Use of Flags in the Electronic Medical Record: A Retrospective Analysis

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ABSTRACT

Introduction: Implicit bias in patient care and outcomes is well documented. However, the presence of bias in hospital security interactions is a relatively new area of research. Flags placed on the electronic medical record identify patients considered high risk for negative outcomes, including those with security interactions.

Objective: We sought to explore the types of flags and their frequency, differences among patients with flags, and their pattern over time.

Methods: We conducted a retrospective chart review of flags placed on electronic medical records over 13 years of adults 18 years or older who were patients at a Midwest, tertiary, academic medical center. Descriptive statistics were used to explore patient demographic data. Chi-square tests were executed to compare patients with different flag types.

Results: Three flag types were investigated: "communication alert," "vulnerable/unsafe, behavior" and "risk management." The communication alert flag was most common, although Black male patients were more likely to receive a vulnerable/unsafe behavior flag than a communication alert flag ($P = 0.001$). Patients who were prescribed anti-anxiety medications, antidepressants, antipsychotics, and psychotherapeutics also were more likely to receive a vulnerable/unsafe behavior flag than a communication alert flag ($P = 0.001$). The highest number of flags was placed during quarter 3 – the months of July, August, and September.

Conclusions: Records of patients with certain demographics and on certain medications were more likely to be labeled with vulnerable/unsafe behavior flags. There is no clear protocol to determine what behaviors elicit which flag. Standardized procedures could help provide transparency to this issue.

INTRODUCTION

Disparities in policing have long plagued the United States and have received significant public attention in recent years. Studies have shown that non-White suspects are more likely to get arrested, experience nonlethal police force, and die from excessive police force.[1-3] These findings and events have led many to question the integrity of policing systems. Investigations into officers and entire police departments have found discriminatory practices and even overt racism, which have prompted numerous attempts for police reform.

Hospitals have begun to follow suit, looking into their own policing or security systems in attempts to identify bias and to hold themselves accountable. Although the majority of hospitals employ non-sworn security personnel, some institutions employ sworn police officers or sheriffs to mitigate security events, which can cause distress for populations that historically have been mistreated by police.[4] While it has been well-established that racial and ethnic disparities exist in patient treatment, few studies have looked at the intersection of policing and health care that exists as hospital security.[5] An internal investigation conducted at Seattle Children's Hospital found that security was disproportionately called on patients and families who identify as Black or African American.[6] Similar findings also were documented at two other large academic hospitals, demonstrating the number of observed security calls for Black patients to be significantly greater than expected based on hospital population representation.[7,8]

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There are usually consequences in place for patients involved in security encounters, including limited visitation, continuous monitoring, or placement of a flag on their electronic medical record. These flags alert clinicians to potential unwanted behaviors to help guide future patient interactions. One study found that placing flags on the charts of high-risk patients resulted in a 91% reduction of violent incidents, which was attributed to improved staff awareness when interacting with these patients.[9] Flags might also be placed after safety events to identify risk-averse patients who would not necessitate a call to security but still put themselves or staff in danger. Research in this area is relatively new, with limited literature.

Our primary objectives were to explore the types and frequency of such flags at an academic medical center. Secondary objectives included examining whether differences exist among patients with flags and flag patterns over time.

METHODS

Study Design and Setting

This retrospective data analysis focused on a tertiary academic medical center in Milwaukee, Wisconsin. The medical center is the region's only level I trauma center. In fiscal year 2019, the majority of patients serviced were White (73.8%), followed by African American (15.5%).[10] As of June 2022, the medical center had over 72000 emergency visits, over 37000 admissions, and nearly 950000 outpatient visits for that year. This study was approved by the Medical College of Wisconsin Institutional Review Board.

Study Sample

Participants were identified through the Epic Clarity database, a dedicated reporting database within the Epic electronic health record system (Epic Systems, Verona, Wisconsin). Patients of the medical center age 18 years or older with a flag in their chart comprised the study population. Data from April 2009 through March 2022 were used.

