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Table 2 Summary statistics of the demographic pro les of

Attributes	Sta (*n* = 18)	Parents (*n* = 20)
Mean age (years) (SD)	46.0 (10.4)	37.7 (7.6)
Age groups		
20–30 years	2	4
31–40 years	9	8
41 - 50 years	6	7
51–60 years	1	1
Gender		
Female	17	17
Male	1	3
Country of Birth		
Australia	8	4
Vietnam	3	7
Chile	2	-
Iraq	2	6
Cambodia	1	-
Lebanon	1	1
Malta	1	-
Indonesia	-	1
Kuwait	-	1
Ethnicity		
Chilean	3	1
Vietnamese	3	7
Iraqi	2	6
Assyrian	-	2
Syriac	-	2
Armenian	-	1
Chaldean	-	1
Italian	2	-
Cambodian	1	-
Greek	1	-
Lebanese	1	1
Maltese	1	-
Uruguayan	-	2
Argentine	-	1
Indonesian	-	1
Kuwaiti	-	1
Serbian	1	-
Undeclared	3	-
Main language spoken at home		
English	8	-
Vietnamese	3	7
Arabic	2	4
Spanish	2	4
Assyrian	1	2
Greek	1	-
Khmer	1	-
Armenian	-	1
Chaldean	-	1
Bahasa (Indonesian)	-	1
Interview Language		
English	18	12
Arabic	-	4

related to the COVID-19 pandemic. e Fair eld Local Government Area was one of the most a ected areas during the delta variant COVID-19 outbreak in 2021, with one of the highest infection rates in the country. e salience of the issues raised by the participants, whose lived experience with health is within the context of a region with long-standing socioeconomic disadvantage was well captured by one of our participants, a 47-year-old father (ID PC04):

> *I have my fears.... fears that antibiotic prescription is getting harder and harder so instead of my child recovering in 2 or 3 days he might need a week or may be two [to recover] without antibiotics. I will have to stay at home without work for all that period and in this case we let the body defend itself against the infection and it might fail to defend itself. I am concerned that the outcome of your project and if health people develop 'public awareness program' that will make the prescription of antibiotics in Fair eld almost impossible. You are concentrating on this area and this scares me. My wife and I can't a ord to get sick because we have small children; who will look after them? Who will take the children to school? My wife and I can't a ord to get sick.*

Two major themes emerged from interviews regarding factors that in uence the use of antibiotics in children attending childcare centres in Fair eld LGA:

- e antibiotic culture.
- e regulatory and administrative environment of childcare centres.

ese two themes interacted and provided insights and understanding of the knowledge, attitudes, and behaviours of sta and parents/carers in relation to antibiotic use.

Theme 1: 'antibiotic culture'

'Antibiotic culture' describes parental and worker beliefs, attitudes, and behaviours around the use of antibiotics in children attending childcare.

Cultural context of fFair eld LGA

Childcare sta and parents observed that residents, particularly the rst-generation migrants, were strongly in uenced by knowledge, attitudes and practices from their country of origin.

> *… when I was a kid, I was not in Australia. I was in a di erent country where we used antibiotics very freely. at's why we get used to it and it's just like a daily activity and when you get used to something you don't see any risk in it. [PC05–40 years, female, tertiary educated, and admin sta]*

Participants reported pressure could be exerted by other parents and relatives who believed that an antibiotic could provide bene t.

Many parents were in dual-income families with both caregivers working. Childcare was an important enabler for work and income resulting in pressure to return children to childcare as soon as possible.

Perceptions of infectious diseases and their management

Some of the participants from both the sta and parent groups expressed the view that antibiotics should only be used for bacterial infections as determined by a health care professional.

However, participants also listed circumstances which may overrule that principle. ese included sites of infection such as ear, lung, throat, tonsil, sinus infections, and gastroenteritis.

> *My daughter always gets ear infection and su ers from earache all the time and without antibiotic she*

> *When my child is very sick and my GP refuses to prescribe, I have no choice other than going to a different doctor who will prescribe; no dramas. This has happened with me personally, I have done this. [PC04–47 years, male, TAFE, and Electrician]*

Participants proffered these views as possible explanations for high rates of antibiotics use in Fairfield. They added that doctors' behaviour may be contributing either through adherence to the practice style in the doctor's country of origin or through pressure from parents.

> *…. and they (doctors) are just too free with their antibiotic prescriptions. Some parents request and they prescribe. [FF0904–45 years, female, diploma in childcare, and childcare worker].*

Theme 2: regulatory and administrative environment in childcare centres

Childcare worker participants were aware of the regulatory and administrative environment in their centre. They cited sick day management policies applicable to their centre, including when attendance was allowed, appropriate monitoring of the child and appropriate procedures for dispensing medications.

Factors affecting sick child attendance

Childcare worker participants regarded a temperature of 38 °C as the cut-off point for attendance at the majority of the centres. Most parents reported that a child with mild fever or runny nose was usually allowed conditional attendance provided the child would be picked-up if requested.

Childcare worker participants reported considering their own assessment of severity, the risk of transmission to others, duration of the illness and duration of antibiotic use. Parents and staff noted stricter application of policies during the COVID-19 pandemic. Some commented that the pandemic may have driven increased doctor-visits.

