

University of New Hampshire

University of New Hampshire Scholars' Repository

Master's Theses and Capstones

Student Scholarship

Summer 2023

Assessing and Improving Pediatric Nurses' Documentation of Childhood Immunization Status Using the Electronic Health Record

Katherine Engalichev

University of New Hampshire, Durham, ke1051@unh.edu

Follow this and additional works at: <https://scholars.unh.edu/thesis>



Part of the [Pediatric Nursing Commons](#)

Recommended Citation

Engalichev, Katherine, "Assessing and Improving Pediatric Nurses' Documentation of Childhood Immunization Status Using the Electronic Health Record" (2023). *Master's Theses and Capstones*. 1672. <https://scholars.unh.edu/thesis/1672>

This Thesis is brought to you for free and open access by the Student Scholarship at University of New Hampshire Scholars' Repository. It has been accepted for inclusion in Master's Theses and Capstones by an authorized administrator of University of New Hampshire Scholars' Repository. For more information, please contact Scholarly.Communication@unh.edu.

**Assessing and Improving Pediatric Nurses' Documentation of Childhood Immunization
Status Using the Electronic Health Record**

Katherine Engalichev MS, RN, CNL

Nursing Department, University of New Hampshire Graduate School

NURS 958: Clinical Nurse Leader Capstone

Professor Kaitlynn Liset MS, RN, CNL

July 27, 2023

Abstract

BACKGROUND: Adherence to the standardized childhood immunization schedule put forth by the American Academy of Pediatrics is the gold standard for decreasing vaccine-preventable disease morbidity. The first step to improving adherence with the recommended immunization schedule is identifying children who are under-immunized. The inpatient setting offers an opportunity to screen pediatric patients for immunization status. A survey was administered to nurses working on an inpatient pediatric unit to gauge nurse self-report of Cerner™ Electronic Health Record (EHR) use for immunization documentation, their perceptions regarding EHR ease of use for documenting pediatric immunization status, attitudes towards documenting immunization status, and perceived implications for nursing care.

METHODS: The Define, Measure, Analyze, Implement, Control (DMAIC) framework was utilized for this quality improvement project. The pre-intervention survey was administered anonymously to six nurses working on the unit. The results revealed a discrepancy between self-reported assessment practices and self-reported documentation practices concerning patient immunization status. Based on these findings, the intervention was implemented. A post-survey was conducted to re-examine nurse documentation practices and attitudes towards the change.

INTERVENTION: Based on current evidence supporting the importance of nurse-driven screening in identifying patients at risk for vaccine-preventable diseases and the survey results revealing that some pediatric unit nurses do not always document childhood immunization status upon admission, the decision was made to change the previously optional question regarding immunization status in the EHR's Admission History PowerForm™ to a required field. The quality improvement intervention was implemented in collaboration with pediatric unit leadership and the facility's Nursing Informatics Committee. A Situation, Background, Assessment, Recommendation (SBAR) report was disseminated to substantiate the change.

RESULTS: Missing data from the post-survey limited the evaluation of nurse documentation practices and attitudes towards the newly required EHR field following the intervention. There was one respondent to the post-survey, who reported documenting immunization status during admission 100% of the time and provided qualitative feedback supporting the change. Unit leadership reported that the change was accepted by staff.

CONCLUSIONS: This quality improvement project was a useful first step towards improving nurse-driven screening practices in the pediatric unit. Identification of patients at risk for vaccine-preventable disease is the foundation required to increase immunization rates on a population health level. However, to sustain and progress towards improving immunization status screening and ultimately increasing opportunities for children to be brought up to date on vaccinations, further steps will be required on behalf of unit leadership and staff. Those steps should include chart audits to monitor compliance with required EHR fields, the development of a written policy for immunization documentation, and efforts to increase the availability and administration frequency of vaccines for under-immunized children admitted to the unit.

