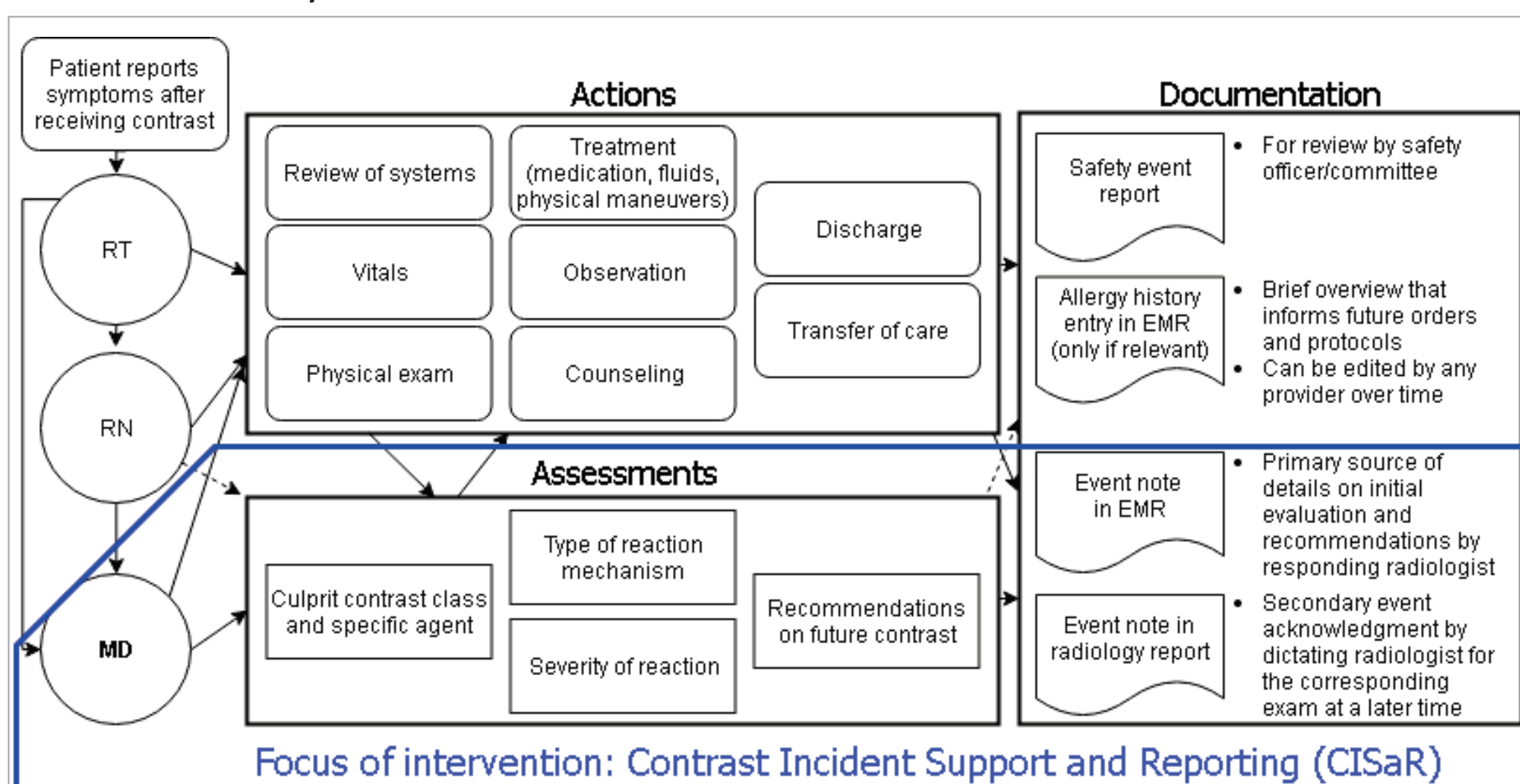


PURPOSE

Allergic-like and physiologic reactions can occur acutely following contrast media administration. An on-site radiologist, including trainees, is typically the first physician responder to such events. Key initial assessments of the event inform immediate as well as future management. These assessments include the culprit contrast class and specific agent, the type of reaction mechanism, and the severity of the reaction.