> *Usually by day three, they've got a few doses (of antibiotic) into them. Yeah. We let them come to our centre. We don't have a rule that says "You cannot attend our centre unless you've got a high temperature". COVID changed a lot of that. We are more cautious now allowing sick children in. [FF2604–52 years, female, tertiary, and early childhood teacher]*
> *I see that a lot of children do get it [antibiotics] prescribed, yes. Especially now, since COVID I do feel that the rise has begun. Parents do give it to their children for the common cold, yes. [FF 7102–36 years, female, TAFE, and childcare worker]*

A doctor's clearance certificate seemed to override all the regulatory and administrative guidelines put in place by the childcare centres. If a parent brought in a sick child (or a child on an antibiotic) with a doctor's certificate stating they were well enough to attend the centres and were not a health-risk to others, the centres could not refuse attendance.

> *If a parent comes with a sick child using antibiotic and has a clearance or a certificate from a doctor saying that this child can attend and was not infectious to others then we don't have any other option but to allow the child to attend if that is what is desired by the parents. [FF0901–36 years, female, tertiary, and early childhood teacher].*

Both participant groups highlighted family circumstances as an influencing factor on attendance. Parents and carers were sometimes in a desperate situation due to casual work or important appointments. Despite sympathy for the parents, childcare worker participants reported feeling constrained to comply with exclusion policies as it would be unwise to allow the child to attend putting others at risk.

> *Oh, dear. Well, it's very hard [a parent working casual and missing payment]. Yeah. Very hard. Unfortunately, we have to go by our policy. If the child is unwell, then actually not allowed to be on the premises, unless they've got a clearance from the doctor. So unfortunately, we wouldn't be able to take that child. [FF1002–53 years, female, TAFE diploma, childcare worker].*

Some parent participants, though sympathetic, supported this approach by centres.

> *My opinion is that the centre will have to make a stronger stand. We're saying 'no'. Like tell this parent, "Look, there are so many, so many, so many other children. If the selfish parent let the infected child going, what about if the infectious disease spread to all the other kids." [PC10–55 years, male, parent, tertiary educated].*

The parents commented that those parents might then visit doctors and put pressure on them for antibiotics and/or a clearance certificate and might even visit multiple doctors with the same request.

> *I love and cherish my children more than anything else in life. When the child is very sick and my GP refuses to prescribe [an antibiotic] I insist as I know my children. If still the doctor refuses I have no*

> *choice other than going to a different doctor who will prescribe; no dramas. This has happened with me personally, I have done this. (PC04–47 years, male, secondary, and electrician]*
> *Yes, there is potential for doctor shopping [if the parents strongly believe that antibiotics is needed]. [PC15–33 years, female, tertiary, and economist]*

Some parents were not primarily motivated by childcare centre sick day management policies. They appeared to follow their own beliefs in determining attendance during illness with their child's well-being as their main consideration.

> *If the child is sick then keep him at home and don't bring him to the centre. Simple. The infection spreads from the child to other children so they say don't bring the child. Flu for example is contagious and can be transmitted from child to child. [PC06–39 years, female, tertiary, and church volunteer]*
> *I always keep my child at home whenever he feels unwell, I won't send him to school. If my child has just come to school, and they say he is not okay, I will take him home. Because I just stay at home and take care of my child, I will take him home so that he does not affect other children and he is much safer as well. [PC18–41, female, tertiary, and homemaker]*

Managing emergent illness

Most childcare workers reported similar policies in relation to managing a child who got sick while in attendance. After initial observation, carers would be called to pick-up a deteriorating child. Unwell children would be isolated.

> *Oh yes. So, we just move them to another room and they will stay there with an educator until the parent arrives. So that's on our policy. We are now more cautious during this pandemic period. [FF1001–40 years, female, tertiary, and early childhood teacher]*

Most parent participants were aware of these practices at

Conclusion

This study suggests that complex factors affect the high use of antibiotics in children attending childcare in a multicultural community. The findings suggest that two themes, cultural factors and regulatory/administrative environment, and their interaction capture these determinants.

We did not find evidence of explicit pressure on parents by childcare services to obtain prescriptions of antibiotics for children. However, the themes appear to work together to possibly increase antibiotic prescription. The culture around antibiotics seems to support beliefs in their efficacy for conditions that may not warrant use, and there is a perception that use in the community is not high or unusual.

The regulatory and administrative context determining childcare attendance during illness does not seem to overtly drive antibiotic seeking behaviour. However, the imperative for parents to attend work appears to increase the likelihood of adoption of strategies perceived to shorten illness, including the use of antibiotics. These factors may also drive attendance at doctor appointments to seek certificates that will facilitate earlier return to childcare. Doctor attendance may increase the prescription of antibiotics.

These findings deserve further investigation, and we recommend that GP perspectives should be included in future studies.

Abbreviations

KG	Kindergarten
LGA	Local government area
NQS	National quality standards
PS	Preschool
TAFE	Technical and further education

Supplementary Information

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Supplementary Material 1

Supplementary Material 2

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Author contributions

AK conceived the research idea, led the research team and wrote the final article based on a previous project report by IH. IH wrote the ethics approval, recruited the participants, carried out and analysed the interviews and wrote the initial project report. AK, IH and CWMT designed and implemented the project and met regularly to analyse the results. RQ and AS were involved in project design and implementation, met to provide feedback on results and provided feedback and final sign off on the manuscript.

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