Keywords: immunization, vaccination, documentation, EHR, EMR, screening, pediatrics

Table of Contents

Introduction.....	5
Problem Description.....	5
Available Knowledge.....	6
Rationale.....	11
Specific Aims.....	12
Methods.....	12
Context.....	12
Interventions.....	13
Study of Interventions.....	14
Measures.....	14
Analysis.....	15
Ethical Considerations.....	15
Results.....	16
Discussion.....	20
Summary.....	20
Interpretation.....	21
Limitations.....	23

Conclusion.....24

References.....27

Appendices.....28

**Assessing and Improving Pediatric Nurses' Documentation of Childhood Immunization
Status Using the Electronic Health Record**

Problem Description

The microsystem where this quality improvement project took place is an eight-bed unit that exists to meet the physical, behavioral, and emotional health needs of children requiring pediatric care, same-day surgery, or an extended hospital stay. Working with a registered nurse on the unit revealed some of the discrepancies between the options available for documentation in the electronic health record (EHR) and those that are frequently utilized. For example, the EHR offered multiple functions to document patient immunization records, disease exposures, and immunization administration. However, the immunizations section within the universal Admission History Checklist was not a required field. Therefore, it was up to nurse discretion whether pediatric patients and their guardians are asked about immunization status upon admission and these questions may be skipped.

Pediatric nurses within the project's microsystem completed a basic Admission History form for each patient during the admission process. This tool, embedded within the EHR and utilized only once per patient per admission, included several required fields as well as optional fields to assess aspects of pertinent past medical history. The original required fields were the COVID-19 risk screening, functional assessment, sexual/reproductive history, and social history. A subsection for immunization history existed within the form but was not required. Personal observation during immersion in this clinical setting revealed that nurses frequently underutilize the optional fields within this form. However, a review of the relevant literature demonstrates that age-appropriate documentation of patient care and health status, including immunization status, is critical for identifying age and disease specific expectations, preventing future complications, and optimizing health outcomes (Dufendach et al., 2015).

Available Knowledge

Pediatric-specific documentation practices can facilitate healthy child development and health maintenance by alerting the care team to obstacles, red flags, and areas where families may require extra education or support. This quality improvement project will evaluate nurse self-report of EHR use for immunization documentation, their perceptions regarding EHR ease of use for documenting pediatric immunization status, nurse attitudes towards documenting immunization status, and perceived implications for nursing care.

Authors of a technical brief from the Agency for Healthcare Research and Quality detailing the specific needs and nuances of a pediatric-specific EHR found that key informants consistently reported a deficit in EHR functionalities for the pediatric populations they served (Dufendach et al., 2015). A review of the literature regarding EHR functionality and screening tools for pediatric populations indicates an overarching need to optimize the EHR for pediatric patients through the inclusion of more evidence-based measurement and documentation tools.

Literature Review Methodology

The writer analyzed peer-reviewed literature gathered from EBSCO's Academic Search Complete, PubMed, and MEDLINE databases. To focus search results, the writer used the Boolean term combinations "electronic health record" + "pediatric" + "immunization" and "immunizations" + "assessment" or "immunizations" + "screening." Upon performing the initial searches, studies were filtered based on recency (published within the past ten years) and the availability of full text. Studies were excluded from the search based on relevance, i.e., those unrelated to pediatric patients were excluded. School-based studies were also excluded, as the literature review was conducted with the intent of applying findings to an acute-care healthcare setting. Finally, articles that did not reference electronic health record use were excluded. The

writer used Melnyk's Hierarchy of Evidence to rate the quality of included evidence by research design.

Literature Review

In the current digital age, electronic health records are a necessary and useful tool for healthcare personnel at every level of care. Care providers can use built-in features in the EHR to screen children for developmental, psychosocial, and environmental predictors of disease. A 2020 clinical report from the American Academy of Pediatrics offers a helpful summary of evidence-based recommendations for clinicians to improve care of pediatric populations, including health informatics recommendations. Recommendations for clinical information systems include utilizing automatically populating growth charts, storage of age-specific data, the ability to designate and document an indeterminate gender, management of immunization records, newborn screening data, age-specific bounds for laboratory results, a function for documenting developmental milestones, automated nutritional calculations, and the ability to provide printed family education in their native language (Ernst et al., 2020).

In one randomized control trial constructed to identify the most effective strategy for increasing the rate at which pediatricians perform secondhand smoke exposure screening during their visits, the researchers assigned pediatricians to three experimental groups (Thomas et al., 2018). The first group (G1) utilized a modified version of their EHR that included prompts for secondhand smoke exposure screening, the second group (G2) attended a lecture on the topic of secondhand smoke exposure but used the original EHR, and the third group (G3) both attended the lecture and utilized the modified EHR (Thomas et al., 2018). Findings showed that G3 documented secondhand smoke exposure in the medical record significantly more than G2 and

G1 ($P < .01$), and G1 documented secondhand smoke exposure in the medical record significantly more than G2 ($P < .05$) (Thomas et al., 2018).

