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The Case of the 10 Pound Giant: A Near Miss Root Cause Analysis

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CASE VIGNETTE

A female patient was transferred from an outside hospital (OSH) for evaluation of altered mental status. No height/weight was entered on arrival. In order to admit the patient, the resident entered physiologically impossible data (**7 feet, 10 pounds**) to work around a hard stop requiring this information prior to placing any orders. Two days later, the patient was prescribed acyclovir for possible encephalitis, a medication that is dosed by ideal body weight (IBW), which is a height-based calculation. The patient therefore received an inappropriately high dose of acyclovir based on a height of 7 feet. The incorrect dosing was identified three days later, and no harm came to the patient.

BACKGROUND

Medication errors contribute to more than 7,000 deaths annually in the United States.¹ Accurate entry of patients' height/weight contributes significantly to proper medication dosing. Thus, when this information is inaccurate or unknown, the dose prescribed may be inappropriate. From June 2004 to November 2008, 479 event reports were submitted to the Pennsylvania Patient Safety Authority regarding medication errors due to breakdowns in obtaining, documenting, and/or communicating patients' weights. Overall, **67.2%** of the events reached the patient, with **1.3%** resulting in significant harm.²

OBJECTIVES

Through an Interprofessional Root Cause Analysis of this Near Miss event, we aimed to:

1. Identify issues contributing to the incorrect dosing of acyclovir
2. Understand relevant institutional policies and compare this to usual practice
3. Propose possible solutions

METHODS

Information regarding the events of the case were gathered through chart review, interviews with parties involved and institutional leaders, and evaluation of institutional policies. Interviews with pharmacists, nurses, and residents were conducted to better understand each healthcare professional's clinical practice on a day-to-day basis.

Based on this in depth understanding of the event, a cause analysis was performed, and root causes amenable to intervention were identified. A fishbone model was created (not pictured) which identified over 30 possible causes for the error in question.

A survey of residents regarding height/weight entry and medication dosing was also conducted to understand the scope of the problem.

