under the age of 5? (PCPs) What are your thoughts on influenza vaccination for your child(ren)? (parents)
<b>Optimism</b> (The confidence that things will happen for the best or that desired goals will be attained)	Do you think it is worthwhile having an education program for parents on antibiotics/prevention strategies such as influenza vaccination and hand hygiene? (PCPs)
<b>Beliefs about Consequences</b> (Acceptance of the truth, reality or validity about outcomes of a behaviour in a given situation)	Do you see any benefit (in recommending influenza vaccination to all children under the age of 5)? (PCPs) Do you see any benefit in vaccinating against influenza? (parents)
<b>Intentions</b> (A conscious decision to perform a behaviour or a resolve to act in a certain way)	Why do you promote (influenza vaccination) especially for kids? (PCPs) Would you consider having an influenza vaccine, for you and your child(ren)? (parents) Would you go back and have it again next year? (parents)
<b>Reinforcement</b> (Increasing the probability of a response by arranging a dependent relationship, or contingency, between the response and a given stimulus)	What strategies/interventions may help you promote influenza vaccination to children? (PCPs) If there are more evidence to indicate that vaccinating kids under the age of five is a good idea, would you think about it?(parents)
<b>Environmental Context and Resources</b> (Any circumstance of a person's situation or environment that discourages or encourages the development of skills and abilities, independence, social competence, and adaptive behaviour)	Do you think they (information pamphlets on influenza vaccination) might help (inform parents on influenza vaccination)? (PCPs) Would you like more information on influenza vaccine? (parents) Would you (vaccinate your child(ren)) if it was government funded? (parents)
<b>Social influences</b> (Those interpersonal processes that can cause individuals to change their thoughts, feelings or behaviours)	If the parents refuse the vaccination in the high risk group, how do you deal with it? (PCPs) If you want more information on influenza vaccination, where would you go? (parents)

**Table 2**

Characteristics of primary care providers.

	GPs (n = 20)	PNs (n = 2)	MCHNs (n = 3)	Pharmacists (n = 5)
Gender	6F, 14M	2F	3F	2F, 3M
Age	51–60 (45%)	31–40 (100%)	51–60 (100%)	25–30 (60%)
Years of experience	18 (4–37 years)	3 (1–5 years)	17.7 (9–30 years)	7.2 (3–13 years)

GPs: General Practitioner.

PNs: Practice Nurses.

MCHNs: Maternal Child Health Nurses.

F: Female.

M: Male.

such as not wanting to upset children with more needles and believing that vaccination brought on influenza were factors which made PCPs and parents reluctant to consider influenza vaccination of all children <5. It is important to note that although we elaborate on these barriers below in discrete domains, in practice there is significant overlap between the constructs.

### 3.1. Capability

There was a general lack of awareness regarding the severity of influenza among young children in parents and PCPs. They com-

mented that they did not see influenza as a severe illness, and dismissed the vaccine as not 'necessary'.

*"... intuitively I thought kids didn't get influenza very severely, not like old people... so I would've thought it is unnecessary [to vaccinate]..."*

[GP5]

*"...my kids don't tend to get sick; they don't get a lot of flu's..."*

[FG1]

**Table 3**  
Characteristics of parents and carers.

Parents and carers	N = 50
<i>Gender</i>	
Women	47 (94%)
Men	3 (6%)
<i>Age: (year)</i>	
21–30	7 (14%)
31–40	31 (62%)
41–50	9 (18%)
>50 (grandparents)	3 (6%)
<i>Income (per week)</i>	
<\$900	6 (12%)
\$900–\$1500	14 (28%)
>\$1500	24 (48%)
No data	6 (12%)
<i>Highest qualifications</i>	
High school/trade certificate	14 (28%)
Undergraduate	22 (44%)
Post graduate/PhD	14 (28%)

In addition, parents did not distinguish between the common cold and influenza. They also did not distinguish between the various strains of influenza that required vaccination annually. Moreover, some parents thought children needed to build their own immunity against influenza virus; therefore vaccinating was not necessary.

“... we want them to catch [the flu] and get the immune system stronger. So immunizing them is not going to let their own immune system get stronger...”

[FG1]

“I think if we do so much stuff to prevent it, then their body doesn't have the natural response to it”.

[FG2]

Uncertainty regarding vaccine efficacy, cost benefit ratios and potential side effects were given by PCPs as reasons why they felt reluctant to recommend influenza vaccination to all children <5. One pharmacist commented that he was not sure of the components of the vaccine, what additives or chemicals were added, while a MCHN commented that the 2010 WA incident did not help to promote the influenza vaccine.

“In the past, it has been a bit controversial, for children under the age of 5...”

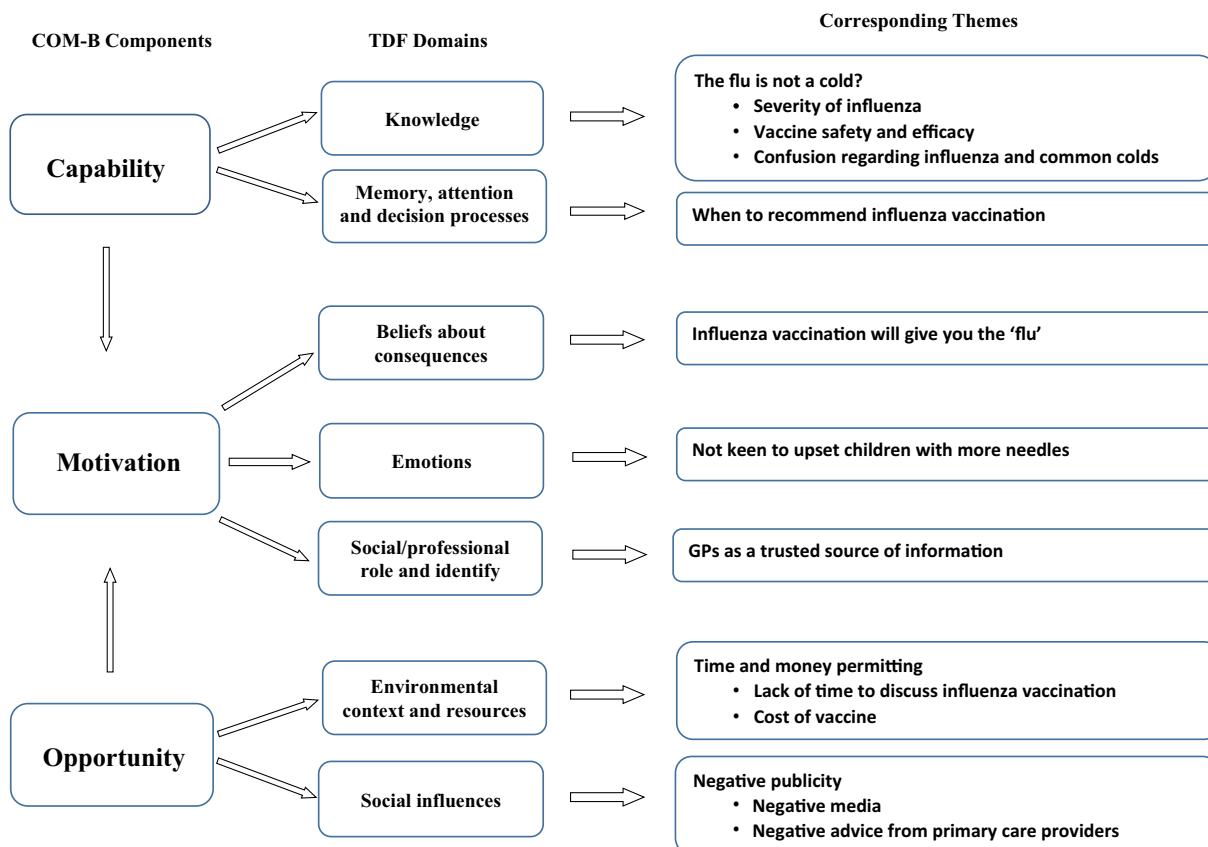
[MCHN1]

Similarly, parents were also unsure of influenza vaccine safety and efficacy. They thought that the vaccine had not been around long enough to know how safe it was for children and some parents commented that having an influenza vaccination was a ‘trend’.

“... So it's just interesting what is current and what is not, and what trends... when it becomes mainstream and normalised. I don't think flu is normalised yet...”

[FG3]

Parents had mixed reactions about whether they wanted to know more about influenza vaccination. For some parents, it was also about if there was sufficient evidence underpinning the severity of the disease and efficacy of the vaccine and whether the GP recommended influenza vaccination for their children. GPs, therefore, emerged as critical point of information and trusted sources in the parents' transcript: parents said they were more likely to vaccinate their children if their GPs recommended it.



**Fig. 1.** Capability, Opportunity, Motivation – Behaviour (COM-B) components with corresponding Theoretical Domains Framework (TDF) domains and themes.

For some PCPs, the decision to immunise children <5 with influenza vaccine was based on whether the child was in a high risk group, whether the benefits of the vaccine out-weighted the risks and they located the responsibility for this decision with the paediatrician (who looks after children in these high risk groups). Therefore PCPs did not discuss influenza vaccination with parents unless the topic was brought up.

*"Yeah, I don't go out and try and get parents of children to have the flu vacs. ... I'm guided by the paediatricians, if they want a child vaccinated, I'll vaccinate him. ..."*

[GP7]

### 3.2. Opportunity

The opportunity to deliver influenza vaccination services may be impeded by time and cost barriers. GPs thought there was not enough time to discuss influenza vaccination with parents and they were reluctant to even bring up the topic as it was not a priority over other 'conditions' during consultations. However, the approach from GPs was often opportunistic rather than proactive:

*"... it's more fortuitous when they come in, and if there's an opportunity, we sort of go through it ..."*

[GP17]

Interestingly, while PCPs thought the cost of the vaccine was a barrier particularly for parents with children not in the high risk groups, it was not mentioned by parents. Having the vaccine as part of the immunisation schedule would more likely influence parents' willingness to accept the influenza vaccine as it legitimised the vaccine by making it a part of routine care.

*"... vaccination schedule, yeah, I would definitely do it then because obviously there are reasons why... that it is necessary."*

[FG4]

Negative publicity leading to a culture of fear following the incident in WA influenced both PCPs and parents:

*"Problem is that the product was a cause for concern..."*

[GP9]

*"... I think immunisation has been hyped up by the media at the moment... in general, so I don't know how you'd go about getting all kids under 5 vaccinated, it's going to be hard."*

[PH2]

*"I wouldn't give it, because I don't know. ... you hear, you read the papers and you hear stories, and I'm scared of those side effects so I think no."*

[FG5]

Because parents saw GPs as a trusted and important source of information, advice about immunising against influenza also influenced their decision:

*"I've had the flu shot, but when I went to the GP they said not to do it for the kids, because they don't know the side effects."*

[FG5]

Some parents commented, however, that they would consider vaccination if their GPs recommended it. Pharmacists and MCHNs mentioned that they might speak with parents regarding influenza vaccine; however they would always recommend parents discuss vaccination with their GP to help them make an informed decision.

*"... it's something to be discussed with your doctor..."*

[MCHN3]

*"I think the case of parents and GPs as opposed to pharmacists recommending it at all... things might change... but I don't really think it's our role to tell (parents)..."*

[PH2]

### 3.3. Motivation

The lack of knowledge for parents influenced their beliefs about the consequences of vaccination and brought out an emotive discourse:

*"It's scary to think about it [incidents with kids with influenza and how sick they could get]..."*

[FG4]

Some parents who had previously been vaccinated believed the vaccine gave them the 'flu'.

*"I've had it [influenza vaccine] twice and two times I got it... whereas not having it, I only get the flu every couple of years..."*

[FG2]

*"... the vaccination actually gives you the flu... So I had the flu probably two days after that..."*

[FG5]

Most parents would immunise their children for other childhood diseases but not influenza.

*"I would immunise my kid against chicken pox but this, the flu, I don't know why."*

[FG3]

*"... so I don't see them in the same boat [as other childhood immunisations] so I would never vaccinate the flu."*

[FG3]

Both PCPs and parents described not wanting to give more needles to children as they felt young children were already receiving too many as part of the childhood immunisation schedule. GPs described not wanting to upset children or cause them to cry.

*"... kids really don't like the injection... they need two injections, initially, for the first year, and then they need one every year after that... if the child doesn't have any other risk factors, I wouldn't really stick another needle into the child."*

[GP11]

In order for GPs to consider recommending influenza vaccination to parents of young children, some GPs said that the Government needed to incorporate the influenza vaccine into the immunisation schedule.

*"Making them free is one thing, and ... inform the doctors and have meetings until that's part of the immunisation schedule..."*

[GP16]

## 4. Discussion

Ours is the first Australian study to explore the reasoning behind decisions to immunise young children against influenza from the views of GPs, PNs, MCHNs, pharmacists and parents. We used the TDF framework and COM-B model to analyse the reasoning and barriers to the uptake of influenza vaccination. By doing so we were able to identify which barriers to address in order to increase the uptake of influenza vaccination to young children <5.

Our study highlighted five major barriers including: (1) lack of knowledge and awareness of influenza and the severity of the

disease, (2) uncertainty of the vaccine's safety and efficacy, (3) negative publicity regarding influenza vaccination, (4) costs incurred because the vaccine was not part of the immunisation schedule, and (5) reluctance to increase the number of immunisations for young children. Conflicting knowledge as to the severity of influenza in young children in PCPs and the lack of awareness of the severity of the disease in parents were amongst major barriers observed. Despite strong clinical evidence demonstrating the safety and efficacy of the influenza vaccine [7–9,34,35], a recent European study has found that both physicians and parents of young children lack sufficient knowledge about influenza vaccination, which in turn translates into a reluctance to vaccinate [22]. This finding is similar to our study results. Additionally, parental misconceptions regarding immunization and influenza as reported in our study also resonates with previous research that found parents were unconvinced that the influenza vaccine could prevent the disease, and vaccination would cause the disease [24,25]. Such misconceptions may be linked to parents confusing the common cold with influenza and/or influenza-like illness.

Another common barrier is the negative publicity surrounding the safety and efficacy of influenza vaccines. Recent studies have highlighted the importance of parental attitudes around vaccine safety and efficacy being the most important attitude influencing decision in uptake of vaccination [14,36–39]. Parental concerns regarding vaccine safety and efficacy after the 2010 influenza vaccine scare in WA led to the direct decrease in the uptake of influenza vaccine in the <5 cohort [14,37]. Similar studies showed that uncertainty regarding the indication for vaccination and perceived barriers such as that the vaccine was not 'safe', severe side-effects, and the child was 'too young' to take up the influenza vaccines were also factors associated with parental attitudes to the low uptake of the vaccine [36,39].

One of the most important facilitators that influenced parents' decision is advice from their healthcare providers. Our study showed that parents often place their trust in their GPs and looked to them for advice regarding the management of their children's health [31], demonstrating the importance of the GP's expressed beliefs and advice when it comes to recommending influenza vaccination in young children. Recent overseas studies have shown, however, that 13.4% of GPs and approximately 30% of healthcare providers would not recommend influenza vaccination to their friends, colleagues or patients [22,23,37]. Thus if they are reluctant to recommend influenza vaccination for young children to parents, uptake rates of influenza vaccination are unlikely to increase.

While similar barriers such as lack of awareness of severity of influenza, uncertainties of vaccine efficacy, negative media, and not wanting to give more needles in an already busy immunisation schedule were expressed by PCPs and parents in this study, there were also contrasting views. Arguably, one of the most important discrepancies was that PCPs assumed cost was a barrier to parents' decision to not vaccinate their children, but parents in our focus groups did not mention cost at all. Rather having influenza vaccination as part of the routine schedule was more likely to be an important facilitator that will influence parents to vaccinate their young children. This may be because the parents in our sample were fairly affluent so that financial considerations regarding vaccination were less of a concern than they would be among lower income families. Certainly work done in Japan has demonstrated a significant association between household income and influenza vaccination with higher income groups more likely to have a history of using influenza vaccination in young children than lower income groups [40].

There were a number of limitations to our study. Firstly, data collection was limited to metropolitan Melbourne, Australia; therefore our findings might not be generalizable to rural or remote areas, or in other countries where health systems are vastly

differently. Secondly, the parents from our focus groups mostly came from high income families leading to a possible limitation of the current study. In addition, our study included possible selection bias as participants showed a genuine interest in the management and prevention of respiratory tract infections in young children, which may not apply across all parental and PCP cohorts. We also provided incentives to participants leading to a possible source of bias, although these incentives are consistent with similar work with estimated earnings and average Australian wage [41,42].

One of the strengths of our study was the ability to include the views from a wide range of healthcare professionals who provide primary healthcare to young children. These professionals often provide a team care approach for children in their first years of life. In addition, we applied the TDF and the COM-B model to inform data collection and analysis, providing a valid and evidence-based approach where identifying barriers can inform future interventions to increase the uptake of influenza vaccination in young children. Future studies could also examine the inverse – i.e., applying a similar methodological approach to identifying enablers to inform future interventions to increase the uptake of influenza vaccination in young children.

The potential implications of our study illustrate that to overcome some of the barriers outlined and enable the increase uptake of influenza vaccination, the following complex interventions are needed: (1) public health campaigns to educate parents on influenza and the severity of the disease, immunity against influenza virus, the necessity to immunise annually, the differences between influenza and the common cold, and highlight the benefit of influenza vaccination for young children; (2) targeted continual education development for GPs and PCPs about the clinical efficacy and the benefit of the influenza vaccine for young children; (3) provision of up-to-date and easy to access influenza surveillance reports to PCPs; and (4) advocate for structural and policy changes to incorporate the vaccine into the routine immunisation schedule. Even if the influenza vaccine cannot be publicly funded in the short term, recommendations from both GPs and government will reassure parents of young children of the benefits of influenza vaccination for young children. Influenza vaccination, or at least the discussion whether to vaccinate, ought to be part of the routine care for young children, rather than opportunistically achieved.

