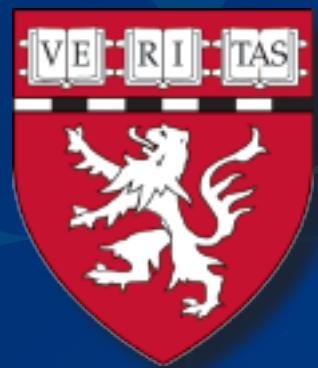


# IMPACT OF A 3 YEAR QUALITY IMPROVEMENT INITIATIVE ON DEPARTMENTAL PERFORMANCE ON COMMUNICATION OF CRITICAL TEST RESULTS



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## PURPOSE

Timely communication of critical test results (CCTR) is fundamental to clinical practice and patient safety. We investigated the impact of a 3-year quality improvement initiative on the timeliness and effectiveness of communicating critical and discrepant imaging results.

## MATERIALS AND METHODS

A departmental CCTR policy was developed and implemented in February 2006 based on recommendations from the Joint Commission, the American College of Radiology, and the Massachusetts Coalition for the Prevention of Medical Errors. The policy defined types of findings (critical or discrepant), urgency level (red, orange, or yellow alert), timelines for notification by urgency level (red within 60 minutes, orange within 3 hours, yellow within 3 days), acceptable modes of communication, escalation process to assure timely communication, and method of measuring adherence to policy. Adherence to CCTR policy was measured by periodic review of all radiology reports from a single day sample between February 2006 and May 2009.

## RESULTS

12,193 radiology reports were reviewed during 17 quality assurance audits. 9.2% of all reports reviewed met CCTR policy criteria for critical results. Adherence to CCTR policy rose from 28.6% in the first month to 68% by the third month, reaching 90% by the 17th month ( $p < 0.001$ ).

## CONCLUSION

Development, implementation, monitoring, and reinforcement of CCTR policy resulted in substantial improvement of departmental performance for CCTR. We anticipate automation of CCTR reporting to further improve patient safety and quality of care.

## INTRODUCTION

Timely communication of critical test results (CCTR) is fundamental to clinical practice (1). Delays and failure in communicating results pose a significant threat to patient safety and are a significant source of medical malpractice claims in radiology (2-4). Prior studies have found failures in communication to be very common, with reported rates ranging from 3-30% of all abnormal test results failing to be communicated in a timely manner (5, 6). To address these concerns, the Joint Commission (JC) once again named CCTR one of the 2009 National Patient Safety Goals (7). However, there are no national performance standards for CCTR.

