

United We Stand

Contrast Reaction Management Training for Outpatient Imaging Centers with Emphasis on Teamwork

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Purpose and Background

- Purpose:
 - Create capable, well-trained teams by restructuring contrast reaction training in a large private practice's outpatient imaging centers in order to enable efficient and effective team response to contrast reactions.
- Background:
 - Following a life threatening contrast reaction, root cause analysis revealed significant deficiencies involving contrast reaction management and associated training.
 - Two of the authors attended a reaction management training course, assisting in the development of our interdisciplinary training plan.
 - Teams of respondents included radiologists, radiology residents, nurses, radiology technologists, and patient care assistants. Over 130 personnel participated.

Methods: Three Phase Approach

Phase 1

Standardization

Phase 2

Education

Phase 3

Simulation

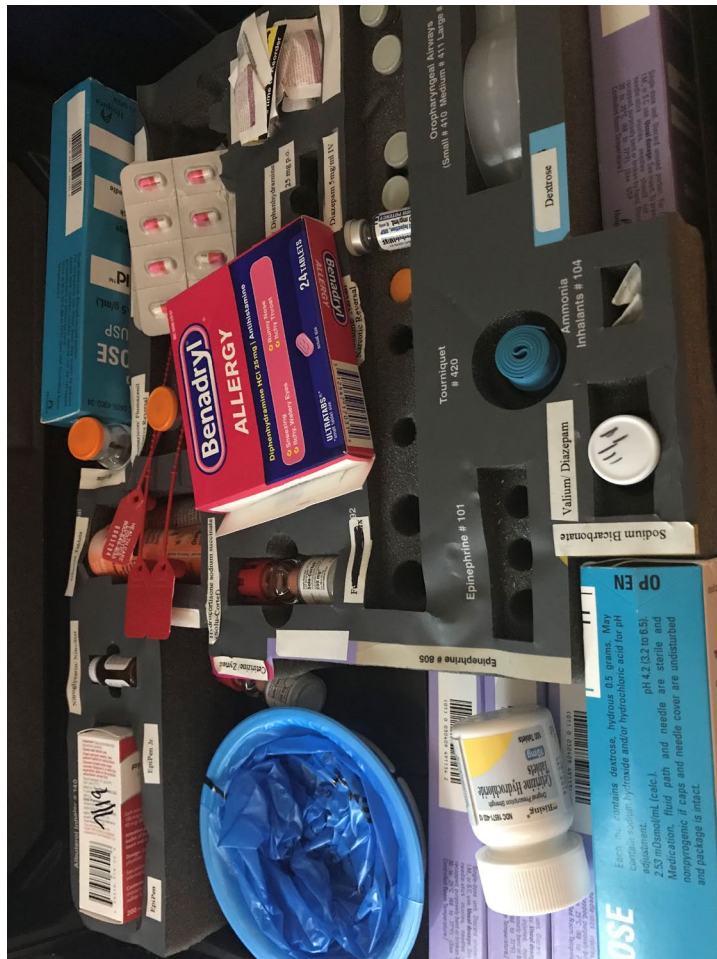
End State

Quantitative and
Qualitative
Metrics

Phase 1: Standardization

- Start:
 - Instructors visited each outpatient location.
- Key Tasks:
 - Assessed existing equipment.
 - Interviewed pharmacists, nurses, and technologists regarding current contrast reaction practices.
 - Identified essential equipment and medications needed to manage reactions.
 - Brief clinic personnel on use and location of new standardized reaction boxes.
- End:
 - Standardized and simplified emergency contrast reaction boxes across all outpatient clinics.

Phase 1: Standardization



Key Reaction Kit Contents:

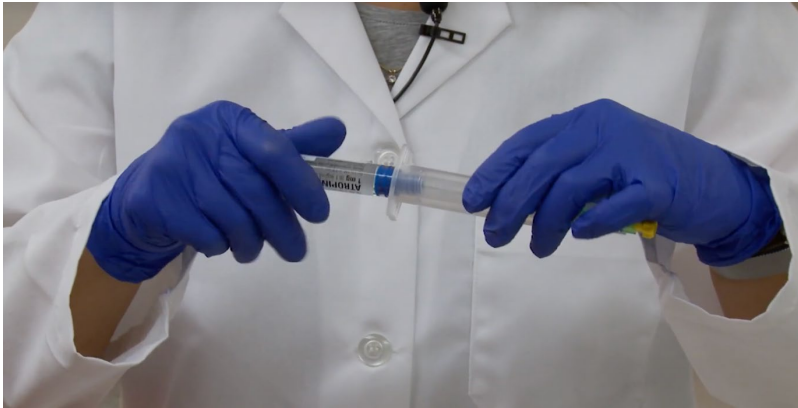
- IV/IM Epinephrine Kits
- Atropine
- Albuterol Inhaler
- Benadryl
- Pulse Oximeter
- Written Medication Guide
- Recorder/EMS handoff sheet

Prior to Standardization

After Standardization

Phase 2: Education

- Start:
 - Administered written test to assess baseline knowledge of physicians, residents, nurses, and PCAs.
- Key Tasks:
 - Personnel complete educational slide presentation with pre and post assessments.
 - Results indicated an additional training modality was needed prior to the simulation lab.
 - Created professionally recorded videos of five common contrast reactions, as well as six medication 'how to' videos.
 - Participants watched online videos with pre and post assessments.
- End:
 - Participants now maximally prepared for simulation lab. Eight data points gathered to assess training program effectiveness.