## 5. Conclusion

Despite young children being one of the most vulnerable groups to contract influenza and influenza related illnesses, and the proven safety and efficacy of influenza vaccination, PCPs and parents are still reluctant to recommend influenza vaccination in young children. The misconceptions and lack of knowledge of influenza and influenza related illnesses, as well as the negative publicity have shaped decisions of PCPs and parents to not vaccinate, despite evidence to the contrary. However, this study has shown that healthcare providers are a trusted source of information and therefore may provide a key role in increasing the uptake of influenza vaccination in this cohort. Changing parental knowledge in this area, as well as improving PCPs' opportunities to discuss and recommend influenza vaccination to parents and legitimise influenza vaccination as part of the immunisation schedule, will therefore help to increase the uptake of influenza vaccination in young children.

## Conflict of interest

We declare that we have no conflicts of interest.



## Authors' contributions

RB completed the background literature search and RB, DG, DM and BB contributed to the study design. RB conducted and transcribed all interviews. RB and BB performed the analysis of the data. RB drafted the manuscript. All authors revised all drafts and approved the final version of the manuscript.

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## **Chapter 8: Visibility and transmission: Complexities around promoting hand hygiene in young children**

Previous studies have shown a causal link between hand washing and the reduction in transmission of infectious diseases, including RTIs and gastrointestinal diseases, in the hospital and community settings (Aiello & Larson, 2002; Chen & Kirk, 2013; Chen, William, & Kirk, 2014; Greenland, Cairncross, Cumming, & Curtis, 2013; Kwok, Galton, & McLaws, 2015; L'Huillier et al., 2015; Stone, 2001). Many intervention studies have been conducted in hospitals, schools, and childcare/day care centres to increase hand hygiene compliance and reduce transmission of infectious diseases such as gastrointestinal diseases and RTIs. However, studies into hand hygiene compliance and sustainability are limited in the Australian primary care setting, especially in regards to practice for young children. Currently there is limited knowledge of PCPs and parents of young children's hand hygiene practice, even though hand hygiene has been widely promoted within Australia (Hand Hygiene Australia, 2018). This chapter investigates the knowledge and practice of hand hygiene and disease transmission of PCPs and parents of young children. This paper was presented at an international conference, the 15<sup>th</sup> World Congress on Public Health, 3-7 April, 2017, Melbourne Convention & Exhibition Centre (MCEC), Melbourne, Australia. The manuscript has been submitted to the journal BMC Public Health for consideration for publication.

# **Visibility and transmission: Complexities around promoting hand hygiene in young children – a qualitative study**

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## **Abstract**

### **Background**

Effective hand hygiene practice can reduce transmission of diseases such as respiratory tract infections (RTIs) and gastrointestinal infections, especially in young children. While hand hygiene has been widely promoted within Australia, primary care providers' (PCPs) and parents' understanding of hand hygiene importance, and their views on hand hygiene in reducing transmission of diseases in the community are unclear. Therefore, the aim of this study was to explore the views of PCPs and parents of young children on their knowledge and practice of hand hygiene in disease transmission.

### **Methods**

Using a cross-sectional qualitative research design, we conducted 30 in-depth interviews with PCPs and five focus groups with parents (n=50) between June 2014 and July 2015 in Melbourne, Australia. Data were thematically analysed.

### **Results**

Participants agreed that hand hygiene practice was important in reducing disease transmissions. However, barriers such as variations of hand hygiene habits, relating visibility to transmission; concerns around young children being obsessed with washing hands; children already being 'too clean' and the need to build their immunity through exposure to dirt; and scepticism that hand hygiene practice was achievable in young children, all hindered participants' motivation to develop good hand hygiene behaviour in young children.

### **Conclusion**

Despite the established benefits of hand hygiene, sustained efforts are needed to ensure its uptake in routine care. To overcome the barriers identified in this study a multifaceted

intervention is needed that includes teaching young children good hand hygiene habits, PCPs prompting parents and young children to practice hand hygiene when coming for an RTI consultation, reassuring parents that effective hand hygiene practice will not lead to abnormal psychological behaviour in their children, and community health promotion education campaigns.

## **Keywords**

Hand hygiene

Hand washing

Transmission

Respiratory tract infection

Children

Primary care providers

Primary care

## Background

Hand hygiene, including hand washing with soap and water, or the use of hand sanitizers, has been shown to reduce transmission of infectious diseases [1-3], especially gastrointestinal and respiratory tract infections [4]. Young children <5 years of age are most at risk, in particular those attending childcare or preschool [5-7].

Effective hand hygiene practice in community settings, has demonstrated a reduction of infections occurring in childcare [7-10], schools [2, 11-13], and in the home [14-16].

According to Aiello et. al's meta-analysis [4] improvements in hand hygiene resulted in a 21% reduction in respiratory illnesses and a 31% reduction in gastrointestinal illnesses in community-based settings. The importance of hand hygiene practice in the prevention of infectious diseases was emphasized in all 30 studies included in this meta-analysis.

Studies from Europe, US, and the UK have also shown that hand hygiene interventions in the community can increase hand hygiene compliance among children [17-19]. For example, interventions involving teacher modelling hand hygiene to school children [20], improving educator's knowledge and attitude towards hand hygiene [21], and the use of alcohol-based sanitizers [15, 22, 23] have significantly reduced illness absenteeism in schools. However, factors such as lack of time to practice hand hygiene, poor adult modelling of regular hand washing, limited facilities including available sinks, soap and water, and the lack of knowledge regarding the importance of hand hygiene have hindered the compliance and sustainability of good hand hygiene practice [24, 25].

Despite wide promotion of hand hygiene in Australia [26] and good evidence that effective hand hygiene practice reduces infectious disease transmission, to date no studies have measured the efficacy and sustainability of hand hygiene practice in the Australian primary

care setting. Thus, it is unclear whether primary care providers (PCPs) and their patients follow recommended protocols to reduce infectious diseases, especially in young children. Accordingly, the aim of this study was to explore the views of PCPs and parents of young children regarding the practice of hand hygiene in the transmission of diseases in young children.

## **Methods**

Data for this research were derived from a larger mixed methods qualitative study exploring PCPs and parents' views, knowledge and attitudes towards their hand hygiene practice and reducing RTI transmission in children <5 years of age. The methods applied have been previously described [27]; in summary, interviews were conducted with 30 PCPs and five focus groups with 50 parents of young children (see Table 1 for schedules).

PCPs were defined as general practitioners (GPs), practice nurses (PNs), maternal child health nurses (MCHNs), and pharmacists (PHs), and a diversified sampling strategy was applied to recruit them. The contact details of GPs and PNs were generated from an existing general practice database at Monash University, Victoria, Australia. Contact details for MCHNs and PHs were generated from the maternal child health services directory [28] and the local business directory respectively. Recruitment was limited to one PCP per practice site across metropolitan Melbourne, Australia.

Purposive sampling via advertisements circulated to playgroups and mothers' groups was used to target parents and carers from the south east and east of Melbourne, Australia. Five mothers' groups and play groups were initially approached to recruit the required number of 50 parents and carers. If one site refused due to time or not enough willing participants, then another would be approached until the total number of 50 participants were reached. A total

of five play groups (two accepted) and three mothers' group (all three accepted) were approached. Interested participants were asked to contact the researcher (RB). All participants consented to up to an hour interview or focus group to explore their views, knowledge and attitudes towards management of respiratory tract infections, including prevention strategies such as influenza vaccination and hand hygiene in children <5 years of age.

Interviews and focus groups (each approximately 1 hour long) were conducted between June 2014 and July 2015 by RB. PCPs' were interviewed at their work place or at a place convenient to them during practice hours; focus groups were conducted at play group centres or at scheduled mothers' group meetings. All participants gave written consent prior to data collection; PCPs were provided with a AUD\$120 and parents with a AUD\$40 gift voucher upon completion.

Interviews and focus group discussions were digitally recorded and transcribed verbatim. Data were analysed using a thematic approach [29] to provide a flexible approach to identify, analyse and report themes or patterns within the data. Initially, two researchers (RB and BB) read three transcripts independently to generate initial codes and themes, which were then compared and refined until consensus was reached. A further three transcripts were coded using the schemata and this process was repeated, three transcripts at a time, to incorporate emerging themes, until all transcripts were coded. Data were managed using NVivo10. Study approval was obtained from Monash University Human Research Ethics Committee (CF14/1384 - 2014000648).

## **Results**

A total of 30 PCPs (13 females) and 50 parents and carers (47 females) participated in the study. The average years of experience for GPs, PNs, MCHNs and PHs were 18.0, 3.0, 17.7,

and 7.2 years respectively. In the parents and carers cohort, 62% (n=31) were in the 31-40 years age group, with over 70% (n=36) having a graduate degree or higher.

All participants revealed high levels of knowledge regarding hand hygiene and its importance. When asked, they gave their definition of hand hygiene, and discussed the importance of hand hygiene in reducing transmission of infection, including day to day practice.

*“Washing hands frequently especially after sneezing, touching the nose, touching the mouth, coughing in the hands... the droplets in the transmission and what it means and even touching the handles of the doors, all of these can be a source of infection sometimes, and washing hands, I mean, they are important.” GP11*

*“Yeah I think it's [hand hygiene] quite important, because your hands touch anything. Like your hands will touch the table and someone will come to the table your hands touched - without even realising, you're touching things. Like you're touching your face all day. Scratching your hair, everything, and then you go and touch things...”*

*FG1*

Despite participants having good knowledge of hand hygiene, and recognising the importance in reducing disease transmission, many barriers such as variation in the practice of hand hygiene among PCPs and parents, linking visibility to disease transmission, and doubts that hand hygiene practice was attainable in young children hindered good hand hygiene practice. We elaborate on these themes below.



## Visibility and transmission

Although PCPs unanimously agreed that hand hygiene was important in reducing the transmission of diseases, there were large variations in practice. Three types of hand hygiene practice were identified among GPs and PHs: some would wash hands between seeing patients irrespective of whether contact has been made, some would only wash hands if skin contact was made, while others would practice hand hygiene only if patients were visibly infectious. However, most GPs commented that they would use alcohol sanitizers between patients if hand washing with soap and water was not possible.

*“... every time I examine the patient...” GP11*

*“Not everyone, not if there’s no skin contact...” GP12*

*“...If I’m handling something or I thought they are likely infectious...” GP17*

*“Would be very rare. We don’t try and touch... [we don’t wash hands] not unless they are obviously sick...” PH1*

PNs on the other hand would often wash hands between patients as they were more likely to ‘touch’ patients during procedures, and rarely would MCHNs see babies/children without skin contact. To the latter group, hand hygiene was habitual and ‘routine’.

*“... I regard it [hand hygiene] as a routine...” MCHN1*

Alongside variations in hand hygiene practices among PCPs, there were also divided views about whether to educate parents and patients on hand hygiene during a sick child consultation. Some commented they would if time permitted; some would not as they assumed parents already had good knowledge of hand hygiene and transmission of infection.

*“I do talk to them and tell them it prevents a lot of cross infections...” GP16*

*“...it just doesn’t come up, often there are other things to talk about, and we just don’t have time.” PH4*

*“Look, parents... I don’t know... but I can see most of the parents are quite... they know the hygiene.... They have the knowledge...” GP4*

However, PCPs commented they would not hesitate to discuss hand hygiene during a gastrointestinal tract infection consultation, but they did not always for an RTI consultation. Similar to PCPs, parents also prioritised hand hygiene practice with gastrointestinal infections, which were seen as more infectious as they were more ‘visible’.

*“Just because I think of a cold as being non-severe... Like, just a natural part of life. But gastro just would prefer to avoid.” FG3*

*“Gastro I would [discuss hand hygiene], but not respiratory tract infections.” GP2*

*“But gastro, you’re also vomiting and stuff, and go through places, institutions, like hospitals...” GP5*

*“... so when we triage... we do have a chat... like gastro... we have a chat to them about the transmission, and decreasing the spread of virus or whatever is causing the gastro, and what is going around...” PN1*

*“They [pharmacy staff] don’t do it [wash hands] always, but if someone comes in with gastro, they would come straight up and (do the alcohol sanitising motion)...” PH4*

PCPs also commented that the interview process for this study gave them pause for thought making some GPs realise that they need to talk to parents.

While parents considered good hand hygiene as washing hands before meals, after meals and after going to the toilet, similar to PCPs, parents also conflated ‘dirt’ with ‘infectious’ and dirt was a visual cue to prompt them to wash their hands.

*“Just teaching her that if your hands are dirty you wash them, so even though I don’t wash my hands every time I eat, I don’t wash my hands if I’ve been out to the washing line, when she comes in [from outside] - “Oh okay, we’ve got to wash our hands now”” FG2*

*“... if somebody has a cold or somebody has gastro or something like that then I’m really freaky about it and I clean everything within an inch of its life. But then other times, we’re, kind of, more relaxed and pretty lazy about it.” FG3*

Visual cues therefore determined behaviour such as when hands should be washed.

Gastrointestinal infections were seen as being ‘visible’, therefore considered as more ‘severe’ than RTIs, leading to the perception that disease transmission and infection control were visually based.

### **“Hand hygiene in kids...it’s almost not worth bothering...”**

Although PCPs demonstrated good knowledge of transmission of RTIs - respiratory route and fomite transmission – they still insisted that hand hygiene practice would not be effective in preventing or reducing RTI transmission.

*“There is no prevention. I would have to stop sending children to crèche, and kinders, and schools because they get an infection ... this is a part of life and growing up ... It's not possible [to prevent]” GP10*

PCPs also believed that hand hygiene could not be achieved in young children as they presumed young children would not have hand hygiene awareness and good practice. In addition, prevention would not be achievable as parents and children have constant contact, especially as young children needed comforting when unwell.

*“Yeah, well, probably not so much in the context of colds, kids are little anyway and they are not going to do it. I talk probably more in terms of gastro, we talk a bit about heightened domestic awareness and practice...” GP7*

*“They are going to kiss you, they are going to touch you... and they are going to kiss each other...” GP2*

Similarly, though parents acknowledged the importance of hand hygiene in reducing transmission of diseases, they also expressed reservations about ‘over-surveilling’ their children and becoming ‘germophobic’. Over emphasising hand hygiene was perceived as leading to obsessive behaviours and psychological distress:

*“... I've actually had to pull it back because she was in there every five minutes... she got really quite OCD (Obsessive Compulsive Disorder) about the whole thing...” FG1*

*“We sound like we're a bit paranoid... my daughter did say to me that I was turning her into a germ-a-phobe...” FG1*

*“I have seen a lot of quite obsessive hand washers at my new workplace.” FG3*

*“I kind of figured I don’t want to be too paranoid because you can’t wipe your hand every two seconds...” FG4*

While parents did not want to be ‘paranoid’ about being too clean and obsessive about hand hygiene, ultimately, they wanted to find that balance between good hand hygiene practice and not being paranoid about diseases. They did describe struggling to determine what was ‘right’, the ‘correct’ hand hygiene practice, and what was considered as being ‘too clean’. Children being too clean was perceived as weakening immunity whereas being ‘dirty’ built immunity:

*“I also wonder about that whole cause [and] effect. Because the people I know who wash their hands obsessively are always sick. And I just can’t decide if they’re always sick because they’re obsessive hand washers or if they’re obsessive hand washers because they’re always sick...” FG3*

*“I worry about using the hand sanitiser too much... I don’t know, I always think there’s ... almost too clean...” FG4*

*“I know some people that are clean, I don’t know about too clean, but their kids get sick quite easily. I don’t know whether it’s because they’re not getting immune to some dirt or something...” FG5*

*“We sound like we’re a bit paranoid, but that’s just us I think.” FG1*

Even though barriers exist for both PCPs and parents of young children when it came to good hand hygiene practice, they all agreed that hand hygiene training still needed to be taught early in life.

### **“It really stems from the parents...” – Teaching hand hygiene**

When asked whose responsibility it was to teach hand hygiene practice to young children, PCPs and parents commented that parents should be responsible.

*“... parents seem to talk to their kids about washing their hands...” GP5*

*“No, I haven’t been telling them, no... I thought the mums would do it...” GP8*

*“So basically, it comes from the parents, if they set good examples...” FG4*

The most effective approach to teaching young children good hand hygiene practice was identified by PCPs and parents as role modelling. Role modelling, the concept of washing hands in front of an audience so the behaviour can be imitated, was expressed as a good way to ‘show’ children how and when hands should be washed, allowing the behaviour to be ‘copied’. Hence developing their hand hygiene practice early in life, and eventually leading to sustained hand hygiene behaviour later in life.

*“I’m role modelling, so they can see me washing my hands... the most important thing I do (in the mother’s group sessions)... that’s hand hygiene.” MCHN1*

*“...Having things down at the children’s level, role-modelling” FG2*

This theme highlighted the general consensus that PCPs and parents thought parents should be responsible for their children’s hand hygiene practice, with prompting and role modeling as the most effective way to teach young children to start the good hand hygiene habit early in life.

## Discussion

Results from this study demonstrated the complex reasoning behind why a simple but important task such as hand hygiene is so difficult to consistently implement in everyday life. Far from a benign, dispassionate process, there are inherent emotions invested in undertaking this task. While the World Health Organization 'My 5 moments for health hygiene' recommends health-care workers to clean their hands before touching a patient, before clean/aseptic procedures, after body fluid exposure/risk, after touching a patient, and after touching patient surroundings [30], factors such as the PCP's own habitual hand hygiene behaviour; the expectation that parents themselves have good hand hygiene practice; scepticism that hand hygiene is effective in reducing RTIs or achievable in young children contributed to the large variation seen in PCPs' recommendations to promote hand hygiene. For PCPs and parents of young children, hand hygiene practices were centered on visual cues such as gastrointestinal infections and 'dirt' as being 'visible', rather than the transmission of diseases. While coughing and sneezing can be quite 'visible', it is often not associated with being 'dirty', hence it is less likely to result in a reflexive action resulting in hand washing. The risk that promoting hand hygiene practice could result in paranoia and the effect of being 'too clean' were overriding concerns for parents more so than the message itself.

