How can we reimagine antibiogram data?

Interactive Antibiogram Decision Support Tool Predicated Upon Infection Site and Probable Pathogens

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Background

Current methods for displaying summary antibiograms are static, have limited utility and are not user friendly.

Methods

Antibiotic susceptibility data for first, non-duplicate patient infection isolates with source/site data were collected from 2009–2018 at an integrated health system for the visualizations.

Iterative user-centered design sessions were held with healthcare providers to guide prototype development, including assessment of source groupings and rational for aggregating data. Three providers participated in initial and follow-up sessions (6 total) with study personnel. Data were aggregated by agreed-upon infection-source and pathogen; antibiotic results with <30 isolates were excluded.
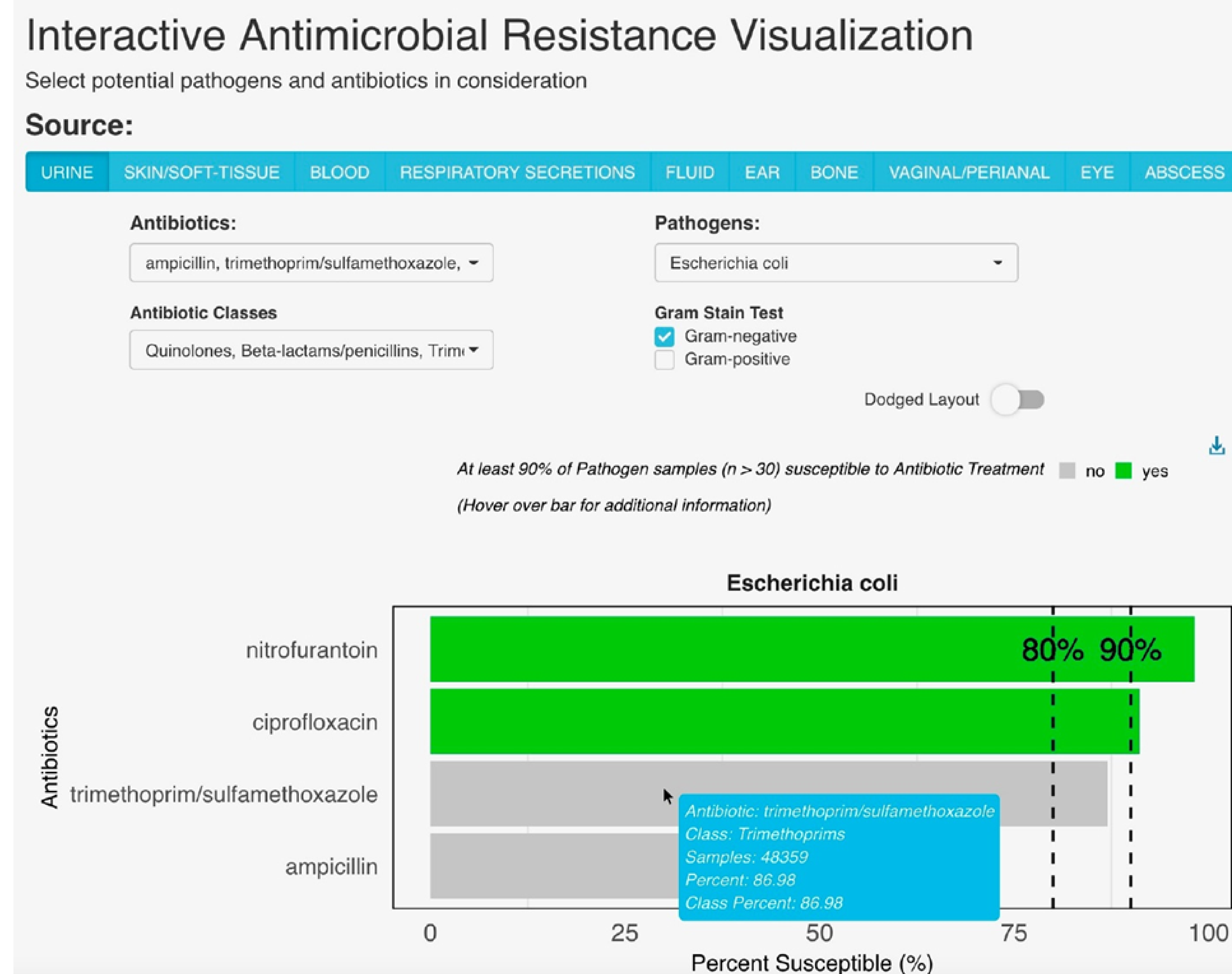
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Results

The multi-year dataset included:
- 119,333 non-duplicative isolates from 194 unique infection sites
- Nearly half were E. coli (n=50,404).

The large dataset collected supports **source-specific** susceptibility results (e.g. eye infections).

