

PENICILLIN ALLERGY DELABELLING

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THE USE CASE

Approximately 6% of the UK population are thought to be penicillin allergic.¹

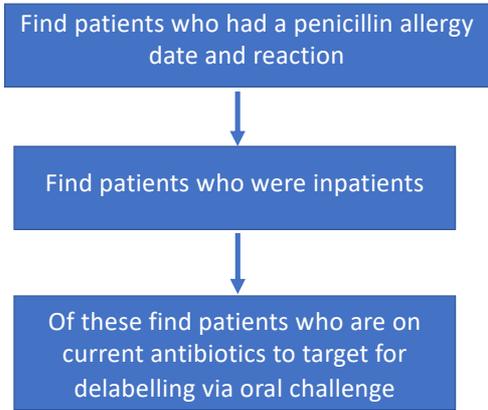
If you were to test the adult population with 95% of the patients would be negative on testing.²

Being labelled penicillin allergic has significant ramifications. Patients labelled as penicillin allergic have been shown to be more likely to be colonised with bacteria associated with antimicrobial resistance such as *MRSA*.³

New guidance from the British Society of Allergy and Clinical Immunology oral penicillin challenge can be used in some low risk cases.

We wanted to help set up a delabelling service at Kings College Hospital.

Creation of a Watcher



EPR documents, observations, results and orders are currently ingested into Elastic indexes using Nifi

SQL views were added to create indexes representing a live list of admissions and all current and former allergies (epr_current_admissions and epr_allergies)



Python-based watcher scripts query the newly ingested data on a daily basis and perform all operations in memory. Once complete, an email is sent based on the presence/absence of data to a specified list of recipients

DEPLOYMENT

Microbiology, Immunology and Pharmacy have been engaged in the project early on.

Pharmacy/Microbiology review list created by watcher every day and target inpatient delabelling.

Exact service being planned for the next few months, with materials being made for patients, GP.

Future directions

Use specific text on documenting penicillin allergy to find documents via NLP of delabelling activity to monitor the service

Training Medcat (A natural language processing programme linked to Cogstack) to pick up allergy reactions.

Consideration of comparing penicillin allergy in structured data and unstructured data

Led to part of my PhD being a cross site collaboration of Kings, UCLH and Imperial looking at quantifying the effect of penicillin allergy

OTHER PROJECTS

Finding cases of TB and Non-tuberculous Mycobacterium using NLP and MEDCAT.

-TB Project: Precision of 0.79, Recall of 0.87, F1 score 0.83

-NTM Project- attempting to find Non-tuberculous mycobacteria through NLP and compare them to laboratory results.

Courses in Demystifying AI completed at KCL and multiple modules in Data Camp

References

- West, R.M., Smith, C.J., Pavitt, S.H., Butler, C.C., Howard, P., Bates, C., Savic, S., Wright, J.M., Hewison, J., Sandoe, J.A.T., 2019. 'Warning: allergic to penicillin': association between penicillin allergy status in 2.3 million NHS general practice electronic health records; antibiotic prescribing and health outcomes. *Journal of Antimicrobial Chemotherapy* 74, 2075–2082.
- Shenoy, E.S., Macy, E., Rowe, T., Blumenthal, K.G., 2019. Evaluation and Management of Penicillin Allergy: A Review. *JAMA* 321, 188. <https://doi.org/10.1001/jama.2018.19283>.
- Blumenthal, K.G., Lu, N., Zhang, Y., Li, Y., Walensky, R.P., Choi, H.K., 2018. Risk of meticillin resistant *Staphylococcus aureus* and *Clostridium difficile* in patients with a documented penicillin allergy: population based matched cohort study. *BMJ* k2400. <https://doi.org/10.1136/bmj.k2400>