Variations in practice stemmed from personal attitudes, perceived behaviour, control and subjective norms [31], leading to the intent to wash hands. Some PCPs thought parents were knowledgeable in hand hygiene practice and therefore did not feel the need to mention hand hygiene during an RTI consultation. A recent study by Barroso et. al. [25] found a counterintuitive inverse relationship between knowledge and hand hygiene behaviour: where medical students reported high hand hygiene behaviour yet had lower knowledge as compared with medical residents, suggesting that factors other than knowledge were

important in determining hand hygiene behaviour in this cohort. Furthermore, many PCPs said they would not wash their hands if there was no patient contact and if the patient was not visibly 'infectious'. Whitby et. al. [32], describe how inherent hand hygiene practice drives the community where visibly soiled, sticky, or gritty hands would prompt hand hygiene behaviour. This 'perceived susceptibility' or 'personal risk' was also described in a study from eight Mediterranean countries [33], where they found health care workers' hand hygiene compliance was significantly higher after patient contact compared to before patient contact, implying that self-protection was a major driver of hand hygiene performance in this cohort. Our results indicated that while the importance of hand hygiene was undeniable, hand hygiene practice and passing hand hygiene knowledge to parents of young children varied considerably within and across PCP groups. The diverse situations each PCP face in different scenarios such as whether patients were seen as 'infectious', or whether they believed parents have the knowledge as to whether they needed to talk to them about hand hygiene were contributing factors to the variations seen in these groups. Parents also relied heavily on visual cues such as 'dirty' and 'infectious', to determine the need to hand wash, as they did not always remind their children to wash their hands. However, the 'awareness' of hand hygiene practice might also explain that hand hygiene was often taken for granted, and not 'thought about'. Therefore, behaviour change interventions might need to be regular and applied in small incremental steps. Raising awareness of possible personal risk could improve practice and sustainability when it comes to hand hygiene behaviour [34].

Additionally, parents were reluctant to encourage hand hygiene practices in their child for fear their children would be 'too clean', and that they needed to be visibly 'dirty' or 'infectious' to build their own immunity. This belief needs to be directly challenged by PCPs during discussion in an RTI consultation, and further educating parents on good hand hygiene



practice should therefore be considered. A more concerning theme that emerged from our study resulting from the discussions emanating from the parents focus groups was parents' fear of their child developing abnormal behavior such as OCD. Although studies have shown strong links between people with OCD and feelings driving them to engage repeatedly and excessively in behavior such as hand washing [35, 36], there is no evidence suggesting that hand washing 'triggers' OCD. These studies found that OCD was characterized by the reduced ability to terminate an action, such as hand washing, rather than a response to a perceived threat i.e. perceived susceptibility or personal risk. Therefore, parents' fear of excessive hand washing leading to OCD was not valid. However, the fear was enough for parents to be vigilant with children's hand washing practice, therefore an important area for further research.

Perhaps one of the biggest barriers to good hand hygiene practice in young children was the skepticism displayed by parents and PCPs that good hand hygiene practice was achievable in young children, and almost not worth pursuing. Thus, while the 'intent' was there regarding hand hygiene, compliance did not always follow. Even though successful interventions incorporating hand washing in young children have shown to reduce absenteeism due to infection [9], a recent study of childcare centres in the Netherlands [37] found that while hand hygiene opportunities were readily available for children, overall adherence to hand hygiene guidelines was only 31% in participating day care centres, which supports the publicly held view that hand hygiene practice is not achievable in young children. However, participants in the study also believed that hand hygiene behaviour should start early in life. A study in Seoul, Korea [38], conducted in an elementary school setting with Year 6 students, showed parents' handwashing practice, parent and child bonding, and shared time have a significant correlation with children's hand hygiene practice. Our study also suggested that both PCPs

and parents thought hand hygiene practice should start with good role modelling in the home, with frequent reminders.

Our study was not without limitations. First, the research was conducted in metropolitan Melbourne, and therefore our results may be not generalisable to other areas such as rural or remote sites, or developing countries where there might be reduced access to hand hygiene products and handwashing facilities. Second, PCPs and parents of young children who participated in the study were very interested in this area, potentially introducing selection bias. Third, providing incentives to participants may have led to a possible source of bias, although these incentives are aligned with similar work with estimated earnings and average Australian wage [39, 40].

Currently little is known regarding young children's hand hygiene practice in the Australian community. Our study has taken the first step in exploring PCPs' and parents' attitude, views and practice of hand hygiene practice, thereby identifying barriers to hand hygiene practice for PCPs and parents of young children, which potentially impact hand hygiene habit and behaviour of young children. To overcome some of these barriers to good hand hygiene practice, the following interventions targeting PCPs and parents may help increase awareness of the importance of hand hygiene and encourage effective hand hygiene behaviour: 1) introduce health promotion that will educate and remind the public that diseases are not always 'visible' and that whether or not one appears dirty, transmission is still possible; 2) good hand hygiene habits should be taught early in a child's life to sustain effective hand hygiene behaviour; and 3) the importance of role modelling as a way to develop good hand hygiene habit in young children. In addition, PCPs should at least encourage parents and young children to practice hand hygiene when coming for an RTI consultation, which may reduce the transmission of RTIs, reinforce the message of the importance of hand hygiene

compliance and result in healthy hand hygiene practice in young children. Finally, parents should be reassured that effective hand hygiene practice will not lead to abnormal psychological behaviour in their children and that hand washing will not reduce a child's immunity.

## **Conclusions**

This study demonstrated that on the surface, both PCPs and parents of young children thought hand hygiene practice was important. However, dissonance emerged in practice because hand hygiene is implicitly tied to beliefs such as washing hands only when 'dirty'; concerns that children need to build their immunity and are already too clean; and skepticism that hand hygiene can be achieved in young children. PCPs should be made aware that hand hygiene can be part of the habit of washing hands between patients, due to fomite transmission of diseases in practice. Parental education around the importance of hand hygiene, focused on the tangible goals of making hand hygiene a regular habit is paramount in teaching young children to develop good hand hygiene practice early in life. The decision to perform hand hygiene should not be based on 'dirt' or relating visibility of infection to transmission of infection. Rather role modelling hand hygiene by parents as well as enforcing hand hygiene early in the child's life will help with better hand hygiene compliance leading to reduced transmission of infectious diseases.

## **Abbreviations**

FG	Focus groups
GP	General Practitioner
MCHN	Maternal and child health nurse
OCD	Obsessive compulsive behaviour
PCP	Primary care providers
PH	Pharmacist
PN	Practice nurse
RTIs	Respiratory tract infections

## **Declarations**

### **Ethics approval and consent to participate**

All participants were provided with a plain language statement explaining the study and gave written consent prior to interview/focus group. The study was approved by Monash University Human Research Ethics Committee (CF14/1384 - 2014000648).

### **Consent for publications**

Not applicable

### **Availability of data and material**

Not applicable

### **Competing interests**

We declare that we have no conflicts of interest.

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### **Authors' contributions**

RB completed the background literature search and RB, BB, DG and DM contributed to the study design. RB conducted and transcribed all interviews. RB and BB performed the analysis of the data. RB drafted the manuscript. All authors revised all drafts and approved the final version of the manuscript.

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## **Table 1: Interview and focus group schedules**

### **PCPs' semi-structured interview schedule:**

Hand hygiene can reduce respiratory tract infections and gastrointestinal infections:

- a) What do you think of the role of hand hygiene?
- b) What role do you play in promoting hand hygiene?
- c) How do you apply this knowledge to parents/children?
- d) Do you see the need to wash your hands between each child? Even if you don't make any skin contact with them?
  - i) If so, do you wash your hands between each child?
  - ii) If not, how often do you wash your hands?
- f) How important do you think hand washing is for respiratory tract infections?
- g) Are there any barriers to hand washing? If so, what are they?
- h) What types of interventions do you think will help you sustain good hand hygiene behaviour? I.e. patient pressure, peer pressure, education, posters
- i) Do you mention hand hygiene as a prevention measure to reducing respiratory infections to parents?
- j) What types of interventions do you think will help parents (and children) to sustain good hand hygiene behaviour?

### **Parents' focus group schedule:**

Hand hygiene can reduce respiratory tract infections and gastrointestinal infections:

- a) What do you think of the role of hand hygiene?
- b) What do you do in terms of hand hygiene at home with your children?  
Under what circumstances would you remind them to wash their hands?
- c) How important do you think hand washing is for respiratory tract infections?
- d) What barriers or concerns do you have with hand washing?

What types of interventions do you think will help you sustain good hand hygiene habits?

## **Chapter 9: Research outcomes and implications: results from a stakeholders' workshop and designing an intervention using the theoretical domains framework and the behavioural change wheel**

The previous chapters 4, 5, 6, 7 and 8 presented the results from the quantitative and qualitative research studies into current PCPs and parents' knowledge, views and practice into the management, treatment and prevention strategies of RTIs in young children. These results described how PCPs' management and treatment of RTIs in young children varied according to the role of the PCP, their years of experience, and the situation they face during an RTI consultation, while parents and carers would depend on previous RTI experiences with a sick child and advice from PCPs to manage RTIs, ultimately placing their trust in their GPs' advice and recommendations. GPs were also influenced by their perceptions of vaccine safety and efficacy. While this research was being conducted, the lack of government support for inclusion of influenza vaccination in the childhood schedule was seen as a barrier to recommending uptake. These decision-making processes form complex interactions involving parent(s) with a sick child, and PCPs wanting to do the 'right' thing but at times, feeling the need to 'please' the parent. The lack of a clear message about the safety and efficacy of influenza vaccination further undermined actions by GPs. Therefore, the design of interventions to better manage, treat and reduce the transmission of RTIs in young children needed to include multiple strategies to address the complex behavioural change targeted at individual and organisational levels.

The next step was to design one or more interventions that addressed the need for behavioural change in PCPs and parents, and to evaluate the effectiveness of such interventions using rigorous methods.

## **9.1 Using a stakeholders' workshop to disseminate research and prioritise directions for interventions**

### **9.1.1 Background**

One of the most important aspects of a research study is to communicate research findings to relevant key stakeholders in order to effect change; a process called knowledge translation. Studies have shown that engaging the community in the dissemination and implementation of research outcomes maximises the success of translating research into practice (Herndon et al., 2017; Jackson & Greenhalgh, 2015; Greenhalgh, Jackson, Shaw, & Janamian, 2016). For example, a recent study report described how dissemination of results on the Kisumu breastfeeding study to local community members was not only beneficial to the researchers' long-term engagement with communities, but also for the successful implementation of study findings (including interventions to improve health outcomes) (Ondenge et al., 2015). Similarly, interested community members can help suggest and prioritise interventions that may address the issues identified by research and help in developing new ideas for interventions that could ultimately be beneficial to both researchers and the community where the research has taken place (Twine, Kahn, Scholtz, & Norris, 2016).

There are many tools available to disseminate research findings (World Health Organization, 2014), such as research reports to relevant government bodies, publishing papers in peer-reviewed journals, presentations at relevant conferences, and press releases and policy briefs to non-specialised audiences. Throughout the PhD, findings were presented at conferences, papers were published in peer-reviewed journals, and opportunities for media engagement were capitalised upon. After gathering the outcomes of the research, a stakeholders' workshop was held to present a summary of all findings as a further means of research dissemination. The

purpose of the stakeholders' workshop was: 1) to disseminate the results of the study to key stakeholders (PCPs and parents); and 2) to engage key stakeholders to identify and prioritise possible areas of focus for an intervention and 3) to contribute to an intervention design using the TDF and the COM-B model.

### **9.1.2 Methods**

A two-hour stakeholders' workshop was held on 28 March, 2017 at the Department of General Practice, Monash University, in Melbourne, Australia. An invitation was sent to all PCPs and parents who participated in the study informing them of the purpose of the workshop. As many of the participating parents from the mothers' group and play groups had left since the study, parents with children <5 years were recruited through convenience sampling, using the research teams' professional and personal networks.

A total of 12 participants attended the stakeholders' workshop: six GPs, one pharmacist, two parents, one infectious disease (ID) physician, and two facilitators (both microbiologists). One GP and the pharmacist were also parents of young children. Participants included 3 males (GPs), and 9 females.

At the workshop, a talk and PowerPoint presentation were used to deliver the study's results to those present. After the presentation, participants were divided into two groups each with a facilitator to undertake the following activities:

- Reflect on the presentation and the findings of current barriers and enablers to the management, treatment and prevention strategies of RTIs in young children, including symptomatic management, OTC medications, antibiotic prescribing, influenza vaccination and hand hygiene strategies; and



- Identify and prioritise possible intervention strategies into the management, treatment and prevention of RTIs in young children.

Participants were given 45 mins for these activities. Each group was provided with butcher's paper and post-it-notes to jot down thoughts and inspirations generated from the discussion of areas that were considered as important to inform the development of future interventions. After the allocated period, the groups were brought back together and a nominated representative from each group was assigned to feedback to the broader group. The ideas were collated by the research team and analysed based on the three main areas: Management of RTIs, recommending influenza vaccination and hand hygiene in young children. These are summarised below.

### **9.1.3 Results from the workshop**

#### **9.1.3.1 Management of RTIs in young children**

Participants identified some common barriers regarding GP management of RTIs in young children, including diagnostic uncertainty of RTIs in young children, losing patients if antibiotics were not prescribed, and parental pressure. It was agreed that these factors ultimately contributed to possible inappropriate prescribing of antibiotics for common RTIs. The fear of children getting 'sicker' if antibiotics were not prescribed or consumed was a common topic for both PCPs and parents. In addition, it was noted that parents needed to stay at home to care for a sick child, resulting in possible loss of income, hence contributing to additional stress for the family. Better communication with PCPs on the diagnosis of the illness, types of symptoms to look for in case the child got sicker, and the expectation of the child's recovery period were areas suggested for discussion that could alleviate parents' concerns, thereby reducing the expectation of antibiotics and allow parents to plan for the child's recovery time being at home.

Interventions were suggested for both PCPs and parents:

- 1) **Management** - a follow up visit 3-4 days following the initial visit should occur either with the GP or a PN, this would provide parents the reassurance for another review if symptoms worsen;
- 2) **Education for parents** to provide information sheets containing facts such as time course of illness, what to look for in case the symptoms worsen, and why antibiotic may or may not be needed;
- 3) **Training for GPs** to reassure GPs' that parents do not want antibiotics but rather a clinical diagnosis and discussion regarding the probable illness duration;
- 4) **Health promotion messaging** to increase dissemination of key RTI prevention messages, including printing these messages on tissue boxes, also information in pharmacies to reduce use of complementary or alternative medicine; and
- 5) **Government, policies and practice changes** – a) nurses to help with follow-up visits (however, funding is needed to ensure sustainability of the role); and b) support carers' time to look after the sick child.

#### **9.1.3.2 Influenza vaccination**

While management of young children with RTIs generated a lot of discussion including barriers and possible interventions, influenza prevention surprisingly had limited suggestions for interventions. Barriers included: vaccine not being freely available for children not in high-risk groups, therefore generating additional cost for parents; parental perception that the vaccine either 'did not' work' or 'caused the disease'; and the necessity for annual influenza vaccination which made visiting the GP a 'traumatic experience' for young children. In addition, it was noted that the 2010 Western Australian influenza vaccination incident had caused a backlash regarding the acceptability of the vaccine, reinforcing to parents that the influenza vaccine was

not safe and in fact, unnecessary, as children needed to build their own immunity by catching influenza. The general consensus was that it was too difficult to effect change in this area as the barriers were too complicated to overcome in the short term.

All participants agreed that in order to increase the uptake of influenza vaccination in young children, the following would need to be considered:

- 1) **Policy change** to include influenza vaccination in the immunisation schedule thus communicating government endorsement (considered to be most difficult);
- 2) **Education** to increase health literacy around efficacy of influenza vaccination to both parents of young children, the general public, and PCPs;
- 3) **Surveillance** using modern laboratory techniques (such as PCR) to guide evidence, as current surveillance data are not available; and
- 4) **Health promotion** to include promoting safety and efficacy of influenza vaccination hence raising awareness in the community.

#### **9.1.3.3 Hand hygiene in young children**

When it came to hand hygiene, all participants agreed that hand hygiene was a much easier area to target effecting behavioural change interventions than influenza vaccination or even RTI management in young children. The general consensus was that hand hygiene was easy to perform and extremely important in reducing transmission of infectious diseases, hence there should not be any barriers impeding this habit. Important issues highlighted the importance of hand hygiene included lack of hygiene displayed in public areas, such as people coughing and spluttering then touching hand rails, door handles etc; children drinking out of the same water bottle at school; and GPs as role models for patients, therefore displaying habits of hand washing or disinfecting hands between patients.

Several interventions were suggested in terms of improving hand hygiene compliance, with the majority of them focussed on education and health promotion:

- 1) **Education** – a) use primary health networks to pilot hand hygiene interventions to PCPs; b) use the current body of literature on infection control from hospital interventions that can be modelled on and applied into the community setting; and c) as already used in hospitals, run hand hygiene compliance audits and provide feedback on hand washing habits to PCPs in the work place;
- 2) **Health promotion** – a) use multi-pronged public advertising campaigns on trains, public toilets, gyms etc; b) make hand sanitisers easily accessible in GP practices, and also public areas; c) use companies such as Johnson and Johnson<sup>®</sup>, and Dettol<sup>®</sup> to help advertise or even provide sponsorship for promotion; d) use fast food outlets such as McDonalds<sup>®</sup> to help advertise, as people don't associate junk food as 'eating', therefore do not often practice hand hygiene before snacking; e) advertise hand hygiene as an important safety measure similar to wearing helmets and seatbelts; and f) use notable people in media campaigns that the general public can relate to (i.e. not a doctor or a scientist). Celebrities suggested were Australian actors and/or models such as Chris Hemsworth and Miranda Kerr to advertise hand hygiene via social media including YouTube<sup>®</sup> and Instagram<sup>®</sup>.

#### **9.1.4 Discussion**

The stakeholders' workshop enabled key stakeholders' input to be gathered regarding the priority areas for intervention strategies for the next stage of research.

