

Parents' awareness of antimicrobial resistance: a qualitative study utilising the Health Belief Model in Perth, Western Australia

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Antibiotics are commonly prescribed to children during illness, making them one of the largest groups of antibiotics consumers.¹⁻³ Globally, there were about 17.7 billion standard units of child-appropriate oral antibiotic formulation, which represented about one-quarter of total antibiotics, sold in 74 countries in 2015.⁴ In 2013, more than half (53%) of Australian children received single antibiotic dispensing, with the majority of these children showing no signs of comorbid illness.⁵ In 2019, the Australian Report on Antimicrobial Use and Resistance (AURA) reported that about 40% of Australians received at least one antibiotic dispensed in the community.⁶ Among the paediatric population, AURA reported that 57% of children aged four years old or younger had received at least one antibiotic in 2016.⁷ A number of studies reported that antibiotics are often prescribed inappropriately for self-limiting viral illnesses such as acute respiratory infections (ARI) in children, which contributes to the spread of antimicrobial resistance (AMR).^{8,9} Parents, as the main decision-makers for their children's healthcare, are an important group to be targeted in promoting responsible antibiotic use and thus preventing AMR. Understanding parental attitudes and exploring their decisions on antibiotic use play a vital role in informing interventions that aim to encourage its responsible use among children.¹⁰ Several campaigns to improve parental awareness regarding AMR and the judicious use of antibiotics

Abstract

Objective: This study aimed to determine local factors that promote or prevent parents' responsible use of antibiotics for their children in Perth, Western Australia.

Methods: The Health Belief Model was used to guide this study. Four focus group discussions were conducted, with 26 participants. Participants were recruited purposively through a parent group organisation. The Framework Method was utilised to analyse the data.

Results: Participants agreed that antimicrobial resistance (AMR) is a serious health problem. However, participants admitted that they lacked awareness of AMR, inhibiting their ability to assess the risks of developing AMR infections among their children. Participants knew the indications and risks of antibiotic use but still viewed antibiotics as a time-saving solution that minimised disruption to their routine. Participants' previous experiences in managing their children's illness increased their confidence and linked their positive and negative experiences with their general practitioners in their judicious use of antibiotics.

Conclusions: While parents demonstrated awareness of the indications of antibiotics, they continue to lack AMR awareness and overvalue antibiotics.

Implications for public health: The findings highlight that incorporating parent empowerment and participation in decision-making regarding antibiotics use, and maintaining a positive relationship with healthcare providers, were important strategies to encourage the appropriate use of antibiotics.

Key words: antimicrobial resistance awareness, parents and children, antibiotics use, qualitative study, health belief model

have been conducted; however, results of a systematic review identified that parents still lack knowledge regarding the proper use of antibiotics.^{11,12} For instance, a nationwide study revealed that one-third of Australian parents would consult another doctor if they believed that their children needed an antibiotic, despite their initial doctor not prescribing one.¹³ Therefore, education is needed to ensure that parents are making informed and appropriate decisions.

To our knowledge, a study to assess parents' practices regarding antibiotics and AMR awareness has not been conducted in Perth, Western Australia (WA). In 2020, there were approximately 610,000 children aged 0–17 years in Western Australia, with 75% of these children living in the metropolitan area.¹⁴ While most of the children (87.6%) in Western Australia were reported to have very good or excellent health, the incidence of ARIs in Western Australia is higher compared with other high-income countries.^{15,16} From

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2002 to 2012, ARIs accounted for 26% of emergency department presentations in Western Australia. Moreover, children from low socioeconomic backgrounds in Western Australia have a higher incidence of hospitalisation due to ARIs compared with children from higher socioeconomic backgrounds.¹⁵ This highlights the need to explore Western Australian parents' knowledge in managing their children's acute respiratory illness, which often leads to inappropriate antibiotic prescriptions. In this regard, our study aimed to determine local factors that promote or prevent parents' responsible use of antibiotics for their children among parents in Perth, Western Australia using the Health Belief Model (HBM). HBM is a framework that is extensively used to understand changes and maintenance of health-related behaviours. It also serves as a guide in designing targeted interventions.¹⁷ The HBM proposes that an individual's belief in a personal threat of an illness together with an individual's belief in the effectiveness of the recommended behaviour or action will predict the likelihood of the person adopting the behaviour.¹⁸