Figure 1. Visualization of urine isolates, *E. coli* and user selected antibiotics.

Final source groupings: Urine, Skin/Soft Tissue, Blood, Respiratory Secretions, Fluid, Ear, Bone, Vaginal/Perianal, Eye, and Abscess.

First an infection source is selected; the visualization then shows pathogen prevalence in descending order. Providers can view susceptibility results for all antibiotics or deselect all and view only those under consideration, such as the four displayed in **Figure 1**. Resulting bar charts allow providers to view which pathogens tested have greater than 80% or 90% susceptibility to each antibiotic.

Figure 2. Selected antibiotic susceptibilities for multiple pathogens can be visualized simultaneously with the dodged feature.
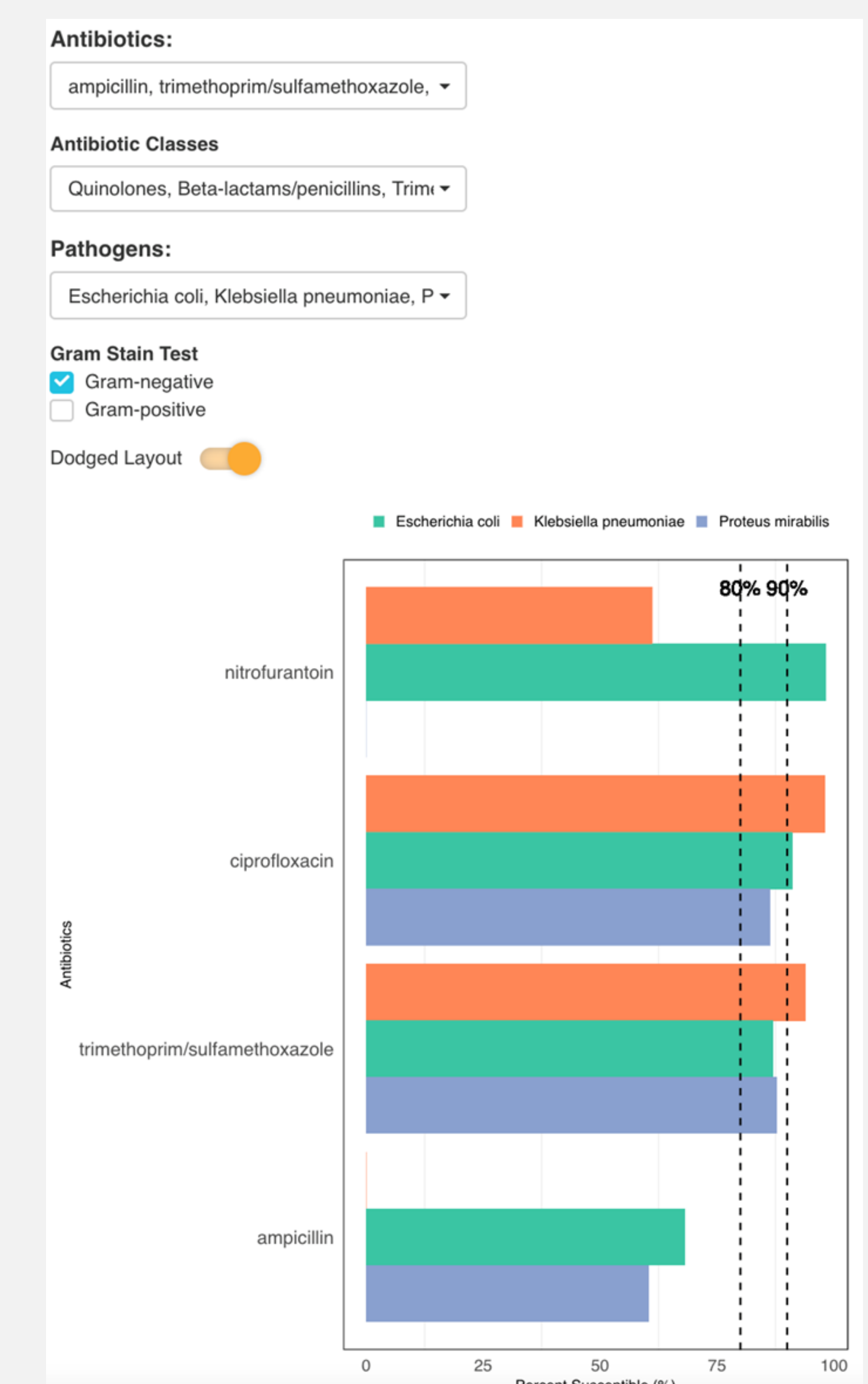
Conclusion

Our interactive antibiogram data clinical decision support tool extends the utility of the traditional lab-generated antibiogram. Importantly, future iterations will include visualizing changes by year, by clinical setting (inpatient vs. outpatient) and an assessment of uptake of this tool in the clinical setting.