Participants commented that the three topics discussed (management of RTIs, influenza vaccination and hand hygiene) were all important areas for future research into achieving better outcomes in the management and prevention of RTIs in young children. While they were receptive to all the areas for possible intervention highlighted by the research findings,

consensus was reached that certain areas were less complicated and more achievable targets to effect behavioural change. For example, participants all agreed that the priority around reducing inappropriate antibiotic prescribing was a significant area that needed urgent attention; that behavioural change was needed in both parents and PCPs, and this was considered as ‘probable’ as parents and PCPs have invested interests in health outcomes for young children. Similarly, while hand hygiene was thought of as ‘common sense’, promoting hand hygiene was the most enthusiastically engaging and discussed topic at the workshop. Innovative suggestions to educate the public on common cold knowledge and hand hygiene included having Chris Hemsworth promoting a ‘Thor throat’; using a prominent supermarket chain to promote ‘Clean food people’ as opposed to the ‘Fresh food people’; and advertisements in fruit and vegetable stores on hygiene awareness such as ‘who has touched your fruit?’ or ‘Don’t touch my fruit!’.

In contrast, most suggested interventions targeting behaviour change in order to increase the uptake of influenza vaccination were considered as being ‘impossible,’ as incorporating the vaccine into the Australian immunisation schedule was seen as the only possible means to alleviate parental safety fears and assist PCPs in the promotion of the vaccine to parents of young children. Changing PCPs and parents’ perspectives on the severity of the disease and the safety and efficacy of the vaccine was seen as being too difficult to overcome in the short term.

There were limitations to the stakeholder workshop approach: a small number of participants were recruited, and only two participants were from the initial qualitative study. Nonetheless, a range of PCPs including GPs and pharmacists, and other healthcare professionals such as an ID physician and microbiologists at the workshop provided a range of experience needed to undertake the format of the stakeholders’ meeting. In addition, some of the GPs and the pharmacist provided their responses as healthcare professionals as well as parents of young children, further enriching the discussion.

### **9.1.5 Reflections from the stakeholders' workshop**

The stakeholders' workshop provided interesting insights: while all areas of research was seen as important, when asked, participants all thought future research (including postdoctoral research) should centre on strategies to improve hand hygiene compliance, as this was seen as an easy and achievable area to reduce RTIs in the short term. When pressed regarding inappropriate prescribing and the use of antibiotics, the GPs in the room thought they were already doing well, and parents thought they were knowledgeable in this area, and further research 'might' help other PCPs and parents, but the benefits were not seen as 'easy' and/or 'fruitful' compared to future research promoting and increasing hand hygiene in young children.

The stakeholders' workshop was held in March 2017. In early 2018, the Australian Government rolled out an initiative providing free influenza vaccine to all children under the age of 5. This initiative is a huge step forward towards overcoming one of the most difficult barriers expressed by participants in this study. The next step will be to assess the uptake of the vaccine in children under the age of 5. However, the extent of the success of this initiative is not known, as I have recently observed on a visit to my obstetric-GP that not all PCPs are aware of this scheme. Hence more work must be done on promoting this initiative in the primary care setting, especially in general practice, and providing updated information of influenza severity and the vaccine to GPs and parents of young children. Only through further evidence-based research can these efforts be determined as to whether they will lead to an increase in uptake of vaccination in this cohort.

## **9.2 Designing an intervention using the Theoretical Domains Framework and Capability, Opportunity, Motivation – Behaviour model**

This thesis research, in conjunction with the stakeholders' workshop, helped identify potential targets for interventions to better manage and prevent RTIs in young children.

A theoretical approach was then used to identify key areas where interventions could affect change, and map these barriers into the relevant TDF and COM-B domains and categories. The next step was to identify the target behaviour where change could be implemented. This was followed by assessing the impact and likelihood of the behaviour change, prioritising the behaviour by considering how much and how likely the impact of change of behaviour would produce the desired outcome, and whether the intervention would be acceptable to the target behaviour. Finally, interventions were proposed and divided amongst each target group: Organisation level, practice level, and/or individual level (Michie, Atkins, & West, 2015). See Appendix 2: tables 5, 6 and 7.

For example, in order to please parents, GPs have expressed they were more likely to prescribe antibiotics if parents were anxious, or if they perceived parents were demanding (Table 5). This behaviour was categorised in the 'intentions' domain of the TDF and as a reflective motivation in the COM-B model, i.e., GPs are more likely to prescribe (motivation) to address parents' needs (intention). The target behaviour is therefore for GPs to be reassured that parents trust their clinical judgement and that they do not necessarily want antibiotics, but give reassurance to parents that their child is not severely ill. The impact and likelihood of behaviour change would be promising, as GPs want to do the right thing, and provide parents with the best management outcome for their children. Therefore, interventions suggested would include training GPs to trust that parents mostly rely on the GPs' clinical judgement and that satisfaction

of the consultation would not necessarily be related to antibiotic prescribing. Better communication between GPs and parents would also be encouraged during the consultation, resulting in lessened parental anxiety, thus reducing the perception that parents want/demand/expect antibiotics and reduce antibiotic prescribing in this cohort.

Similarly, some parents expressed the belief that the influenza vaccine could cause the disease (Table 6). This behaviour was categorised in the 'beliefs about consequences' domain of the TDF and as a reflective motivation in the COM-B model i.e., parents believed that influenza vaccination gave the disease (beliefs about consequences) hence they would not consider vaccinating their young children with the influenza vaccine (motivation). The target behaviour in this case was for parents to understand and believe that influenza vaccines will not give them the disease and that they are safe and efficacious. The impact and likelihood of behaviour change would be promising as parents would be educated regarding the risk of influenza in young children and the benefit of the vaccine.

In terms of hand hygiene, participants commented that lack of hygiene facilities in public areas was a barrier to good hand hygiene practice (Table 7). This is an environmental context and resources barrier in the TDF domain, and a physical opportunity in the COM-B model i.e., lack of hygiene facilities in public areas (environmental context and resources) restricts parents and young children to practice hand hygiene (physical opportunity). The impact and likelihood of behaviour change would be categorised as unpromising but worth considering, as changes would be needed from the Government to supply more facilities in public areas hence increasing access to hand hygiene opportunities in the community.



### 9.3 Next steps

Tables 5, 6 and 7 provide possible component parts of future interventions which could be used to better manage and prevent RTIs in young children by identifying the problems, targeting the behaviours and using the TDF and COM-B components to define, assess likely success and propose areas for behaviour change. This work suggests that there is no single solution and that multiple areas will need to be targeted using one or more complex interventions. These include interventions at the individual level such as PCPs and parents and carers of young children; the practice level such as general practice and pharmacies; and organisation levels such the State and Federal Governments who approve and implement policies in the community. Evaluation of the proposed interventions as specified in the current study can provide researchers a rational means to determine the most likely interventions to address the barriers identified in the study.

In Chapter 3, a complex intervention containing several interacting components was described, including behaviour of the person receiving the intervention and the different groups or the organisation level (Craig et al., 2008, Medical Research Council, 2000). In this case, the person at the individual level targeted by the interventions are the PCPs and the parents; the groups targeted are the practices with needs such as increasing time for consultation to help change individual behaviour; and at the organisation level i.e., government, where changes are needed to increase hand hygiene facilities in public areas in order to affect change at the individual level.

Due to these intersecting factors influencing individual, practice and government levels, it is essential to consider all the variable outcomes when designing a complex intervention. It is therefore often not possible or beneficial to isolate a target behaviour when developing a complex intervention, as a group of target behaviours can interact with each other to influence

a set of outcomes. Consequently, addressing a group of behaviours within a complex intervention may be feasible and effective to achieve the same goal(s). For example, training GPs on how to handle difficult patients and be reassured that parents trust their clinical judgement and do not necessarily want or demand antibiotics, will address the barriers including GPs' perception of parents wanting/demanding antibiotics, fear of losing parents, and wanting to please parents. In addition, this change in target behaviour will also reduce inappropriate prescribing and ultimately contribute to better health outcomes for young children.

Similarly, if updated information including severity of influenza and the benefit of vaccination in young children can be provided, as well as surveillance to guide evidence for PCPs, this will encourage PCPs to recommend influenza vaccination to parents of young children. Thereby increasing parents' awareness of influenza and safety of the vaccine, alleviating parental fears regarding side effects, and increasing the uptake of the vaccine in this vulnerable cohort.

Participants at the stakeholders' workshop suggested hand hygiene was the most likely area to impact and affect behaviour change. While proposing possible interventions, it was clear that the three behaviour conditions: capability, opportunity and motivation were equally distributed for managing RTIs and influenza vaccination, but motivation was predominately the condition in the COM-B system for hand hygiene. These findings showed that PCPs and parents' beliefs about consequences of hand hygiene hindered the motivation to undertake good hand hygiene practice. To overcome these barriers, training and education for PCPs and parents and carers on the importance of hand hygiene to reduce transmission of infectious diseases are crucial to affect behaviour change in young children.

The next suggested phase of the research would be to test the proposed interventions by piloting them in the community. This would determine the acceptability and feasibility of the interventions and enable further refining of the process by addressing the main issues identified in the development phase.

## **Chapter 10: Discussion, implications and future directions**

Respiratory tract infections are most prevalent in young children, and although the majority of these illness are mild and self-limiting, they are a major cause of morbidity in this vulnerable group. While management may involve rest and hydration, many factors influence the management and treatment in this age group. To better manage and prevent RTIs in young children, it is paramount that PCPs and parents of young children work together to achieve the best possible health outcome. The objectives of this thesis were to explore the knowledge, attitude and practice of parents and PCPs in the management and prevention of RTI in young children by examining the current GP management of RTIs in children under the age of 5; explore the knowledge and attitude and practice of parents and PCPs in the management of RTIs and identify the barriers and enablers to the uptake of evidence-based methods aimed at preventing and minimising RTIs in young children; and identify areas for interventions and strategies that would increase awareness and improve parents and PCPs' prevention and management strategies of RTIs in young children in the Australian primary care setting.

The thesis first explored current GP management of the four most common RTIs in young children (Chapter 4). This quantitative analysis of five years of national general practice data showed GPs' management of paediatric RTIs varied according to the clinical problems, and with the age and sex of the GP. Next, in order to understand the reasoning behind these management decisions of GPs, 20 GPs were interviewed about their management of RTIs in young children using a qualitative approach. Concurrently, 10 other PCPs - three MCHNs, two PNs, and five pharmacists – were also interviewed about their knowledge and attitude in the prevention of RTIs in children under five years of age (Chapter 5), in particular comparing and contrasting the views of PCPs and 50 parents in the antibiotic treatment of RTIs in young

children (Chapter 6), including prevention strategies such as influenza vaccination (Chapter 7) and hand hygiene (Chapter 8). Through this approach, we were able to understand the barriers and enablers into PCPs and parents' RTI management and prevention strategies in young children. Finally, through feedback from key stakeholders (Chapter 9), a comprehensive list of possible directions for further research into the development of an intervention design was developed (Chapter 9).

Finally, I wish to summarise the key research findings, the research implications of these findings and provide some possible future research directions to progress into better management and prevention of RTIs in young children.

## Summary of key findings

### *The problems of RTI management in young children*

The literature review in chapter 2 presented prevalence, management and treatment of RTIs in young children, and identified reasons for divergence/non-adherence of PCPs from current guidelines. While common RTIs are often managed with supportive management such as hydration and rest, OTC medications are still being used even though they are no longer recommended for children under the age of two (Harnden et al., 2007; National Health and Medical Research Council, 2012) and antibiotics continue to be prescribed for common URTIs (Ahmed et al., 2010; Cordoba et al., 2015; Dekker, Verheij, & van der Velden, 2017; Grossman et al., 2012; McCullough et al., 2017). Our study (Chapter 4) found GP management of paediatric RTIs in Australia varied according to the clinical problems being treated, while male GPs prescribed antibiotic for URTIs significantly more often than female GPs, and older GPs prescribed antibiotics for URTIs more often than younger GPs. While Australian data on antibiotic prescribing compares favourably to other developed countries, the rate of prescribing of URTIs (20%) was still higher than recommended guidelines (McCullough et al., 2017).

### *Possible reasons why guideline recommendations are not being followed*

Our study (Chapters 5 and 6) identified some of the reasons why guideline recommendations were not always followed. First it is not often easy to diagnose illness in a child; the younger they are, the more difficult it is for them to express their discomfort - hence diagnosis relies on the observations of the parent/carer of the child, leading to possible misinterpretation of the illness if the parent/carer is extremely anxiously regarding the sick child (de Jong et al., 2009). Second, some GPs, and to a lesser extent, pharmacists, may want to please the anxious parent/carer by recommending OTC medication or even antibiotics for the sick child (Coenen et al., 2013; Ong et al., 2007; Stearns, Gonzales, Camargo, Maselli, & Metlay, 2009), leading

to extra cost of unnecessary medications, and confirming to the parents that they will help treat the child with RTI symptoms. Third, miscommunication and misinterpretation of anxious parents/carers may be perceived by GPs that parents/carers are expecting and/or demanding antibiotics (Fletcher-Lartey, Yee, Gaarslev, & Khan, 2016; Hansen, Hoffmann, McCullough, van Driel, & Del Mar, 2015; Hardy-Holbrook, Aristidi, Chandnani, DeWindt, & Dinh, 2013; Mustafa, Wood, Butler, & Elwyn, 2014). As one GP commented if parents did not ask for antibiotics, they wouldn't have to prescribe it. Finally, diagnostic uncertainty will ensure that GPs will be more cautious, especially in this cohort, hence increasing the possibilities that management and treatment will divert from clinical guidelines (Arnold, To, McIsaac, & Wang, 2005; Moro et al., 2009). While diagnostic uncertainty may only be reduced through clinical experience and education, better communications between parents and PCPs will at least lessen the perception that parents demand treatment such as antibiotics, therefore reassuring GPs that parents may only want a diagnosis rather than expecting antibiotics for the sick child.

### ***Delayed prescribing***

One way to overcome perceived parental demands and expectations is the use of delayed prescribing. Studies have shown that delayed prescribing have reduced antibiotic used by up to 50% (Andrews et al., 2012; Little et al., 2014). Benefits of this strategy include a sense of sharing decision making with patients (patient empowerment and satisfaction); a perceived ability to 'please' anxious patients; and avoiding re-consultation. While this approach may be favourable to both GPs and parents who want to do something for their sick child, it may miss the opportunity to educate patients about the appropriate use of antibiotics. In fact, this approach may encourage parents to expect an antibiotic prescription for the same illness in future. It may also enable patients to store unused scripts or medication to be used for other purposes later on when the patient would benefit from clinical review or when it may not be

clinically indicated, potentially contributing to antimicrobial resistance (Del Mar, 2007; McNulty, Lecky, Hawking, Quigley, & Butler, 2015). Any moves to implement delayed prescribing in Australia should be informed by the current research that this approach does not recommend antibiotic use but is merely a safety net if the child's condition worsens. More research is needed to determine the acceptability and feasibility of this opportunity to increase communication between PCP's and parents, and the subsequent antibiotic use resulting from delayed prescribing in the community setting.

### ***Conflicting advice and dissonance views on the management and treatment of RTIs***

In addition to barriers to the management and treatment of RTIs, our study also found that PCP's provide conflicting management advice to parents and carers of young children regarding OTC medication and when to resume normal activities (Chapter 5). This not only hinders the management of RTIs in this cohort, but also confuses parents as to the best course of action to manage a sick child with RTI symptoms. Parents expressed their trust in their GPs and in general, PCP's are seen as an important provider of health information by patients. Therefore, it is important that conflicting advice be avoided to minimise confusing parents in the treatment of RTIs. Thus, it is important to encourage PCPs to work closely with anxious parents with a sick child. The current study also highlights the importance of providing education to PCPs on best practice and current management guidelines.

There were strong indications that GPs perceived parent and carers wanting antibiotics for their sick child while parents have expressed that they merely wanted a diagnosis and reassurance that their child's illness was not severe (Chapter 6). This dissonance directly contributed to over-prescribing of antibiotics. As current Pharmaceutical Benefit Schedule (PBS) data, or dispensing data, do not match to the Medicare Benefit Scheme (MBS) data, or the prescribing data, it is not possible to accurately measure antibiotic use. Further studies that can match the



prescribing data to the dispensing data will provide crucial information to determine antibiotic use. Furthermore, studies should follow the patient journey as to the fate of the prescription, whether the antibiotic was filled, consumed and if not, what happened to the unfilled script.

The above considerations highlight the importance of improved communication between PCP's and parents and the affordance of such interactions. An additional benefit of such interactions is the opportunity to educate on preventative strategies.

### ***Acceptability of influenza vaccination as a prevention strategy***

As well as highlighting the issues of current management and treatment of RTIs in young children, our study also explored influenza vaccination as a prevention strategy for reducing RTIs in young children (Chapter 7). While influenza vaccine has been shown to be effective against influenza and influenza related illnesses, PCPs were still reluctant to recommend the vaccine, and parents perceived that the vaccine was not necessary in this cohort. Our study highlighted barriers such as lack of knowledge regarding the disease and the questionable efficacy and safety of the vaccine as causes of concern. In addition, parents' perception that the vaccine caused the disease and that children needed to 'build' their own immunity undermines current public health strategies to reduce preventable diseases such as influenza. Increasing influenza vaccine uptake may be achieved if GPs recommend vaccination to parents/carers of young children. Better information needs to be provided to PCPs in order for them to alleviate the fear of side effects and focus the benefits of the vaccine to parents of young children. An important finding of our current study was that GPs needed to be reassured of the benefit of influenza vaccine and having the vaccine as part of the Australian Immunisation Schedule would send an important signal to both PCPs and parents/carers. This message is slowly rolling out across Australia with NSW first advised in late January 2018 that free influenza vaccine will be provided for all NSW children under the age of 5 (Aubusson, 2018) and the Victoria

State Government follow suit in February announcing free influenza vaccine for all children under the age of 5 (Appendix 1).

As has been seen in previous seasons of high influenza activity, public health campaigns including media advertising also need to focus heavily on preventative strategies such as hand hygiene. However, this education often comes late in the season. More could be done to change regular practice of hand hygiene as a preventative strategy.

