

Expediting CT Imaging in Patients with Known Creatinine and Pregnancy Status



Shane Hnatusko, DO PGY-4

Faculty Advisors: Tyler Evilsizer, DO, Anastasia Fisher, DO

INTRODUCTION

It is standard to obtain a negative pregnancy test in any female patient of childbearing age prior to obtaining computed tomography (CT) imaging. This is done to help reduce unnecessary radiation to the developing fetus, and furthermore, to limit the potential side effects of intravenous contrast dye. Similarly, it is standard to obtain a serum creatinine prior to using intravenous contrast in any patient at risk for acute or chronic renal insufficiency. This institutional practice is driven based on the controversial and theoretical risk of contrast induced nephropathy.

In our current system, the orders for CT and laboratory tests are placed by the treating physician. The radiology technician then waits until the appropriate test results are ordered and resulted before performing the imaging study. In some cases, the treating physician deems pre-imaging testing unnecessary, however this often leads to substantial delays because of errors in direct communication between the treating physician and the radiology department. Delays in imaging can cause substantial delays in patient care, and potentially place patients at risk for poor outcomes.¹

Some common reasons why pre-imaging testing is bypassed:

- 1) Emergent need for imaging
- 2) Test results were obtained in a reasonable timeframe prior to the current visit
- 3) The patient presents as a transfer and results were obtained from the outlying facility

Currently, there is no reliable way to communicate the decision to forego testing with the radiology department. The current practice relies on verbal communication to discuss the plan to forego imaging. In the setting of a busy emergency department, this method has served to be an unreliable and undocumented form of communication.

OBJECTIVES

We propose the addition of an option, that is directly linked to the imaging study order, which documents why the treating physician is bypassing the tests and/or to input lab values that have been previously obtained. We predict that by adding a reliable and direct way of communication to the order, we will eliminate the current confusion and delays that we experience regularly. In turn, this will lead to faster imaging times and more reliable communication with the radiology department.

PROJECT DESIGN

We contacted Tatum Caldwell, Kim Coleman, and Gayla Marler to facilitate the changes to the CT orders in Meditech. **Figure 1** is an example of the current CT orders seen in Meditech. **Figure 2** is the same order with the anticipated bypass changes. **Figure 3** is an example of the current printout received by the radiology technician, while **Figure 4** is the same printout with the bypass changes.

Once the changes were completed in Meditech, information about the changes and directions on how to use them were provided to the emergency department residents, as well as the radiology technicians. Furthermore, the bypass alert was prominently displayed on the order printout to facilitate the recognition of the changes.

PLAN OF EVALUATION

Subjective information was gathered from the emergency department residents about any perceived improvements. A short survey was provided using SurveyMonkey Inc.² to first assess for familiarity with the changes, and then the presence of subjective improvements in imaging delays, reliability of communication, and overall functionality of the bypass changes. Since this project was created based off the observations of the emergency department physicians, this information was predicted to serve as validation for progress made in the present work environment.

