Recommendations & Implementation Strategies

Safe Practices for Drug Allergies
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Acknowledgments

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Introduction

Adverse events due to drug allergy interactions continue to occur in healthcare despite the use of clinical decision support (CDS) to alert clinicians to the potential for such interactions when prescribing, verifying, and administering medications. Recognizing the importance of improving safety through improvements in drug allergy alerts, a group of experts conducted research and set forth five multidisciplinary recommendations, including improving allergy documentation; encouraging patient engagement; looking at alerting mechanisms; developing policies and guidelines; and continuously tracking and monitoring alerts for improvements.\(^1\)\(^3\) The Partnership for Health IT Patient Safety’s (Partnership’s) safe practices for CDS for drug allergy interactions build on these recommendations and identify ways to use technology to implement them. The safe practices include optimizing technologies and identifying ways to incorporate external CDS to provide timely safety information about drug allergy interactions.

Overview

This guide explains the basis of the safe practices for CDS for drug allergy interactions and then details what improvements can be made. The safe practices focus on using technology to standardize documentation; enabling CDS tools to provide more actionable information; monitoring alerts for effectiveness; and engaging patients. This focus is aimed at optimizing and providing safe, timely, and appropriate care related to drug allergy interactions.

The Partnership’s approach was a multipronged, multistakeholder collaborative effort. The outcome of the workgroup meetings, evidence-based literature review, and data review resulted in the following safe practices for improving CDS for drug allergy interactions:

- Use technology to standardize the documentation of drug allergy status\(^4\)\(^7\)
- Provide actionable drug allergy alerts to improve the safety and effectiveness of drug allergy communications\(^8\)\(^11\)
- Use technology to monitor the effectiveness of allergy alerts
- Engage patients through the use of technology to provide accurate drug allergy communications\(^6\)
Recommendations

Use technology to standardize the documentation of drug allergy status\textsuperscript{4-7}

Provide actionable drug allergy alerts to improve the safety and effectiveness of drug allergy communications\textsuperscript{8-11}

Use technology to monitor the effectiveness of allergy alerts

Engage patients through the use of technology to provide accurate drug allergy communications\textsuperscript{6}

Clinical workflow, processes, and procedures are important to keep in mind when looking at drug allergy interactions. Multiple steps in the process involve not only information gathering but also use of the available information. Where and when information is documented in the record and how it is displayed impacts the usability of the information and the goal of getting the right information to the right people, in the right format, using the right channel, and at the right time in the workflow.

Patients, clinicians, content and EHR developers, and local information technology (IT) staff all play a role in implementing and facilitating safety. As stakeholders, each group shares the responsibility in executing these safe practices. Additional information and suggested tools for implementing these safe practices are available on the Partnership’s website in the full report.
Use technology to standardize the documentation of drug allergy status.4-7

**Rationale:** Standardization of documentation will facilitate mapping to clinical decision support, aid in triggering drug allergy alerts based on criticality and necessity, and help achieve interoperability.

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**What is technology’s role?**

Use technology to incorporate documentation fields that can capture information (e.g., characterization of allergy information) needed to trigger external CDS and improve alert accuracy. Accommodate and implement CDS to provide additional help for a clinician entering the information when the categorization is not readily clear. Use standard external CDS definitions and standardized triggers for drug allergy alerts.

**What can stakeholders do?**

Stakeholders need to know that drug allergy information is categorized into data entry fields that help determine the type of allergy (e.g., immune-mediated, side effect, intolerance). The drug allergy information should be specific in both the medication name and the reaction. The specific drug—not the drug class—is always the preferred entry. When there is more than one reaction per drug, it is important to indicate whether the reactions occurred at the same time or with different exposures. While greater use of the technology may facilitate the standardization of drug allergy status and enable actionable allergy alerts to improve the safety and effectiveness of drug allergy communications, it is important to routinely review and record all allergy information. The option for free-text allergy information should be eliminated, because it does not allow for notification or communication triggers within the record and cannot trigger external CDS.

