



Patient-related factors drive high rates of reported antibiotic allergies: A qualitative study

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ABSTRACT

Background: Unnecessary antibiotic avoidance due to allergy fears has adverse cost and health implications however, the problem is difficult to resolve because patient and provider-related factors leading to avoidance are multifactorial. We use qualitative research methods to explore patient perspectives of antibiotic allergy and testing to reach the heart of the problem.

Objective: To reveal factors leading patients to report antibiotic allergy, and determine what education is required to prevent the cycle of erroneous allergy reporting.

Methods: The 29 patients were a sample of convenience recruited from a tertiary public hospital in Western Australia between March 2020 until August 2020; 18 were inpatients and 11 outpatients, with a median age of 64.2 years, and 15 (55%) were female. Semi-structured interviews assessed patients' understanding and knowledge of three topics: (1) antibiotic allergy, (2) antibiotic allergy testing, and (3) outcomes of testing. Interview transcripts underwent thematic analysis by two researchers, independently.

Results: Three main, overlapping themes emerged as influential across topics: (1) Severity of the Index Reaction, (2) Trust in family and health care providers, and (3) Health literacy. Patients were largely unaware of the benefits of confirmatory testing, and the detrimental health consequences of unnecessary avoidance. Patients displayed trust in health care providers' expertise and assumed that medical records were accurate to prevent prescribing errors.

Conclusions: The findings provide evidence for an effective patient education strategy and highlight failures among hospital and primary health providers to recognise the potential harm of unverified antibiotic allergy. Healthcare professionals are influential at multiple steps of a patient's healthcare journey and addressing unconfirmed antibiotic allergy should be taken at each opportunity.

1. Introduction

Experience of an adverse drug reaction (ADR), associated with antibiotic use can lead a patient to avoid all future exposure to the culprit and related drugs. Commonly, the patient or parent has poor recall of the reaction, and the assumption of an immune-mediated allergy to the antibiotic arises after discussion with a trusted doctor. Once reported within the medical system, an allergy alert or label (AAL), attached to clinical documentation prevents prescription of the culprit antibiotic, and often the entire antibiotic class. Reported allergy is questioned rarely during a patient's journey through health facilities

(Fig. 1) but is seldom determined to be a true immune-mediated ADR. The adverse clinical implications of unverified AAL, including suboptimal clinical outcomes, suboptimal antimicrobial stewardship, and increased healthcare costs (West et al., 2019; Sousa-Pinto et al., 2017; Macy and Contreras, 2014; MacFadden et al., 2016; Komyathy et al., 2020) go largely unnoticed by patients, who are unlikely to seek referral for testing (Fig. 2).

To address the high rate of AAL in Australia, (Knezevic et al., 2016; Travis et al., 2020; Trubiano et al., 2015; Yuson et al., 2018) confirmatory testing is recommended, (Australasian Society of Clinical Immunology and Allergy. ASCIA [Internet]; Therapeutic Guidelines. TG

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[Internet]) and is safe and effective. Despite recommendations, AAL remain prevalent, due partly to the lack of resources funding services, and largely to an under-appreciation by both patients and health professionals, of the health detriments posed by AAL. Patient education encouraging self-referral and improving communication of ADRs is required. Additionally, to be effective and prevent relabeling, it is necessary to identify deficits in health literacy to assist correct identification of antibiotic allergy.

Qualitative research in the field of AAL is growing, and informative data concerning patient perspectives and knowledge deficits regarding AAL evaluation has emerged from the US and UK. Patients have been found to be unaware of the negative consequences of carrying an AAL (Blumenthal et al., 2020a; Jose and Ishmael, 2017; Santillo et al., 2020; Wanat et al., 2018) however, those that are tested generally have confidence in taking the culprit antibiotic following successful delabeling. Participant surveys and questionnaires from Australian studies (Tan et al., 2019; Bourke et al., 2015; Loprete et al., 2022) report on a willingness to use delabeled antibiotics, and adherence to allergy label modification, but an in depth understanding of why patients commonly report antibiotic allergy and/or are anxious about testing is lacking. Ethnographic accounts are useful in clinical environments, because of the emphasis on fieldwork, field notes, and information from key informants (Maharaj, 2016; Wind, 2008; Tedlock, 1991; Powell et al., 2021). Using this conceptual framework, we explored: 1) What factors led patients to report an antibiotic allergy; 2) Their existing knowledge and/or experience of allergy testing; and 3) What happened to their antibiotic avoidant behaviour following testing.

