







Proceeding Paper

Managing Penicillin Allergy in Primary Care: An Important but Neglected Aspect of Antibiotic Stewardship [†]

Marta Wanat ^{1,*}, Sibyl Anthierens ², Marta Santillo ¹, Catherine Porter ³, Joanne Fielding ³, Mina Davoudianfar ¹, Emily Bongard ¹, Ly-Mee Yu ¹, Christopher Butler ¹, Louise Savic ⁴, Sinisa Savic ⁵, Johanna Cook ¹, Kelsey Armitage ¹, Philip Howard ^{6,7}, Sue Pavitt ⁸, Jonathan A. T. Sandoe ^{3,‡} and Sarah Tonkin-Crine ^{1,9,‡}

¹ Nuffield Department of Primary Care Health Sciences, University of Oxford, Oxford OX2 6GG, UK

² Department of Family Medicine and Population Health, Faculty of Medicine and Health Sciences, University of Antwerp, 2610 Antwerp, Belgium

³ Healthcare Associated Infection Research Group, Leeds Institute of Medical Research, University of Leeds, Leeds LS2 9JT, UK

⁴ Department of Anaesthesia, Leeds Teaching Hospitals NHS Trust, Leeds LS1 3EX, UK

⁵ Department of Immunology and Allergy, Leeds Teaching Hospitals NHS Trust, Leeds LS1 3EX, UK

⁶ School of Healthcare, Faculty of Medicine and Health, University of Leeds, Leeds LS2 9JT, UK

⁷ Department of Medicines Management and Pharmacy, Leeds Teaching Hospitals NHS Trust, Leeds LS2 7UE, UK

⁸ Dental Translational and Clinical Research Unit, Faculty of Medicine and Health, University of Leeds, Leeds LS2 9JT, UK

⁹ National Institute for Health Research (NIHR) Health Protection Research Unit (HPRU) in Healthcare Associated Infections and Antimicrobial Resistance, University of Oxford, Oxford OX2 6GG, UK

* Correspondence: marta.wanat@phc.ox.ac.uk

† Presented at the Antibiotic Guardian 2022 Shared Learning & Awards; Available online: <https://antibioticguardian.com/antibiotic-guardian-2022-shared-learning-awards/>.

‡ Joint senior authors.



Citation: Wanat, M.; Anthierens, S.; Santillo, M.; Porter, C.; Fielding, J.; Davoudianfar, M.; Bongard, E.; Yu, L.-M.; Butler, C.; Savic, L.; et al. Managing Penicillin Allergy in Primary Care: An Important but Neglected Aspect of Antibiotic Stewardship. *Med. Sci. Forum* **2022**, *15*, 8. <https://doi.org/10.3390/msf2022015008>

Academic Editor: Diane Ashiru-Oredope

Published: 24 March 2023



Copyright: © 2023 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

Abstract: An estimated 2.7 million people in the UK are potentially prevented from accessing highly effective and inexpensive penicillins as a result of incorrect penicillin allergy records. Removing incorrect penicillin allergy records may lead to improved patient outcomes and contribute to the tackling of antibiotic resistance. We aim to develop and evaluate whether the ‘Penicillin Allergy Assessment Pathway’ (PAAP) is effective in improving patient outcomes. At the first stage of this work, we have focused on understanding patients’ and primary care clinicians’ views of attending and referring to penicillin allergy testing, and then prescribing and consuming penicillin following a negative test result.

Keywords: penicillin allergy; general practice; intervention development

1. Project Overview

Penicillins are generally highly effective, narrow-spectrum, inexpensive antibiotics, and are the first-line recommended treatment for many infections. Around 6–10% of people in the UK have an allergy to penicillins listed in their medical records, but importantly, fewer than 1 in 10 of them are truly allergic [1]. This means that a significant proportion of patients are potentially restricted access to these highly effective penicillins. Incorrect penicillin allergy records are associated with antimicrobial resistance (AMR), as well as health outcomes (mortality, treatment failure, and surgical site infection) and altered antibiotic prescribing and resource use (e.g., longer hospital stays), and this is being recognised at the policy level. However, the management of penicillin allergy in primary care is challenging, as the awareness of and access to penicillin allergy testing is limited. We are conducting a programme of work that tries to address this gap. The initial stages of this programme

involved a rapid review [2] and a qualitative study [3,4] with 31 patients and 19 primary care physicians. This initial stage has allowed us to gain an in-depth understanding of the patient and primary care clinician views on managing penicillin allergy in primary care, and to identify the barriers and facilitators to penicillin allergy management and attending/referring for testing. These barriers were then mapped to behaviour change theories in order to describe the proposed mechanisms of change. Based on these findings, we have designed and developed behavioural intervention materials for both patients and clinicians to address their concerns and information needs. These intervention materials are now being used as a part of the 'ALABAMA' trial, targeting patients with a record of penicillin allergy deemed at low risk of true allergy. If the trial finds that this new approach to allergy assessment is effective and efficient, this would justify more patients being assessed and the allocation of appropriate resources. By incorporating behavioural science into safe and appropriate penicillin de-labelling, this work has the potential to significantly impact both direct patient care and the increasing burden of AMR.