**How can this be done?**

Coded and detailed information will help create tiers of allergy severity and clinical relevance that will either contribute to the generation of a drug allergy alert or indicate that an alert is not needed, but this cannot be accomplished if the information does not appear in a computable format.

- Standardize the location of the information recorded
- Accurately categorize the information, incorporating fields to differentiate between allergies and intolerances
- Standardize database dictionary for meaning and mapping (e.g., SNOMED CT, RxNorm®, HL7® DAM standards for allergies [substance, allergic reaction type and status, severity of reaction])
- Provide definitions for standardized categories (allergy, intolerance, side effects)
- Standardize documentation to capture the information accurately
- Eliminate free-text allergy/intolerance documentation
- Routinely remove old allergy/intolerance information from entries
Table 1. How Stakeholders Use Technology to Standardize the Documentation of Drug Allergy Status

<table>
<thead>
<tr>
<th>Stakeholders</th>
<th>Implementation Strategies</th>
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| Developers (EHR, CDS) | - Accommodate ways to accurately define, characterize, and distinguish adverse drug reactions as side effects, toxicities, intolerances, idiosyncrasies, or allergies:  
  - Consider the use of additional standardized fields to accommodate contraindications, patient preferences, reaction types, and descriptions  
  - Provide standard definitions and fields for optimization of external CDS  
  - Develop technical standards that build on USP allergy and intolerance standards to improve interoperability  
  - Use standard nomenclatures to enable documentation:  
    - Determine whether allergy/intolerance lists can be reconciled and encoded from free-text entries  
  - Enable collection of detailed specification of the patient’s allergy that can be completed at the time of entry or reconciliation to ensure that alerts are triggered when they matter most, and avoid unnecessary alerts for mild intolerances or previously tolerated medications:  
    - Provide for alert tiering |
| Clinicians         | - Ensure that drug allergy information is reconciled with the patient at each encounter and that inaccurate information is updated or removed  
  - Assist vendors with development of preferred encoded, structured fields related to substance, allergic reaction type and status; and severity of reaction  
  - Ensure that free-text allergy/intolerance entries are eliminated if possible  
  - Involve patients and families in verifications and updates of information |
| Healthcare organizations | - Use alert tiering to reduce alerting:  
  - Test and validate prior to implementation  
  - Require clinicians to document in necessary fields for optimization of CDS |
Provide actionable drug allergy alerts to improve the safety and effectiveness of drug allergy communications

**Rationale:** Ensure appropriate alerting mechanisms are based on drug allergy information, workflow, and user role to reduce unnecessary alerts and minimize clinician burden.

**What is technology’s role?**
Drug allergy alerts act as a safeguarding feature. Functionalities that improve these alerts include alert tiering, matching algorithms, and smart functions (e.g., the probability of these reactions occurring). The alert format and intrusiveness are also important considerations.

**What can stakeholders do?**
Tiering of alerts allows for greater attention to those with the greatest severity and as such will demand stakeholder action. Stakeholders need to ensure that actionable drug alerts are available. Any refinement of alerts should consider predetermined criteria used to trigger the drug allergy alerts.

**How can this be done?**
Ensure that the “five rights” of clinical decision support (right information, right person, right CDS intervention format, right channel, and right time in workflow) are considered for drug allergy alerts throughout the lifecycle to improve the safety and effectiveness of drug allergy communications.