Video Screenshots

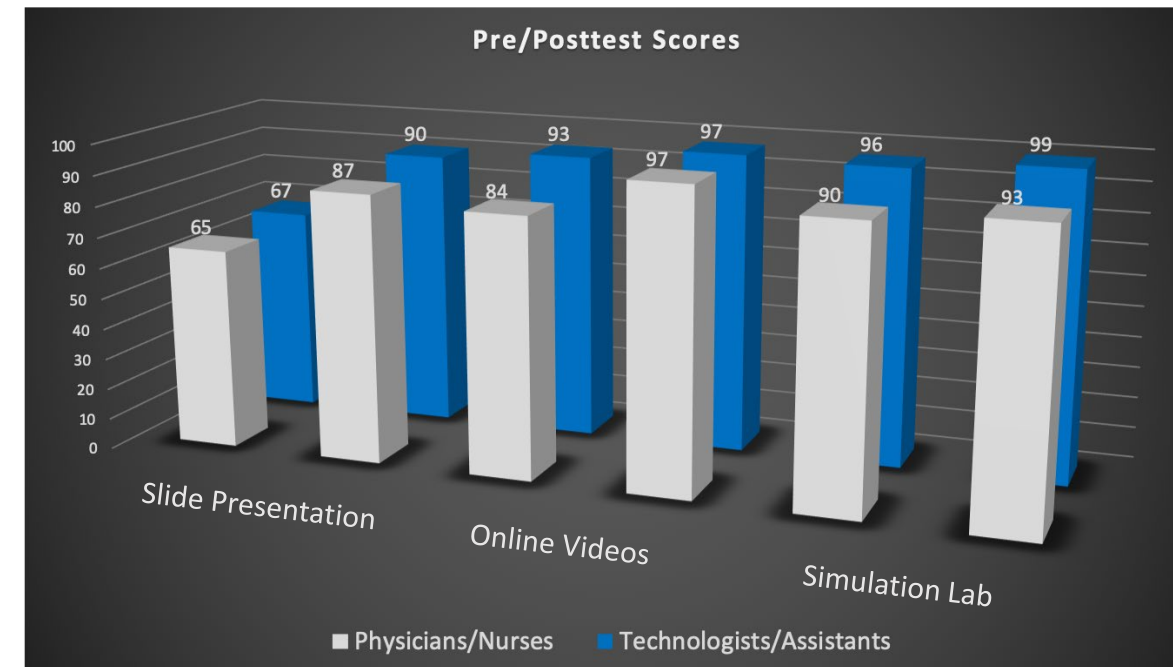
Medication preparation, bronchospasm, laryngeal edema, hives, reaction box overview, EMS handoff (starting top left, counterclockwise).

Phase 3: Simulation

- Start:
 - Teams of 4-6 participants consisting of at least one physician, nurse, technologist, and PCA were given a simulation lab pretest.
- Key Tasks:
 - Utilized a robotic manikin, capable of producing clinical symptoms and real time change to vital signs with various interventions.
 - Teams responded to six different contrast reaction simulations: hives, bronchospasm, laryngeal edema, vasovagal, anaphylaxis, and multi-symptom.
 - Participants utilized the standardized emergency contrast reaction box.
 - A debrief was completed after each simulation.
- End:
 - Over 130 participants completed the final simulation lab training. Four additional quantitative data points gathered as well as qualitative data from surveys.

Results

- Quantitative Data:
 - Collected from multiple choice exams administered before and after each training modality; net of 12 data points.
- Statistically significant improvement by both groups during the first two phases ($p < .05$)
- Statistically significant improvement by both groups from initial assessment to completion of the training program ($p < .05$)
- Posttest scores improved with each phase of the program
- Qualitative: preference for video/simulation training. Lack of standardization/knowledge prior to training.



Conclusion

- Meaningful improvement throughout the training program
- Multiple learning modalities:
 - Prior to simulations, pretest scores above 90%, improving from initial 65%.
 - Qualitative data collected reinforced the three-part training program.
- Simulation lab cost:
 - Well prepared teams allows efficient use of time
 - Supplemental videos may be a lower cost alternative.
- Subjectively:
 - Participants enthusiastic about simulation lab training.
 - Rotating various roles amongst team members yielded higher success/fluidity.
- Way forward:
 - Surveys to measure confidence levels. Future on site/in-clinic training.