2. Outcomes and Impact

The findings from our rapid review and qualitative study identified modifiable behavioural aspects, which were then systematically mapped onto the behaviour change theories. We have found that clinicians lacked experience of penicillin allergy testing services and thus wanted more information on what this testing involved and the safety of the tests, which, in turn, could help them to have conversations about testing with their patients [2–4]. The issue of safety was also described at length by patients, including their concerns about having a reaction, being adequately monitored during the test, the test invasiveness, and the safety of taking penicillins after a negative test [2–4]. We also found that both clinicians and patients did not perceive penicillin allergy to be a major problem in general practice due to the availability of alternative antibiotics [4]. Based on these findings, we have produced an intervention consisting of two booklets for patients and a handout for clinicians. Specifically, the 'Penicillin Allergy Testing: going for a test' leaflet for patients addresses the benefits of having access to penicillins and the safety of the test, while the 'Penicillin Allergy Testing: a negative test result' leaflet provides information about the accuracy of the testing and addresses patient concerns about consuming penicillins after a negative test. The clinician materials entitled 'Penicillin Allergy Testing: Information for general practice', contains information on penicillin allergy testing, the importance of de-labelling, and safety of the testing. These intervention materials are now being used as a part of the 'ALABAMA' trial, examining if a new pre-emptive 'penicillin allergy assessment pathway' that targets patients assessed as low risk of true allergy can be clinically effective in improving patient health outcomes and antibiotic use.

The importance of our findings has been acknowledged by the selection for the NIHR Evidence Alert as a study most likely to be of interest to the public and professionals, and to inform changes to policy and practice. The Alert highlighted the importance of checking penicillin allergy records and the further research needed in this area [5].

3. Future Development

If the "ALABAMA" trial finds that this new approach to allergy assessment is effective and efficient, this would justify more patients being assessed and the allocation of appropriate resources. This would have an impact on antibiotic prescribing and consumption, which are key components of antibiotic stewardship. Further interviews with patients and clinicians will examine the feasibility and acceptability of the PAAP and the materials, which will be crucial in ensuring the successful implementation of the pathway, if it is found effective.

Supplementary Materials: The following supporting information can be is downloaded at: <https://www.mdpi.com/article/10.3390/msf2022015008/s1>, Poster: Managing penicillin allergy in primary care: an important but neglected aspect of antibiotic stewardship.

Author Contributions: Conceptualization, J.A.T.S., C.B., S.P., S.S., L.S., E.B., P.H. and S.T.-C.; methodology, S.T.-C., S.A., M.W. and M.S.; formal analysis, S.T.-C., S.A., M.W. and M.S.; investigation, C.P., J.F., M.D., L.-M.Y., J.C. and K.A.; resources, J.A.T.S., C.B., S.P., S.S., L.S., E.B. and S.T.-C.; data curation, M.W.; writing—original draft preparation, M.W.; writing—review and editing, All; supervision, S.T.-C. and J.A.T.S.; project administration, J.F. and C.P.; funding acquisition, J.A.T.S., C.B., P.H., S.T.-C. and S.P. All authors have read and agreed to the published version of the manuscript.

Funding: This work was supported by the National Institute for Health Research (NIHR) under its Programme Grants for Applied Research Programme (Grant Number RP-PG-1214-20007) and by the National Institute for Health Research (NIHR) Health Protection Research Unit in Healthcare Associated Infections and Antimicrobial Resistance (NIHR200915) at the University of Oxford in partnership with the UK Health Security Agency (UKHSA) (ST-C and CCB) and by the National Institute for Health Research (NIHR) infrastructure at Leeds.

Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki, and approved by the London Bridge Research Ethics Committee (Ref: 19/LO/0176).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: Data are available upon reasonable request.

Conflicts of Interest: The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript; or in the decision to publish the results.

References

1. Powell, N.; Kohl, D.; Ahmed, S.; Kent, B.; Sandoe, J.; Tonkin-Crine, S.; Owens, R.; Stephens, J.; Upton, M. Effectiveness of interventions that support penicillin allergy assessment and de-labeling of patients by non-allergy specialists: A systematic review protocol. *JBI Evid. Synth.* **2022**, *20*, 624–632. [[CrossRef](#)]
2. Wanat, M.; Anthierens, S.; Butler, C.C.; Wright, J.M.; Dracup, N.; Pavitt, S.H.; Sandoe, J.A.; Tonkin-Crine, S. Patient and prescriber views of penicillin allergy testing and subsequent antibiotic use: A rapid review. *Antibiotics* **2018**, *7*, 71. [[CrossRef](#)] [[PubMed](#)]
3. Wanat, M.; Anthierens, S.; Butler, C.C.; Savic, L.; Savic, S.; Pavitt, S.H.; Sandoe, J.A.; Tonkin-Crine, S. Patient and primary care physician perceptions of penicillin allergy testing and subsequent use of penicillin-containing antibiotics: A qualitative study. *J. Allergy Clin. Immunol. Pract.* **2019**, *7*, 1888–1893. [[CrossRef](#)]
4. Wanat, M.; Anthierens, S.; Butler, C.C.; Savic, L.; Savic, S.; Pavitt, S.H.; Sandoe, J.A.; Tonkin-Crine, S. Management of penicillin allergy in primary care: A qualitative study with patients and primary care physicians. *BMC Fam. Pract.* **2021**, *22*, 112. [[CrossRef](#)] [[PubMed](#)]
5. Are you Sure You Are Allergic to Penicillin? Professionals and Patients Are Urged to Double-Check. Available online: <https://evidence.nihr.ac.uk/alert/are-you-sure-you-are-allergic-to-penicillin/> (accessed on 15 December 2022).

Disclaimer/Publisher's Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.