Methods

Participants and settings

Participants were recruited through Connecting Community for Kids (CC4K). CC4K is a collective impact initiative dedicated to improving the wellbeing and development of children and families in Western Australia.¹⁹ It has more than 300 member families across four local government areas (LGA) in Perth.¹⁹ For this study, we targeted two LGAs, namely Cockburn and Kwinana. These two LGAs were chosen based on their contrasting Socio-Economic Indexes for Areas (SEIFA) scores. According to the Western Australian State Government, Cockburn has a higher SEIFA score (76) than Greater Perth (61), while Kwinana LGA has a SEIFA score (41) below the mean score of Greater Perth.²⁰ This allowed us to assess similarities and differences in terms of knowledge of antibiotic use and AMR awareness of parents with different socioeconomic backgrounds.

Online invitations containing the nature of the research and the study group's contact details were sent via email to all CC4K members on the contact list. An invitation to participate was also posted on CC4K's official Facebook page with the link to book potential participants' preferred focus group

discussion (FGD) session. We initially planned to conduct three FGDs with a maximum of ten participants for each FGD. During the first three FGDs, a total of 19 participants attended out of the 28 potential participants. Additional invitations for two more FGDs were sent with fifteen potential participants responding. Seven participants attended the fourth FGD wherein data saturation was reached. An additional eight participants who responded were notified of the cancellation of the fifth FGD. Each participant received an AU\$70 gift card to compensate for their time and travel expenses and an AU\$20 petrol allowance.

A qualitative and explorative research design using FGDs was used. Four FGDs were conducted in two community centres in Perth between January and September 2020. The FGDs lasted between 90 and 120 minutes including breaks. The four FGDs were conducted by one of the researchers who also acted as the facilitator.

Instrument

The HBM consists of six main constructs: perceived severity, perceived susceptibility, perceived benefits, perceived barriers, cues to action and self-efficacy – these were used to develop the FGD guide. The HBM constructs and how they were applied in this study are described in Supplementary File 1. Existing literature was used to assess the knowledge and behaviour of parents regarding antibiotic use for their children, antimicrobial awareness and previous antimicrobial awareness campaigns involving parents and children. Prior to the FGDs, demographic data were collected. The FGD guide is available in Supplementary File 2.

Data analysis

The Framework Method was used to analyse the data.²¹ Deductive coding was employed with indexing of themes based on HBM, which allowed the research team to examine the existence of key themes. Each FGD was audio-recorded and transcribed verbatim. The author (AA) who conducted the FGDs listened to audio recordings and read the transcription. The transcription was shared with other authors (MB) and (CL) for familiarisation. Line-by-line coding using NVivo software (version 10, QSR International, Cambridge, MA) was performed by one author (AA). Copies of indexed illustrative quotations were reviewed by two authors and any discrepancies among identified

themes were resolved by discussion amongst the authors.

Ethics approval

This study was approved by Murdoch University, Human Research Ethics Committee, approval number 2019/129.

Results

Description of participants

A total of 26 participants were included in this study. The majority of the participants were female (96%). Most of the participants were aged 35 years and above (65%) and of European Australian descent (65%). Half of the participants (13) were either postgraduate or graduate degree holders, 42% of the participants had completed high school or trade certificate, while two participants had not completed high school (8%), see Table 1.

Thematic analysis based on HBM constructs

Utilising the HBM, this study identified several factors in the community that influence the likelihood of parents engaging in judicious use of antibiotics for their children. Figure 1 summarises the factors that promote and prevent judicious antibiotic use in children in our study. These factors are further discussed within each HBM construct.

Perceived severity

Participants agreed that AMR is a serious public health problem and expressed that AMR could be more serious in the coming years. Their worries stem from the prospect that there will be no effective medicines to treat simple infections in the future.

No more effective antibiotics

You worried that it's going to take you out. If it's a superbug, there's no medicine that helps it, then it could kill you. – P20FGD4

Superbug – it has mutated with other viruses or other bugs and created something that we have no medicine. – P8FGD2

AMR is a future worry

Down the track, give them 20 or 30 years and the overuse of antibiotics. We are facing life-threatening issues with them. – P14FGD3

However, participants perceived that AMR tends to be more serious in vulnerable groups.