2. Methods

2.1. Setting and sampling strategy

Twenty-nine adult inpatients and outpatients, with a history of AAL, volunteered for the study. The ‘inpatient’ group (n = 18) comprised a

convenience sample of patients pre-screened for an inpatient delabeling study. The ‘outpatient group’ was recruited from the Drug Allergy Outpatient Clinic (n = 11) following general practitioner referral. We conducted the study at Sir Charles Gairdner Hospital, a 600-bed tertiary hospital in Western Australia, between February and July 2020. The Sir Charles Gairdner Osborne Park Hospital Human Research Ethics Committee approved the research (RGS 0844) as a sub-study of an inpatient antibiotic delabeling study: Safely Preventing Errors and Complications due to Inappropriate Allergy Labelling (SPECIAL). In the SPECIAL study, consenting inpatients were randomized either to receive antibiotic allergy testing or usual care (control). All patients in the sub-study gave written informed consent.

2.2. Data collection techniques

Published research and field notes, documented by the research team during recruitment for the inpatient delabeling study, informed the development of the semi-structured interview guide. Open-ended questions, refined over the data collection period, explored three broad topics. (1) The patients’ initial experience of the adverse reaction; (2) Awareness and importance of AAL testing; and (3) Understanding of results and outcomes of testing. Patients interviewed following testing were within one year of evaluation (n = 16). A Clinical Immunology registrar was the primary researcher, and a participant observer (Maharaj, 2016; Wind, 2008; Tedlock, 1991). Interviews were conducted face-to-face or by telephone, recorded and transcribed.

2.2.1. Review of medical documentation

Following AAL assessment, patients and their general practitioners received a notification outlining testing results, and recommendations for future antibiotic use. We compared patients’ reported allergy status with the notification content, the patient electronic health record (My Health Record), and activation of a hospital-wide Clinical Alert.