The strength of the study by Thomas et al. was its randomization and clear delineations between interventions; however, it did not supply an exact number of pediatricians assigned to each of the three experimental groups and only sampled from primary care settings (2018). Nonetheless, evidence suggests that EHR prompts are effective in changing the way clinicians interview patients and document their findings, and rates improve when the EHR prompts are combined with continuing education (Thomas et al., 2018).

The importance of immunization documentation for pediatric populations was explored in a retrospective study of internationally adopted children at Italy's Meyer Children's University Hospital between the years of 2009 to 2018 (Bechini et al., 2020). Internationally adopted children are a particularly at-risk population for being behind on childhood immunizations or unimmunized altogether (Bechini et al., 2020). The researchers involved in this study found that place of birth plays a role, with children born in the African continent or Central America being less likely to hold vaccine documentation from their country of origin compared to children adopted from Eastern European or Asian nations (Bechini et al., 2020). Without immunization documentation, children may require serology testing once admitted to an acute care setting if they were not previously tested outpatient (Bechini et al., 2020). Of the over 1900 children included in this study, the researchers found that more than half of the newly arrived internationally adopted children were unprotected against Measles, Mumps, Rubella and Varicella upon their admission to the hospital (Bechini et al., 2020).

A literature review published by the American Academy of Pediatrics in 2019 includes extensive data regarding pediatric inpatient immunization programs, attitudes and barriers to

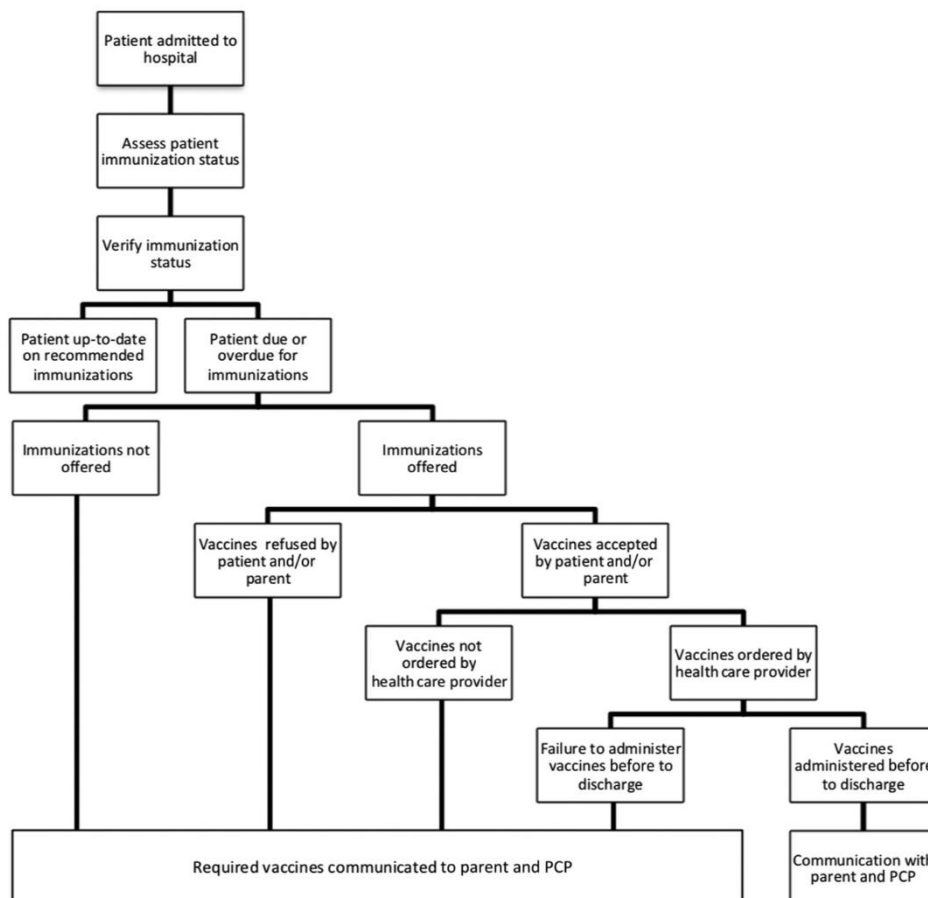
immunization, and interventions to increase pediatric inpatient immunization rates (Mihalek et al., 2019). The authors explained that although most vaccines are administered in outpatient settings, inpatient hospitalization offers an opportunity to vaccinate children who may have otherwise slipped through the cracks (Mihalek et al., 2019). They cited nursing-driven screening as a key strategy to increase pediatric immunization rates (Mihalek et al., 2019):

