

# When is a drug interaction, not a drug interaction? Comparison of drug-drug interactions (DDIs) checking databases between the UK and USA

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## Background

- The drug-drug interaction (DDI) checking function of an electronic medical record (EMR) is helpful but can be a distraction, firing too many warnings and leading to alert fatigue. Anecdotally, hospital staff often ignore warnings.
- In addition, several DDI checking databases are in common use, which can give differing and possibly conflicting information.

## Objectives

- What is the concordance of DDI databases when evaluating identified high risk interactions alerts on an EMR system between UK and USA systems? Can the number of alerts be safely downgraded to reduce alert fatigue?

## Materials and Methods

- Comparison of drug-drug interaction (DDI) checking databases; Stockley's Drug Interactions (Stockley's) in the UK and Lexicomp (Lexi), Micromedex (MDX), and Facts and Comparison (Facts) in the USA.
- Based on their review, 477 interactions were recommended to be downgraded to moderate risk. These 477 interactions were further evaluated by a USA based senior pharmacist utilizing the DDI checking databases of Lexi, MDX, and Facts to identify the severity of the interaction.
- The agreement across all three databases, as well as between each database was analysed.
- Descriptive statistics analysed the difference between the ratings and agreement in each database with the Chi-Square Test and an alpha set to 0.01.

846 different DDI warnings tripped within Epic during November 2015. Reviewed by senior UK clinical pharmacists which also included the use of Stockley's Drug Interactions online (via MedicinesComplete).

477 (56%) of the 846 of high or significant warnings agreed to be downgraded to moderate and not to trip along with all other moderate level warnings

The proposed 477 to be downgraded was further evaluated by USA based senior pharmacist utilizing the DDI checking databases of Lexi, MDX, and Facts.

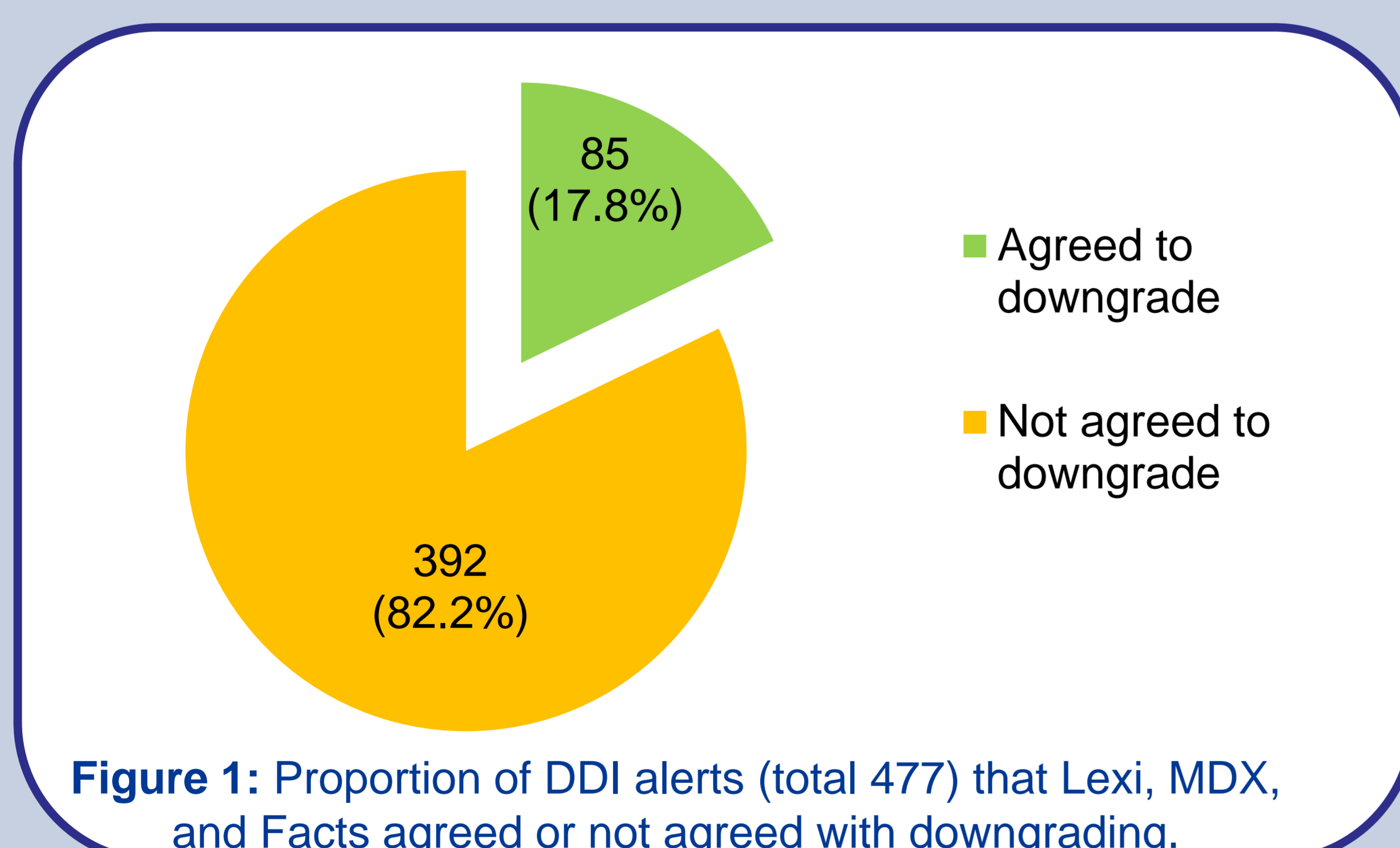


Figure 1: Proportion of DDI alerts (total 477) that Lexi, MDX, and Facts agreed or not agreed with downgrading.

## Results

- Of the 477 interactions evaluated, Lexi, MDX, and Facts, agreed on the rating only 17.8% (85/477) of the time (figure 1).
- Of these 85 interactions:
  - 80% (68/85) were no interaction/none reported;
  - 2% (2/85) were considered a moderate interaction;
  - and 18% (15/85) were considered a major interaction.
- However, for moderate interaction (4% versus 19%,  $p < 0.00001$ ) and major interactions (23% versus 55%,  $p < 0.00001$ ) MDX had a higher rate of agreement with Lexi compared to Facts.
- All three databases were significantly different from Stockley's ( $p < 0.001$ ).

## Discussion and Conclusions

- There are a number of DDI checking database tools available for the clinician to utilize.
- The interaction checker in an EMR seems to over-alert what it considers highly significant interactions.
- Based on common DDI checking databases (in the UK and USA), the concordance of results is very low.
- This study highlights the need for checking multiple sources and critically evaluating the impact of the DDI before taking action, either to consider downgrading an alert from the EMR or for managing the individual patient case.
- Of the original 846 DDI alerts – approximately 10% were agreed by both groups to be downgraded.

## Acknowledgments

The Epic Systems Corporation drug-drug interaction warnings tripped within Epic (at Cambridge University Hospitals NHS FT) during November 2015. This data was used in our evaluation. Stockley's Drug Interactions online via [www.medicinescomplete.com](http://www.medicinescomplete.com) Cambridge University Hospitals (CUH) NHS Foundation Trust (FT).