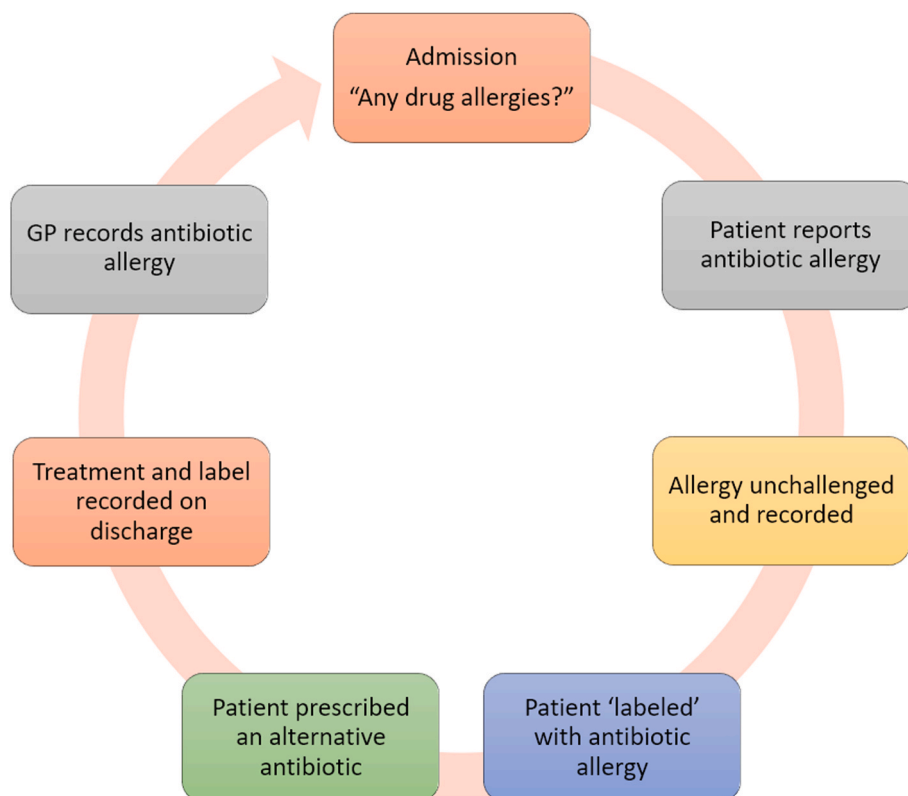


Fig. 1. The patient journey through hospital admission.

2.3. Analysis

Data collection and analysis took place concurrently. Interview transcripts were imported to NVivo 12 (QSR International Pty Ltd), and analysis was undertaken independently by two researchers (RB and SH) using an inductive thematic approach (Braun and Clarke, 2006). Text representative of themes emerging from the interviews was coded to three main topics. Common themes were identified, and analysis continued until data were considered saturated (Guest et al., 2006). Demographic information is presented as mean (SD).

3. Results

3.1. Patient characteristics

Twenty-nine patients were interviewed (n = 18 inpatients; n = 11 outpatients), Table 1 provides a summary of demographic and clinical characteristics. Hospital inpatients were more likely to report a distant drug reaction (89%), or a history consistent with a low-risk reaction (61%). In contrast, outpatients were more likely to have a history of a high-risk reaction (72%), and report multiple antibiotic allergies (72.2%), as expected.

3.2. Interviews

The interviews explored three main topics: (1) Factors leading to self-reported allergy; (2) Existing knowledge and/or experience of allergy testing; and (3) Antibiotic avoidant intention/behaviour following testing. Table 2 contains quotes arising from the patient interviews. Across the three topics, three overlapping themes emerged as influential to patient reporting, these were: (1) ADR severity; (2) Trust in family and healthcare providers; and (3) Health literacy (Fig. 3). Within these themes we found that the severity of the index reaction, and the trust placed in advice given by family and health care providers following the reaction, was influential in strengthening and maintaining the personal belief of antibiotic allergy. Conversely, the level of health literacy modulated allergy beliefs over the life span and prompted reporting and acceptance of delabeling.

3.3. Topic 1: factors leading to self-reported allergy

3.3.1. Recall of the reaction, severity, and the role of family and health providers

One third experiencing adverse reactions in adulthood expressed fear and concern and the intensity of symptoms supported recall, one patient saying: "I remember it because it was dramatic" ... it was terrible, it

Table 1

Characteristics of the patients (N = 29).

Demographic Table	Outpatients n = 11 (%)	Inpatients n = 18 (%)	Total N = 29 (%)
Age (y), median	60.81	62.28	64.2
Sex, female	6 (54.5)	9 (50.0)	15 (55.2)
Residence, rural	2 (18.2)	4 (22.2)	6 (20.7)
Immunocompromised ^a	1 (9.09)	11 (61.1)	12 (41.4)
Penicillin Allergy	11 (100)	17 (94.4)	28 (96.6)
Severity of antibiotic allergy^b			
High risk	8 (72.7)	7 (38.89)	15 (51.72)
Low risk	3 (16.7)	11 (61.1)	14 (48.3)
No of participants with multiple AAL	8 (72.7)	4 (22.2)	12 (41.4)
Time since index reaction			
≥3–12 months	4 (36.4)	2 (11.1)	6 (20.7)
≥1–5 yrs	6 (54.5)	0	6 (20.7)
≥10 yrs	1 (9.09)	10 (55.56)	11 (37.9)
≥50 yrs	0	6 (33.3)	6 (20.7)
Antibiotic allergy testing			
Tested	8 (72.7)	8 (44.4)	16 (55.2)
Delabeled	2 (18.2)	8 (100)	10 (62.5)
Positive	6 (75.0)	0	6 (37.5)

Notes.