Table 1: Demographics of the focus group participants.

Parents and Carers		N = 26 n(%)
Gender		
Women	25	(96%)
Men	1	(4%)
Age range: (in years)		
18–25	0	(0%)
25–30	2	(8%)
31–35	7	(27%)
35–older	17	(65%)
Number of children		
1–2	17	(65%)
3–4	6	(23%)
5 and above	3	(12%)
Ethnicity		
European Australian	17	(65%)
Aboriginal and Torres Strait Island people	3	(12%)
Asian	5	(19%)
African	1	(4%)
Local Government Area		
Cockburn	9	(35%)
Kwinana	17	(65%)
Annual Household Income		
29,000 and below	5	(19%)
30,000 to 50,000	5	(19%)
51,000 to 70,000	3	(12%)
71,000 to < 100,000	7	(27%)
100,000 and above	6	(23%)
Highest qualifications		
High school undergrad	2	(8%)
High school or trade certificate	11	(42%)
Bachelor's degree	7	(27%)
Postgraduate degree	6	(23%)
Employment Status		
Full-time worker	4	(15%)
Part-time worker	9	(35%)
Unemployed	11	(42%)
Self-employed	2	(8%)

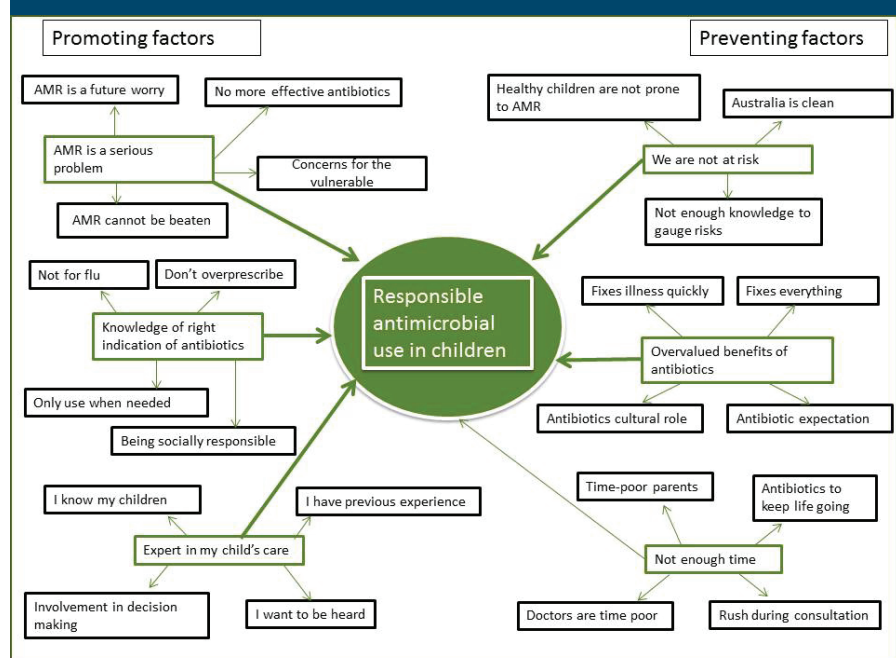
Concerns for the vulnerable

It is a big problem for those in society that have depressed immune systems or the very young and the very old that they're the vulnerable. – P5FGD2

We all know that these serious illnesses tend to be more fatal in the under-fives and the elderly. – P8FG2

Perceived susceptibility

Participants consistently perceived that the likelihood of their children developing antimicrobial-resistant infections was low, commonly citing that their children were “healthy” and not exposed to a lot of antibiotics.

Figure 1: Factors influencing responsible use of antibiotics among parents.

Healthy children are not prone to AMR

I think my child at this stage; I feel he has a fairly robust immune system, so I don't feel that there is a huge risk for him at this time. – P5FGD2

I don't feel that we use antibiotics that much that my kids would be resistant to anything. – P2FGD1

There was a general consensus among participants that they did not have sufficient awareness of AMR to assess the risks of their children developing AMR infections.

Not enough knowledge to gauge risks

I don't have enough information to make an educated opinion on it being, are my children at risk? Are their children's children at risk? – P3FGD1

Moreover, participants perceived Australia as ‘clean’, therefore the occurrence of AMR was likely to be low.