### ***Feasibility of hand hygiene as a prevention strategy***

Effective hand hygiene has been linked to reduced transmission of RTIs and gastrointestinal diseases in the community setting, especially in young children. Our study however reports that both PCPs and parents of young children believe that hand hygiene will not prevent RTI transmission in young children; that hand hygiene is not achievable in this cohort; and that young children need to build their immunity by exposure to ‘dirt’ (Chapter 8). These results are surprising, as we found that PCPs and parents all thought hand hygiene was important in reducing disease transmission. Moreover, PCPs’ variable performance of hand hygiene practice and parents concern that regular hand washing can lead to obsessive compulsive disorder (OCD) hinder the practice and the long-term sustainability of hand hygiene. To overcome these barriers, it is therefore important to develop interventions such as public campaigns to educate the community on the importance of regular hand hygiene practice to reduce diseases such as RTIs, and that hand hygiene is habitual, unconscious and routine rather than a chore completed when it is thought about.

### ***Why is managing and reducing/preventing RTIs in young children so difficult?***

Managing and reducing or preventing RTIs in young children is not an easy undertaking. Factors such as lack of knowledge around the severity of influenza and the efficacy of the

vaccine, environmental constraints including insufficient time during GP consultation to discuss antibiotics, PCPs' desire to please parents and to 'do something' for the sick child are just some of the reasons that often hinder best practices that could lead to better management and treatment of RTIs in young children. It was crucial, therefore, to understand the barriers before interventions could be developed to improve management and treatment of RTIs in this vulnerable group.

Interventions are required to effect behavioural change in all groups including GPs, PNs, MCHNs, pharmacists and parents and carers who all have vested interests in the care of children. Primary healthcare professionals are parents' first and frequent contact point and provide not only management, but preventive advice regarding a child's health, which parents trust and depend on. Interventions can be explored to change behaviour in regards to management, treatment and prevention of RTIs.

### ***Interventions aimed to better manage and reduce RTIs in young children***

The qualitative study as well as the stakeholders' forum uncovered some interesting areas for interventions aimed to increase awareness of and better manage and prevent RTIs in young children (Chapter 9). These are summarised below:

#### **1) RTIs and antibiotic use:**

- a. implement public health campaigns to raise awareness and increase knowledge of RTIs and antibiotic use for parents;
- b. provide support such as clinical decision support tools and decision aids for PCPs to enhance better communication with parents;
- c. Reassure GPs that prescribing antibiotics is not necessarily associated with the visit and that parents will not necessarily go elsewhere if antibiotics were not prescribed

as long as enough consultation is allowed to include a treatment plan for the sick child.

2) influenza vaccination:

- a. educate parents on the severity of influenza, and the benefit, safety and efficacy of the influenza vaccine for young children via public health campaigns;
- b. provide up to date information and surveillance on influenza to PCPs;
- c. advocate for policy changes to incorporate the vaccine into the Australian immunisation schedule;

3) hand hygiene:

- a. implement health promotion programs to remind the public that transmission of diseases is not related to the visibility of dirt or infection;
- b. the importance of developing good hand hygiene habits early in life to sustain long term good behaviour;
- c. the importance of role modeling to young children.

## **Strengths and limitations**

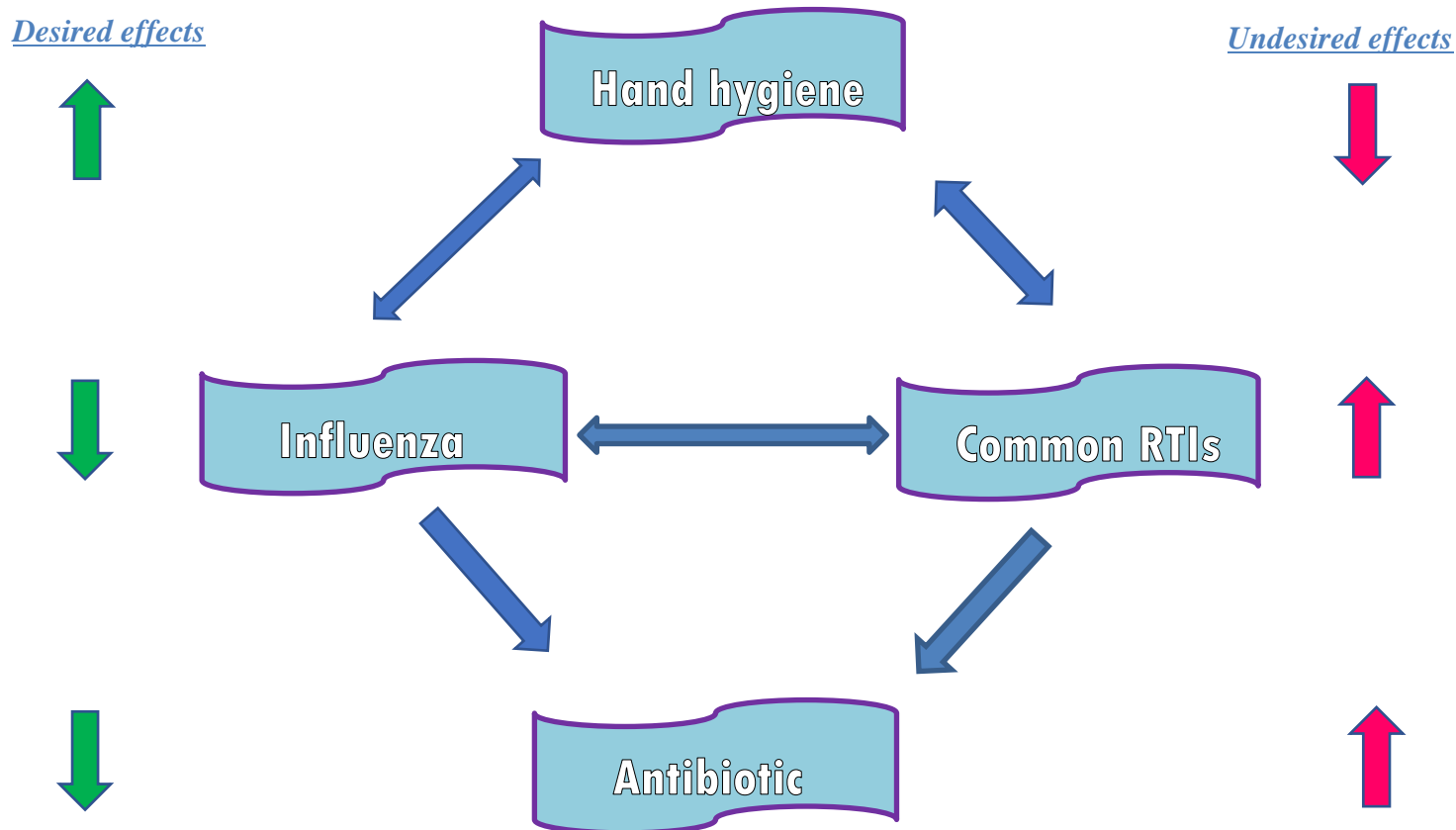
The strength and limitations of individual studies have been discussed in the individual journal articles included in the thesis (Chapters 4, 5, 6, 7 and 8). However, it is important to note the overall strengths and limitations of the thesis to understand the future directions and gaps that could be addressed. As far as I am aware, this is the first study to examine the management, treatment and prevention of RTIs in young children in primary care by including the views from a range of primary care providers such as GPs, PNs, MCHNs and pharmacists. These professionals often provide a team care approach for children in their first years of life and are the first point of contact in the child's healthcare. In addition, the research was based on the

UK MRC framework and used a behavioural theory approach to develop interventions to better manage and prevent RTIs in young children. By using a behaviour theory approach, I was able to first understand the behaviour, identify the intervention options, and finally suggest future implementation options for future research. Furthermore, the overwhelming response received from participants, especially PCPs, to participate in this study allowed me to obtain data from a wider geographic area.

While participants in the study were genuinely interested in this topic and wanted to make a difference to the management, treatment and prevention of RTIs in young children, this might have led to selection bias. Additionally, parents from the focus groups mostly came from a higher income bracket and had a higher level of education leading to an additional possible limitation to this study. Finally, it is worth considering that parents' views may have been different if obtained whilst waiting for a general practice consult in the presence of a sick and screaming child, as opposed to the calm and familiar playgroup/mothers' group environment.

## **Implications and future direction**

Current published evidence demonstrates a strong association between the practice of hand hygiene and reduced transmission of RTIs. Future research focused on increasing hand hygiene practice will decrease transmission of RTIs such as common colds and influenza and, in turn, reduce RTIs thus ultimately leading to measurable decreases in antibiotic prescribing and use (see Figure 4). The opposite or the undesired effects is also true, that decreased attention to hand hygiene practice would increase the transmission of RTIs, thereby leading to more RTIs, and increasing antibiotic prescribing and antibiotic use (see Figure 4).



**Figure 4. Relationships between hand hygiene and RTIs in the community and its effects**

As proposed in this diagram, it is essential that preventive strategies such as hand hygiene, should be addressed appropriately and early in a young child's life. Public health campaigns on the importance of hand washing or even a reminder to wash hands can be advertised through social media, posters in public places such as pharmacies, doctor surgeries, public transportations, and additional printed prevention messages on tissue boxes, could all be highly effective interventions especially in the winter months when the prevalence of common colds and influenza is high.

From 2018, Australia now provides free influenza vaccination to all children under the age of 5. While this is an exciting step forward to reduce the prevalence and disease burden of

influenza in this cohort, it is not known whether this new measure is being communicated adequately to the community, or whether PCPs are now recommending influenza vaccination for young children. Further research into the acceptability of the vaccine from the PCPs perspective will determine whether additional interventions are required, such as providing updated influenza surveillance information to PCPs and increasing parental knowledge of influenza and the vaccine in order to increase the uptake of the vaccine in this cohort.

While reducing transmission of RTIs by adequate hand hygiene and uptake of influenza vaccination may reduce the overall rate of RTIs, hence reducing the number of antibiotics prescribed, it does not educate parents on the reasoning behind antibiotic prescribing for RTIs nor does it reduce expectations and demands for antibiotics in this cohort. In order to address appropriate prescribing of antibiotics for RTIs in this cohort, further research will be needed to include interventions such as parental education on RTIs and antibiotic use and provide support to PCPs such as clinical decision support tools to reduce antibiotic use in this cohort.

For the first time, using a team care approach and a clear and vigorous theoretical methodology, I was able to identify and align potential strategies to address the issues identified in the research. Suffice to say, by using the UK Medical Research Council's framework for the development and evaluation of complex interventions and employing the TDF and the COM-B model to explore and understand how participants shape their behaviour, this enabled the development of interventions based on robust and evidence-based research. Future packaging of one or more complex interventions would be the next step to be piloted in the community, involving general practices, primary health networks, maternal and child health organisations, pharmacies, preschools, and the Department of Health, in order to bridge the knowledge and practice gaps identified and to better manage and prevent RTIs in young children.

## **Conclusion**

Parents all recall the anxiety associated with dealing with numerous and frequent occurrence of colds, experiencing the feelings of inevitability that comes from knowing that when one child comes home from childcare with a cold, that the rest of the family may be next in line for infection. The cupboards of family homes are stocked with numerous types of medications from the various forms of analgesics aimed at different age groups to the myriad forms of products that are marketed to give relief from these debilitating conditions. Although experience tells us all that these infections do resolve, this does little to prepare us for the inevitable loss of time and the fatigue that ensues.

Respiratory tract infections are most common in young children, are an economic burden that includes costs to healthcare and carer's time away from work. This thesis highlights the many factors and barriers that influence the decision-making processes for both PCPs recommending and parents and carers managing and treating young children. In order to overcome some of these barriers, it is imperative that PCPs are updated with the latest evidence-based health information that supports clinical decision making and thus supporting their communication with parents in the ways that they need it most. By providing targeted healthcare needs, parents and carers will be enabled to better manage and reduce RTIs in children.



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## Appendix

### Appendix 1: Newspaper article on influenza vaccination

#### Herald Sun Saturday February 23 2018

[https://myaccount.news.com.au/sites/heraldsun/subscribe.html?sourceCode=HSWEB\\_WRE170\\_a\\_GGL&mode=premium&dest=https://www.heraldsun.com.au/news/victoria/state-government-offers-free-flu-vaccination-for-kids-under-five/news-story/9faab496e95d698a2fb864bb87ff4345?memtype=anonymous](https://myaccount.news.com.au/sites/heraldsun/subscribe.html?sourceCode=HSWEB_WRE170_a_GGL&mode=premium&dest=https://www.heraldsun.com.au/news/victoria/state-government-offers-free-flu-vaccination-for-kids-under-five/news-story/9faab496e95d698a2fb864bb87ff4345?memtype=anonymous)

#### **VIC NEWS**

### State government offers free flu vaccination for kids under five

Grant McArthur and Lucie van den Berg, Herald Sun

February 23, 2018 9:30pm

Subscriber only

**FREE** influenza shots will be offered to Victorian children under five from next flu season.

The state government will today announce a \$3.5 million program to provide flu shots to more than 385,000 children aged six months to five years old in a bid to avoid a repeat of last year's horror season.

The move also takes a shot at the federal government, which is responsible for the National Immunisation Program but has refused to extend flu vaccinations to cover children.

It comes as new research reveals the reasons some parents do not give their children the flu jab, even though the vaccine is safe and effective in this age group.



Federal Health Minister Greg Hunt has ignored calls to cover children with a free flu vaccine. Picture: AAP

Common misconceptions uncovered in the Monash University study were that the jab could cause the flu and that children needed to be exposed to “build their - immunity”. The study found some parents would consider the shot if it was recommended by their doctor or on the NIP schedule.

Federal Health Minister Greg Hunt has announced the NIP would include a - turbocharged free flu vaccine for over-65s, but ignored calls to cover children.

Victorian Health Minister Jill Hennessy said flu was the greatest cause of hospital admissions among children, and the state government would step in to ensure families could have their children vaccinated free from May to protect them during the peak of this year’s flu season.



Minister for Health Jill Hennessy said flu was the greatest cause of hospital admissions among children. Picture: Kylie Else

“And we’ll keep pressuring Malcolm Turnbull and the Liberals to protect Victorian kids permanently,” she said.

The Monash Uni study, published in the journal, *Vaccine*, found children under five were not being vaccinated against flu, despite being vulnerable to the illness.

Department of general practice PhD student Ruby Biezen said interviews with maternal and child health nurses and pharmacists found common reasons they did not recommend shots were uncertainty about vaccine efficacy in young children and concerns about out-of-pocket costs for parents.



Ivy

Warfield, 3, had a severe case of the flu last year and spent a week in the Royal Children's Hospital. Picture: Jake Nowakowski

Last year, more than 3941 children were reported struck down with the flu, compared with just 871 a year earlier.

April Warfield hopes other families will be spared the pain her daughter Ivy, 3, - experienced last year.

Ivy was struck down with influenza A and taken to the Royal Children's Hospital suffering febrile convulsions. She spent a week in hospital recovering, including time in intensive care.

"We went downhill very quickly," Ms Warfield said.

"We didn't know what was wrong with her, we didn't think it would be the flu. - Immunisations are definitely important — we don't want to go through that again."

## Appendix 2: Barriers, target behaviour, impact and likelihood of behaviour change and suggested interventions

*Table 5. Managing respiratory tract infections in young children*

Barriers	TDF Domain	COM - B	Target behaviour	Impact and likelihood of behaviour change	Proposed interventions
GPs' diagnostic uncertainty	Knowledge	Capability - psychological	Reduce GPs' diagnostic uncertainty	Unpromising but worth considering	<b>Individual level: GPs</b> Education and training required for GPs, however, diagnostic uncertainty mainly overcome through experience
Pharmacists recommending OTC and alternative medications (such as probiotics) often without evidence	Skills	Capability – physical	Pharmacists and other PCPs to only recommend evidence-based treatments to parents of young children	Promising	<b>Individual level: Pharmacists and other PCPs</b> Education and training required for pharmacists and other PCPs on the effectiveness of OTC and alternative medications in this cohort
Lack of consultation time to discuss management options with parents	Environmental context and resources	Opportunity - physical	Allow longer consultation time for PCPs to discuss management options with parents	Unpromising but worth considering	<b>Practice level: General practice and pharmacy</b> Provide GPs with longer consultation times to discuss management options with parents. Provide pharmacists with time to discuss with parents their management options when approached at the practice
GPs' perception that parents	Social influences	Opportunity - social	GPs to be reassured that parents trust their clinical	Promising	<b>Individual level: GPs</b>

want/demand/expect antibiotics			judgement and that they do not necessarily want antibiotics, but reassurance that their child is not severely ill		Training required for GPs, reassuring them that parents generally trust their clinical judgement. Better communication during the RTI consultation and providing a diagnosis and reassurance which may reduce the perception that parents want/demand/expect antibiotics
Wanting to do something for the sick child (PCPs and parents)	Social influences	Opportunity - social	PCPs and parents to be reassured that treatment for an uncomplicated RTI may only need symptomatic management and antibiotic is not always necessary	Promising	<b>Individual level: PCPs</b> Training required for PCP on how to handle and reassure anxious parents with a sick child and not provide medication, especially antibiotics as seen as a need to do something for the sick child <b>Individual level: Parents</b> Education required for parents to understand RTI symptoms in young children and that medication including OTC medication and/or antibiotic is not necessary for an uncomplicated RTI
PCPs providing conflicting management advice to parents	Intentions	Motivation - reflective	PCPs are united and consistent in their management advice to parents	Promising	<b>Individual level: PCPs</b> Provide training and regular meetings (such as healthcare conference) for PCPs to be updated with the latest evidence-based information on management and prevention of RTIs in young children, and to encourage better communication between PCPs
GPs prescribing antibiotic inappropriately to please parents	Intentions	Motivation - reflective	GPs to be reassured that parents trust their clinical judgement and that they do not necessarily want	Promising	<b>Individual level: GPs</b> Training required for GPs, reassuring them that parents generally trust their clinical judgement and satisfaction is not necessarily related to

			antibiotics, but reassurance that their child is not severely ill		antibiotic prescribing. Better communication during the RTI consultation and providing a diagnosis and reassurance which may reduce the perception that parents want/demand/expect antibiotics
Parental anxiety/pressure	Emotion	Motivation - automatic	PCPs to reassure parents and educate parents on the symptoms of RTIs	Promising	<p><b>Individual level: PCPs</b> Training required for PCP on how to handle and reassure anxious parents with a sick child and how to deal with parental anxiety and pressure for diagnosis and that parents are not necessarily wanting medications including antibiotics</p> <p><b>Individual level: Parents and carers</b> Education required for parents to understand RTI symptoms in young children and that medication including OTC medication and/or antibiotic is not necessary for an uncomplicated RTI</p>
GPs' fear of losing patients	Emotion	Motivation - automatic	GPs to be reassured that parents trust their clinical judgement and that they do not necessarily want antibiotics, but reassurance that their child is not severely ill	Promising	<p><b>Individual level: GPs</b> Training required for GPs, reassuring them that parents generally trust their clinical judgement and will not necessarily go elsewhere if antibiotic was not prescribed. Better communication during the RTI consultation and providing a diagnosis and reassurance may reduce the perception that parents want/demand/expect antibiotics</p>



