

asynchronous computerized notifications of test results in a primary care resident clinic

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PROBLEM & BACKGROUND

Termed “view alerts,” computerized notifications are the primary way information such as test results or nursing concerns are conveyed to the provider asynchronously (Fig. 1).

- Within the Veteran Affairs (VA) system, 37% of primary care providers report at least one patient missed test result within the previous two weeks leading to a diagnostic delay⁸.
- One study showed that VA providers received 58 “view alerts” per day² with providers spending an average of 69 minutes processing these view alerts³ with an estimated 7% of abnormal laboratory and imaging being missed⁴.
- In a study of 1196 critical imaging results sent through computerized notifications, 92 results (7.7%) had no follow-up at 4 weeks after transmission even after being sent to ≥ 1 provider.

Many internal medicine residents will work in the outpatient setting and yet will receive little training on how to manage this aspect of primary care. In this project, we aimed to devise a view alert surrogate system that

- Allows residents to be the primary manager of view alerts for their panel
- Gives residents the necessary support to address view alerts
- Removes the burden of view alerts for residents when they are on rotations that do not allow for time and support to process view alerts effectively

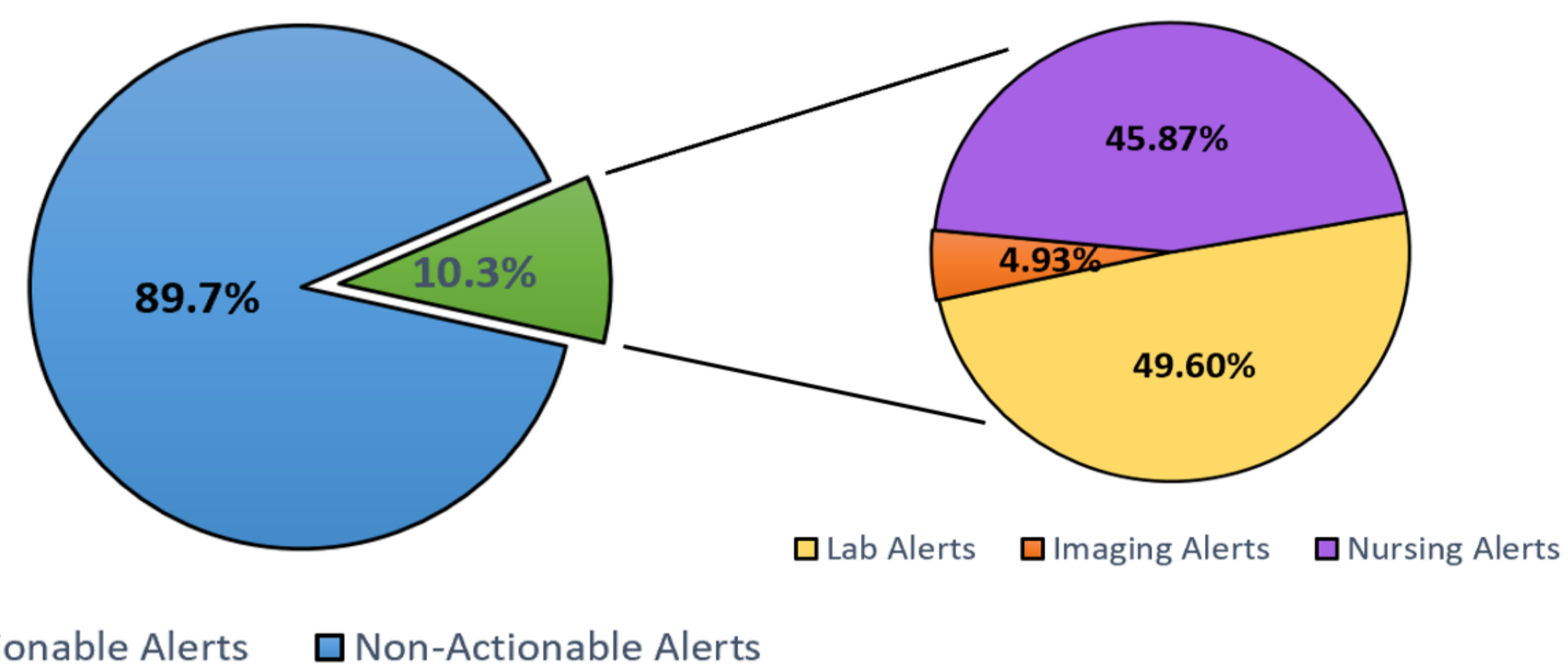


Figure 2. Types of view alerts reviewed. Non-actionable alerts included duplicates and non-trackable alerts.