Data Collected

Flags are placed on patients' charts to alert staff to details about the patient and travel across encounters. Any member of the health care team involved in the patient's care who has access to their electronic medical record (EMR) can place flags. At our institution, the specific flags identified were "communication alert," "risk management," and "vulnerable/unsafe behavior." These flags were first used in 2009, 2016, and 2021, respectively. Flags are most often placed on a patient's chart after a safety event, which is an incident that puts a patient or staff at risk for harm. Communication alert flags are used for various reasons ranging from reporting use of inflammatory language to noting a patient's desired contact person. Risk management flags are used to identify high-risk patients, for example, those who are more likely to fall or leave against medical advice. Of the 3 flag types, there is a clear protocol in place only for placement of a vulnerable/unsafe behavior flag. This is outlined in the hospital employee handbook, which states that a vulnerable/unsafe behavior flag should be considered for any verbal, physical, or emotionally threatening action by a patient. The protocol includes a review of the incident by security and the charge nurse to determine if a flag is appropriate. It also suggests appropriate precautions and interventions that could be implemented when interacting with the flagged patient.

The following demographic information was extracted: age, sex, race/ethnicity, county, language, Epic risk score (identifies patients at increased risk of postoperative mortality, complication, readmission, and long-term intensive care unit stay); medications including narcotics, anti-anxiety agents, antidepressants, antipsychotics, and stimulants; medical diagnoses including AIDS, HIV, alcohol abuse, depression, drug abuse, liver disease, metastatic cancer, neurologic disorder, peripheral vascular disease, psychoses, and renal failure; and comorbidity count. The department and specialty where the safety event occurred also was obtained.

Analyses

Because the flags were utilized in varying years, 2 separate data sets were created for further exploration. One data set consisted solely of patients with the communication alert flag, which was the only flag used throughout the entire study period (2009 through 2022). The second data set included patients with either a communication alert flag or a vulnerable/unsafe behavior flag from quarter 3, 2021, to quarter 2, 2022, the period when both flags were in use. Descriptive statistics were used to explore patient data. Demographics of the study population with a communication alert flag were summarized with mean and standard deviation for continuous variables and count and percentages for categorical variables. Comparison of the communication alert flag population and the vulnerable/unsafe behavior flag population from quarter 3, 2021, to quarter 2, 2022, utilized 2 sample *t* tests for continuous variables and chi-square goodness of fit tests for categorical variables. The type of patient safety events that occurred was summarized with counts and percentages. The statistical significance was assessed at $P < 0.05$. Complete analyses were performed using R.4.1.3 (R Core Team, 2022).

RESULTS

Communication alert flags were used in every year of the study (n = 4162). Risk management flags were recorded only in 2016 (n = 6) and 2021 (n = 1) and, therefore, due to the limited number, were not incorporated into the analysis. Vulnerable/unsafe behavior flags (n = 631) were first used in quarter 3, 2021, and are not included in the following demographic analysis because they were not in use over the entire study period.

The average patient age was 57 years at the creation date of

Table 1. Population Demographics of Patients With Communication Alert Flags, 2009 – 2022

Mean age at flag creation	56.5 (SD = 20.5)
Sex, n (%)	
Male	1980 (47.6%)
Female	2181 (52.4%)
Unknown	1 (0.0%)
Race/ethnicity, n (%)	
White	2786 (66.9%)
Black	1046 (25.1%)
Hispanic	173 (4.2%)
Other	120 (2.9%)
Unknown	37 (0.9%)
Primary language, n (%)	
English	4009 (96.6%)
Spanish	55 (1.3%)
Hmong	10 (0.2%)
Russian	5 (0.1%)
American Sign Language	10 (0.2%)
Other	63 (1.5%)
Unknown	10 (0.2%)
Most common medications, n (% of patients prescribed)[a]	
Narcotics	2890 (88.5%)
Anti-anxiety agents	1873 (57.4%)
Antipsychotics	1546 (47.4%)
Antidepressants	1652 (50.6%)

[a]Some patients were prescribed multiple medications.

Table 2. Communication Alert Flags per Quarter, 2010[a]– 2021

Quarter	Flags
Q1 (January – March)	769
Q2 (April – June)	800
Q3 (July – September)	1515
Q4 (October – December)	888

[a]Data from 2009 have been omitted from this table because communication alert flags were not in used until Quarter 2 of that year.