Australia is ‘clean’

You don't get so much in developed countries. You don't get it where it's really clean. – P22FGD4

I suppose, here in Australia, we don't really have the contaminated water or anything, where the bacteria can be. – P12FGD3

Perceived benefits

Participants identified that using antibiotics when ‘needed’ can benefit their children, can prevent their children from developing

antimicrobial-resistant infections, and can preserve the effectiveness of antibiotics.

Knowledge of indications of antibiotics

I would not go to the GP and take antibiotics if she has a normal flu. Because then I think the risk is greater that she actually does develop resistance against antibiotics if I would do that all the time. – P4FGD1

If you don't overprescribe antibiotics and they are used only systematically if it's really, really needed that they're going to be more effective. – P8FGD2

However, the majority of participants acknowledged family benefits when antibiotics were given, as they were a ‘quick fix’ that minimised disruption to their normal routine.

Fixes illness quickly, fixes everything

Whenever I've used them, they will work well quickly. When my kids are being sick, when it's worked really quick, they are going back on their feet. – P21FGD4

When I use [them] antibiotics worked really well and quickly, and, um, fixed any dramas they've had. – P18FDG

Perceived barriers

There was a unanimous acknowledgement among participants that “time” was their greatest barrier in engaging in the judicious use of antibiotics. Parents admitted that they often counted on antibiotics for a quick

resolution of symptoms so they could return to their normal routine.

Time-poor parents

I think the barriers are also that we are very time-poor. So there's a barrier that we want the quick fix. So we might go the antibiotic route just in order to keep life going. – P13FGD3

Because they're [parents] looking for something to work quickly so that life can resume. We are busier now than we ever have been. – P1FGD1

Participants also recognised the role that antibiotics played in Australian culture in the past, where they were prescribed easily, and they perceived that this practice still persists today; hence parents expected antibiotics use whenever their children were ill.

Antibiotics cultural role

I think that antibiotics have a place in our culture. – P7FGD2

A few years ago, it was antibiotics, antibiotics, everything and that was, as a society, we grew up expecting to go to the doctor and get antibiotics. And that expectation still carries on. – P17FGD3

Participants also felt that GPs did not have sufficient time, and due to short consultation times, GPs would simply prescribe them antibiotics. They also perceived that GPs tended to prescribe antibiotics when parents requested them.

Time-poor doctors

And the time of GPs got with us. They just prescribed without explaining any further how and what to use and side effects. So that is the barrier. – P3FGD9

I think my GP was probably in a rush which I understand. I notice it now why am I getting all these scripts (antibiotics) for my son. – P6FGD2

Perceived self-efficacy

Participants also asserted their role as the leader and decision-maker for their children's health, as 'knowing their children' also led to increased awareness on when they thought it was appropriate to give antibiotics or not to use antibiotics at all.

Expert in my child care

I know my child and when she's feeling really, really bad. I want to have at least one second opinion, maybe even more. – P4FGD1

I know my daughter. I know if she's going to get worse, then I'll start it, but I can tell if she's getting better or not going to give her something if she's going to get better by herself. – P14FGD3

However, when it comes to their self-efficacy in controlling AMR, participants felt that they could do anything to help control the spread of antimicrobial resistance.

AMR cannot be beaten

Can't be treated. – P10FGD3

The one we can't beat. – P14FGD3

Cues to action

Participants who were involved in decisions on how to manage their children's illness by their GPs facilitated responsible use of antibiotics.

Involvement in decision-making

He's [GP] giving us more the decision. He does advise to just wait another day or two and if she doesn't get better, then to start it. – P3FGD1

I guess they always do say to me, he'll always say, "We could go down this course, we could give her this, this, and this?" – P1FGD1

Participants' positive experiences were linked to the actual time being spent by their GPs to examine the child and explain the illness. Participants felt that GPs who prescribed antibiotics easily were being dismissive.

I want to be heard

Our doctor takes time to answer back. Also answering the questions, breaking it down and also when my child is sitting next to me. – P9FGD3

If I didn't think they needed it (antibiotics), I'd be like, okay, you've just, you've just prescribed it to get rid of me. You're not taking what I'm saying seriously, especially because it's hard, not everything is an antibiotic thing. – P20FGD4

Participants also deliberated the long-term impact of antibiotics being given inappropriately and the potential consequences in the larger community.