Access to accurate vaccine histories remains a major barrier in inpatient immunization programs because providers frequently under document and parents over recall a child's vaccine status. Strategies identified to increase inpatient vaccination included creation of a multidisciplinary immunization team, educational interventions, visual reminders, catch-up vaccine plans, order sets, and nursing-driven screening. When offered inpatient vaccination, a majority of parents accepted immunizations for their children (Mihalek et al., 2019, p. 550).

Ultimately, the first step to improving immunization rates in a population is identifying the immunization status of its members (Figure One) (Mihalek et al., 2019). The American Academy of Pediatrics Advisory Committee recommends using inpatient hospitalizations as an opportunity to vaccinate (Mihalek et al., 2019). Two of the studies included in Mihalek et al.'s literature review involved interventions which targeted immunization documentation (2019). Both revealed that patients had significantly improved accuracy and adequacy of immunization histories following efforts to enforce documentation of immunization status (Mihalek et al., 2019).

Figure One

Inpatient Immunization Flow Chart



(Mihalek et al., 2019).

An alternative to inpatient vaccination is vaccine counseling for later, outpatient administration. Singh et al. conducted a systematic review to determine strategies for overcoming vaccine hesitancy (2022). They found that when parents and primary care providers were notified of missing vaccines before pediatric patient discharge from the inpatient setting, combined with education for the parents regarding the benefits of immunization against vaccine-preventable diseases, patients had a notably higher rate of receiving “catch-up” vaccines than those who were not given the counseling (Singh et al., 2022). Twenty-seven percent of patients whose guardians participated in vaccine counseling versus eight percent in the control group

received greater than, or equal to, one catch-up vaccine within one month of their discharge ($p < .001$) (Singh et al., 2022).

Rationale

This quality improvement process was guided by the DMAIC (define, measure, analyze, improve, and control) framework. The “define” step started with clinical observation of documentation practices on the pediatric unit and brief interviews with key stakeholders. Based on the observation that childhood immunization status did not have to be documented to complete patient admissions, a preliminary survey was administered. This pre-intervention survey was the first component of the “measure” step and assessed nurses’ documentation practices related to childhood immunization status as well as nurse perceptions regarding immunization documentation, EHR ease of use, and EHR usability.

During the “analyze” step, pre-survey data was reviewed to determine a practical approach towards improving immunization status documentation on this unit. Finding a discrepancy between assessment practices and documentation practices during patient admission, unit leadership and nursing informatics were consulted to develop an action plan. During the “improve” step, the EHR was modified in congruence with the proposed solution that had been approved by unit leadership.

The final “control” step involved a re-evaluation of the same documentation processes assessed in the pre-survey, as well as survey questions regarding nurse perceptions of the EHR intervention and understanding of the explanatory support material provided. The purpose of this post-survey was to evaluate the effectiveness of the intervention as well as how it was received by staff, with the ultimate objective of creating a control plan to “document what is needed to

keep an improved process at its current level” and recommending future improvements (DMAIC Process, n.d.).

Specific Aims

The specific aim of this project was to increase nurses’ self-reported frequency of immunization status documentation during admission of pediatric patients on this unit to 100% as well as to improve attitudes towards immunization documentation and EHR usability. Ideally, the post-survey evaluating self-reported EHR use for immunization documentation and attitudes regarding immunization documentation would have revealed increased reports of immunization documentation and improved attitudes regarding the EHR’s usability for that purpose as compared to the baseline survey. The goal was to gather preliminary survey data from every full-time nurse on the unit by June 21, 2023, and final survey data following the interventions by July 20, 2023.

Methods

Context

The focus for care on this pediatric unit is to return sick and injured children to a state of optimal health so that they can be discharged to their homes with their families. Pediatric patient needs may range from single day admissions or post-operative observations to multi-week holds for behavioral health monitoring, treatment for acute respiratory illnesses, traumas, and more. Interventions made on this unit can be generalized to most inpatient acute care pediatric settings.