^a Immunocompromised: haematological malignancy, oncological malignancy, autoimmune disease.

^b High risk = immediate Immunoglobulin E mediated reactions (anaphylaxis, angioedema, urticaria), or severe T cell mediated reaction (drug eruption with eosinophilia, drug-induced liver injury). Low risk = benign rash >1 year ago, childhood exanthema, pruritus, intolerance, inaccurate documentation.

was absolutely, I can't describe how bad it was". Recollection of childhood reactions (n = 5) to penicillin featured in family anecdotes, and some questioned the 'label' applied by a parent in the distant past "I was never tested and then I just always had it, ...I just had it locked in my brain and that's why I just kept going with it ... I always wondered, I probably don't have it ... because it was so long ago". Advice from doctors also encouraged future avoidance, for example, "our family doctor ... he said don't ever have it again because next time it may be worse and you wouldn't want that to happen". Trust of parental or medical advice was prevalent among all patients and is represented by the quote: "they just said 'just don't have it [penicillin] and don't ever have it', and so that's what I've always done".

3.3.2. Health literacy

Appreciation of the detrimental health implications associated with antibiotic allergy was limited, particularly in the inpatient group who had not received pre-test counselling from their GPs as did outpatients. Most assumed there would always be an alternative antibiotic and were unaware these could be less effective, more costly, have side effects, or

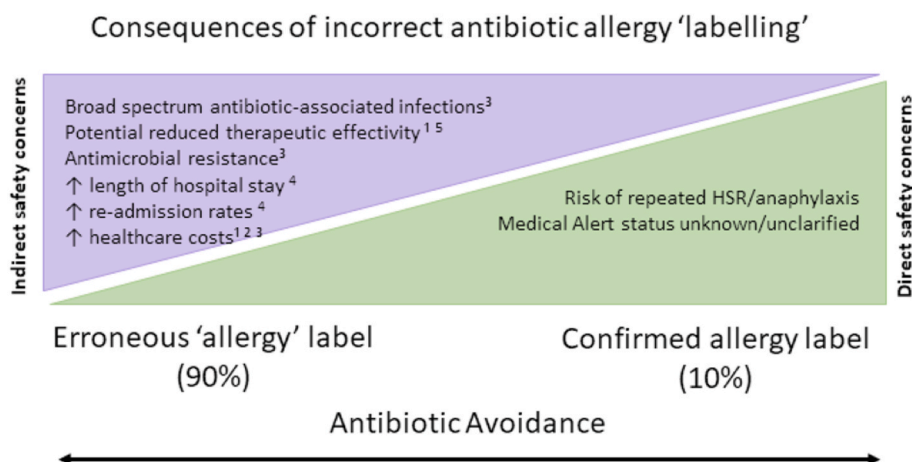


Fig. 2. Patient safety is compromised when antibiotic allergy is not evaluated.

Table 2
Patient perspectives of antibiotic allergy, antibiotic allergy testing and post testing outcomes. Representative quotes mapped against the three main themes emerging from the topics: Severity of Reaction, Trust, and Health Literacy.

