Impact of a Four-Point Order-Priority Score on Imaging Examination Performance Times

Ryan P. McWey, MD[a], Michael D. Hanshew, MS[a], James T. Patrie, MS[b], Dustin M. Boatman, MD[a], Cree M. Gaskin, MD[a]

Abstract

Background: Many hospitals use a traditional categoric system (eg, STAT, ASAP [as soon as possible], routine) to prioritize orders for imaging examination performance. If left undefined, these categories contain ambiguity, which contributes to errant or misused categorizations, and ultimately, lost opportunity to optimally direct resources toward timely patient care. Our hospital implemented ordinal order-priority categories with specific definitions. We sought to determine the impact of this prioritization method on examination performance time and consistency.

Methods: A four-level numeric priority system with clinical definitions for each category was implemented in 2011 to replace a traditional model for hospital imaging orders. Retrospective analysis was performed on imaging orders for three years (2011-2013) after implementation, to assess the order-to-performance time (OTPT), defined as the time between order placement by the provider and examination completion by the technologist. Consistency was measured by the length of the interquartile range for the OTPT distribution. Comparison was made to orders from the preimplementation year (2010), as a control.

Results: The OTPT and OTPT consistency for performed examinations were both predictably stratified by order-priority level. Relative to control, we observed a reduction in the percentage of prioritized examinations, as well as modest general improvements in OTPT and OTPT consistency.

Conclusions: A revised order-priority system with ordinal categorizations and clinical definitions accompanying each priority level at order entry yielded desirable prioritization of imaging examination performance by technologists, as evidenced by appropriate stratification of turnaround times and consistency by level of priority.

Key Words: Examination prioritization, performance times, turnaround times, order priority

J Am Coll Radiol 2016;13:286-295.

INTRODUCTION

Enterprise ordering systems for imaging, laboratory, and other ancillary services use traditional priority categorizations, such as STAT, ASAP (as soon as possible), and routine. The ordering provider chooses one of these categories to inform the receiving service of the relative urgency of the order. Although these categorizations generally convey urgency, or lack thereof, if left undefined, the terms can be ambiguous or competing and may not apply clear stratification of relative priority, leading to lost opportunity to prioritize care delivery. An additional concern is that these categories commonly lack definitions to restrict or guide their usage, contributing to overuse or misuse [1,2]. For example, 74% of orders for portable chest radiographs were reported as STAT at one academic medical center [2].

The peer-reviewed literature has documented the benefit gained from a binary system offering STAT and routine

[a]Department of Radiology and Medical Imaging, University of Virginia Health System, Charlottesville, Virginia.

[b]Department of Public Health Sciences, University of Virginia Health System.

Corresponding author and reprints: Cree M. Gaskin, MD, Box 800170, Department of Radiology and Medical Imaging, University of Virginia Health System, 1215 Lee St, Charlottesville, VA 22908; e-mail: cree@virginia.edu.

C.M.G. receives author royalties from Thieme Medical Publishers and Oxford University Press. The other authors have no conflicts of interest related to the material discussed in this article.

1546-1440/15/$36.00 ■ http://dx.doi.org/10.1016/j.jacr.2015.08.023

options, compared with no prioritization at all [3-5]; however, evidence is lacking to guide management of more-complex scenarios common in today's health care environment. Although one could argue that all emergency department (ED) orders should be STAT, rather than routine, given patient expectations and institutional throughput requirements, this binary system then fails the patient who is in a code category, stroke alert, or trauma alert, because the urgency of their situation is "diluted" by other STAT orders that are less clinically time sensitive. Unfortunately, a binary system is not sophisticated enough to handle multiple patient-care scenarios across an enterprise. This lack of complexity may lead to the propagation of additional undefined order-priority categories (eg, ASAP, now, critical, discharge pending), which paradoxically may introduce further ambiguity into the prioritization process.

Ordering providers are best positioned to understand the relative urgency of imaging examinations for their patients; however, they cannot be expected to effectively communicate complex information for examination prioritization without an ordering system that facilitates the process. When implementing a new electronic health record (EHR; EpicCare; Epic Systems, Verona, Wisconsin) and radiology information system (RIS; Radiant; Epic Systems) in March 2011, our institution revised its imaging order prioritization schema to attempt to address the limitations just described with the traditional model for inpatient and ED imaging examinations. More specifically, order-priority categories were made numeric, to be more clearly ordinal, and were accompanied by brief clinical definitions at order entry to attempt to provide guidance and improve clarity in the prioritization of imaging examination performance to the ordering provider and the receiving technologist.

Ideal prioritization of imaging examination performance means that the most time-sensitive clinical scenarios receive the fastest turnaround times, with great consistency and without need for additional verbal input to further facilitate the process. We hypothesized that our institution's new or at least redesigned model would result in desirable prioritization of imaging examination performance by appropriately stratifying median turnaround time and turnaround time consistency by level of priority. The purpose of this study was to retrospectively evaluate the impact of this defined numeric order-priority system on the prioritization of imaging examinations at our large academic institution.

METHODS

This HIPAA-compliant study did not necessitate formal institutional review board approval because our methodology was restricted to deidentified information.

New Order-Priority System

Our institution implemented a radiology-specific numeric order-priority system for inpatients and ED patients in March 2011, replacing our existing traditional undefined order-priority categories. Four new hierarchic order-priority categories (priorities 1-4) were established and defined with basic clinical scenarios at order entry (Table 1). Providers received three minutes of instruction on this prioritization schema during their new EHR training. Brief definitions were displayed in the EHR at order entry to guide the ordering providers in selecting the appropriate priority category. Additionally, an electronic requirement was implemented, whereby an order could not be placed until a priority category was selected.

Table 1. Clinical definitions for the new numeric priority system as provided to the ordering users during a brief training session prior to implementation

Priority Level	Description
1—Critical/Alert	Absolute most urgent studies; used sparingly; eg, stroke alerts, trauma alerts, codes, operating room instrument miscount
2—Emergent/Inpatient spine clearance	ED nonalerted traumas, as well as most other ED patients; trauma spine clearance on inpatients
3—Urgent/Discharge pending	Unit patients and other acutely ill inpatients as well as inpatients whose procedure or discharge are dependent on their exam
4—ASAP/Most inpatients	Default for most inpatient exams not defined above; performed ASAP after more urgent exams

Note: Institutional definitions inform ordering providers about appropriate clinical scenarios for each level of priority, eliminating guesswork and potentially reducing the misuse or overuse of high-priority ranking. Priority 1 is established as a more-urgent category, above what is commonly considered STAT at other institutions (eg, most emergency department examinations; our priority 2), so that providers can better communicate the most truly time-sensitive minority of examinations to technologists to perform first. The term "routine" has been replaced by "most inpatients," to indicate that most inpatients will be done "as soon as possible," presuming no other more-urgent clinical scenario needs to be addressed first. The system is numeric to communicate clear hierarchy regarding level of urgency to the technologists and other parties.
ASAP = as soon as possible; ED = emergency department.