Registered nurses are the core of the interdisciplinary team in the pediatric unit. During this project, there were twelve nurses for the unit, two of which were strictly per diem, and no assistive personnel. The only cost to the quality improvement initiative was the time cost to the

nursing informatics team to change the immunizations section of the Admission History Checklist to a required field. The surveys took no more than ten minutes each and could be completed during a shift, while nurses were being paid for their time. At the conclusion of the project, the results were presented to unit management to inform future changes. Future projects may incur additional time costs to improve usability and ease-of-use of the EHR.

Interventions

The quality improvement process began with a preliminary survey for nurses using Likert-style questions to assess nurses' self-reported use of the EHR for immunization status documentation as well as their perceptions of EHR functionality for the task, attitudes towards immunization documentation in general, and perceived implications for nursing practice. The intervention consisted of an EHR modification and an educational SBAR (Situation, Background, Assessment, Recommendation) regarding the EHR change. The EHR was modified by nursing informatics to make the immunizations section of the Admission History Checklist a required field. Nurses were educated about the change using an SBAR posted around the unit, which was also sent to stakeholders via email. The SBAR cited evidence-based best practice regarding immunizations and immunization documentation to explain the rationale for the change.

Baseline survey results were compared against a second survey, which assessed the same domains as well as understanding of the SBAR education. The surveys were administered on Qualtrics and accessible through a QR code, which was posted in the staff break room on the unit. A brief description of the project was posted alongside the QR code. Following the EHR modification, the SBAR was posted beside the second survey and embedded within it for reference.

Study of the Interventions

A descriptive statistical analysis of data gathered from the preliminary and secondary surveys was attempted; however, it was limited in both its rigor and reliability due to missing data. The analysis focused on changes in mean self-reported frequency of immunization documentation and attitudes regarding the importance and relevance of documenting immunization status for pediatric patients. Descriptive statistical analysis of the preliminary survey using Qualtrics™ facilitated the identification of central tendency, variability, and distribution in nurse EHR use, reported ease of use, attitudes and perceived implications regarding immunization documentation at their current baseline. After the EHR modification, the descriptive statistical analysis sought to identify any improvement or deterioration in nurse perspectives towards immunization status documentation practices based on the change, including qualitative narrative responses. It also included an analysis of nurse perspectives towards the SBAR, which was part of the intervention and could not be compared to pre-survey data.

Measures

The operational definition of the outcome studied was “nurse self-reported frequency of documenting childhood immunization status upon admission.” The decision to study nurse attitudes versus patient outcomes was made due to the time constraints on this project. A future project could analyze relationships between immunization status documentation and patient outcomes, education provided, referrals to specialists, patient and family satisfaction, or provider satisfaction with nursing assessments. The surveys were crafted specifically for this project to simplify and shorten the survey process for unit nurses. They focused on the perceived relevance and importance of immunization documentation for pediatric patients, as opposed to software

ease of use, which is the focus of most existing EHR-centric surveys. The surveys were composed of multiple-choice demographic questions, Likert scale continuum questions, a matrix and open-ended text box questions.

Analysis

The descriptive statistical analysis of survey data was conducted using Qualtrics and Excel. The analysis identified mean frequency of use for different EHR features related to immunization documentation, mean perceived importance of documenting childhood immunization status, range of disease exposure assessment and documentation practices, and standard deviation of all responses.

Ethical Considerations

There were no major ethical concerns identified during the design or implementation of this project. No patient data was used in the study. It focused wholly on nurse perspectives and self-reported documentation practices gathered via online surveys, thereby eliminating the need for children or families to participate in the study. Survey participation was optional for nurses and responses were anonymous. This proposal was reviewed by the University of New Hampshire Department of Nursing Quality Review Committee to attest that it meets quality improvement criteria and was exempt from Institutional Review Board approval.

Results

Initial Steps

This quality improvement project began with the objective of evaluating developmental assessment processes on the pediatric unit and incorporating a developmental assessment into the EHR. Unit leadership was supportive of the idea; however, meetings with key stakeholders in the nursing informatics department revealed that the proposed EHR changes would require more time than was available for this project's completion. Therefore, the decision to transition to a focus on immunization status documentation was made, given key stakeholder input that modifying the Admission History Powerform embedded within the EHR would be a more efficient and realistic process.

The pre-intervention survey was designed to assess nurses' self-reported use of the EHR for immunization status documentation as well as their perceptions of EHR functionality for the task, attitudes towards immunization documentation in general, and perceived implications for nursing practice. It was administered before the EHR modification took place, and survey results were used to inform the change. Unit leadership endorsed the proposal and then it was presented to the Nursing Informatics Committee, which approved it for implementation.