Being socially responsible

I don't like the thought of it [antibiotics] being given out just willy nilly because I know the impact that it has on the wider scope of things. – P11FGD3

I worry about the long-term impact of the resistance and that some doctors just hand it to you as an easy fix. – P13FGD3

Discussion

Our findings suggest that parents perceived AMR as a serious threat to public health, but they did not perceive their children to be potentially vulnerable to antimicrobial-resistant infections. The discordant view between the perceived severity and perceived susceptibility to AMR has been documented in studies in Sweden and France.^{22,23} In our study, this might be due to participants stating that their children are generally healthy and have not used a lot of antibiotics in the past. This reaffirms the results of a study in the UK where parents consider their children to be at minimal risk of developing AMR infections because their families were 'low users' of antibiotics.²⁴

Another reason for this discrepancy might be the participants' lack of awareness of the risks of AMR infections. Participants in our study admitted that they have inadequate knowledge of AMR; therefore, they were unable to measure their children's risks of developing antibiotic-resistant infections and showed little concern regarding AMR. Poor understanding of AMR has been documented in other Australian studies.^{25,26} This might also explain the lower levels of perceived susceptibility to AMR by Australians in general. Another factor may be due to the view that Australia is a 'clean country' and does not have prevalent resistant organisms. These perceptions are contrary to research that reported Australia to have a large reservoir of AMR, both within the country and in its neighbouring countries.²⁷ This suggests that AMR awareness campaigns should include the current AMR situation in Australia and its risks to individuals.

In our study, the findings showed that participants showed little concern for their children's current risk of having an antimicrobial-resistant infection but reported anxiety over not having an effective antibiotic pipeline to treat diseases in the future. Langford et al. argued that the public holds an 'unrealistic optimism', where AMR is often seen as a distant issue for future generations and would not individually impact themselves or their family.²⁸ Our participants also prioritised their children's quick recovery over future concerns of AMR. According to Spicer et al., this future concern about AMR is immediately superseded by present concerns of recovery from an illness.²⁹ Moreover, when parents are confronted with caring for an unwell child, along with their

emotional attachment, their future concerns are easily overridden whether on the long-term impact of antibiotics or on developing AMR infections.³⁰ Previous studies have also demonstrated parents' lack of awareness of the future side effects of antibiotics in a child's microbiome and the development of antibiotic-resistant infections in the future.²⁴ In effect, due to the lack of awareness of the side effects of antibiotics and the possibility of developing AMR infections in the future, parents are still opting for antibiotics even if they may not be medically warranted.^{24,31} According to the Wellcome Trust, an organisation that aims to optimise science's potential to improve public health, an AMR awareness campaign could be more effective if it increases the sense of personal relevance of AMR risk and responsibly emphasises both its current and future risk.³² Campaign messages highlighting that children can also be affected by AMR might be effective in future campaigns.³² However, it is also important that campaign messages are sensible enough to not provoke fearful responses that may stop parents from giving antibiotics to their children when medically needed.

Our findings suggest that participants demonstrated awareness that antibiotics are not effective against 'flu' or viruses, and they 'only use them when needed'. Yet, participants still resort to antibiotics to treat their children especially when they are time-pressured. A review found evidence of cognitive dissonance among individuals regarding AMR, where individuals have a high level of AMR awareness and judicious use of antibiotics, yet they are unable to associate these with personal implications of AMR.³³ Meanwhile in the US, a study found that parents were more informed and sophisticated when it came to antibiotic use for their children.³⁴ The overestimation of the benefits of antibiotics and their perceived ability to shorten the illness continues to persist among parents in this study. This finding is in line with the results of a previous study citing that Australian parents believed that antibiotics can shorten illness duration by five to ten times and also reduce the likelihood of complications.³⁵ However, an Australian study found that patients receiving antibiotics for upper respiratory tract infections (URTIs) reported the same symptom severity and recovery period as those not receiving antibiotics.³⁶ Spicer et al. suggested that including numerical data on the specific risks

and benefits of antibiotic treatment in public health campaigns might be useful to address this cognitive dissonance and promote the responsible use of antibiotics.²⁹