Topic: Factors leading to self-reported antibiotic allergy	
Severity of the index reaction	<p>"I remember it because it was dramatic". (F, 75 yrs)</p> <p>"It was terrible ... I can't describe how bad it was". (M, 77 yrs)</p>
<ul style="list-style-type: none"> • Fear and uncertainty 	<p>"I thought 'nup' this is it, I'm dead". (F, 72 yrs)</p>
Trust in family	<p>"It was something that I was not sure about ... I don't remember anything to do with it, it was something my mum used to always say" (M, 42 yrs)</p>
<ul style="list-style-type: none"> • Family anecdotes 	<p>"Mum is anaphylactic, and my Dad is allergic to [penicillin] as well. So, they stopped my sister and I having it". (F, 36 yrs)</p>
Trust in doctors	<p>"My memory is a bit dim, but I do remember the doctor ... our family doctor for about 40 years ... he said my reaction was so severe. He said, 'don't ever have penicillin again'". (M, 80 yrs)</p> <p>"You know in those days you relied on the doctor, and you believed what the doctor said". (F, 71 yrs)</p> <p>"I said I was allergic to Penicillin, and they said oh we won't give you penicillin we'll give you something else". (M, 80 yrs)</p>
Health literacy	<p>"I never really thought about it in any serious way ...". (M, 70 yrs)</p>
<ul style="list-style-type: none"> • Lack of awareness of implications of AAL 	<p>"I didn't know what was going on, and it was never really explained to me very well". (M, 62 yrs)</p> <p>"Oh, well, we will just have to look for an alternative". (F, 63 yrs)</p> <p>"Given that I haven't had any antibiotics now for close on four years then I wouldn't think that it was a problem". (F, 75 yrs)</p>
<ul style="list-style-type: none"> • Identifying implications for prescribers 	<p>"So consequently, for anybody, knowing what to give me is a real problem". (M, 67 yrs)</p> <p>"Because every time if I get an infection, it gives my doctor a headache, cause these allergies". (F, 74 yrs)</p>
Topic: Existing knowledge and/or experience of allergy testing	
Severity of index reaction	<p>"If I became sick again, to know whether I was allergic to penicillin or not would be helpful". (F, 81 yrs)</p>
<ul style="list-style-type: none"> • GP initiated referrals 	
Health literacy	<p>"I did think about it when I was younger, but it cost such a lot of money and I thought well, it's just as easy to say [I have a penicillin allergy]". (F, 63 yrs)</p>
<ul style="list-style-type: none"> • Erroneous assumptions • Following education 	<p>"I mean it's a risk that maybe I should take for something that's worthwhile, in that I could be treated more effectively with penicillin". (F, 81 yrs)</p> <p>"... somewhere in that period of time, the allergy has sort of watered itself down and disappeared". (M, 70 yrs)</p>
Trust in expertise	<p>"I was expecting to have a reaction ... but I was very much assured of medical assistance there in place". (F, 58 yrs)</p> <p>"Well, I was in hospital for a start, so if I had an attack, I'd have all the best treatment there". (F, 72 yrs)</p>
Topic: Antibiotic avoidant intention/behaviour following testing	
Severity of the index reaction	<p>"But what if I tell the doctor 'well I'm not allergic to anything' and then he gives some penicillin and I get a reaction?". (F, 66 yrs)</p>
<ul style="list-style-type: none"> • Fear and uncertainty 	<p>"Hypothetically, if I hadn't reacted, I would still have avoided penicillin because I didn't want to go through [the reaction] again". (F, 58 yrs)</p>
Health literacy	<p>"That'd be on my notes in hospitals anyway ... because I think they're all linked ... is that right or not?". (F, 63 yrs)</p>
<ul style="list-style-type: none"> • Assumptions/expectations 	<p>"... because I have had a few things done, that's why I tell people go look in my file". (F, 63 yrs)</p>
Trust in expertise	<p>"I mean you just trust the doctor; they know what you're allergic to, I know there are mistakes made but yeah, I just trust them". (F, 63 yrs)</p> <p>"Every time I got to a doctor, 'can I have penicillin', 'no, no we can see here that you' ... it is not worth their life if I have a reaction". (M, 67 yrs)</p> <p>"I know that I have had sulphur in stuff ... that I eat ... I report sulphur allergy because of what the doctor and nurse ended up saying ...". (M, 42 yrs)</p>

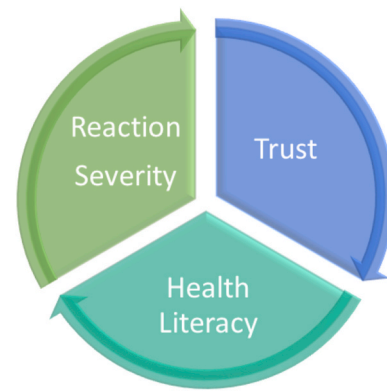


Fig. 3. Three common themes influencing patient reporting of antibiotic allergy, understanding of antibiotic allergy testing, and testing outcomes.

increase the chance of developing antimicrobial resistance. Patients with multiple antibiotic allergies (41.4%) acknowledged difficulties for prescribers one person commenting that "Anyways ... knowing what to give me is a real problem. Does it worry me? Not really, it worries my wife more than me", and older age influenced attitudes.