Process Measures and Outcomes

The preliminary survey results included responses from six nurses. Of the six respondents, five were staff nurses on the pediatric unit and one was a maternity nurse who floated to pediatrics. Three respondents reported working in pediatrics for zero to five years, one for six to ten years, one for 11-15 years, and one for 16 or more years.

Pre-survey data revealed a moderately high self-reported frequency of use of the immunizations tab in the EHR (see Table One). The immunizations tab was separate from the

Admission History Checklist and not part of a modifiable Powerform. Survey respondents reported almost always verbally asking immunization status during admission, however, their reported documentation frequency for immunization status during admission was lower. One of the six respondents reported that they never perform this documentation within the Admission History Checklist. Nurses' perceived importance and relevance of childhood immunization status being documented within the EHR was consistently high.

Table One

EHR Documentation Practices: Pre-Survey

Task	Mean Frequency (1.00-5.00)
Use of EHR immunizations tab	3.83
Asking immunization status during admission	4.50
Documenting immunization status on Admission History Checklist	3.83

EHR ease-of-use and usability affect nurse compliance with evidence-based best practice for documentation (Kutney-Lee et al., 2019). The mean perceived ease-of-use of the Admission History Checklist was 3.33 on a scale of 1-5. Two respondents shared free-text feedback in the pre-survey regarding EHR usability and ease of use. One stated “documenting on covid and influenza is easy. Documenting on other aspects of the pediatric immunization schedule is quite difficult.” Two respondents referred to the EHR as “not user friendly,” with one specifically citing “ad hoc forms” (Powerforms). The Admission History Checklist is performed on a Powerform, which was ultimately modified during the intervention.

Based on pre-survey data, an SBAR (Situation, Background, Assessment,

Recommendation) was completed to provide a description of the change process to unit staff as well as the informatics team. The SBAR was approved by pediatric nursing leadership and nursing informatics for distribution among staff via employee email. The decision was made to distribute the SBAR in coordination with the announcement of the EHR modification. The SBAR served as the educational component of this intervention, as it referenced pre-survey data and explained the foundation for the change. Printed copies were posted in the pediatric staff break room along with the link to the post-survey as well as in several other places around the unit.

The post-survey only yielded one response after a seven-day data collection window. This limited the availability of quantitative data that can be accurately compared to the pre-survey. However, the respondent did include a qualitative response regarding the EHR modification. In response to the question “do you have any comments about the EHR modification,” this nurse stated, “I think it will help nurses who were not previously documenting in this section to remember to document there.”

Contextual Elements

The intervention and change process were affected by multiple factors, including delayed response times from key stakeholders, leadership and staff vacation periods, and the small unit size. The intervention was dependent on the timing and approval of the nursing informatics committee, which meets once monthly. It may also be relevant to note that half of the original survey respondents reported working in pediatrics for zero to five years, skewing the sample towards less experienced nurses.

The pediatric unit was also plagued by staffing challenges, requiring frequent reliance on float nurses from the neighboring maternity unit or general float pool. Several of the pediatric-specific nurses on staff work part time or per diem. It is likely that not every pediatric nurse was able to experience the EHR change between the day that it went live (7/5/23) and the day the post-survey was first offered (7/9/23). However, the post-survey remained active for a full week of data collection with just one respondent.

Associations

The lack of post-survey data inhibited a fair evaluation of the success or failure of the project's specific aim, however, the EHR modification did necessitate a change in documentation practices for nurses who were not previously documenting on immunization status during admission. Because the Admission History Checklist is a required form for all patients and cannot be completed without filling out each mandatory field, the frequency of immunization status documentation was estimated to have increased to 100% following the intervention.

Unintended Consequences

The EHR intervention resulted in a minor mandatory change in documentation practices for nurses outside of the pediatric unit. Because the universal Admission History Checklist was changed to make immunization status required, nurses caring for adult patients must select a "not applicable due to patient age" option in the form. Although nurses on other units are not required to assess or document their patients' immunization status as was the process change on pediatrics, their admission documentation process has still undergone a slight alteration.

Missing Data

Substantial post-survey data is missing due to a lack of participation from unit staff. In contrast to the six pre-survey respondents, only one nurse participated in the post-survey, which is a response rate decrease of 83.33%. The motivation for staff to avoid participation is unclear. This could be influenced by workload, lack of interest in the project topic, or other contextual factors such as short staffing and burnout.