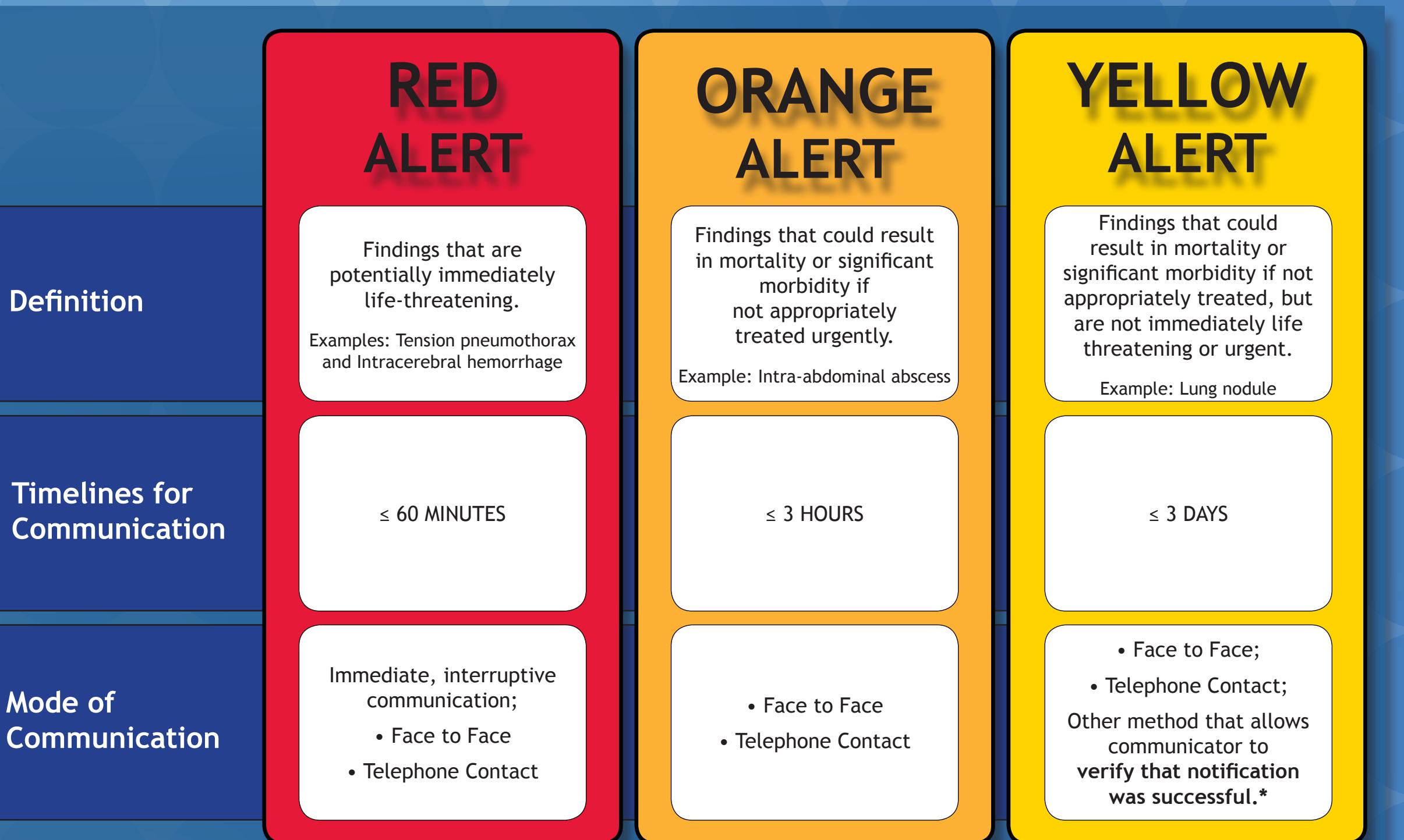
In February 2005, the Massachusetts Coalition for the Prevention of Medical Errors and the Massachusetts Hospital Association formed a Consensus Group that issued Safe Practice Recommendations for timely and reliable reporting of critical results (8). The Consensus Group comprised a multi-disciplinary stakeholder group with physician and nurse representation from laboratory, cardiology, pathology, radiology, and other disciplines. Based on these recommendations, we developed a departmental policy for CCTR that set clear guidelines and procedures for notification of the patient's healthcare provider for imaging exams with critical and/or discrepant findings. We report on the impact of a three-year quality improvement initiative to implement the CCTR policy, monitor adherence, and perform continuous process improvement for CCTR.

## METHODS

This retrospective study was performed at a 752-bed adult urban tertiary academic medical center with over 600,000 radiology procedures annually. We developed a critical results reporting policy to meet JC requirements based on Safe Practice Recommendations of the Massachusetts Coalition for the Prevention of Medical Errors (CITE). The CCTR policy was implemented in February 2006. Key components of the policy included:

**1. Definition of critical results.** A critical result was defined as a finding requiring direct notification of a member of the patient's care team including a) a new/unexpected radiologic finding that could result in mortality or significant morbidity if appropriate diagnostic and/or therapeutic follow-up steps are not undertaken, or b) an interpretation that is significantly different from a preliminary interpretation already communicated.

**2. Stratification of critical results by urgency: timelines for communication.** Three categories were created to define appropriate notification time parameters for communication critical results (red, orange, yellow alerts). A red alert included critical results that were potentially immediately life-threatening, such as a tension pneumothorax, ischemic bowel, or intracerebral hemorrhage; red alerts required immediate interruptive notification of the care team within 60 minutes of discovery of the findings. An orange alert included findings that could result in mortality or significant morbidity if not appropriately treated urgently (within 2-3 days), such as an intra-abdominal abscess or impending pathological hip fracture; notification was required within 3 hours of discovery of findings. A yellow alert included findings that could result in mortality or significant morbidity if not appropriately treated but are not immediately life-threatening or urgent, such as a solitary pulmonary nodule or solid renal mass; notification was required within 3 days of discovery of findings.