CHANGES MADE

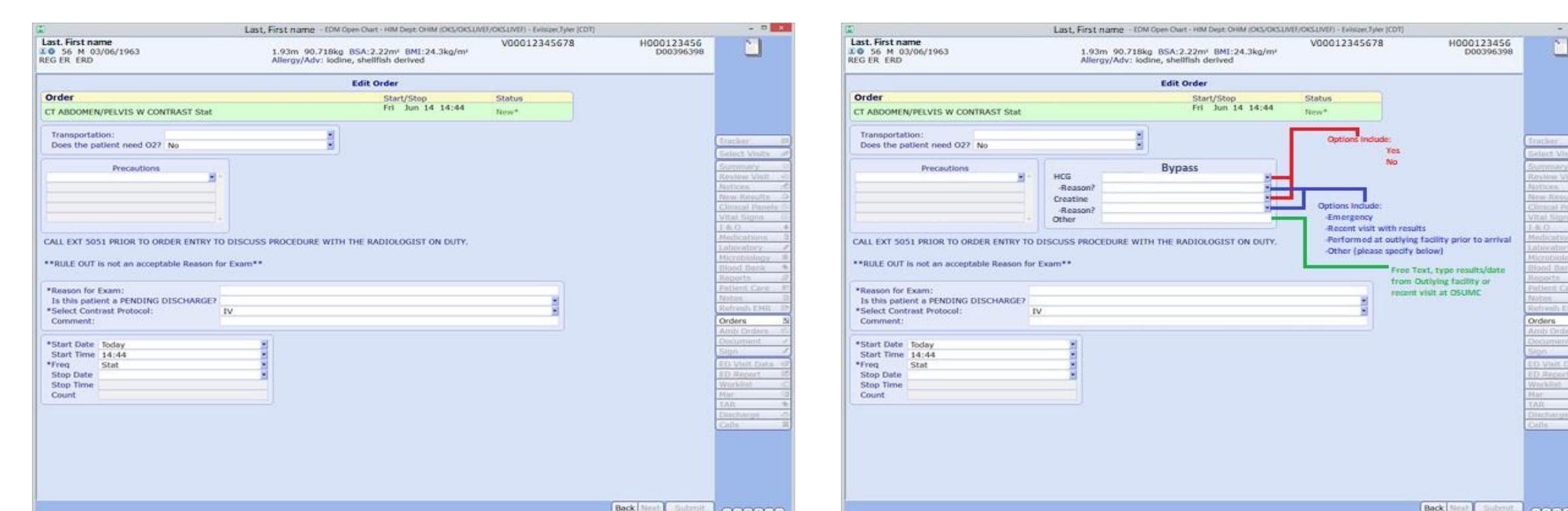


Figure 1

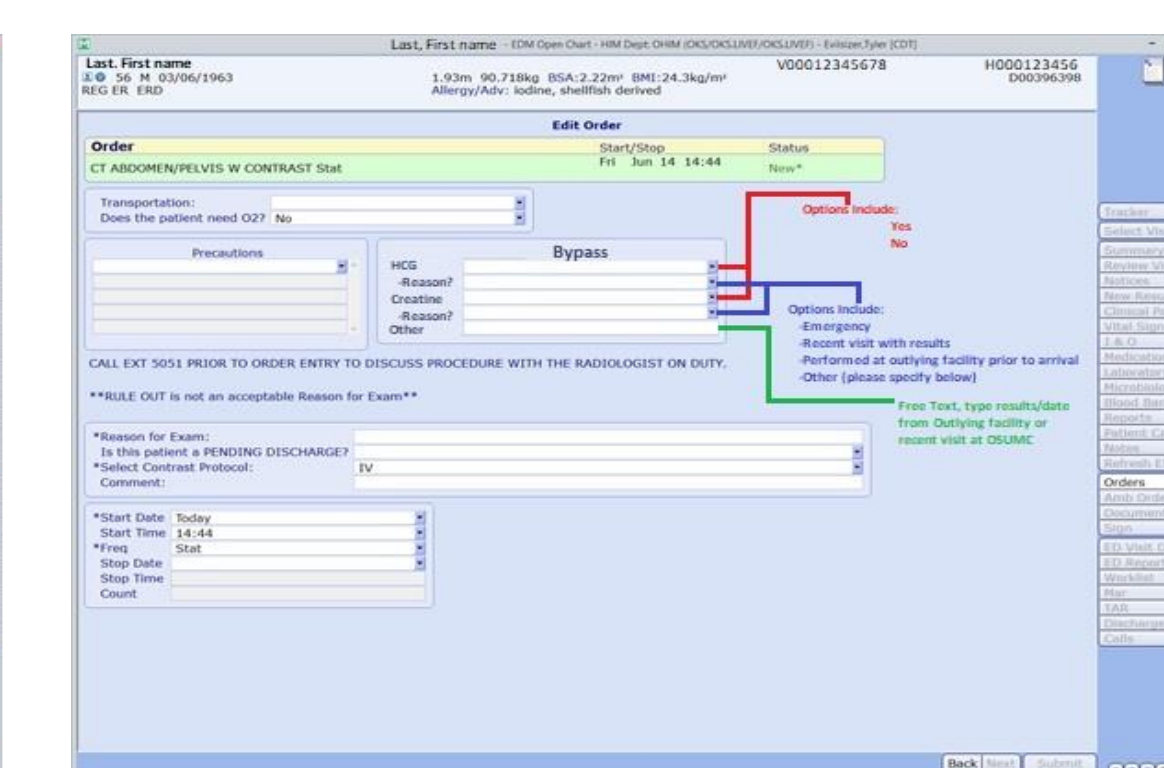


Figure 2

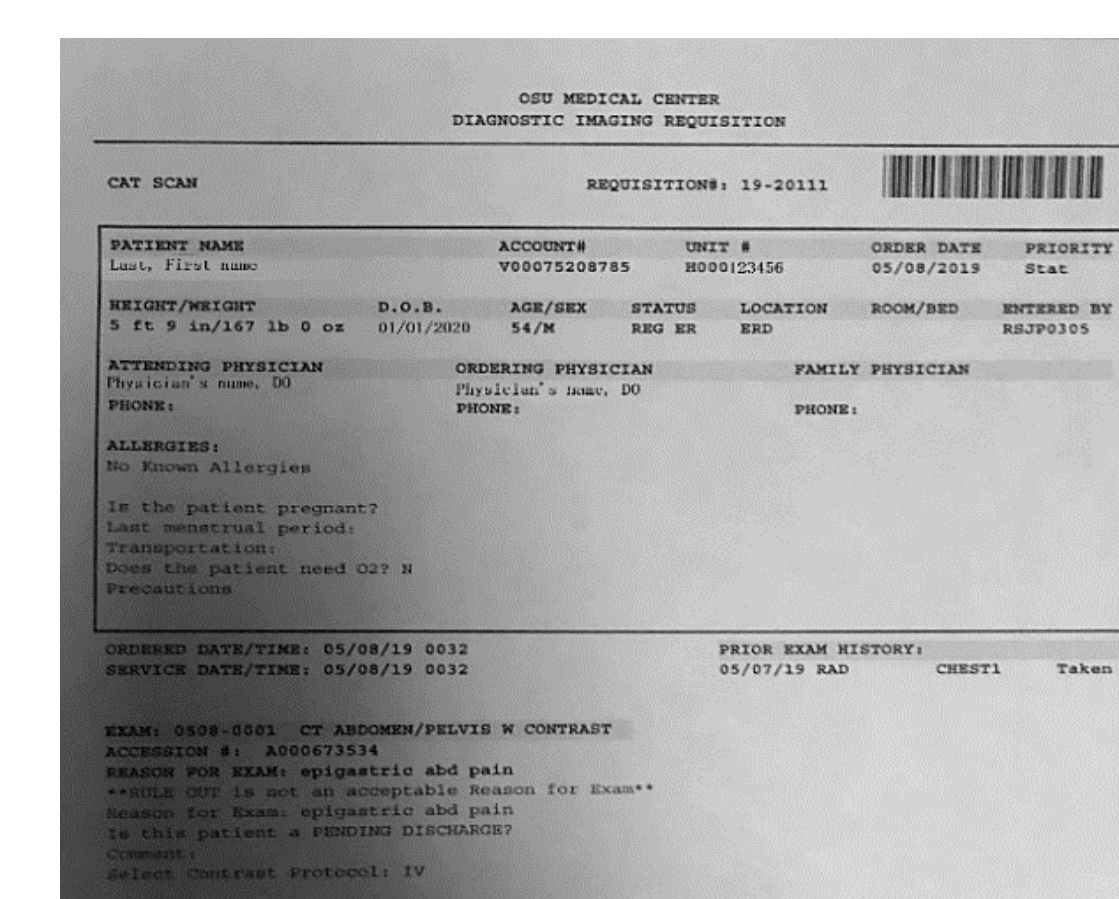


Figure 3

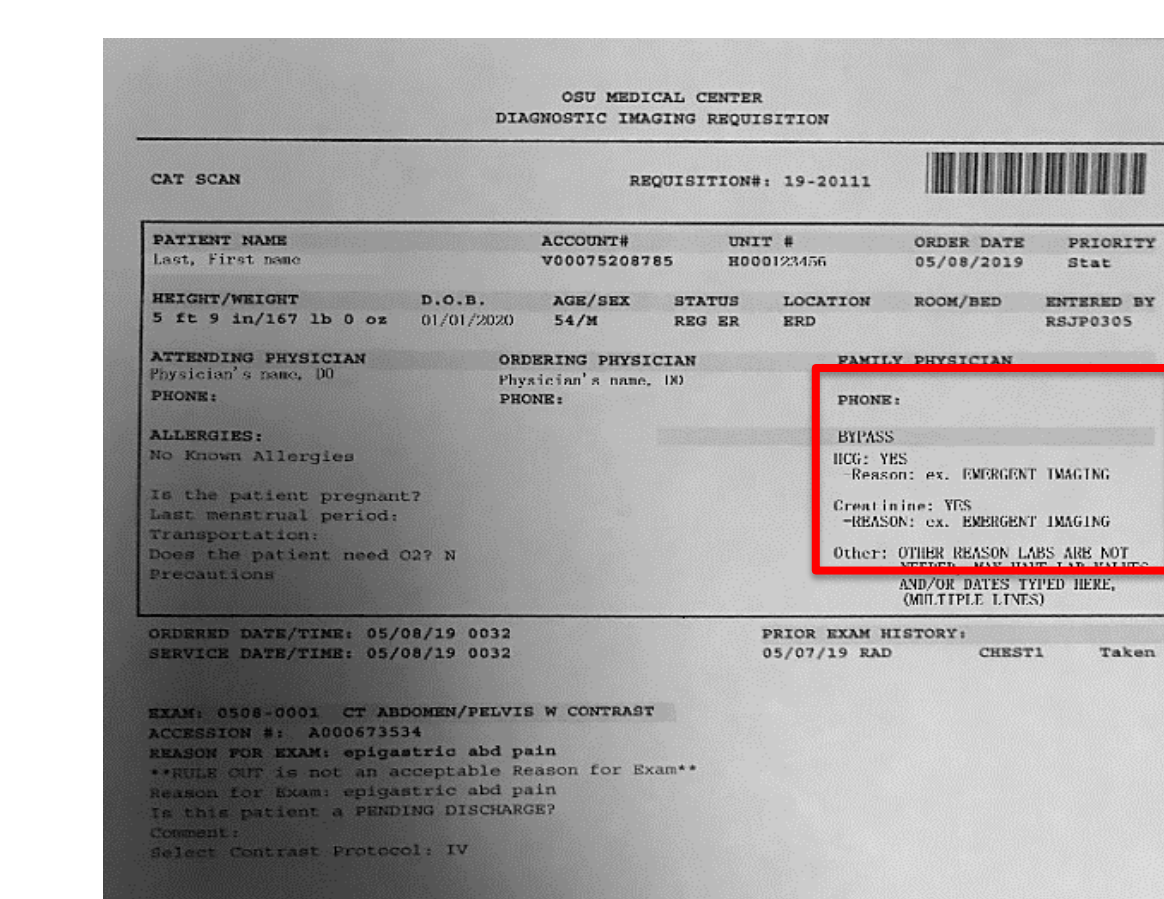


Figure 4

PRELIMINARY RESULTS

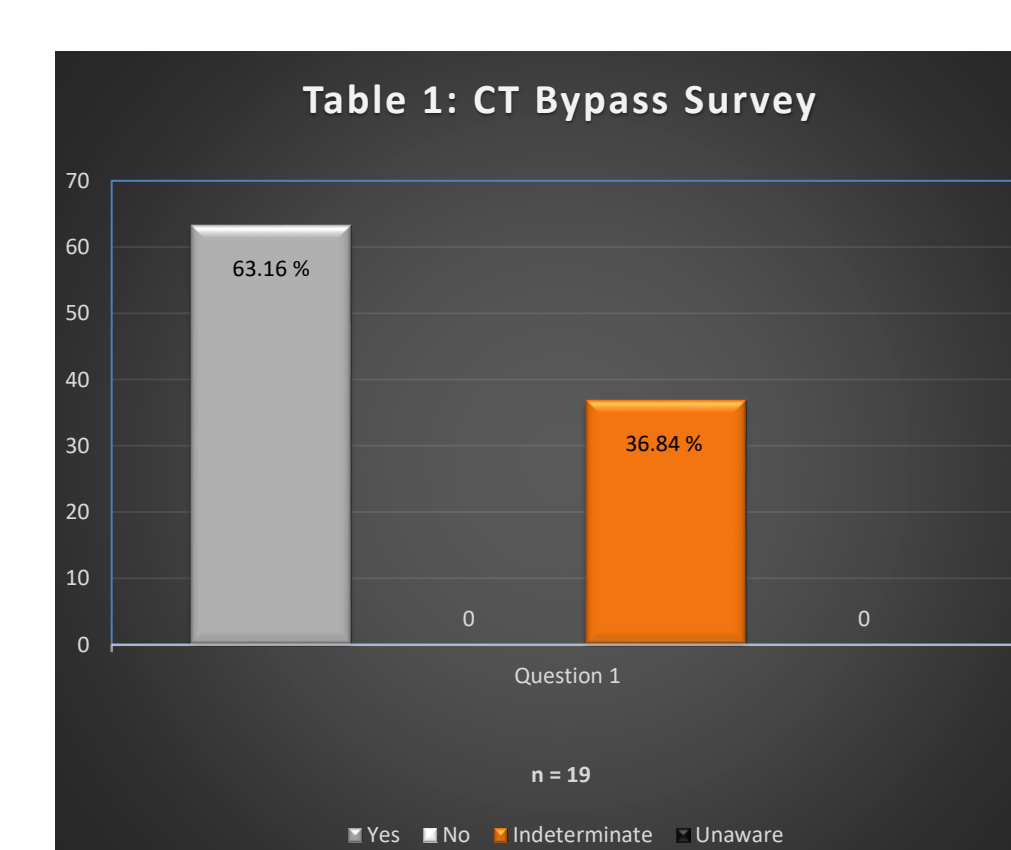


Table 1

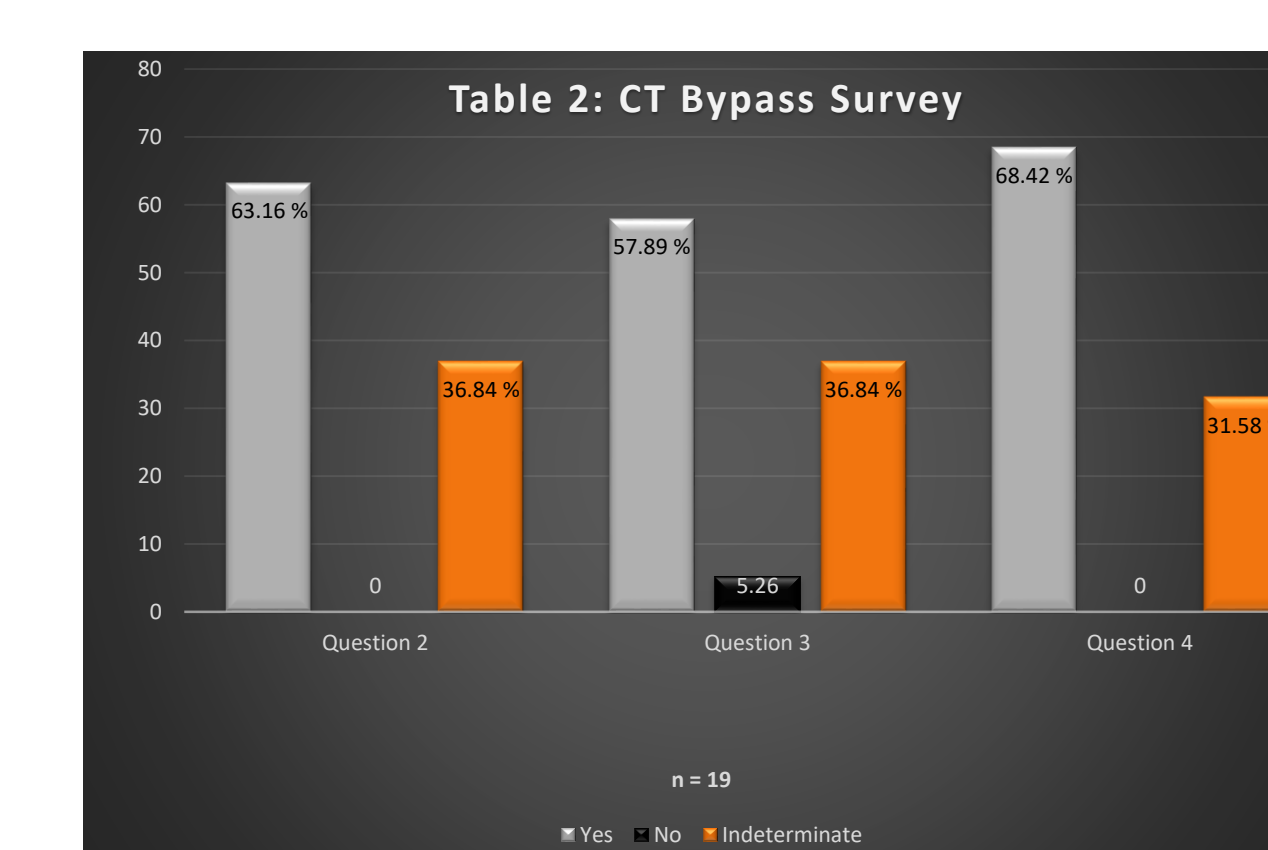


Table 2

Survey Questions:

- 1) The CT order bypasses (i.e. recent creatinine results, recent pregnancy test results, emergent bypass) have been overall helpful:
 - a. Yes, they are overall helpful
 - b. No. These additions have not been helpful to me
 - c. I have not noticed a difference