CAUSE ANALYSIS

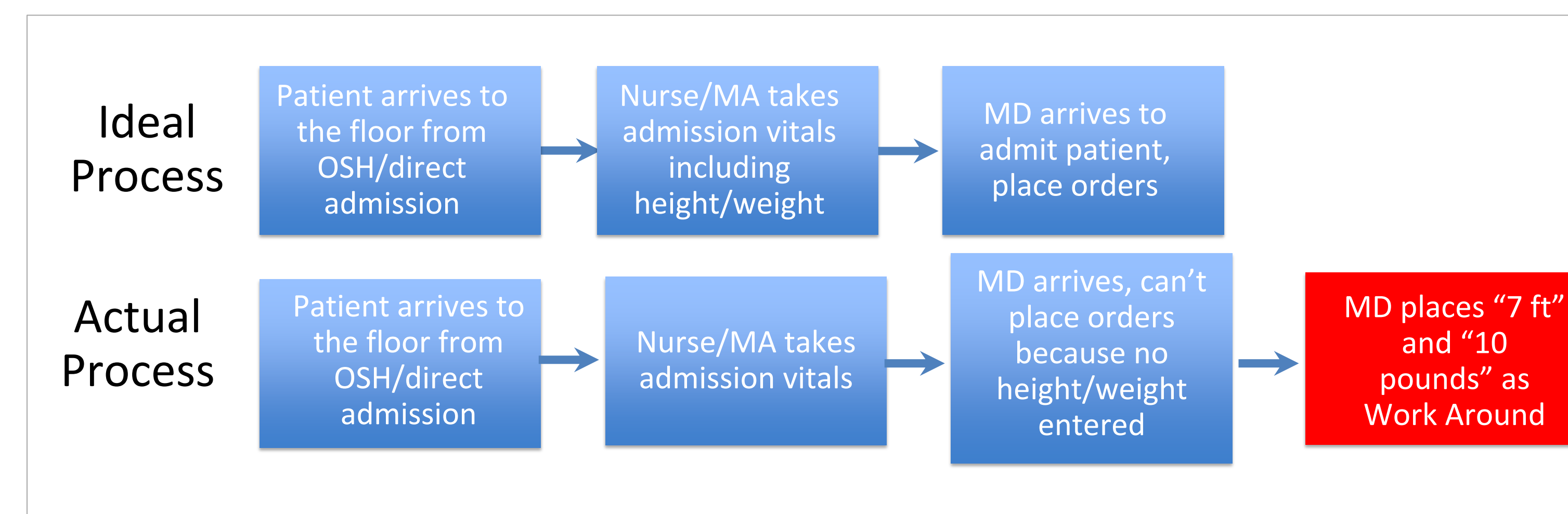
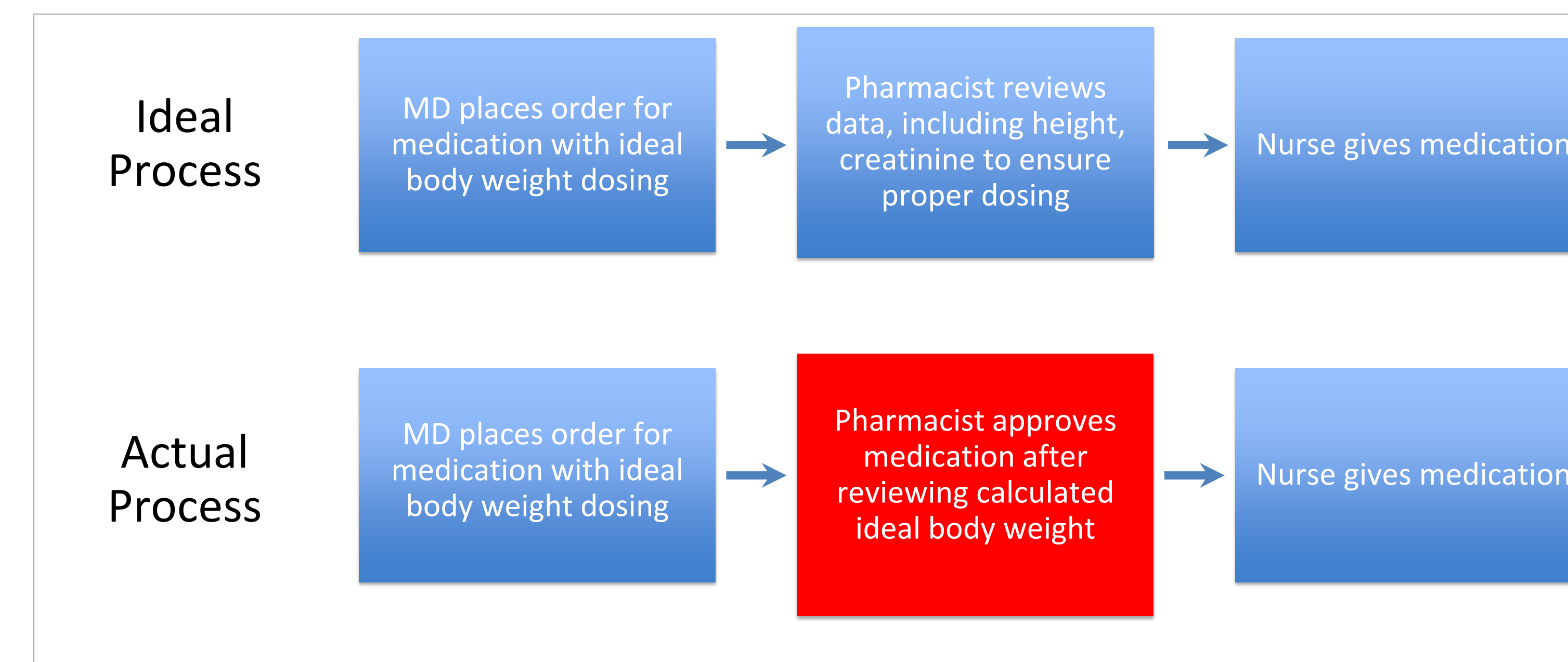


Figure 1 (above): Comparison between the ideal process of admitting a new patient and entering vital signs, and the process in this case

Figure 2 (below): Comparison between ideal and actual process behind medication ordering, Pharmacy confirming, and nurse giving ideal body weight dosed medication