**Table 6. Recommending influenza vaccination to young children**

Barriers	TDF Domain	COM - B	Target behaviour	Impact and likelihood of behaviour change	Proposed interventions
Lack of knowledge and awareness regarding the severity of the disease	Knowledge	Capability - physical	PCPs to have the knowledge of the severity of influenza in young children Parents to have the knowledge and awareness of influenza severity in young children	Promising	<b>Organisational level: Government</b> Provide up to date and easy to access surveillance reports to PCPs on influenza and related diseases <b>Individual level: PCPs</b> PCPs to discuss with parents regarding the severity of influenza and the benefits of the vaccine in young children <b>Individual level: Parents</b> Provide education to parents (through PCPs and public health campaigns) on the severity of the disease and the benefits of the vaccine
Unsure of vaccine safety and efficacy	Knowledge	Capability - physical	PCPs and parents to have the knowledge on the safety and efficacies of the vaccine	Promising	<b>Organisational level: Government</b> Provide up to date and easy to access surveillance report to PCPs on influenza and related diseases <b>Individual level: PCPs</b> PCPs to discuss with parents regarding the severity of influenza and the benefits of the vaccine in young children <b>Individual level: Parents</b>

					Provide education to parents (through PCPs and public health campaigns) regarding the severity of the disease and the benefits of the vaccine
Confusing the common cold with influenza	Knowledge	Capability - physical	Parental knowledge and understanding of symptoms and treatment of influenza and common cold	Promising	<b>Individual level: Parents</b> Provide education for parents to recognise the differences between the common cold and influenza, including symptoms and treatment
When to recommend influenza vaccination	Memory, attention and decision processes	Capability - psychological	PCPs having updated information of schedule and knowledge regarding influenza and vaccine	Promising	<b>Individual level: PCPs</b> Provide up to date and easy to access surveillance reports to PCPs on influenza and related diseases, and the benefits of vaccination in this cohort PCPs to discuss with parents regarding the severity of influenza and the benefits of the vaccine in young children <b>Individual level: Parents</b> Provide education to parents (through PCPs and public health campaigns) regarding the severity of the disease and the benefits of the vaccine
Cost	Environmental context and resources	Opportunity - physical	Include influenza vaccination in the Australian immunisation schedule	Unpromising but worth considering	<b>Organisational level: Government</b> Policy change requiring the inclusion of influenza vaccination in the Australian immunisation schedule

Time	Environmental context and resources	Opportunity - physical	Allow more time in the consultation to immunise young children	Unpromising but worth considering	<b>Practice level: General practice</b> Provide GPs with longer consultation time to discuss the benefits of vaccination with parents Include paid PNs to provide influenza vaccination to young children
Negative publicity	Social influences	Opportunity - social	PCPs to recommend influenza vaccination to young children and provide evidence-based information on the risk and benefits of the vaccine to parents of young children	Unpromising but worth considering	<b>Individual level: PCPs and parents</b> Provide evidence-based information on the benefits of vaccination for young children
Not recommending influenza vaccine to all children without risk factors	Intentions	Motivation - reflective	PCPs and parents to understand the severity of influenza and the importance and benefits of the vaccine	Promising	<b>Individual level: Parents</b> Provide evidence-based information on the risk of influenza in young children and of the benefits of vaccination to PCPs
Belief that influenza vaccination will give you the disease	Beliefs about consequences	Motivation - reflective	Parents to understand the severity of influenza and the importance and benefits of the vaccine	Promising	<b>Individual level: Parents</b> Education required for parents to know that influenza vaccination will not give them the disease, including the types of vaccine (attenuated live vaccine) Provide evidence-based information on the risk of influenza in young children and the benefits of vaccination for young children

Not keen to upset children with more needles	Emotions	Motivation - automatic	PCPs to understand that the benefits of influenza vaccination outweigh the risks associated with suffering the disease in young children	Promising	<b>Individual level: PCPs and parents</b> Discussion required with PCPs and parents that the benefits of influenza vaccination outweigh the risks associated with suffering the disease in young children
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**Table 7. Hand hygiene in young children**

<b>Barriers</b>	<b>TDF Domain</b>	<b>COM - B</b>	<b>Target behaviour</b>	<b>Impact and likelihood of behaviour change</b>	<b>Proposed interventions</b>
Unsure of 'correct' procedure for hand hygiene practice	Skills	Capability - physical	Parents know the correct procedure for hand hygiene practice	Promising	<b>Individual level: Parents</b> Educate parents on the benefit of hand hygiene in reducing transmission of RTIs and correct hand hygiene procedures including how and when to wash hands, in turn, teach and model hand hygiene to young children
Lack of hygiene facilities in public areas	Environmental context and resources	Opportunity - physical	Increase facilities such as sinks, liquid soap, hand dryers etc. in public areas, or hand sanitizers similar to hospital environment	Unpromising but worth considering	<b>Organisational level: Government</b> Provide facilities such as soap, sinks, hand dryers, and hand sanitizers in public areas such as toilets, inside buildings and shopping complexes
Did not see the need to mention hand hygiene to parents during RTI consultation	Intentions	Motivation - reflective	PCPs to understand the importance of hand hygiene and that hand hygiene not only reduces the transmission of gastrointestinal diseases, but also RTIs. Also, should remind parents about the importance of hand hygiene during RTI consult	Promising	<b>Individual level: PCPs</b> Training required to inform PCPs to discuss the importance of hand hygiene with parents during a RTI consultation as hand hygiene not only reduces the transmission of gastrointestinal disease, but also RTIs. PCPs should also be aware that not all parents have this knowledge, therefore it is important to mention as a reminder to parents, the importance of hand hygiene

Presumption that parents were knowledgeable regarding hand hygiene	Optimism	Motivation - reflective	PCPs to inform parents regarding the benefit of hand hygiene in reducing the transmission of RTIs and how to correctly wash hands	Promising	<p><b>Individual level: PCPs</b></p> <p>Training required to inform PCPs to discuss the importance of hand hygiene with parents during a RTI consultation as hand hygiene not only reduces the transmission of gastrointestinal disease, but also RTIs. PCPs should also be aware that not all parents have this knowledge, therefore it is important to mention as a reminder to parents on the importance of hand hygiene</p>
Did not believe disease transmission was possible in young children	Optimism	Motivation - reflective	PCPs and parents to understand the importance of hand hygiene and that hand hygiene not only reduces the transmission of gastrointestinal diseases, but also RTIs in young children	Promising	<p><b>Individual level: PCPs</b></p> <p>Educate PCPs on the importance of hand hygiene and that effective hand hygiene is possible to reduce disease transmission in young children</p> <p><b>Individual level: PCPs and parents</b></p> <p>Model hand hygiene behaviour to young children to encourage and enforce good hand hygiene behaviour early in life to sustain the behaviour long term</p>
Did not believe hand hygiene was achievable in young children	Optimism	Motivation - reflective	PCPs and parents to understand the importance of hand hygiene and that hand hygiene not only reduces the transmission of gastrointestinal diseases, but also RTIs in young children	Promising	<p><b>Individual level: PCPs</b></p> <p>Educate PCPs on the importance of hand hygiene and that effective hand hygiene is possible to reduce disease transmission in young children</p> <p><b>Individual level: PCPs and parents</b></p>

					Model hand hygiene behaviour to young children to encourage and enforce good hand hygiene behaviour early in life to sustain the behaviour long term
Concerns that hand washing would lead to OCD	Beliefs about consequences	Motivation - reflective	PCPs to inform parents on the benefit of hand hygiene in reducing the transmission of RTIs and how to correctly wash hands, and increase parent knowledge that hand washing will not lead to OCD in children	Promising	<b>Individual level: Parents</b> Educate parents on the importance and benefit of hand hygiene in reducing disease transmission and provide evidence that hand hygiene will not lead to OCD in children
Relating 'dirt' with 'infection'	Beliefs about consequences	Motivation - reflective	Parents to understand that transmission of diseases is not 'visible', that dirt does not always equate to infection	Promising	<b>Individual level: Parents</b> Educate parents on transmission of diseases, and that transmission of diseases is not always visible and that dirt does not equate to diseases nor the transmission of diseases
Hand washing not necessary if no patient contact	Beliefs about consequences	Motivation - reflective	PCPs to understand the benefit of hand washing between patients, regardless of contact – hand hygiene as a habit	Promising	<b>Individual level: PCPs</b> Training is required for PCPs to provide evidence that hand washing between patients will establish a 'habit' of good hand hygiene, good modelling to patients, and sustaining long-term hand hygiene habits
Children need to build their own immunity	Beliefs about consequences	Motivation - reflective	PCPs to inform parents on the benefit of hand hygiene in reducing the transmission of RTIs	Promising	<b>Individual level: PCPs</b> Encourage PCPs to discuss the importance of hand hygiene <b>Individual level: Parents</b>

					Educate parents on the broader mechanisms of immunity development in children and how hand hygiene reduces disease transmission and model hand hygiene behaviour to young children to encourage and enforce good hand hygiene behaviour early in life to sustain the behaviour long term
Belief children are already too clean	Beliefs about consequences	Motivation - reflective	PCPs to inform parents on the benefit of hand hygiene in reducing the transmission of RTIs	Promising	<p><b>Individual level: PCPs</b> Encourage PCPs to discuss the importance of hand hygiene</p> <p><b>Individual level: Parents</b> Educate parents on the broader mechanisms of immunity development in children and how hand hygiene reduces disease transmission and model hand hygiene behaviour to young children to encourage and enforce good hand hygiene behaviour early in life to sustain the behaviour long term</p>



## Appendix 3: Advertisement

### 3.1 Advertisement – Invitation letters for general practitioners and practice nurses



MONASH University

#### **Research Study: Knowledge, attitude and practice of primary care providers in reducing respiratory tract infections in young children**

- Are you a GP or Practice Nurse?
- Do you currently see 5 or more children less than 5 years of age per week as patients?

We would like to invite you to participate in a research being conducted by the Department of General Practice, Monash University. The purpose of this study is to understand general practitioners and primary care nurses view on the prevention and management of respiratory tract infections in young children.

The method of this research is via a face to face or a phone interview. The interview will take up to an hour, and will be audio recorded.

You will be paid \$120 in the form of a voucher for participation.

The interview will be held at a time and place that is convenient for you.

**If you are interested in participating in this study, please contact Ruby Biezen:**

[REDACTED] [REDACTED]  
[REDACTED] [REDACTED]

### 3.2 Advertisement – Invitation letter for maternal child health nurses



MONASH University

- **Are you a Maternal Child Health Nurse?**
- **Do you currently see 5 or more children less than 5 years of age per week as patients?**

We would like to invite you to participate in a research being conducted by the Department of General Practice, Monash University. The purpose of this study is to understand primary care providers' view on the prevention and management of respiratory tract infections in young children.

The method of this research is via a face to face interview. The interview will take up to an hour, and will be audio recorded.

You will be paid \$120 in the form of a voucher for participation.

The interview will be held at a time and place that is convenient for you.

**If you are interested in participating in this study, please read the attached Explanatory Statement and/or contact Ruby Biezen:**



### 3.3 Advertisement – Invitation letter for pharmacists



**MONASH University**

**Project: Knowledge, attitude and practice of primary care providers in reducing respiratory tract infections in young children**

- **Are you a Pharmacist?**
- **Do you currently see 5 or more children less than 5 years of age per week as patients?**

We would like to invite you to participate in a research being conducted by the Department of General Practice, Monash University. The purpose of this study is to understand primary care providers' view on the prevention and management of respiratory tract infections in young children.

The method of this research is via a face to face interview. The interview will take up to an hour, and will be audio recorded.

You will be paid \$120 in the form of a voucher for participation.

The interview will be held at a time and place that is convenient for you.

**If you are interested in participating in this study, please read the attached Explanatory Statement and/or contact Ruby Biezen:**



### 3.4 Advertisement – Pamphlet for parents and carers



# MONASH University

## **Research Study: Knowledge, attitude and practice of parents and carers in reducing respiratory tract infections in young children**

Researchers at the Department of General Practice, Monash University are seeking interested participants to be involved in a focus group discussion on the knowledge, attitude and practice of parents and carers in the prevention and management of respiratory tract infections in young children.

- **Are you over 18 years of age?**
- **Are you a parent or primary carer for at least one child under the age of 5 years?**
- **Do you speak English?**
- **Has your child experienced at least one cold since birth?**

The method of this research is via a focus group discussion. The focus group will take up to 90mins, and will be audio recorded for data analysis only and you will not be identified in any way.

You will be reimbursed with a \$40 Coles Myer gift voucher for your participation. The focus group will be held at a time and place convenient to you.

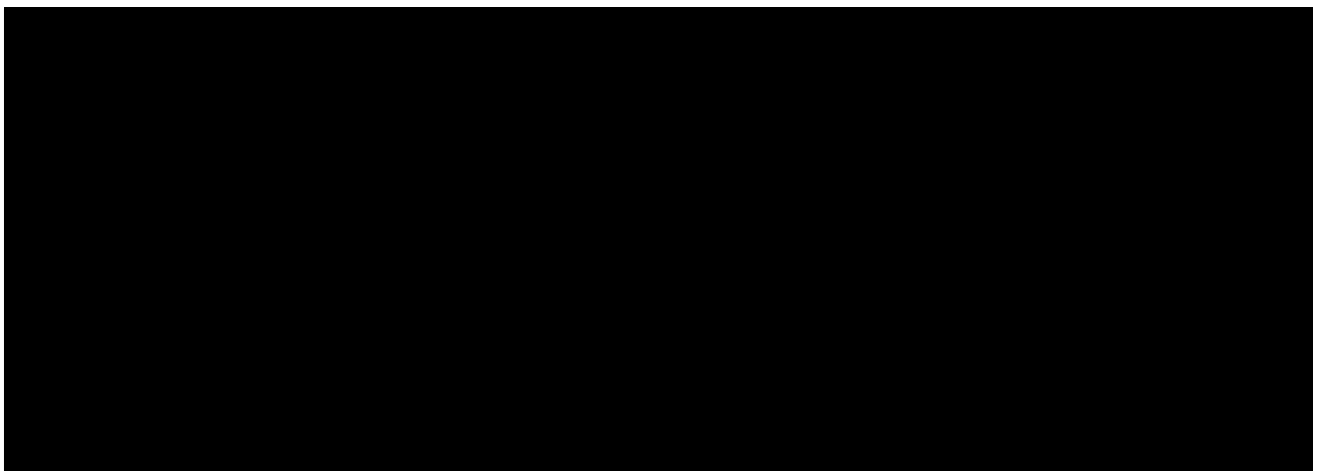
**If you are interested in participating in this study, please contact Ruby Biezen:**

██████████

██████████

██████

██████████████████



## Appendix 4: Explanatory Statement

### 4.1 Explanatory Statement – General Practitioners



MONASH University

#### EXPLANATORY STATEMENT

**Project: Knowledge, attitude and practice of primary care providers in reducing respiratory tract infections in young children**

**Chief Investigator: Bianca Brijnath**

Department of General Practice

[REDACTED]

[REDACTED]

**Student Researcher: Ruby Biezen – PhD student**

Department of General Practice

[REDACTED]

[REDACTED]

#### **This information sheet is for you to keep**

You are invited to take part in this research project conducted in the Department of General Practice at Monash University, funded by the Royal Australian College of General Practitioners (RACGP) and the National Health and Medical Research Council of Australia (NHMRC). Please read this Explanatory Statement in full before deciding whether or not to participate in this research. If you would like further information regarding any aspect of this project, you are encouraged to contact the researchers via the phone numbers or email addresses listed above.

#### **What does the research involve?**

The aim of this study is to understand general practitioners and other primary care providers' perspectives on the prevention and management of respiratory tract infections (RTIs) in young children. The research involves participating in an up to an hour, audio-recorded, face-to-face or a phone interview.

#### **Why were you chosen for this research?**

We are sending you this Explanatory Statement because you have either responded to an invitation to participate or an advertisement placed in your Medicare Local newsletter. If you currently see 5 or more children less than 5 years of age per week as patients, we would like to invite you to participate in an interview.

#### **Consenting to participate in the project and withdrawing from the research**

You will be asked to sign a consent form before participating in the interview. However, you are free to terminate the interview at any time, may withdraw from further participation at any stage during the interview and will be able to withdraw data up to one week after the interview. The interview is totally voluntary, all data will be de-identified (i.e., you will not be identified in any way).

#### **Possible benefits and risks to participants**

We do not perceive any risks outside your normal day-to-day activities. We are looking forward to obtaining your knowledge, views and current practice in the management of RTIs in young children. There are no direct benefits to participating in this study. However, we hope to use the data from this study to design an intervention program to potentially change hand hygiene behaviour and reduce respiratory infections in the population.

**Payment**

You will be reimbursed with a \$120 Coles Myer gift voucher at the completion of the interview for your time.