Figure 1. Communication Alert Flags per Year

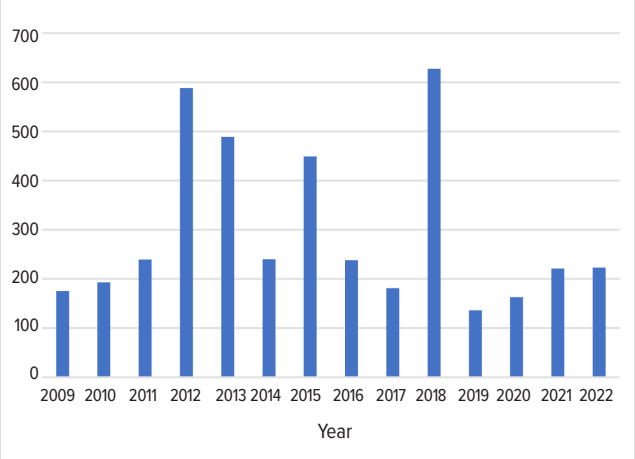
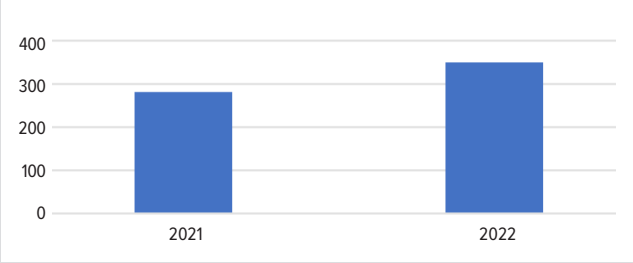


Figure 2. Vulnerable/Unsafe Behavior Flags per Year



a communication alert flag. There were slightly more female patients (n = 2181, 52.4%) and the majority of patients were White (n = 2786, 67.5%), followed by Black (n = 1046, 25.4%) and Hispanic (n = 173, 4.2%). Table 1 provides complete demographics for patients with communication alert flags. The most prescribed medication classes during admission for patients with a communication alert flag were narcotics (n = 2890, 88.5%), anti-anxiety agents (n = 1873, 57.4%), antidepressants (n = 1652, 50.6%), and antipsychotics (n = 1546, 47.4%).

The average number of communication alert flags per year was 297 (SD +/- 160). The most common time of year for creation of communication alert flag was quarter 3 (July-September), with 37.% (n = 1551) of all communication alert flags being created during these months (Table 2). The incidence of flags peaked in 2012 (n = 588) and 2018 (n = 627) (Figure 1).

Vulnerable/unsafe behavior flags were seen only during quarter, 2021 through quarter 2, 2022 (Figure 2). Therefore, patients with these flags were compared with a subset of patients with communication alert flags, specifically those from quarter 3, 2021 through quarter 2, 2022. There were more males identified with vulnerable/unsafe behavior flags than communication alert flags, which was statistically significant (Table 3). Other factors that were significantly different between the 2 flags included race/ethnicity; the use of anti-anxiety, antidepressant, anti-psychotic, psychotherapeutic medications; and neurologic disorders.

DISCUSSION

There are multiple ways to interpret the overall number of flags added to medical records per year. In comparison to the cumulative number of hospitalizations, emergency, and outpatient visits, the incidence of flags is less than 0.02% for all patient encounters in 2022. However, if looking at sheer numbers, flags were created anywhere from 1 every half-day to 1 every 2.5 days.

The definition of the vulnerable/unsafe behavior flag and its protocol suggest some amount of medical worker harm. Literature notes that "workers in the medical field encounter more nonfatal incidents of WPV [workplace violence] than workers in any other profession."[11] Workplace violence refers to not only physical acts but also includes harassment and any other behavior that is threatening.[12] The Association of American Medical Colleges, US

Bureau of Labor Statistics, Occupational Safety and Health Administration, and American Association of Critical-Care Nurses have reported on the alarming rise in violence experienced by health care workers.[13-15] Nonetheless, the actual number of events that occur remains uncertain. This is primarily because information and data on this topic comes almost exclusively from surveys and interviews.[16,17] Furthermore, the interpretation of verbal remarks is subjective, the result of each individual's background and personal experience. What may make one individual feel threatened or uncomfortable may not be the case for another. In this study, flags are placed in patient charts by medical center staff. The determination of whether a flag is needed is largely, if not completely, up to individual medical center personnel, which makes it challenging to accurately quantify and collect information on patient-related safety events.