Process flow diagram on the key components and roles in the response to an adverse contrast reaction. To improve communication, we developed a tool to support radiologists' documentation of contrast incidents, with emphasis on assessments that can affect future radiologic care.

The responding radiologist should record these assessments explicitly and communicate a plan for contrast administration to those who may request or protocol radiologic exams for this patient in the future, rather than delegate these details for non-expert providers to record, for the patient to relay, or for future clinicians to infer.

However, documentation of clinical events in the electronic medical record (EMR) is a skill that radiologists infrequently practice, so important elements may be overlooked at the point of care (see Balfour et al., *JACR* 2015). Further, the American College of Radiology (ACR) recommends that contrast adverse events be documented in the radiology report, but because the responding radiologist may not be the one who interprets the corresponding study, the event is often omitted from the radiology report.

We propose that providing a semi-structured clinical documentation support tool can improve the completeness of radiologists' notes on acute contrast reactions.

METHODS

INTERVENTION

Contrast Incident Support and Reporting (CISaR) is a web browser-based application for acute contrast event documentation intended for the responding radiologist. Users look up the patient and imaging exam performed and then select boxes specifying elements such as contrast type, reaction mechanism and severity based on specific signs and symptoms (as defined in the ACR Contrast Manual), and treatments provided.

Based on those assessments, CISaR generates a recommendation for future contrast-enhanced studies. The user can edit or append the text. CISaR then creates an event report under an imaging accession (in Epic) and appends a brief statement in the associated radiology report (in PowerScribe).

ANALYSIS

Inclusions: acute contrast events identified by hospital safety reports involving Radiology (routinely filed by technologists or nurses) or CISaR reports

Exclusions: extravasation events, delayed contrast reactions reported after the encounter, acute drug reactions other than to contrast media, and near misses

Data source: chart review for event notes in the electronic medical record, specifically in Notes or Imaging activities but not the allergy history module

Outcomes: presence and completeness of event documentation by radiologists (inclusive of radiology residents and fellows)

Comparison: baseline (pre-intervention) vs. intervention phase (after introductory wash-in period)