When asked about antibiotic resistance, some patients understood the phenomenon as developing 'immunity for example: "Are you referring to how people become immune to antibiotics over time?". Few recognised that antibiotic resistance could have personal health implications, "Provided I get the right antibiotics, no, I don't think superbugs would be a problem". Patients used the term 'allergy' interchangeably with 'side-effect'; many believing antibiotic allergy resulted from high doses or were expected actions of antibiotics. Some believed the risk of subsequent reactions could wane, nonetheless, avoidance continued. Most concerning were the eight patients reporting symptoms of anaphylaxis who did not understand the potential consequences. One underappreciated the seriousness of the reaction describing the reaction as a 'mild anaphylaxis'.

3.4. Topic 2: existing knowledge and/or experience of allergy testing

3.4.1. Antibiotic allergy testing - awareness and importance

We explored the patients' awareness and importance of AAL testing to identify motivators and barriers. Ten of the 11 outpatients with a history of a severe reaction were referred for specialist testing by their GP. A primary motivation 'to test' for this group was to confirm allergy status and increase treatment options for infectious conditions. In contrast, inpatients were largely unaware that AAL testing was possible, or how to access the service only becoming aware of the service following inpatient education. Other barriers included erroneous concerns about the cost "I did think [about getting testing] when I was younger, but it cost such lot of money and I thought well, it's just as easy to say to people, no [I have a penicillin allergy]"; unaware that testing is free in the public health system following referral. An ongoing issue for country patients is the distance to facilities "I wouldn't mind [having testing] but the problem is I have to travel to Perth all the time. It is just expensive and hard".

Again, increasing age was a disincentive to test, and those in good health were ambivalent. The severity of the previous reaction influenced motivation to test, and two participants declined confirmatory inpatient testing due to the burden of their current medical illness with the uncertainty of having another reaction: "I'll be happy to but I'm just too scared to do the liquid now because I've been on a rough journey, I couldn't stand another reaction. I just couldn't do it" - both participants had a history of anaphylaxis. Overall, the patients balanced the risks and benefits of testing. Trust in the providers and the hospital testing environment was evident; "Well, I was in hospital for a start, so if I had an attack, I'd have all the best treatment there. I had my epipens (sic) right near

me. No, I felt quite safe doing it in that situation in hospital” and thirteen patients scheduled for testing reported confidence in the test and intention to take the culprit antibiotic if the test result was negative.

3.5. Topic 3: antibiotic use intention/following testing

Three patients continued to report penicillin allergy unaware they had tolerated penicillins since the index reaction. The result of antibiotic allergy testing was more trustworthy to patients than delabeling on clinical history alone. Comprehension and recall of the test swayed patients’ attitudes and behaviour which varied between the two groups. Of the inpatients and outpatients who received AAL testing (n = 16), thirteen underwent an oral provocation challenge, and ten had their AAL removed.

3.5.1. Fear and uncertainty

All the inpatients who had been tested were delabeled (n = 8) but half were unable to recall details surrounding the challenge at the time of the interview. Three inpatients with equivocal skin test results continued to avoid penicillin despite negative oral provocation challenges to amoxicillin. Patients who accepted the results of skin testing and oral challenge as proof of their AAL status saw health advantages. Women were more likely to report feeling worried at the time of the index reaction and some expressed hesitation concerning re-exposure to penicillin despite medically supervised testing, and they feared a subsequent ADR. The following response is indicative: *“but then what if I do have it and then I get a reaction if I ever tell the doctor ‘well I’m not allergic to anything ‘and then he gives some penicillin and then I get a reaction. It’s like with any medication you never know if you’re going to have an actual reaction or not. So that’s why and because of that one I won’t give it 100% that I’m not going to have a reaction to it”*.

