Improving drug allergy management in Australia: education, communication and accurate information

Drug allergy education and effective communication of accurate information can optimise drug allergy management and patient safety

A drug allergy label is often applied to a patient after an adverse drug reaction (ADR), usually resulting in subsequent avoidance of the drug and related drugs. Recent attention has focused on antibiotic allergy labels and the benefits of delabelling.[1] But drug allergy labels, which occur in up to 35% of patient electronic health records (EHRs), encompass all types of medications, with antibiotics, opiates and non-steroidal anti-inflammatory drugs being among the most common (Box 1).[2] Accurate and effective communication of drug allergy is crucial for safe prescribing, including sufficient information to enable assessment of the risk of re-exposure compared with the risk of withholding the index drug and related drugs.

Although, strictly speaking, drug allergy refers to an immunological drug reaction (eg, an IgE-mediated immediate or T cell-mediated delayed reaction), in this context, "allergy" is commonly used as a generic term for any ADR, whether an immunological reaction or a pharmacological side effect. Drug allergy labels may be conveyed by the medical record (including EHRs), the patient history, or medical alert jewellery. However, the label is frequently not supported by information on the nature of the ADR. It is noteworthy that information entered into the allergy field in the current iteration of My Health Record may be self-reported, with very little reaction detail and no medical validation required (www.myhealthrecord.gov.au/for-healthcare-professionals/what-is-in-my-health-record). While it is vital that true allergies are appropriately highlighted and the causative agents avoided, it is also important that useful drugs are not unnecessarily contraindicated by spurious overlabelling (Box 2).

In Australia, drug allergy is the most common cause of fatal anaphylaxis.[8] Drugs implicated in anaphylaxis deaths are antibiotics, anaesthetic agents, non-steroidal anti-inflammatories and radiocontrast media (Box 1).[8] Anaphylaxis and other serious drug allergy reactions are largely unpredictable; however, the risk is clearly elevated in patients who have had a previous reaction, offering an opportunity for prevention. In limited situations, genetic testing for risk of severe cutaneous drug reactions (eg, abacavir, risk allele *HLA-B*57:01*[9]) is also predictive.

A review of coronial findings in four drug allergy-related deaths between 2011 and 2013, conducted by the Australasian Society of Clinical Immunology and Allergy Drug Allergy Working Party, identified deficiencies in the knowledge and skills of health care professionals, including:

- a lack of knowledge in recognising and appropriately managing severe allergic drug reactions;
- unclear documentation of drug allergies;
- a lack of knowledge with regards to generic versus trade names of drugs, and the potential cross-reactivity of drugs;
- poor communication of known allergies (eg, ignoring medical alert jewellery); and
- misuse of terminology (eg, "sulpha" instead of a specific drug name such as sulfamethoxazole).

Therefore, improved education, communication and documentation are essential to prevent further fatal outcomes.

A recent multicentre study of 232 616 adult outpatients in the United States found that allergy documentation is often incomplete.[10] In this study, for example, 15.6% of patients had a documented β-lactam allergy; of these, the specific culprit drug was mentioned in only 39.8% and the initial allergic reaction characteristics were documented in only 22.7%. The variability in documentation suggested that many patients are mislabelled.[10] Similarly, an audit of drug allergy documentation in the United Kingdom identified that at least 20% of medical records and 24% of the medication charts contained inaccurate drug allergy documentation. The documentation improved after better education of junior doctors in regards to drug allergies.[11]

A national Australian survey identified significant knowledge gaps among clinicians, including drug allergy specialists and pharmacists.[12] Of note, nurses made the majority of penicillin allergy notations (58%) in South Australia's Enterprise Patient Administration System statewide EHR,[13] indicating that educational initiatives may need to include all health professionals.

Effective education and prescribing guidelines have been shown to improve knowledge of drug allergy natural history as well as diagnosis and management.[14] A clinical guideline that directs history taking and prescribing of antibiotics for low risk patients with an antibiotic allergy label significantly increased first-line antibiotic use and delabelling without increasing ADRs.[15]

In cases in which a patient might benefit from the drug, a review of the label requires information on the nature, severity, timing and circumstances of the original reaction, when available. Knowledge of drug reaction types and cross-reaction risks (Box 1) enables risk stratification. Immunology or clinical pharmacology consultation may provide additional expertise when required. If this assessment indicates

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1 Most common drug allergy labels in Australia