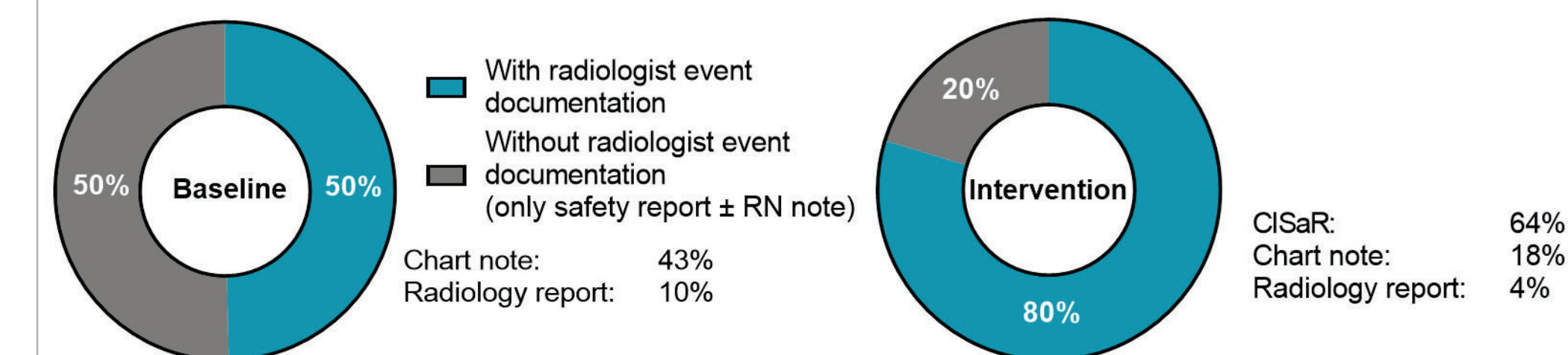
Statistics: Fisher's exact test

RESULTS

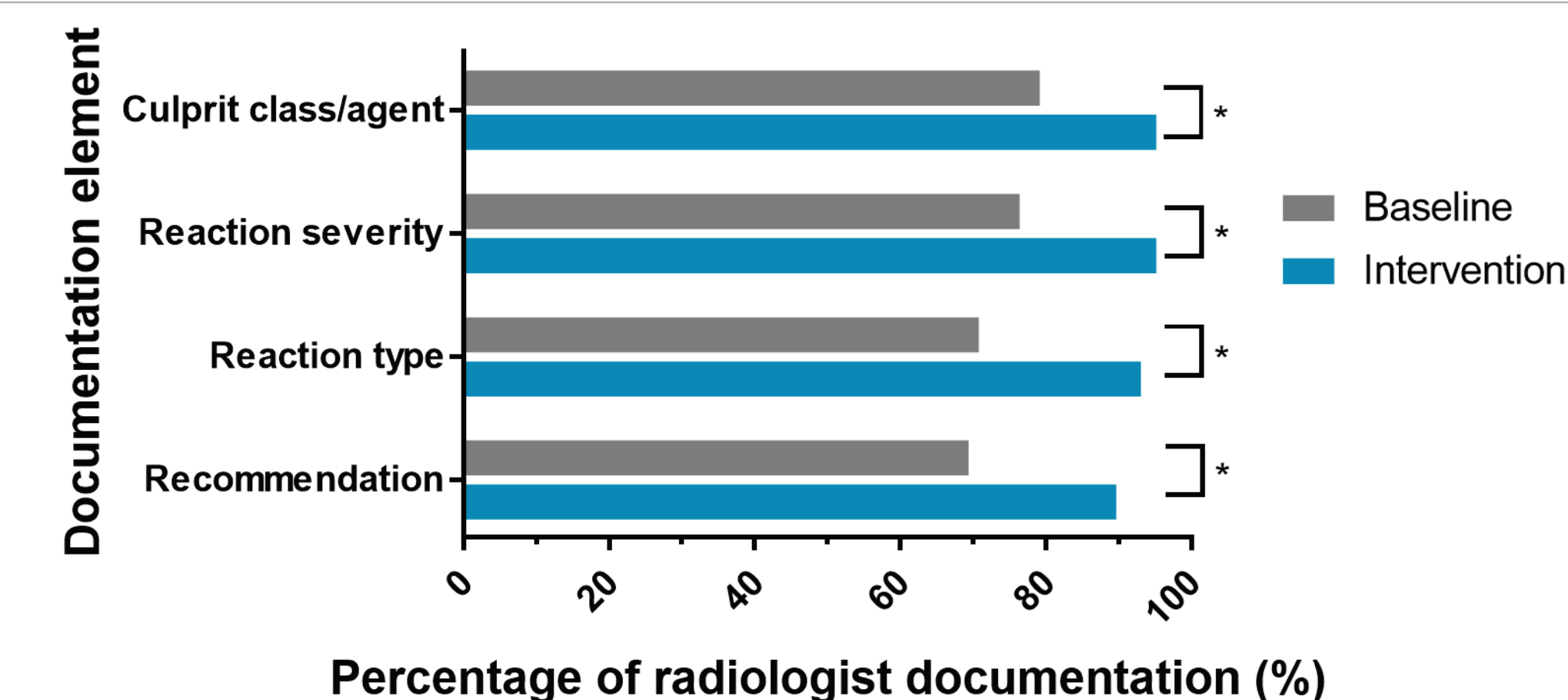
Baseline (8 mo)
N=149 events

Wash-in
3 wk

Intervention (9 mo)
N=183 events



Completion rate: Comparison of the proportion of acute contrast reactions that have any radiologist event documentation, which can be written in a chart note directly, in a radiology report directly, and/or via CISaR. $p < 0.0001$



Completeness rate: Comparison of the proportion of reactions with radiologist event documentation that contains each key element: the culprit contrast class or specific agent (eg, iodinated contrast), reaction severity (eg, mild), reaction type (eg, allergic-like), and a recommendation for future contrast exposure (eg, premedication). *, $p < 0.001$ for all comparisons.

CONCLUSION

High quality clinical documentation of acute contrast events by radiologists was observed following implementation of a semi-structured documentation tool that integrates with both the EMR and radiology reporting software. With the tool available, more events were documented by radiologists and greater than 90% of reports included the key assessments of the culprit contrast agent or class, reaction severity, and reaction mechanism type, as well as a recommendation for preventative management.