Using Generative AI to Redesign Drug-Drug Interaction Alert Text for Clinical Decision Support

ASHP Artificial Intelligence Case Studies

David Dulak, PharmD, BCPS
Fort HealthCare
Fort Atkinson, WI

Case Study Type: Clinical Decision Support

Tool Type: Clinician or Internal-Facing, Internally Developed

Case Overview:
Pharmacy informatics used a generative AI large language model (LLM) as a drafting and synthesis tool to redesign drug-drug interaction (DDI) alert text for use in our electronic health record (EHR). Existing interaction monographs are clinically comprehensive but often lengthy and not optimized for rapid decision-making during order entry. The pharmacist supplied source interaction monographs, supporting clinical references, and local workflow constraints; the AI helped summarize evidence into standardized, action-first alert formats such as contraindicated, generally avoid, adjust dose, monitor closely, or separate administration. It also helped identify clinically meaningful class effects, exceptions, alternative therapies, route/formulation differences, and monitoring recommendations. Every AI-generated recommendation remained subject to pharmacist review and source verification before EHR build. The goal was not to replace drug-information references or clinical judgment, but to accelerate content development while improving consistency, readability, and actionability of medication safety decision support.

Tool and Project Details:
The LLM was used as a stand-alone generative AI drafting assistant; it was not directly integrated with the EHR and did not make autonomous clinical decisions. Source material included drug-interaction monographs, product labeling, selected practice references, and locally defined alert-design rules. The pharmacist provided the source material and clinical context, refined the AI output iteratively, verified recommendations, and manually translated approved text into the EHR. The workflow did not require patient-level information. Existing drug-information resources remained the clinical source of truth.

Key Elements of Success:
A pharmacist-led workflow was essential: source monograph/information → AI draft → pharmacist critique/revision → source verification → EHR build. Standardized formatting rules improved consistency, including action-first summaries, limited use of “APPLIES IF”/“DOES NOT APPLY IF,” brand/generic clarification when management differed, and class-based alerts only when the clinical action was truly shared. AI was used for synthesis and drafting rather than final clinical determination. General organizational support was obtained from clinical leadership, including the Chief Medical Information Officer, and the IT team to proceed with implementation. Approval was provided for the overall approach and workflow rather than for each individual AI-assisted alert revision.

Impact on Outcomes:
Formal patient-outcome or alert-override data have not yet been collected for this text-redesign initiative. Early qualitative benefits include faster development of complex interaction content, more consistent alert structure, clearer dose/monitoring/separation instructions, removal of redundant text, and easier inclusion of practical alternatives. The project also created a reusable pattern library for future medication-safety builds. Planned evaluation of user response, alert burden, and downstream clinical impact remains.

Role of the Pharmacy and Pharmacists:
Pharmacy informatics led interaction selection (based on clinical severity and potential alert burden), source review, prompt development, clinical interpretation, and final approval of alert text. The pharmacist determined whether interactions should be class-based or drug-specific, evaluated dose adjustments and monitoring recommendations, and decided when alternatives or exceptions were clinically useful. Generative AI served as a drafting and synthesis aid only; it did not independently approve content. Final recommendations were verified against drug-information references before EHR implementation.

Budget & Resource Allocation:
No dedicated EHR-AI integration or new clinical software build was required for this workflow. Primary resources included existing access to generative AI, pharmacist informatics time for prompting and validation, drug-information references, and normal EHR build time. A formal financial ROI has not been calculated. The expected operational value is reduced content-development time and more reusable, standardized alert language while maintaining pharmacist oversight.

Lessons Learned:
Generative AI was most useful when paired with pharmacist oversight, primary literature, and established human-factors principles. Payne et al. (JAMIA 2015) and related human-factors literature supported minimizing text, using consistent terminology, prioritizing critical information, and making alerts directly actionable. Primary drug-interaction literature, product labeling, and practical references were used to validate drug-specific recommendations. AI could otherwise overgeneralize class effects, add low-value sections, or overstate alternatives. Post-build testing also identified that an EHR code-level change could alter alert formatting despite unchanged source text, reinforcing the need to validate the provider-facing display after system upgrades. Key lessons were to lead with the clinical action, preserve only management-changing nuance, remove redundant text, and independently verify every dose, interval, contraindication, and alternative.

[Payne TH, et al. Improving the usability of drug-drug interaction clinical decision support. J Am Med Inform Assoc. 2015;22:1243-1250.]

Future Goals & Ongoing Monitoring:
The alert library will continue to expand using the same standardized, pharmacist-validated workflow, including additional CYP/P-glycoprotein, binding, anticoagulation, and other high-value interactions. Future work may include measuring build efficiency, alert utilization/override behavior, provider feedback, and whether more actionable text changes prescribing decisions. Maintenance will require periodic re-verification against current labeling and drug references.

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