Men appeared pragmatic, saying they would just put up with the reaction. In general, the original reaction did not contribute to avoidance of testing but did influence the likelihood of accepting re-exposure to a prior culprit. Patients with a history of severe reaction admitted they would continue to avoid the antibiotic they assumed caused the index reaction, even after testing showed they were not truly allergic one person saying: *“I might have to take some antibiotics again one day I don’t know, but at this stage, no I would never want to take a penicillin again”*.

3.5.2. Trust and expectations of the health care system

Our interviews also revealed patient expectations of the health care system. Commonly patients believed that details concerning allergy history carried across the hospital record system and were in effect ‘linked’ and similarly, that outcomes of testing were readily available to all health care providers. One person confidently stated *“Yeah, because I have had a few things done, that’s why I tell people go look in my file”*. In contrast with these assumptions, clinical alerts were not attached to the record charts of 7/12 (58%) patients reporting severe antibiotic allergies. The My Health Record, active for 75% of patients, showed 68% were incorrect. Ten of 16 patients tested had received copies of the drug allergy notification, and most found this resource useful. However, only 17% of patients with confirmed antibiotic allergy carried personal medical alerts, with the remainder rationalising that accurate hospital records, trust in providers, and self-reporting would prevent adverse prescribing. The importance of carrying a medical alert on their person was low priority, but some attitudes changed after interaction with the researcher who raised their awareness of the personal medical alert *“In reality, I’ve been silly. I should’ve gone and done it [obtained a medical alert bracelet] straight away because everything is great in hindsight ... so it’s now a chief priority”*.

4. Discussion

This study has identified content key to addressing the high rate of self-reported AAL seen in health settings and reasons why confirmatory

testing is underutilised. Our study included two disparate and representative populations: outpatients referred by general practitioners for specialist assessment of antibiotic ADRs, and inpatients who carried historic AAL with no referral for specialist testing. Three themes emerged as influential to patient reporting and testing: health literacy, trust in family and health providers, and ADR severity.

Our research and others (Wanat et al., 2019; Powell et al., 2024) show that patients err on the side of safety and avoid the culprit antibiotic; and are largely unaware of the benefits of confirmatory testing, and the detrimental health consequences of unnecessary avoidance, unless it is brought to their attention by health care providers. Patients did not view reporting an unconfirmed allergy as a potential health issue, because it had always been easy to avoid the antibiotic believed to be the culprit.

Trusted family, and medical advice provided at the time of the ADR, and the perceived risk of recurrent reactions perpetuated the cycle, coupled with re-validation of the erroneous label at each subsequent interaction with a healthcare provider. Notably, women carried greatest concern of developing a severe reaction, despite negative testing, similar to the findings of studies conducted in the US (Blumenthal et al., 2020a), and the UK (Wanat et al., 2019).

Medication literacy was limited among our participants and driving the rate of AAL in an older population, as has been described by others (Travis et al., 2020; Powell et al., 2024). Antibiotic resistance was variously understood, a problem which has been described by others (Bakhit et al., 2019). In addition, being ‘too healthy’ or ‘too old’ tended to diminish the importance of the problem; and further deficits in health literacy concerning allergy nomenclature, and the recognition and management of anaphylaxis, also contributed to patients’ limited motivation to confirm or correct an allergy label.

Specialist evaluation initiated by the GP occurred only when serious consequences ensued, such as a severe reaction or difficulties with antibiotic prescribing. We found that addressing the issue of unconfirmed allergy as a potential health problem, led to patient motivation for either authentication of the allergy label or for optimising antibiotic choice for future treatment. These issues represent educational targets for patients and their doctors (Fig. 1).

We found positive attitudes concerning the testing service and providers, concordant with other research (Jose and Ishmael, 2017; Loprete et al., 2022; Wanat et al., 2019; Powell et al., 2024; Herrmann et al., 2024; Wilson et al., 2020; Lachover-Roth et al., 2019; Sundquist et al., 2017), which suggests a willingness to undergo testing. Notably, a history of severe ADR did not limit uptake in testing because patients felt safe in the hospital environment, and trusted healthcare providers’ expertise. However, the severity of the index reaction, and a long history of carrying an AAL contributed to hesitation with future antibiotic re-exposure and acceptance of delabeling by history alone, in common with other research (Sundquist et al., 2017).