Purpose: Notification of the patient's healthcare provider when the radiologist determines that an imaging study has new and unexpected findings that could result in mortality or significant morbidity.

The details of the communication must be clearly documented in the radiology report and contain name of the communicator, date and time of communication, and name of the recipient of communication. For example, "Critical findings were communicated by Dr. [radiologist] to Dr. [surgeon] at 3:15pm on Monday, January 3, 2009."

The person communicating the critical/discrepant radiological findings should be certain that the member of the patient care team is aware of the critical nature of the findings.

\* Per the JC and BWH Policy, e-mail is not a verifiable method of communication.

Figure 1. Diagram capturing key aspects of the departmental policy.

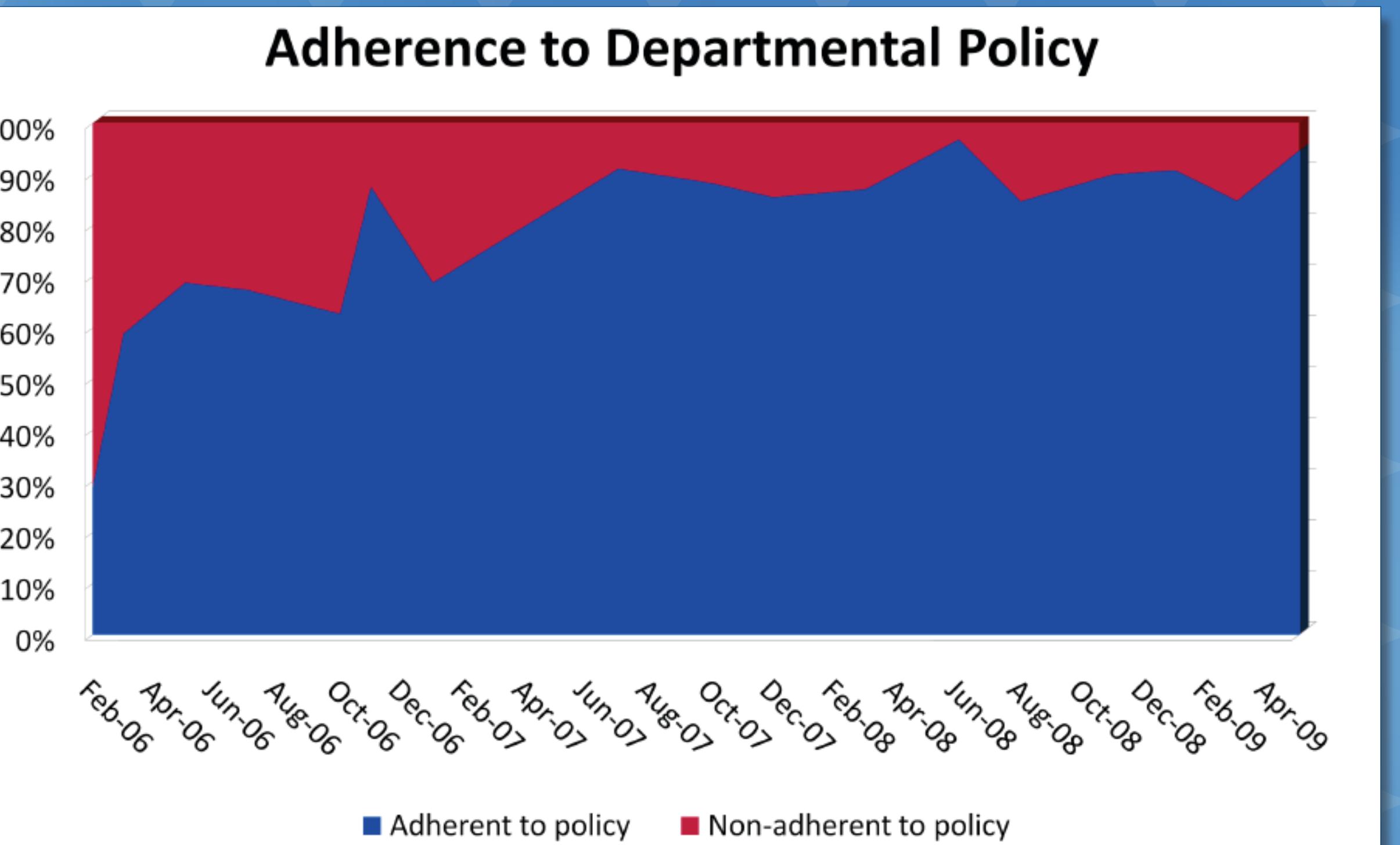


Figure 2. Graph demonstrating the percentage of analyzed reports that adhered to departmental policy throughout the study period.