Time is considered a health resource; in Australia, more than two-thirds of women felt rushed, too busy and time-pressured.³⁷ The experience of time pressure for parents could result in limited opportunities to access health services and engage in healthy behaviour for themselves and their children.³⁸ In our study, being restrained by time was considered the most significant barrier to engaging in the judicious use of antibiotics. Most of the participants were also involved in paid employment, thus wanting to resolve their child's illness urgently and return to work. A study found that parents with improved access to parental sick leave increased parents' and children's access to healthcare services, engagement in preventative behaviours such as influenza vaccination and decreased visits to hospital emergency departments.³⁹ Further research is needed to investigate if improving parental sick leave policies and conditions reduces the inappropriate use of antibiotics for children.²²

A key finding of this study was the participants' views that GPs do not have enough time to examine their children thoroughly, leading to the prescription of antibiotics without sufficient explanation of their indications and side effects. Our participants cited that antibiotics were prescribed easily when they consulted 'bulk-bill' practices. Moreover, a participant also viewed that some practices also included giving in to patients' requests for antibiotics if they persistently asked for them. According to Biezen et al., GPs in Melbourne cited their lack of consultation time as a huge barrier to being able to effectively communicate and educate parents on the appropriate use of antibiotics for URTIs.⁴⁰ Moreover, GPs were more likely to prescribe antibiotics and less likely to educate patients when they were running behind, or when consultations were made during the late afternoon or on weekends.⁴⁰ Increasing consultation time might improve communication between parents and their GPs and result in decreased antibiotic prescriptions.

A study on GPs in Melbourne cited the possibility of patients leaving their services if they did not prescribe antibiotics.⁴⁰ Our findings contradict this notion. Participants in our study remained satisfied with their GPs after consultations even without an antibiotic

prescription, provided that their children were examined thoroughly. Furthermore, participants expressed that they would leave their GPs if they prescribed antibiotics easily. In our study, prescribing antibiotics easily might represent an invalidation of parents' expertise and experience in their children's care. Our participants considered themselves as 'experts' in their children's care and they have an increased awareness of the appropriate use of antibiotics. Participants in this study remarked that they knew their children and they knew when they need antibiotics, thus they stressed the need to be involved in decision-making as to whether antibiotics were necessary. Improving parental communication during consultations can therefore be added to future AMR awareness interventions.

Patient empowerment is recognised as a core ingredient of high-quality patient-centred care.⁴¹ Patient empowerment has been associated with positive health outcomes such as medication adherence, compliance in the management of chronic disease, increased health-related quality of life, and self-efficacy.^{42,43} Wu et al. cited that restoring consumers' decision-making authority and providing choices from a variety of options empowered consumers and significantly increased self-efficacy, service utilisation and engagement.⁴⁴ Our study findings suggest that this also holds true for the responsible use of antibiotics for children.

Strengths and limitations

Given the aims of our study, participants were purposefully recruited from LGAs in Perth. The two local governments represented advantage and disadvantage indices that were higher and lower than Western Australia's average and represented varied socioeconomic demographics.²⁰ Having participants from these two LGAs provided insights about differences and similarities regarding antibiotic use in children and AMR awareness from communities with higher and lower socioeconomic backgrounds. While there are overlapping themes between these two communities, caution when interpreting the results is warranted as this may not represent the views of average Western Australians. As a limitation of this study, the FGDs were only conducted by one researcher who also acted as a facilitator. This might have limited the opportunity to observe non-verbal data and biases affecting the group discussion.⁴⁵

Conclusion

Parents' experience in managing their children's illnesses increased their knowledge regarding the correct use of antibiotics. However, having the knowledge does not always translate into responsible use of antibiotics for their children, especially when parents struggle to balance attending to their sick child while maintaining the family routine. Empowering parents to communicate their experiences and articulate their role in decision-making during consultations with their doctor has the potential to decrease inappropriate prescribing in children in the community.

Antimicrobial resistance is perceived as a serious health problem that cannot be solved. The lack of personal connection to AMR and the belief that it is not prevalent in Australia hinder society from participating in preventing AMR. Communicating the risks of AMR to an individual and the community and providing actionable solutions in AMR awareness interventions may address these perceptions.

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Supporting Information

Additional supporting information may be found in the online version of this article:

Supplementary File 1: The application of the Health Belief Model constructs to investigate parent's perceptions and understanding of antibiotic use and antimicrobial resistance.

Supplementary File 2: Focus group discussion topic guide.