- Evaluate alert format display for accuracy and effectiveness
- Consider the reaction and other contextual information when refining alerts
- Tier alerts after evaluation by subject matter experts, override rates, and other pertinent information
- Evaluate matching algorithms that determine relationships between the allergen and the prescribed medication
Table 2. How Stakeholders Provide Actionable Drug Allergy Alerts to Improve the Safety and Effectiveness of Drug Allergy Communications

<table>
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<th>Stakeholders</th>
<th>Implementation Strategies</th>
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| Developers (EHR, CDS)         | ▪ Improve alert functioning:  
  — Use standard alert dictionaries  
  — Allow for alert tiering (and determine the basis of the tiering)  
  — Provide reports with usable data elements to allow clinicians to analyze and evaluate overrides  
  — Enable information to be provided closer to the point of decision  
  ▪ Evaluate display of alert text (e.g., timing, intrusiveness, text format)  
  ▪ Evaluate matching algorithms (e.g., match between allergen and prescribed medication) and consider the probability of reactions |
| Clinicians                    | ▪ Consider reaction severity and other contextual information before overriding an alert  
  ▪ Evaluate override rates, types, and reasons |
| Healthcare organizations      | ▪ Continuously monitor alerts, alert frequency, overrides, and reasons for overrides to improve alert functioning:  
  — Timing  
  — Intrusiveness  
  — Text and interface display  
  ▪ Develop an oversight team, including appropriate subject matter experts, with accountability to evaluate appropriate alert tiering and workflows |
Use technology to monitor the effectiveness of allergy alerts

**Rationale:** Technology can be used to provide valuable feedback to improve firing of drug allergy alerts. Making the firing mechanism more satisfactory may decrease clinician burden.

**What is technology’s role?**
It is possible to use technology to monitor the effectiveness of allergy alerts. Monitoring the effectiveness of drug allergy alerts entails data collection (e.g., override rates, override rates over time, override reasons, appropriateness of overrides, alert frequency). Dashboard display of information for individual clinicians and for overall reports may improve effectiveness.

**What can stakeholders do?**
Stakeholders should continually monitor and evaluate allergy alerts and override rates over time. Organizations might consider structuring an oversight committee to monitor and address data collection and reporting issues. It is important not only to gather and monitor the information regularly but also to communicate the findings to those who can then take action.

**How can this be done?**
An increasing concern is that alerts are no longer functioning as effective safeguards; this may be due to inconsequential alerts, high volumes of alerts, and the use of various alerts for a multitude of reasons. It is important to routinely monitor and report on alert functions and the reaction to those functions to ensure alert effectiveness.

- Evaluate alert functioning
- Understand contributing factors to override rates
- Obtain and incorporate feedback from clinicians about commonly encountered issues
- Evaluate algorithm effectiveness in matching allergens and prescribed medications
- Display information:
  - On clinician dashboards
  - In summary reports
### Table 3. How Stakeholders Can Use Technology to Monitor the Effectiveness of Allergy Alerts

<table>
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<th>Implementation Strategies</th>
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| Developers (EHR, CDS) | ▪ Provide reports with usable data elements to allow clinicians to analyze, evaluate, and optimize alerts  
                        ▪ Enable dashboard displays of regularly monitored information  
                        ▪ Evaluate matching algorithms                                                                         |
| Clinicians            | ▪ Recognize alert override rates and consider appropriateness  
                        ▪ Monitor performance over time                                                                         |
| Healthcare organizations | ▪ Evaluate alert functioning:  
                          ▪ Firing  
                          ▪ Override rates  
                        ▪ Understand contributing factors to override rates  
                        ▪ Obtain and incorporate feedback from clinicians about commonly encountered issues  
                        ▪ Develop an oversight team, including appropriate subject matter experts, with accountability to evaluate appropriate alert tiering and workflow |
Engage patients through the use of technology to provide accurate drug allergy communications

**Rationale:** Improve the communication of drug allergy information among patients, caregivers and families, and clinicians to ensure accurate and up-to-date information is readily available.

**What is technology’s role?**
Patients and their families now have ready access to portals not only to view information but to provide input into their personal health records. Technology can enable and integrate these patient-facing technologies, allowing patients to view and edit their allergy information to keep this information current, relevant, and up-to-date.