METHODS

A covering or surrogate resident from within the same residency program on elective rotation was assigned to cover the view alerts of the patients paneled to another resident on rotation in the inpatient setting (i.e., working on the medical wards or intensive care unit). This surrogate resident was familiar and had their own panel of patients at the same VA clinic location. All residents received an email detailing the expectations of the surrogacy and surrogate residents received view alerts from their resident counterpart into their personal inbox.

Daily recordings of each resident’s inbox were obtained for one selected week in November 2018, during which no surrogate resident was available, and January 2019, during which the surrogate resident was implemented. Manual chart review was performed on these recordings by one of three physicians (two third-year residents and one attending). The view alerts were categorized by alert type (including duplicates or non-trackable notifications) and the dates of alert and response were recorded in Excel spreadsheets. Other variables were recorded including whether and when the attending responded first; and if and how an action was performed for the alert.

Info	Patient	Location	Urgency	Alert Date/Time	Message
Patient Name	Patient Name		Moderate	01/01/2010@03:14	Scheduled Consult: ORTHOPEDICS
Patient Name	Patient Name		Moderate	01/01/2010@15:09	Scheduled Consult: NON-INVASIVE ECHO
Patient Name	Patient Name		Moderate	01/02/2010@02:06	COMPLETED EMERGENCY ROOM NOTE available
Patient Name	Patient Name		HIGH	01/02/2010@05:35	Medications Nearing expiration
Patient Name	Patient Name	GM	Moderate	01/02/2010@08:09	Imaging request held: KNEE 3 VIEWS, LEFT
Patient Name	Patient Name		Moderate	01/03/2010@07:09	Abnormal labs - [TROPONIN I]
Patient Name	Patient Name		Moderate	01/04/2010@03:23	Abnormal labs - [LIPID PROFILE, COMPREHENSIVE
Patient Name	Patient Name		Moderate	01/04/2010@08:46	Abnormal labs - [BASIC METABOLIC PANEL]
Patient Name	Patient Name		Moderate	01/05/2010@02:06	Labs resulted - [MICROALBUMIN;URINE]
Patient Name	Patient Name	---	Moderate	01/05/2010@04:33	COMPLETED PHARMACY PATIENT ENCOUNTER

Figure 1. An example of inbox of view alerts in EMR at the VA⁴.