**Confidentiality**

All interview transcripts will be de-identified to maintain confidentiality. Any information which is released by you which could lead to your identification or that of another person will also be removed.

**Storage of data**

Data collected will be stored in accordance with Monash University regulations and kept on University premises, in a locked filing cabinet for 5 years. Only the researchers in this study will have access to the data.

**Use of data for other purposes**

The aggregated de-identified data may be used for purposes other than this study where ethics approval has been granted and you will not be named or identified in any way.

**Results**

You may obtain a copy of the plain language report of the study outcomes at the end of the project by emailing Ruby Biezen [REDACTED]

**Complaints**

Should you have any concerns or complaints about the conduct of the project, you are welcome to contact the Executive Officer, Monash University Human Research Ethics (MUHREC):

Executive Officer

Monash University Human Research Ethics Committee (MUHREC)

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Thank you,

[REDACTED]

Dr Bianca Brijnath

Research Fellow

Department of General Practice

## 4.2 Explanatory Statement – Practice Nurses



MONASH University

### EXPLANATORY STATEMENT

**Project: Knowledge, attitude and practice of primary care providers in reducing respiratory tract infections in young children**

**Chief Investigator: Bianca Brijnath**

Department of General Practice

[REDACTED]

[REDACTED]

**Student Researcher: Ruby Biezen – PhD student**

Department of General Practice

[REDACTED]

[REDACTED]

#### **This information sheet is for you to keep**

You are invited to take part in this research project conducted in the Department of General Practice at Monash University, funded by the Royal Australian College of General Practitioners (RACGP) and the National Health and Medical Research Council of Australia (NHMRC). Please read this Explanatory Statement in full before deciding whether or not to participate in this research. If you would like further information regarding any aspect of this project, you are encouraged to contact the researchers via the phone numbers or email addresses listed above.

#### **What does the research involve?**

The aim of this study is to understand primary care providers' perspectives on the prevention and management of respiratory tract infections (RTIs) in young children. The research involves participating in an up to an hour, audio-recorded, face-to-face interview.

#### **Why were you chosen for this research?**

We are sending you this Explanatory Statement because you have responded to an advertisement placed in your Medicare Local newsletter. If you currently see 5 or more children less than 5 years of age per week as patients, we would like to invite you to participate in an interview.

#### **Consenting to participate in the project and withdrawing from the research**

You will be asked to sign a consent form before participating in the interview. However, you are free to terminate the interview at any time, may withdraw from further participation at any stage and will be able to withdraw data up to one week after the interview. The interview is totally voluntary, all data will be de-identified (i.e., you will not be identified in any way).

#### **Possible benefits and risks to participants**

We do not perceive any risks outside the participant's normal day-to-day activities. We are looking forward to obtaining your knowledge, views and current practice in the management of RTIs in young children.

There are no direct benefits to participating in this study. However, we hope to use the data from this study to design an intervention program to potentially change hand hygiene behaviour and reduce respiratory infections in the population.

**Payment**

You will be reimbursed with a \$120 Coles Myer gift voucher at the completion of the interview for your time.

**Confidentiality**

All interview transcripts will be de-identified to maintain confidentiality. Any information which is released by you which could lead to your identification or that of another person will also be removed.

**Storage of data**

Data collected will be stored in accordance with Monash University regulations and kept on University premises, in a locked filing cabinet for 5 years. Only the researchers in this study will have access to the data. A report of the study may be submitted for publication, but individual participants will not be identifiable in any way.

**Use of data for other purposes**

The aggregated de-identified data may be used for purposes other than this study where ethics approval has been granted and you will not be named or identified in any way.

**Results**

You may obtain a copy of the plain language report of the study outcomes at the end of the project by emailing Ruby Biezen [REDACTED]

**Complaints**

Should you have any concerns or complaints about the conduct of the project, you are welcome to contact the Executive Officer, Monash University Human Research Ethics (MUHREC):

Executive Officer

Monash University Human Research Ethics Committee (MUHREC)

[REDACTED]  
[REDACTED]  
[REDACTED]

[REDACTED] [REDACTED] [REDACTED]

Thank you,

[REDACTED]

Dr Bianca Brijnath  
Research Fellow  
Department of General Practice



#### 4.3 Explanatory Statement – Maternal Child Health Nurses



MONASH University

### EXPLANATORY STATEMENT

**Project: Knowledge, attitude and practice of primary care providers in reducing respiratory tract infections in young children**

**Chief Investigator: Bianca Brijnath**

Department of General Practice

[REDACTED]

[REDACTED]

**Student Researcher: Ruby Biezen – PhD student**

Department of General Practice

[REDACTED]

[REDACTED]

#### **This information sheet is for you to keep**

You are invited to take part in this research project conducted in the Department of General Practice at Monash University, funded by the Royal Australian College of General Practitioners (RACGP) and the National Health and Medical Research Council of Australia (NHMRC). Please read this Explanatory Statement in full before deciding whether or not to participate in this research. If you would like further information regarding any aspect of this project, you are encouraged to contact the researchers via the phone numbers or email addresses listed above.

#### **What does the research involve?**

The aim of this study is to understand primary care providers' perspectives on the prevention and management of respiratory tract infections (RTIs) in young children. The research involves participating in an up to an hour, audio-recorded, face-to-face interview.

#### **Why were you chosen for this research?**

We are sending you this Explanatory Statement because we would like your perspectives in this research. If you currently see 5 or more children less than 5 years of age per week as patients, we would like to invite you to participate in an interview.

#### **Consenting to participate in the project and withdrawing from the research**

You will be asked to sign a consent form before participating in the interview. However, you are free to terminate the interview at any time, may withdraw from further participation at any stage and will be able to withdraw data up to one week after the interview. The interview is totally voluntary, all data will be de-identified (i.e., you will not be identified in any way).

#### **Possible benefits and risks to participants**

We do not perceive any risks outside the participant's normal day-to-day activities. We are looking forward to obtaining your knowledge, views and current practice in the management of RTIs in young children.

There are no direct benefits to participating in this study. However, we hope to use the data from this study to design an intervention program to potentially change hand hygiene behaviour and reduce respiratory infections in the population.

**Payment**

You will be reimbursed with a \$120 Coles Myer gift voucher at the completion of the interview for your time.

**Confidentiality**

All interview transcripts will be de-identified to maintain confidentiality. Any information which is released by you which could lead to your identification or that of another person will also be removed.

**Storage of data**

Data collected will be stored in accordance with Monash University regulations and kept on University premises, in a locked filing cabinet for 5 years. Only the researchers in this study will have access to the data. A report of the study may be submitted for publication, but individual participants will not be identifiable in any way.

**Use of data for other purposes**

The aggregated de-identified data may be used for purposes other than this study where ethics approval has been granted and you will not be named or identified in any way.

**Results**

You may obtain a copy of the plain language report of the study outcomes at the end of the project by emailing Ruby Biezen [REDACTED]

**Complaints**

Should you have any concerns or complaints about the conduct of the project, you are welcome to contact the Executive Officer, Monash University Human Research Ethics (MUHREC):

Executive Officer

Monash University Human Research Ethics Committee (MUHREC)

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Thank you,

[REDACTED]

Dr Bianca Brijnath

Research Fellow

Department of General Practice

#### 4.4 Explanatory Statement – Pharmacists



MONASH University

### EXPLANATORY STATEMENT

**Project: Knowledge, attitude and practice of primary care providers in reducing respiratory tract infections in young children**

**Chief Investigator: Bianca Brijnath**

Department of General Practice

[REDACTED]

[REDACTED]

**Student Researcher: Ruby Biezen – PhD student**

Department of General Practice

[REDACTED]

[REDACTED]

#### **This information sheet is for you to keep**

You are invited to take part in this research project conducted in the Department of General Practice at Monash University, funded by the Royal Australian College of General Practitioners (RACGP) and the National Health and Medical Research Council of Australia (NHMRC). Please read this Explanatory Statement in full before deciding whether or not to participate in this research. If you would like further information regarding any aspect of this project, you are encouraged to contact the researchers via the phone numbers or email addresses listed above.

#### **What does the research involve?**

The aim of this study is to understand primary care providers' perspectives on the prevention and management of respiratory tract infections (RTIs) in young children. The research involves participating in an up to an hour, audio-recorded, face-to-face interview.

#### **Why were you chosen for this research?**

We are sending you this Explanatory Statement because we would like your perspectives in this research. If you currently see 5 or more children less than 5 years of age per week as patients, we would like to invite you to participate in an interview.

#### **Consenting to participate in the project and withdrawing from the research**

You will be asked to sign a consent form before participating in the interview. However, you are free to terminate the interview at any time, may withdraw from further participation at any stage and will be able to withdraw data up to one week after the interview. The interview is totally voluntary, all data will be de-identified (i.e., you will not be identified in any way).

#### **Possible benefits and risks to participants**

We do not perceive any risks outside the participant's normal day-to-day activities. We are looking forward to obtaining your knowledge, views and current practice in the management of RTIs in young children.

There are no direct benefits to participating in this study. However, we hope to use the data from this study to design an intervention program to potentially change hand hygiene behaviour and reduce respiratory infections in the population.

**Payment**

You will be reimbursed with a \$120 Coles Myer gift voucher at the completion of the interview for your time.

**Confidentiality**

All interview transcripts will be de-identified to maintain confidentiality. Any information which is released by you which could lead to your identification or that of another person will also be removed.

**Storage of data**

Data collected will be stored in accordance with Monash University regulations and kept on University premises, in a locked filing cabinet for 5 years. Only the researchers in this study will have access to the data. A report of the study may be submitted for publication, but individual participants will not be identifiable in any way.

**Use of data for other purposes**

The aggregated de-identified data may be used for purposes other than this study where ethics approval has been granted and you will not be named or identified in any way.

**Results**

You may obtain a copy of the plain language report of the study outcomes at the end of the project by emailing Ruby Biezen [REDACTED]

**Complaints**

Should you have any concerns or complaints about the conduct of the project, you are welcome to contact the Executive Officer, Monash University Human Research Ethics (MUHREC):

Executive Officer

Monash University Human Research Ethics Committee (MUHREC)

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Thank you,

[REDACTED]

Dr Bianca Brijnath

Research Fellow

Department of General Practice

#### 4.5 Explanatory Statement – Parents and Carers



MONASH University

### EXPLANATORY STATEMENT

**Project: Knowledge, attitude and practice of parents and carers in reducing respiratory tract infections in young children**

**Chief Investigator: Bianca Brijnath**

Department of General Practice

[REDACTED]

[REDACTED]

**Student Researcher: Ruby Biezen – PhD student**

Department of General Practice

[REDACTED]

[REDACTED]

#### **This information sheet is for you to keep**

You are invited to take part in this research project conducted in the Department of General Practice at Monash University, funded by the National Health and Medical Research Council of Australia (NHMRC). Please read this Explanatory Statement in full before deciding whether or not to participate in this research. If you would like further information regarding any aspect of this project, you are encouraged to contact the researchers via the phone numbers or email addresses listed above.

#### **What does the research involve?**

The aim of this study is to understand parents and carers' perspectives on the prevention and management of respiratory tract infections (RTIs) in young children. The research involves completing a questionnaire on your knowledge of respiratory tract infection in young children (10 minutes) and participating in an audio-recorded focus group discussion (up to 90 minutes).

#### **Why were you chosen for this research?**

We are sending you this Explanatory Statement because you have responded to the study advertisement. If you are over 18 years of age, have one or more children under the age of 5, speak English without a translator, and live in the Dandenong, Casey and/or Cardinia area, we would like to invite you to participate in a focus group.

#### **Consenting to participate in the project and withdrawing from the research**

You will be asked to sign a consent form before participating in the focus group discussion. You are free to withdraw from the focus group and further participation at any stage during the focus group. However, data cannot be identified after the completion of the focus group, therefore your data will not be able to be withdrawn after this time. The focus group is totally voluntary, all data will be de-identified (i.e., you will not be identified in any way).

#### **Possible benefits and risks to participants**

We do not perceive any risks to you being in this study. However, there may be discomfort associated with group dynamics or individual participants, their opinions or their disclosures, which are not foreseeable.

There are no direct benefits to participating in this study. We hope to use the data from this study to design an intervention program to potentially change hand hygiene behaviour and reduce respiratory infections in the population.

**Payment**

You will be provided with a \$40 Coles Myer gift voucher at the completion of the focus group for your time.

**Confidentiality**

All transcripts will be de-identified to maintain confidentiality. Any information which is released by you which could lead to your identification or that of another person will also be removed. Participation in a focus group (of approximately 8 people or more) means that absolute confidentiality is not guaranteed, although the researchers will not use any information which would lead to direct identification of participants.

**Storage of data**

Data collected will be stored in accordance with Monash University regulations and kept on University premises, in a locked filing cabinet for 5 years. Only the researchers in this study will have access to the data.

**Use of data for other purposes**

The aggregated de-identified data may be used for purposes other than this study where ethics approval has been granted and you will not be named or identified in any way.

**Results**

You may obtain a copy of the plain language report of the study outcomes at the end of the project by emailing Ruby Biezen [REDACTED]

**Complaints**

Should you have any concerns or complaints about the conduct of the project, you are welcome to contact the

Executive Officer, Monash University Human Research Ethics (MUHREC):

Executive Officer

Monash University Human Research Ethics Committee (MUHREC)

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Alternatively, you can contact Parentline Victoria, a parent counselling service provided by the Department of Education and Early Childhood Development, should you feel the need for advice on this research topic.

[REDACTED]

<http://www.education.vic.gov.au/about/contact/Pages/parentline.aspx>

Thank you,

[REDACTED]

Dr Bianca Brijnath  
Research Fellow  
Department of General Practice

## Appendix 5: Consent Form

### 5.1 Consent Form – General practitioners, practice nurses, maternal child health nurses and pharmacists



MONASH University

**Project: Knowledge, attitude and practice of primary care providers in reducing respiratory tract infections in young children**

**Chief Investigator: Bianca Brijnath**

I have been asked to take part in the Monash University research project specified above. I have read and understood the Explanatory Statement and I hereby consent to participate in this project.

I consent to the following:	Yes	No
I agree to be involved in an interview	<input type="checkbox"/>	<input type="checkbox"/>
I agree to allow the interview to be audio-taped	<input type="checkbox"/>	<input type="checkbox"/>

**and**

I understand that my participation is voluntary, that I can choose not to participate in part or all of the project, and that I can withdraw at any stage of the study without being penalised or disadvantaged in any way

**and**

I understand that any information I provide is confidential, and that no information that could lead to the identification of any individual will be disclosed in any reports on the project, or to any other party

**and**

I understand that data from the interview will be kept in a secure storage and accessible only to the research team. I also understand that the data will be destroyed after a 5 year period unless I consent to it being used in future research.

Name of Participant \_\_\_\_\_

Participant Signature \_\_\_\_\_ Date \_\_\_\_\_

## 5.2 Consent Form – Parents and carers



# MONASH University

### CONSENT FORM

**Project: Knowledge, attitude and practice of parents and carers in reducing respiratory tract infections in young children**

**Chief Investigator: Bianca Brijnath**

I have been asked to take part in the Monash University research project specified above. I have read and understood the Explanatory Statement and I hereby consent to participate in this project.

I consent to the following:	Yes	No
I agree to be involved in a focus group	<input type="checkbox"/>	<input type="checkbox"/>
I agree to allow the focus group to be audio-taped	<input type="checkbox"/>	<input type="checkbox"/>

**and**

I understand that my participation is voluntary, that I can choose not to participate in part or all of the project, and that I can withdraw at any stage, up until the completion of the focus group, without being penalised or disadvantaged in any way

**and**

I understand that any information I provide is confidential, and that no information that could lead to the identification of any individual will be disclosed in any reports on the project, or to any other party

**and**

I understand that data from the interview will be kept in a secure storage and accessible only to the research team. I also understand that the data will be destroyed after a 5 year period unless I consent to it being used in future research.

Name of Participant \_\_\_\_\_

Participant Signature \_\_\_\_\_ Date \_\_\_\_\_



## Appendix 6: Primary Care Providers Interview Schedule

### 6.1 Interview schedule – General practitioners



MONASH University

Primary Care Providers Interview Schedule – **General Practitioners:**

**Project: Knowledge, attitude and practice of primary care providers in reducing respiratory tract infections in young children**

#### Demographic information:

1. **Gender:** ☐ Male ☐ Female
2. **Age (years)** ☐ 25-30 ☐ 31-40 ☐ 41- 50 ☐ 51- 60 ☐ 61- 70 ☐ 71+
3. **Number of years worked as a GP:** .....
4. **Your current work fraction**  
☐ Full time (*Six or more sessions per week*)  
☐ Part time (*Between one and five sessions per week*)
5. **The type of practice you work in**  
☐ Solo  
☐ Group  
☐ Other (*Please describe*) .....
6. **Does your practice:**  
☐ Bulk bill  
☐ Private  
Other (*Please describe*) .....
7. **Suburb of your practice** .....
8. **Medicare Local your practice belongs to** .....
9. **Number of GPs in your practice** .....
10. **Number of FTE GPs in your practice** .....
11. **Number of PNs in your practice** .....
12. **Number of FTE PNs in your practice** .....
13. **FRACGP qualification**  
☐ Yes  
☐ No
14. **Other medical qualifications**  
☐ Yes (*Please specify*) .....
- ☐ No
15. **Approximately what percentage of your patients are children under the age of 5?**  
..... % of patients

#### 16. What types of preventive health are practiced in the clinic?

Types of preventive health	Clinic (Yes/No)	You (Yes/No)
4yo health check		
Immunisation		
45-49yo health check		
75+ health check		

#### 17. Does your practice recall your patients for health checks?

- ☐ Yes  
☐ No

## Interview Questions:

### Diagnosis:

1. How often do you see children with colds?
2. What are the usual symptoms?
3. How do you diagnose the infection?

### Management:

4. How do you manage children's cold symptoms?
5. What do you recommend to the parents/carers?
6. Can you tell me the process of prescribing antibiotics for respiratory tract infections in this age group?