RESULTS

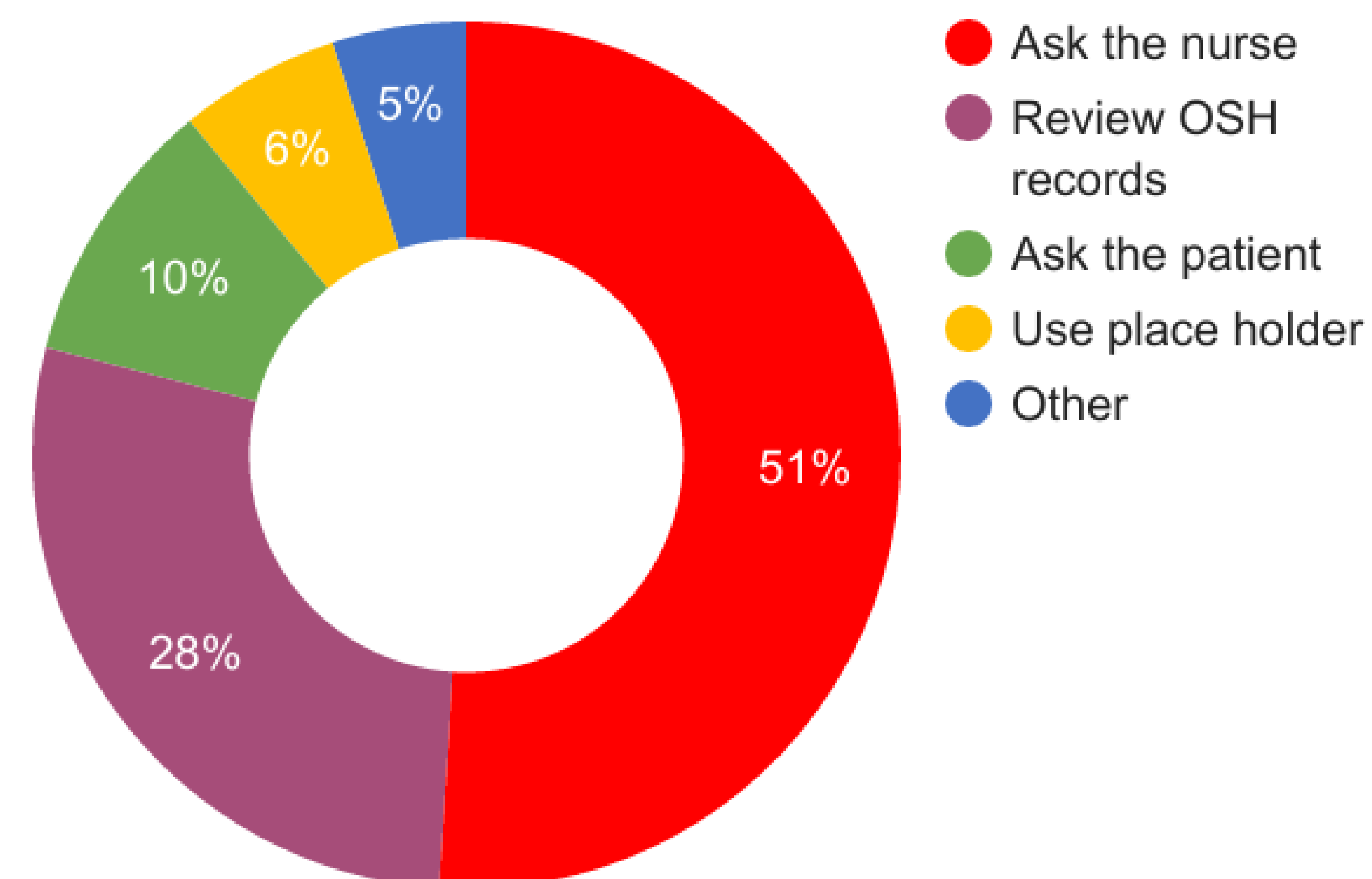


Figure 3 (above): Survey data demonstrating how Internal Medicine and Neurology residents obtain patient's initial height.