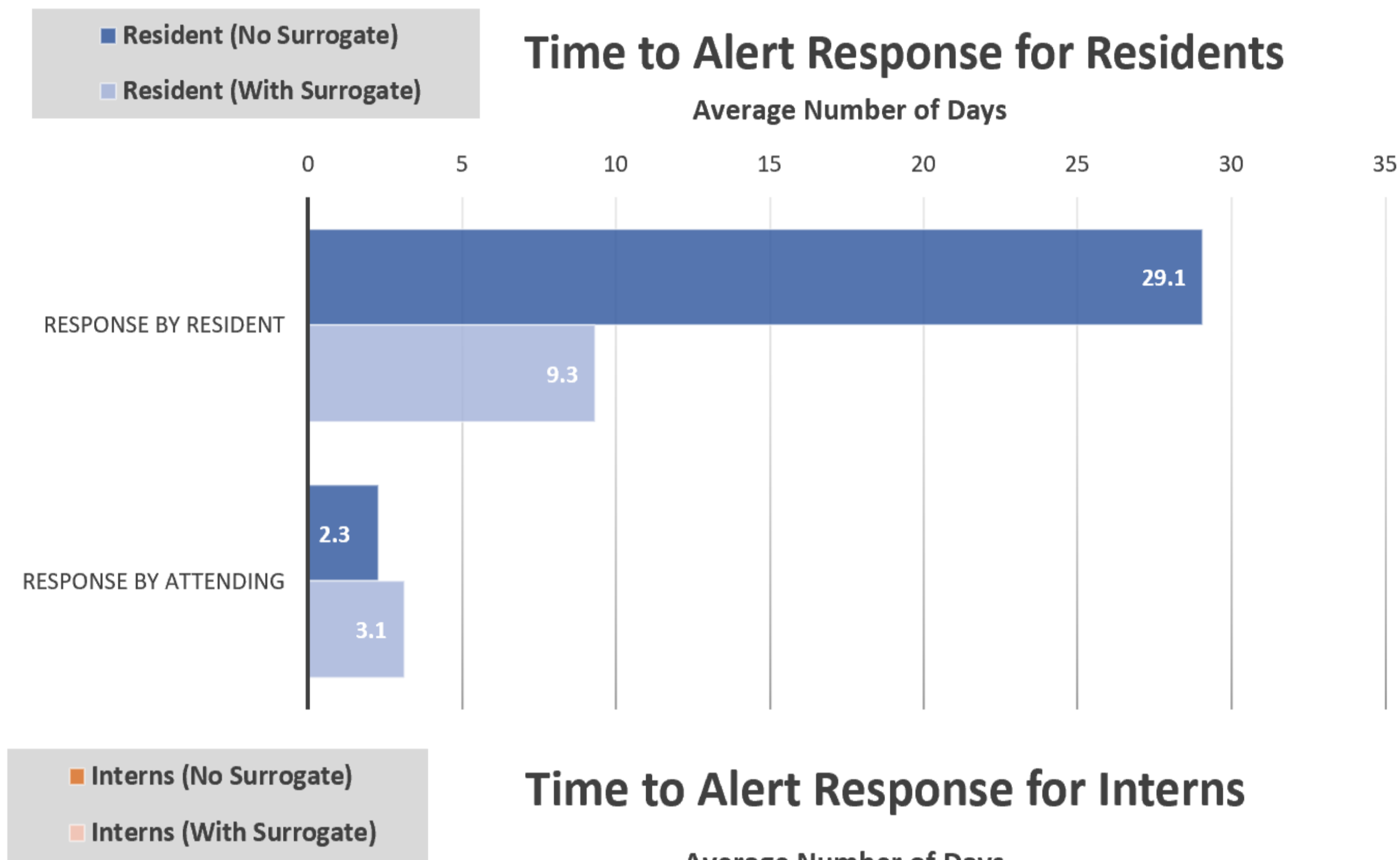


Figure 3 and 4. Response time to view alerts by residents and interns, respectively.

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RESULTS

A total of 12,225 view alerts were reviewed but only 10.3% were found to be actionable. These actionable alerts were further categorized into Lab Results, Imaging Results and Nursing Notes (Fig. 2). We found that a surrogate provider shortened the time to response of a view alert by more than 50% from a resident or intern physician and increasing the percentage of view alerts that were first addressed by a resident (Fig. 3 and 4). The surrogate provider also decreased the percentage of alerts by two-thirds that the attending physician responded to first. However, this did not necessarily lead to appropriate management as a large amount of actionable view alerts (almost doubled in amount while the surrogate resident program was in place) with had no evidence of timely follow-up (Fig. 5).