**3. Escalation process to assure timely communication.** In the rare event that there was a red alert and no member of the care team could be reached within the 1-hour timeline, the attempt to communicate proceeded according to the following escalation process. For inpatients or outpatients cared for by BWH physicians: 1) referring MD / covering MD / house-staff / member of care team; 2) attending MD; 3) chief of service; 4) department chair; 5) chief medical officer. For outpatients cared for by a non-BWH physician: if the patient's physician or other care team member could not be contacted, the patient should be contacted and directed to go to the BWH ED (or nearest ED) for red/orange alerts and to follow up with his/her physician for yellow alerts.

**4. Mode of communication:** Red and orange alerts required communication via face-to-face or telephone contact. The person communicating the critical/discrepant radiological finding must be certain that the member of the patient care team was aware of the critical nature of the findings. Yellow alerts could be communicated by face-to-face, telephone contact, or another method that allowed verification that notification was successful. Per JC and hospital policy, e-mail was not considered a verifiable method of communication.

**5. Documentation.** The details of the communication must be clearly documented in the radiology report and contain name of the communicator, date and time of communication, and name of the recipient of communication. For example, "Critical findings were communicated by Dr. [radiologist] to Dr. [surgeon] at 3:15pm on Monday, January 3, 2009." In order to measure departmental adherence to the communication policy, we conducted a periodic review of reports. Every other month, all reports generated during a single day were reviewed by each section head or his/her designee to determine whether each report met CCTR policy. Reports were assigned to one of the following categories: A) Result was critical/discrepant and communication timeline met policy requirements; B) Result was critical/discrepant and communication timeline did not meet requirements; C) Result was critical/discrepant but no communication was documented; or D) Result was not critical or discrepant.

Reports were reviewed during 17 audits between February 2006 and May 2009. We measured and published departmental adherence to CCTR policy on our web-based quality dashboard. Each section head reviewed reports that did not meet CCTR policy with the responsible radiologist. In addition to the periodic audits, all complaints related to CCTR from referring providers were investigated and discussed with responsible radiologists and section heads. Statistical analysis was performed using SPSS Statistics version 17.0 (SPSS Inc., Chicago, IL). Pearson's chi-square test for independence was performed at a significance level of  $p < 0.05$ .

## RESULTS

12,193 radiology reports were reviewed. 9.2% of all reports reviewed met CCTR policy criteria for critical results, with no significant variation during the study period ( $p < 0.05$ ). Adherence to CCTR policy rose from 28.6% in the first month to 68% by the third month, reaching 90% by the 17th month ( $p < 0.001$ ).

## DISCUSSION

In a three-year continuous quality improvement initiative on CCTR, we found that the majority of radiology critical results did not meet CCTR policy guidelines at the start of the initiative, but implementation and monitoring increased adherence rate to greater than 90% by the 17th month. Our findings highlight both the scope of delays and failures in communicating critical results and the potential for significant improvement through a CCTR quality improvement initiative.

The setting in which we conducted our quality improvement initiative has likely impacted our ability to successfully implement the CCTR policy. Our setting is an academic environment with outpatient providers using common EMR / paging system. Additionally, commitment by senior hospital leadership to patient safety and Quality Improvement (QI) initiatives potentially contributed to our results.

One limitation in our study is lack of baseline data on the number of radiology reports failing to communicate critical results in a timely fashion before implementation of the CCTR quality improvement initiative. The roll-out of the CCTR policy and significant physician education efforts likely increased adherence rates during first audit in February 2006 over prior baseline. In addition, future work will investigate whether non-adherence was associated with ordering provider practice settings (inpatient, emergency, ambulatory) and the impact of a non-network ordering provider on CCTR adherence.

Future efforts towards quality improvement include introduction of an automated critical alerts management system that is able to enforce, measure and report on adherence to current policy (9).

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