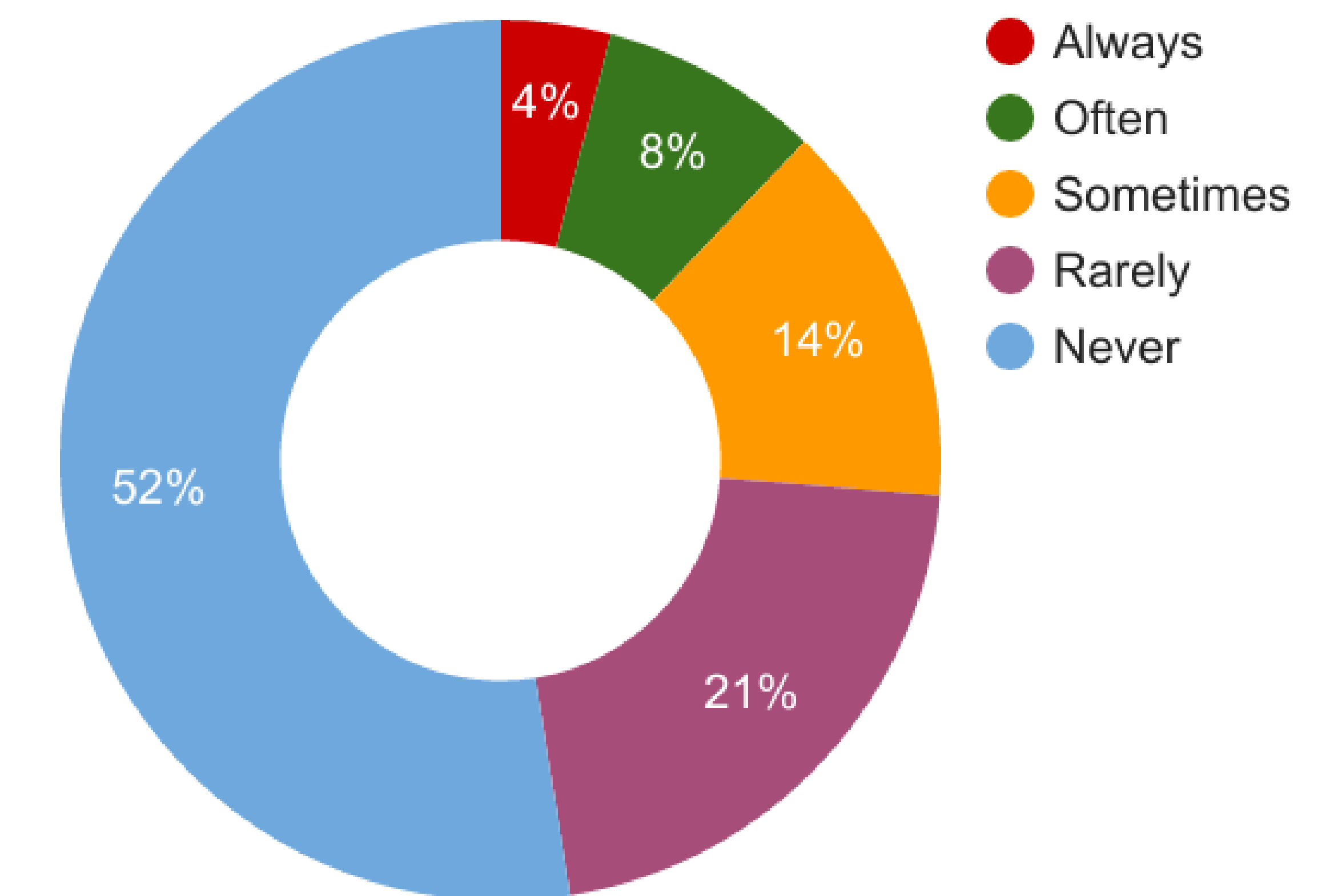


Figure 4 (above): Survey data demonstrating how often Internal Medicine and Neurology residents use a work-around for patient height and weight

DISCUSSION

This case demonstrates how hard stops, often created to standardize processes of care, can sometimes lead to dangerous work arounds and unintended consequences. Reviewing survey data, we were relieved to find that a minority of residents use this work around regularly. We identified three root causes which, if addressed, would significantly decrease the likelihood of event recurrence:

1. **Hard stop** - Requirement that height/weight be entered prior to placing admission orders prompts use of work arounds.
2. **Unclear task delegation** - Height/weight could be obtained by a range of professionals (RN, nurse intern, technician, MD), leaving no one ultimately responsible for timely data entry.
3. **Over reliance on EHR to calculate accurate dosing** - a review of the dose and IBW without review of contributing height is an example of the risk that comes with automation of tasks.

Proposed solutions:

1. **Remove hard stop** - This solution has already been implemented within Epic, where admission orders can be entered without a height/weight
2. **Standardization/delegation** - While usually a nursing task, this responsibility could be formalized in the nursing admission process, and reminders could be incorporated to "double check" height/weight in the first 24 hours after admission.
3. **Improved IT formatting and clinical decision support in pharmacy** - Pharmacists' medication approval screens should be formatted to display height/weight clearly, especially for IBW-based medications.