Drug class	Allergy facts
Antibiotics	• Currently, 18% of adult hospital patients and 24% of general medical inpatients carry an antibiotic allergy label in their medical record[1] • It is estimated that less than 10% of adult and paediatric patients carrying such a label are truly at risk of a significant allergic or other adverse reaction • Avoidance of a first-line preferred antibiotic has adverse clinical and cost implications; therefore, delabelling patients with inappropriate antibiotic allergy labels should be a clinical priority[1]
Opiates	• Allergy to opiates is the second most common drug allergy label, applied to 6.8% of patient electronic health records (EHRs) in the United States[2] and comprising 22.2% of all drug allergy reports in the South Australian statewide EHR (unpublished data) • The majority of opiate allergy labels are opiate intolerances (gastrointestinal or neurological symptoms), and even in patients with pruritus or urticaria, the mechanism is usually pharmacological rather than immunological • True allergy, with anaphylaxis potential, is extremely rare, and the majority of patients can be managed with dose modification, pre-medication or selection of an alternative agent
Non-steroidal anti-inflammatory drugs (NSAIDs)	• NSAIDs are the third most common drug group resulting in hospital EHR allergy labels[2] • NSAIDs produce a wide range of adverse reactions resulting in an allergy label, including gastrointestinal intolerance and asthma exacerbation (aspirin-exacerbated respiratory disease) • Many adverse reactions including the majority of allergy-like manifestations, such as urticaria and angioedema, are class effects, resulting from the pharmacological action of cyclooxygenase enzyme inhibition • NSAIDs may also cause drug-specific anaphylaxis, in which case, only the index drug is contraindicated[3] and the label "NSAID allergy" should not be used
Anaesthetics	• Neuromuscular blocking agents (NMBAs), antibiotics, dyes or contrast and chlorhexidine are common causes of perioperative anaphylaxis, whereas latex allergy is decreasing[4,5] • The high incidence of severe NMBA reactions is thought to be at least partly due to prior exposure to the cross-reactive antitussive agent pholcodine, available over the counter • Norway has seen a decrease in NMBA-related allergic reactions since pholcodine was taken off the market[6] — a similar approach has been suggested but not implemented in Australia • Drug allergy labelling, including the use of medical alert devices, is particularly important in patients with a history of perioperative anaphylaxis due to a higher mortality rate and risk of re-exposure in emergency situations
Radiocontrast media (RCM)	• Iodinated RCM may produce immediate or delayed allergic-type adverse reactions, but these are less frequent with modern non-ionic and lower osmolality agents, so patients who had reactions in the past may no longer be at risk • It is important that patients who have had a reaction to RCM are not labelled "iodine allergic" since this is an ambiguous and potentially misleading term[7] • Many RCM allergic reactions are specific to the agent used, so the agent associated with the reaction should be recorded to facilitate further investigation if necessary

2 Summary of drug allergy management issues

- Patients with documented severe drug allergies have been given the drug in error in health settings
  - Drug allergy is the most common cause of fatal anaphylaxis in Australia
  - Delay in the diagnosis and management of severe reactions to drugs may occur, as the reactions have not been recognised
- Patients are often labelled as having a drug allergy when they are not allergic to the drug
- Antibiotics are a drug class that are overlabelled, which results in inappropriate prescribing and increased use of broad spectrum antimicrobials, poor patient outcomes and a financial impact on the health system
- Reasons for overlabelling and drug allergy medication errors include:
  - confusion on what is a drug allergy by health professionals and the general community;
  - variation in the way drug allergies are recoded in patient electronic health records;
  - incorrect or inadequate communication to patients about drug allergy; and
  - lack of referral procedures and standardised protocols for drug allergy testing
- A national approach is required to:
  - improve education to close knowledge gaps of health professionals;
  - develop and implement delabelling drug protocols; and
  - develop national patient electronic health records to identify patients who have severe drug allergies

that the label may be erroneous or no longer valid, then further evaluation by blood tests or skin tests (when available) and cautious challenge may refute or verify the label. Challenge testing should be undertaken judiciously, under close observation and monitoring, with due consideration of the likelihood and potential severity of any reactions that could occur. Patients and doctors may be reluctant to challenge due to fear and overestimation of risk,[16] but this risk should be balanced by the potential benefit from the drug if it is tolerated.

Priority areas of knowledge to be addressed include:

- improvement in quality of the drug allergy history — date, exact drug, reaction type and severity;

- contemporaneous documentation of ADRs in medical records to preserve maximum information for future reference — this may require standardised record formats for EHRs;
- understanding of the mechanism, severity and cross-reactivity of drug allergy (Box 1);
- understanding of risk, including likelihood and potential severity of adverse reactions — a low likelihood of anaphylaxis or severe cutaneous adverse reaction is a more important contraindication than a higher likelihood of a non-dangerous ADR; and
- referral for investigation to verify or dismiss drug allergy labels — priority for useful antibiotics or drugs with strong indications and potential benefits.

Communication of drug allergy information and drug avoidance advice, such as degree of contraindication, is of central importance, particularly in emergency and perioperative situations as well as in any clinical context, including community practice, hospitals and pharmacies. This could be achieved through well designed, linked and reconciled local or national EHRs, national registries of verified drug reactions, and validated medical alerting devices. Furthermore, education of health care workers would improve the quality of information entered into such systems.

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