Table 3. Comparison of Demographic Factors Between Communication Alert Patient Group and Vulnerable/Unsafe Behavior Patient Group From Quarter 3, 2021 – Quarter 2, 2022

	Communication Alert (n = 337)	Vulnerable/Unsafe Behavior (n = 631)	*P* value
Mean age (SD)	53 (20)	52 (9)	0.5
Sex, n (%)			< 0.001
Female	167 (49.6%)	233 (36.9)	
Male	170 (50.4%)	398 (63.1%	
Race/ethnicity, n (%)			< 0.001
White	208 (61.7%)	303 (48.0)	
Black	87 (25.8%)	285 (45.2)	
Hispanic	26 (7.7%)	24 (3.8)	
Other	16 (4.7%)	15 (2.4)	
Epic risk score (mean)	3.7 (2.4)	5.1 (2.4)	< 0.001
Medications, n (% of patients prescribed)[a]			
Anti-anxiety	173 (57.3%)	490 (79.9)	< 0.001
Antidepressants	160 (53.0%)	415 (67.7)	< 0.001
Antipsychotics	190 (62.9%)	534 (87.1)	< 0.001
Psychotherapeutics	45 (14.9%)	232 (37.8)	< 0.001
Medical diagnosis, n (%)			
Metastatic cancer	16 (4.7%)	7 (1.1)	< 0.001
Neurologic disorder	25 (7.4%)	100 (15.8)	< 0.001
Psychoses	6 (1.8%)	65 (10.3)	< 0.001

[a]Some patients were prescribed multiple medications.

Vulnerable/unsafe behavior flags were found only in 2021 and 2022, which suggests a likely change in documentation practices. It is possible that the communication alert flag was used previously as a catch-all for any adverse event that occurred. Interestingly, there were more vulnerable/unsafe flags than communication alerts when the former came into use in 2021 and 2022. A more standardized process for flag documentation is needed, including further guidance on which behavior solicit which flag type. It should be noted that most vulnerable/unsafe behavior flags follow a specific format that includes prompts, such as recommended safety practices, known triggers, behavior exhibited, and de-escalation methods, that can be filled out by the flag creator. This provides a more robust picture of the unsafe behavior while giving clinicians necessary insight for proper patient care. It would be beneficial to approach all types of flags in this systematic manner, as prompts could encourage the flag creator to describe the incident in a way that might prevent future conflict and promote safety for all involved.

There were differences between patients with communication alert flags in 2021 and 2022 compared to those with vulnerable/unsafe behavior flags. The latter flag had a significantly higher proportion of male and Black patients. Additionally, patients with this flag were prescribed more anti-anxiety agents, antidepressants, antipsychotics, and psychotherapeutic drugs than patients with the communication alert flag. Coincidingly, diagnoses of neurologic disorders or psychoses were more prevalent with the vulnerable/unsafe behavior flag. It is important to consider the implications behind flag types. While it was not possible to ascertain the exact reason for the placement of each flag, by its own protocol definition, vulnerable/unsafe behavior flags are used when a patient's conduct is felt to be threatening. The differences seen between flags may not be surprising given historical stereotypes, research on implicit bias, its effect on health care workers' perceptions, and, subsequently, health care inequalities.[18-22] There is also an abundance of literature that demonstrates the stigmatization of patients with mental health conditions, both by those in health care and the public.[23-25] However, it is possible that the underlying neurologic and psychiatric conditions themselves predispose patients to certain behavior.[26]

It is interesting that for multiple years, most flags were placed during quarter 3 (July-September), which is when new interns and fellows start at academic medical centers. This raises questions as to whether house staff turnover could factor into flag placement. Literature on "the July effect" notes important concerns with each new academic year, including increased patient mortality and decreased efficiency attributed to the inexperience of trainees.[27]

Limitations

Our study has several limitations. First, this study serves to better understand and identify patterns in security interactions at a single academic medical center in Wisconsin. Whether these results can be generalized to community practices or other academic centers is unclear. Further, there are some gaps in the data collected that prevented full analysis of flags. There were so few risk management flags recorded over the course of the study (n = 7) that this category

was not included in the analysis. Additionally, vulnerable/unsafe behavior flags were not in use prior to July 2021, preventing the investigators from making comparisons before that time. Finally, out of the 3 flags, recommended protocols and workflows are in place only for the vulnerable/unsafe behavior flag. There are no clear guidelines for the remaining flags as to what behavior would justify their use. This, in turn, provides little context as to what it truly means to have these specific flags placed on a chart. Future steps should explore health care staff experiences to better understand their thresholds and reasons for flagging patients.

CONCLUSIONS

Patients with certain diagnoses and characteristics were more likely to be labeled with specific flags compared to others. How often hospital safety events happen remains inconclusive. Standardized processes and procedures for reporting events across all health care systems could help with quantifying and providing transparency to this issue.

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Data Availability: Datasets used in this study were pulled from the medical record and cannot be shared with individuals outside the approved Institutional Review Board protocol.

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