**What can stakeholders do?**
Engage patients in their care, emphasizing the importance of accurate and up-to-date information. Ensuring accurate transfer and availability of this information, and having usable and easily readable displays of allergy information increases the likelihood that errant information can be identified and corrected.

**How can this be done?**
An increasing concern is that alerts are no longer functioning as effective safeguards; this may be due to inconsequential alerts, high volumes of alerts, and the use of various alerts for a multitude of reasons. It is important to routinely monitor and report on alert functions and the reaction to those functions to ensure alert effectiveness.

- Engage patients (family members/caregivers) in the collection and reconciliation of drug allergy information
- Routinely review a patient’s drug allergy status with the patient (family member/caregiver)
- Implement patient-facing technologies that integrate with the electronic health record
- Ensure that information is available and exchanged with all appropriate care sites
- Encourage patients to use available portals:
  - To review their drug allergy information
  - To verify that the allergy information is accurate and up-to-date
  - To notify the organization/caregiver if the information is incorrect
  - To edit the allergy information if the portal permits
- Increase awareness of patient portal access throughout the organization and community to help patients (family members/caregivers) access their records
Table 4. How Stakeholders Can Engage Patients Through the Use of Technology to Provide Accurate Drug Allergy Communications

<table>
<thead>
<tr>
<th>Stakeholders</th>
<th>Implementation Strategies</th>
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<tbody>
<tr>
<td>Developers (EHR, CDS)</td>
<td>■ Develop patient-facing technologies to gather and communicate drug allergy information</td>
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<td>■ Facilitate exchange of information across the various providers, clinicians, and healthcare organizations</td>
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<tr>
<td>Clinicians</td>
<td>■ Implement strategies to engage patients in reviewing their allergy information capturing and correcting information that is inaccurate, previously undocumented, or outdated</td>
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<td>■ Instruct patients how to initiate a correction or update to viewed information</td>
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<tr>
<td>Healthcare organizations</td>
<td>■ Implement and use patient-facing technology to gather and communicate drug allergy information and changes among the patients, caregivers and various members of the healthcare team</td>
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Conclusion

Drug allergy interactions remain a potentially life-threatening safety concern. Adverse events associated with such reactions can delay the delivery of an appropriate treatment, necessitate additional treatments, increase care costs, and negatively impact patient outcomes. The safe practices and implementation strategies offered herein were built upon expert study and investigation. Using technologies to facilitate documentation, improve alerting, monitor outcomes, and engage patients will improve safety.

Health IT and content developers, clinicians, pharmacists, hospital administrators, and IT and other subject matter experts must work collaboratively to optimize technologies—including the incorporation and use of clinical decision support tools and technology standards—to improve outcomes related to drug allergy interactions.

You can access the full complement of materials at hitsafety.org or at www.ecri.org/safepractices.
References


About ECRI Institute and the Partnership for Health IT Patient Safety

ECRI Institute is an independent, nonprofit organization improving the safety, quality, and cost effectiveness of care across all healthcare settings. The combination of evidence-based research, medical device testing, and knowledge of patient safety makes ECRI uniquely respected by healthcare leaders and agencies worldwide. For more than 50 years, ECRI Institute has had an unwavering dedication to transparency and strict conflict-of-interest policies. The organization has earned a reputation as the trusted voice of unbiased, research-based assurance for tens of thousands of members around the world using its solutions to minimize risk and improve patient care.

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In 2013, ECRI Institute convened the Partnership for Health IT Patient Safety (Partnership), in part because of ECRI Institute’s long history of cutting-edge patient safety initiatives, and in part, in response to the growth in recognition that action was needed not only to fully realize the benefits of health information technology, but to involve the appropriate parties in the identification, classification, aggregation, analysis, and development of solutions to the ever-increasing concerns attributed to health information technology. The Partnership was established to make healthcare safer by understanding and mitigating health IT hazards and safety events. For more information on the Partnership, please visit our website.