Effects of Surrogate Provider on Actionable Alerts

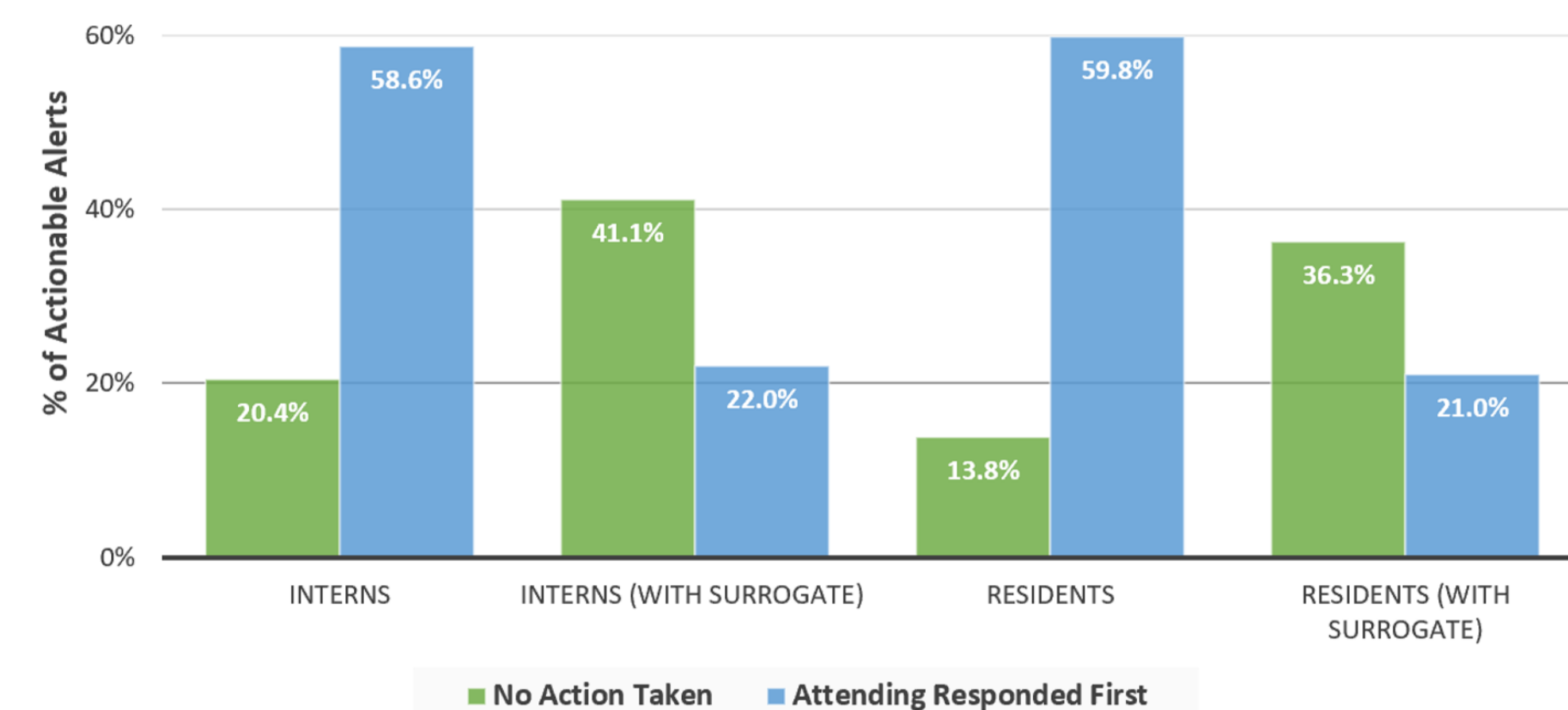


Figure 5. Effects of surrogate provider on actionable alerts.

DISCUSSION & NEXT STEPS

While a surrogate resident did shorten the time to response of alerts by a significant number of days, the percentage of actionable alerts that had no action taken by the resident almost doubled with the use of a surrogate resident.

We theorize some reasons for this discrepancy:

- Due to the pressure to process alerts quickly residents may “sign off” on the alert assuming that another provider will “take care of it” without taking the necessary action.
- While there is a great amount of pressure to clear the number of alerts *quantitatively*, there is little to no incentive to respond to an alert *appropriately*.
- Covering for another resident involves having more view alerts than before and without proper education, residents are unequipped to combat “alert fatigue.”

We envision that the next steps in improving this vital skill for residents in their future practice might include dedicated time for view alert processing and attending supervision on the appropriateness of processing. This will likely add education on triaging and managing view alert asynchronously as residents have experience managing results synchronously with the patient available. Such a system can also increase resident engagement and comfort with managing asynchronous view alerts, which will become a large component of their post-training work life.