There are few studies that examine outpatient and inpatient perspectives in the same study. We found inpatients, in comparison with outpatients, more ambivalent concerning testing, having a higher rate of continued antibiotic avoidance due to misunderstanding, or forgetting results of the test, or even the testing procedure itself. Despite a negative oral provocation challenge, it was easy for patients to misinterpret skin test results as positive, therefore underscoring the importance of clear post-testing communication. As described in the SPECIAL study (Herrmann et al., 2024) and others (Wanat et al., 2019) we identified reluctance among inpatients to consent to antibiotic allergy testing because of inter-current health issues (*“too much going on”*), and a reluctance to accept that unintended exposure to penicillin could confirm ‘delabeling’ without testing (Sundquist et al., 2017). In this context, inpatient delabeling may not be the most effective or timely strategy to reduce the prevalence of AAL. However, hospital doctors and primary health care providers should not overlook the importance of delabeling inpatients, for reasons that have been described as time constraints (Wanat et al., 2019; Sundquist et al., 2017), or because of lack of knowledge regarding

AAL (Savic et al., 2019) or testing services. Arguably, inpatient delabeling should be considered in the context of clinical need and in collaboration with specialty allergy services, which can also be accessed through an outpatient clinic, to derive maximal benefit to the patient and healthcare service (Herrmann et al., 2024).

The incorrect assumption among patients that medical records are accurate and available across health settings was demonstrated in ours and other studies (De Clercq et al., 2020; Inglis et al., 2017). Notable safety concerns were the underuse of personal medical alert cards or jewelry, and incorrect or absent medical records. Follow-up from GPs was uncommon, and we conclude that if patients cannot remember being tested, and documentation is sub-standard, the likelihood of an AAL persisting is high, regardless of effective diagnostic testing to remove or confirm an AAL. However, paying greater attention to pre and post-test counselling can improve adherence to antibiotic label modification (Santillo et al., 2020; Bourke et al., 2015; Loprete et al., 2022; Sundquist et al., 2017) and is particularly important for older patients, and those with multiple comorbidities (Wanat et al., 2019; Blumenthal et al., 2020b).

Qualitative research methods enable deeper understanding of patient factors involved in self-reporting and persistence of AAL. This approach ensures high internal validity. Analysis of interviews by two researchers reduced potential bias. Patients received information concerning AAL, either from the researcher, their GPs at the time of referral, or from the study information sheets. This information may have influenced their attitudes to testing, and account for the discrepancy between willingness to test but reluctance to take the culprit in future. The researcher's medical status may have influenced the perspectives of patients. However, the paradigm of ethnography accommodates the researcher as, in effect, a primary research instrument (Maharaj, 2016; Wind, 2008).

5. Conclusion

Our sample was heterogeneous, and representative of a spectrum of risk concerning likelihood of true antibiotic allergy, and varied comprehension of the harm associated with reporting an unconfirmed allergy. Our findings, are grounded in an Australian health context, but are universal. It is evident that patient and healthcare provider discussions around antibiotic allergy testing have begun, since referral to Australian drug allergy services has increased exponentially. However, it is clear there is ongoing need for education of both the wider community and health providers to recognise the potential harm associated with unconfirmed AAL. Our study also highlights that these conversations must continue beyond specialist allergy referral to ensure acceptance of post-testing outcomes and to prevent the cycle of erroneous reporting.

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CRedit authorship contribution statement

Renee Berry: Writing – review & editing, Writing – original draft, Visualization, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Susan Herrmann:** Writing – review & editing, Writing – original draft, Visualization, Software, Resources, Methodology, Formal analysis, Data curation, Conceptualization. **Michaela Lucas:** Writing – review & editing, Visualization, Supervision, Resources, Funding acquisition, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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