 - d. I am unaware of the changes
- 2) The bypasses to the CT orders have improved communications with the radiology department:
 - a. Yes, communication has been more effective and/or efficient
 - b. No, this addition has not helped in any way
 - c. I have not noticed a difference
- 3) With the addition of the CT bypass, I have had to call the radiology department less:
 - a. Yes, this addition has noticeably decreased the amount of calls to radiology about delayed studies
 - b. No, this addition has not had an impact on the amount of calls to radiology about delayed studies
 - c. I have not noticed a difference
- 4) Since initiating the CT order bypass, I have felt that delays in obtaining imaging have decreased overall (Example: You receive a transfer patient. Labs indicate that a creatinine has already been performed - you use the CT order bypass to indicate the creatinine - radiology sees this and there is no delay in obtaining the CT):
 - a. Yes, this has decreased delays
 - b. No, this has not changed delays in imaging studies
 - c. I have not noticed a difference

*** Survey results were collected from nineteen emergency medicine residents.

DISCUSSION

The subjective portion of our results suggest a trend toward overall improvement in decreasing imaging delays, as well as improved communications with the radiology department.

Limitations of this study are notable for possible reporting bias, recall bias, and skewed results from a substantial decrease in the emergency department census because of data collection occurring during the height of the COVID-19 pandemic.

Plans for continuation of this project include the incorporation of objective data and hospital wide expansion. We plan to continue this project by tracking the average time from CT order, to obtainment of the image. A comparison from before and after the implementation of the CT order changes will be performed to assess if improvement has been made. Furthermore, since the same CT orders are accessed by all residents throughout the hospital, educating other residents on the changes could implement hospital-wide improvements in communication and timing of imaging.

RESOURCES

1. Mital R, et al. A case of a false-positive urine pregnancy test and delayed diagnosis of obstructive pyelonephritis. Am J Case Rep 2020;e920440. [Epub ahead of print]
2. SurveyMonkey Inc. San Mateo, California, USA. Accessed at <https://www.surveymonkey.com/> on April 30, 2020.

ACKNOWLEDGEMENTS

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