#### Prompts:

- Recommend over the counter medications, type of over the counter medications recommended
  - Under what circumstances is antibiotics prescribed?
  - Referring patients to specialists
7. Are you guided by parents (re. antibiotics)?

#### Prompts:

- In terms of counselling

### Prevention strategies:

8. What do you see as good prevention strategies to reduce respiratory tract infections?
9. What advice would you give to parents on prevention strategies with respiratory tract infections?

### Influenza vaccination:

10. Do you or your practice promote influenza vaccination? Why or why not?
11. It is recommended that children in the high risk groups are given influenza vaccination:
  - a) What are your thoughts on this?
  - b) Do you give children in the high risk group influenza vaccination? How often in the last two years? Is that pro-active (ie. calling parents of children in the high risk group) or only when you see the patient?)
  - c) If the parent refuses the vaccination in the high risk group, how do you deal with this?
  - d) What are your thoughts on recommending influenza vaccination to all children under the age of 5?
  - e) If the parent insists on the vaccination and you don't agree with it, what do you do?

### Hand hygiene:

12. What is your understanding of the meaning of hand hygiene?
  - a) What do you think of the role of hand hygiene in preventing RTIs?
  - b) What role does your practice or you play in promoting hand hygiene?
  - c) How do you apply this in your consultation?
  - d) How do you apply this knowledge to your practice? Patients?
  - e) Do you see the need to wash your hands between each patient? Even if you don't make any skin contact with them?
    - i) If so, do you wash your hands between each patient?
    - ii) If not, how often do you wash your hands?
  - f) Are there any barriers to hand washing? If so, what are they?
  - g) What types of interventions do you think will help you sustain good hand hygiene behaviour? I.e. patient pressure, peer pressure, education, posters
  - h) Do you mention hand hygiene as a prevention measure to reducing respiratory infections to parents?
  - i) What types of interventions do you think will help parents (and children) sustain good hand hygiene behaviour?

**Education:**

13. Do you think it is worthwhile having an education program for parents on antibiotics? How would you like to see it implemented?
14. Do you see a need for an education program for GPs and practices on antibiotics? How would you like to see it implemented?
15. What type of education session would you like to see prevention strategies for:
  - a. GPs and practices (including practice nurses)
  - b. Patients and parents and carers
16. Is there anything you would like to ask me about this interview or project?
17. Is there anything you would like to comment on about this interview or project?

## 6.2 Interview schedule – Practice nurses



**MONASH** University

### Primary Care Providers Interview Schedule – Practice Nurses:

**Project: Knowledge, attitude and practice of primary care providers in reducing respiratory tract infections in young children**

#### Demographic information:

1. **Gender:** ☐ Male ☐ Female
2. **Age (years):** ☐ 25-30 ☐ 31-40 ☐ 41- 50 ☐ 51- 60 ☐ 61- 70 ☐ 71+
3. **Number of years worked as a Practice Nurse:** .....
4. **Your current work fraction**  
☐ Full time (*Six or more sessions per week*)  
☐ Part time (*Between one and five sessions per week*)
5. **The type of practice you work in**  
☐ Solo  
☐ Group  
☐ Other (*Please describe*) .....
6. **Does your practice:**  
☐ Bulk bill  
☐ Private  
Other (*Please describe*) .....
7. **Suburb of your practice** .....
8. **Medicare Local your practice belongs to** .....
9. **Number of GPs in your practice** .....
10. **Number of FTE GPs in your practice** .....
11. **Number of PNs in your practice** .....
12. **Number of FTE PNs in your practice** .....
13. **Type of qualification(s)** .....
14. **Type of membership(s)** .....
15. **Approximately what percentage of your patients are children under the age of 5?**  
..... % of patients

#### 16. What types of preventive health are practiced in the clinic?

Types of preventive health	Clinic (Yes/No)	You (Yes/No)
4yo health check		
Immunisation		
45-49yo health check		
65+ health check		

#### 17. Does your practice recall patients for health checks?

- ☐ Yes  
☐ No

## Interview Questions: Practice Nurses

### Diagnosis:

1. How often do you see children with colds?
2. What are the usual symptoms?

### Management:

3. What advice do you give parents/carer regarding managing children's cold symptoms?
4. What do you think of over the counter medications for the treatment of cold symptoms for children?

### Prevention strategies:

5. What do you see as good prevention strategies to reduce respiratory tract infections?
6. What advice would you give to parents on prevention strategies with respiratory tract infections?

### Influenza vaccination:

7. Do you or your practice promote influenza vaccination? Why or why not?
8. It is recommended that children in the high risk groups are given influenza vaccination:
  - a) What are your thoughts on this?
  - b) Do you give children in the high risk group influenza vaccination? How often in the last two years? Is that pro-active (ie. calling parents of children in the high risk group) or only when you see the patient?
  - c) If the parent refuses the vaccination in the high risk group, how do you deal with this?
  - d) What are your thoughts on recommending influenza vaccination to all children under the age of 5?
  - e) If the parent insists on the vaccination and you don't agree with it, what do you do?

### Hand hygiene:

9. What is your understanding of the meaning of hand hygiene?
  - a) What do you think of the role of hand hygiene?
  - b) What role does your practice or you play in promoting hand hygiene?
  - c) How do you apply this knowledge to your practice? Patients?
  - d) Do you see the need to wash your hands between each patient? Even if you don't make any skin contact with them?
    - i) If so, do you wash your hands between each patient?
    - ii) If not, how often do you wash your hands?
  - e) Are there any barriers to hand washing? If so, what are they?
  - f) What types of interventions do you think will help you sustain good hand hygiene behaviour? Ie. patient pressure, peer pressure, education, posters
  - g) Do you mention hand hygiene as a prevention measure to reducing respiratory infections to parents?
  - h) What types of interventions do you think will help parents (and children) sustain good hand hygiene behaviour?

### Education:

10. Do you think it is worthwhile having an education program for parents on antibiotics? How would you like to see it implemented?
11. Do you see a need for an education program for GPs and practices on antibiotics? How would you like to see it implemented?
12. What type of education session would you like to see prevention strategies for:
  - a. GPs and practices (including practice nurses)
  - b. Patients and parents and carers
13. Is there anything you would like to ask me about this interview or project?
14. Is there anything you would like to comment on about this interview or project?

### 6.3 Interview schedule – Maternal child health nurses



**MONASH** University

#### Primary Care Providers Interview Schedule – **Maternal Child Health Nurses:**

**Project: Knowledge, attitude and practice of primary care providers in reducing respiratory tract infections in young children**

#### Demographic information:

1. **Gender:** ☐ Male ☐ Female
2. **Age (years):** ☐ 25-30 ☐ 31-40 ☐ 41- 50 ☐ 51- 60 ☐ 61- 70 ☐ 71+
3. **Number of years worked as a Maternal Child Health Nurse:** .....
4. **Your current work fraction**  
☐ Full time  
☐ Part time .....days per week
5. **Suburb of your practice** .....
6. **Number of MCHN in your practice** .....
7. **Number of FTE MCHN in your practice** .....
8. **Type of qualification(s)** .....
9. **Type of membership(s)** .....
10. **Approximately what percentage of your patients are children under the age of 5?**  
..... % of patients
11. **What types of preventive health do you encourage?**

Types of preventive health	Clinic (Yes/No)	You (Yes/No)
4yo health check		
Immunisation		

12. **Does your practice recall patients for health checks?**

☐ Yes  
☐ No

## Interview Questions:

### Diagnosis:

1. How often do you see children with colds coming in for their regular appointments?
2. What are the usual symptoms?

### Management:

3. What advice do you give parents/carer regarding managing children's cold symptoms?
4. What do you think of over the counter medications for the treatment of cold symptoms for children?
5. How useful do you think antibiotics are for the treatment of common colds in children?

### Prevention strategies:

6. What do you see as good prevention strategies to reduce respiratory tract infections?
7. What advice would you give to parents on prevention strategies with respiratory tract infections?

### Influenza vaccination:

8. It is recommended that children in the high risk groups are given influenza vaccination:
  - a) What are your thoughts on this?
  - b) Do you advise parents with children in the high risk group to receive influenza vaccination? How often in the last two years?
  - c) If the parent refuses the vaccination in the high risk group, what would be your advice to them?
  - d) What are your thoughts on recommending influenza vaccination to all children under the age of 5?
  - e) If the parent insists on the vaccination and you don't agree with it, what do you do?

### Hand hygiene:

9. What is your understanding of the meaning of hand hygiene?
  - a) What do you think of the role of hand hygiene?
  - b) What role do you play in promoting hand hygiene?
  - c) How do you apply this knowledge to parents/children?
  - d) Do you see the need to wash your hands between each child? Even if you don't make any skin contact with them?
    - i) If so, do you wash your hands between each child?
    - ii) If not, how often do you wash your hands?
  - e) Are there any barriers to hand washing? If so, what are they?
  - f) What types of interventions do you think will help you sustain good hand hygiene behaviour? I.e. patient pressure, peer pressure, education, posters
  - g) Do you mention hand hygiene as a prevention measure to reducing respiratory infections to parents?
  - h) What types of interventions do you think will help parents (and children) sustain good hand hygiene behaviour?

### Education:

10. Do you think it is worthwhile having an education program for parents on antibiotics? How would you like to see it implemented?
11. What type of education session would you like to see provided for parents and carers on respiratory infection prevention strategies?
12. Is there anything you would like to ask me about this interview or project?
13. Is there anything you would like to comment on about this interview or project?

## 6.4 Interview schedule – Pharmacists



**MONASH** University

Primary Care Providers Interview Schedule – **Pharmacists:**

**Project: Knowledge, attitude and practice of primary care providers in reducing respiratory tract infections in young children**

### Demographic information:

1. **Gender:** ☐ Male ☐ Female
2. **Age (years):** ☐ 25-30 ☐ 31-40 ☐ 41- 50 ☐ 51- 60 ☐ 61- 70 ☐ 71+
3. **Number of years worked as a Pharmacist:** .....
4. **Your current work fraction**  
☐ Full time  
☐ Part time .....*days per week*
5. **Suburb of your pharmacy:** .....
6. **Number of pharmacists in your pharmacy:** .....
7. **Number of FTE pharmacists in your pharmacy:** .....
8. **Type of qualification(s):** .....
9. **Type of membership(s):** .....
10. **Approximately what percentage of your patients are children under the age of 5?**  
..... % of patients
11. **What types of preventive health do you encourage?**

Types of preventive health	Clinic (Yes/No)	You (Yes/No)
4yo health check		
Immunisation		



## Interview Questions:

### Diagnosis:

1. How often do you see children with colds, or parents asking advice regarding children with colds?
2. What are the usual symptoms?

### Management:

3. What advice do you give parents/carer regarding managing children's cold symptoms?
4. What do you think of over the counter medications for the treatment of cold symptoms for children?
5. How useful do you think antibiotics are for the treatment of common colds in children?
6. How often do you dispense antibiotics for children under the age of 5? For respiratory infections?
7. Do you think that antibiotics are generally over-prescribed in this cohort?

### Prevention strategies:

8. What do you see as good prevention strategies to reduce respiratory tract infections?
9. What advice would you give to parents on prevention strategies with respiratory tract infections?

### Influenza vaccination:

10. It is recommended that children in the high risk groups are given influenza vaccination:
  - a) What are your thoughts on this?
  - b) Do you advise parents with children in the high risk group to receive influenza vaccination? How often in the last two years?
  - c) If the parent refuses the vaccination in the high risk group, what would be your advice to them?
  - d) What are your thoughts on recommending influenza vaccination to all children under the age of 5?
  - e) If the parent insists on the vaccination and you don't agree with it, what do you do?

### Hand hygiene:

11. What is your understanding of the meaning of hand hygiene?
  - a) What do you think of the role of hand hygiene?
  - b) What role do you play in promoting hand hygiene?
  - c) How do you apply this knowledge to parents/children?
  - d) Are there any barriers to hand washing? If so, what are they?
  - e) What types of interventions do you think will help you sustain good hand hygiene behaviour? I.e. patient pressure, peer pressure, education, posters
  - f) Do you mention hand hygiene as a prevention measure to reducing respiratory infections to parents?
  - g) What types of interventions do you think will help parents (and children) to sustain good hand hygiene behaviour?

### Education:

12. Do you think it is worthwhile having an education program for parents on antibiotics? How would you like to see it implemented?
13. What type of education session would you like to see provided for parents and carers on respiratory infection prevention strategies?
14. Is there anything you would like to ask me about this interview or project?
15. Is there anything you would like to comment on about this interview or project?

## Appendix 7: Parents and Carers Questionnaire



### Knowledge, attitude and practice of parents and carers in the prevention and management of respiratory tract infections in young children

#### Demographic Information:

1. Gender: ☐ Male ☐ Female
2. Age (years): ☐ 18-20 ☐ 21-30 ☐ 31-40 ☐ 41- 50 ☐ 51- 60 ☐ 61+
3. Number of person in household .....
4. Number of children in household .....
5. Age of children .....
6. Care of child(ren) under the age of 5 (please tick as many as appropriate):
  - ☐ Childcare Days per week .....
  - ☐ Kinder Days per week .....
  - ☐ Homecare Days per week .....
  - ☐ Care with other children (that are not yours) Days per week .....
  - ☐ Other (please specify): ..... Days per week .....
7. Other activities (please tick as many as appropriate):
  - ☐ Swimming Days per week .....
  - ☐ Mother's group Days per week .....
  - ☐ Gymbaroo Days per week .....
  - ☐ Mini Maestro Days per week .....
  - ☐ Other (please specify): ..... Days per week .....
8. How often does your child (or children) have colds on average? .....
9. When you take your child with a respiratory tract infection to the doctor, what do you expect from the doctor?  
.....  
.....  
.....
10. Do you work in a paid job?
  - ☐ Yes ☐ No

11. If yes, what is your profession? .....

Do you work:

- ☐ Full time
- ☐ Part time      Days per week .....
- ☐ Casual
- ☐ Other (*Please describe*) .....

12. What is your household net income per week?

- ☐ Less than \$300      ☐ \$300 - \$600      ☐ \$600 - \$900
- ☐ \$900 - \$1500      ☐ More than \$1500

13. What is your highest qualification? (ie. Year 12, trade certificate, university degree)

.....

14. Where did you learn of this study?

- ☐ Childcare centre
- ☐ Kinder
- ☐ Local shopping centre
- ☐ Local library
- ☐ Medical clinic
- ☐ Maternal child health centre
- ☐ Other (please specify): .....

**Knowledge, attitude and practice of respiratory tract infections (Questions reproduced from Belongia 2002, Mangione-Smith 2001):**

1. Most cough, cold and flu illnesses are caused by:

- ☐ Bacteria                      ☐ Virus

2. Antibiotics are needed for:

- ☐ Bronchitis
- ☐ Runny nose with green mucus
- ☐ Runny nose with yellow mucus
- ☐ Cough, cold and flu symptoms
- ☐ Middle ear infection

3. Antibiotics are needed for :

- ☐ Bacterial infections                      ☐ Viral infections

**Please tick only one box for each statement:**

	<b>Statements</b>	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
<b>1.</b>	I will always want antibiotics for my child's cough, cold or flu symptoms					
<b>2.</b>	My child will be sick for a longer period if he/she does not receive an antibiotic for cough, cold or flu symptoms					
<b>3.</b>	I generally know if my child needs an antibiotic before seeing the doctor for cough, cold or flu symptoms					
<b>4.</b>	I will go to another doctor if my doctor does not prescribe antibiotics for my child for cough, cold or flu symptoms					
<b>5.</b>	I usually go to the doctors if my child has been unwell with cough, cold or flu symptoms for longer than 3 days					
<b>6.</b>	I am more satisfied with the doctor visit if I am prescribed antibiotics for my child with cough, cold or flu symptoms					
<b>7.</b>	I am always guided by what my doctor recommends for my child with cough, cold or flu symptoms					
<b>8.</b>	I always have to initiate the discussion of antibiotics before my doctor would be willing to prescribe antibiotics for my sick child with cough, cold or flu symptoms					
<b>9.</b>	I usually know what I want out of the doctor's appointment before I go					
<b>10.</b>	I will take my child to see a doctor if he/she has a high temperature (over 40°C)					
<b>11.</b>	I will take my child to see a doctor if he/she has a temperature (37 °C - 40°C)					

**Please tick only one box for each answer:**

<b>I get my advice from:</b>	Never	Rarely	Sometimes	Very Often	Always
My doctor					
Previous experience					
Next door neighbour					
My mother/relative					
Internet					

## **Appendix 8: Parents and Carers Focus Group Schedule**

### **Knowledge, attitude and practice of parents and carers in the prevention and management of respiratory tract infections in young children**

#### **Diagnosis:**

1. What do you do when a child has a cold?

Prompts:

- Symptoms
- Where to go for advice (internet, GPs, friends/relatives)
- When it is necessary to see a GP (high fever, earache, complaint for 24 hours etc, experiences (first child vs second and subsequent child; sickly child, or prem babies; parents education level; how they were brought up as a child themselves)

2. What constitutes as a high fever? At what temperature would you consult your GP?

#### **Management:**

3. How would you manage a child's cold symptoms?

Prompts:

- Over the counter medications
- Antibiotics

4. What do GPs recommend? Would you consider asking for medications?

Prompts:

- Over the counter medications
- Antibiotics

#### **Prevention strategies:**

5. What are good prevention strategies to prevent respiratory tract infection?

#### **Influenza vaccination:**

6. How does the group feel about influenza vaccination?

Prompts:

- For parents and child
- Decision to vaccinate or not

7. Where would you go for information regarding vaccination (influenza and general)?

#### **Hand hygiene:**

8. How important is hand washing?

Prompts:

- In RTIs

9. How can we promote hand hygiene at home?

Prompts:

- Reminder to wash hands
- Barriers or concerns regarding hand washing
- Interventions to sustain good hand hygiene behaviour (education, at childcare? Preschool)

**Education:**

10. Do you think it is worthwhile having an education program for parents on antibiotics? Do you think it is possible?
11. What type of education session would you like to see on prevention strategies?
12. Is there anything you would like to ask me about this interview or project?
13. Is there anything you would like to comment on about this interview or project?