Discussion

Summary

Key Findings

Most notably, while assessing documentation practices amongst pediatric nurses, pre-survey data revealed that although nurses reported that they almost always asked immunization status during admission, only four out of six respondents reported documenting on that question every time. One respondent even reported that they never document immunization status during the admission history. These responses demonstrate a discrepancy between what nurses are assessing verbally and what they are documenting in the EHR. The objective of the intervention was to eliminate that incongruity regarding childhood immunization status.

Relevance to Rationale

This quality improvement project was guided by the DMAIC (Define, Measure, Analyze, Improve, Control) framework. The problem was defined through the pre-survey and was the key finding from that data — a self-reported discrepancy between verbal assessment and documentation practice that failed to align with the evidence-based practice standard of documenting childhood immunization status for every pediatric patient (Mihalek et al., 2019).

The intent of the post-survey was to measure nurse documentation practices following the modification, as well as to analyze their reported satisfaction with the EHR change and their understanding of the SBAR presented to justify it. Only one response was received, but that participant reported a strong understanding of the SBAR and supported the change. Due to time constraints and a lack of feedback from unit nurses, no improvements were attempted. Finally, the process will be maintained, or “controlled,” by the EHR software. Because the question regarding childhood immunization status was changed to a required field in the admission history, nurse documentation practices on this unit will remain more congruent with evidence-based best practice than they were before this project.

Interpretation

Associations

There was a direct association between the intervention (EHR change) and the outcome of nurses completing the immunization status question during patient admissions. Chart audits would be required to confirm 100% compliance with the change. However, based on observed workflow and insight from key informants, nurses However, more nuanced outcomes regarding nurse perceptions of the change and comprehension of its rationale were difficult to assess due to the lack of post-survey responses. The one nurse who responded to the post-survey expressed positive feedback regarding the change.

Comparisons with Literature

The use of electronic health records in both inpatient and outpatient clinical settings has historically been met with a mixture of resistance and acceptance (Cho et al., 2021). Changes to an existing EHR are subject to the same disparate reactions. In their descriptive correlational study examining nurse resistance to EHR changes, Cho et al. explain that user resistance is

usually a response to mandatory systems (2021). Because the change made in this quality improvement project did result in a new mandatory question field, it could be anticipated that nurses would be resistant to the change. However, the singular post-survey respondent reported acceptance of the change and stated that they perceived it as helpful. A brief interview with the unit's nurse educator following the intervention further supported staff acceptance of the change. The educator stated that there had been no resistance to the rollout of the modified EHR Powerform and denied any issues or concerns (A. Reade, personal communication, July 11, 2023).

Impact

The impact of this intervention is unique in that most nurses did not have to change their assessment process. No new clinical practices were introduced. Instead, nurses were simply required to document on a question that most (five out of six) initial survey respondents already reported "always" asking during admission. Therefore, for most nurses, the process change was limited to clicking a box. The familiar concept of immunization status was expanded in the practice setting through education regarding its relevance to microsystem and population health. The simplicity of this task for nurses, contrasted with the far-reaching positive impacts of having patient immunization status rates available for the microsystem, is what garnered stakeholder buy-in initially. It has also led, per stakeholder report, to a smooth transition (A. Reade, personal communication, July 18, 2023).

Expected versus Actual Outcomes

The expected outcome of nurse documentation on childhood immunization status within the EHR's admission history form was actualized due to the question field becoming mandatory. Due to the extensive body of available literature surrounding the phenomenon of nurse resistance

to EHR changes, resistance was expected with this quality improvement project. However, per the post-survey response and discussions with the unit nurse educator, this project's change appears to have been well received.

Costs

A time cost to the nursing informatics team was incurred to change the immunizations section of the Admission History Checklist to a required field. Pediatric unit nurses now also must spend an additional estimated 30 seconds during the admission process selecting the patient's immunization status from the multiple options available in the admission history Checklist.

Limitations

This project was limited by the discrepancy in response rate between the pre-survey and post-survey. The post-survey response rate was 10% among pediatric staff nurses compared to the initial 50% response rate to the pre-survey. In addition to posting the SBAR and post-survey QR code around the unit, face-to-face conversations and digital communication only yielded one survey response. The limited quantity of survey respondents decreased the generalizability of the findings and impaired its internal validity.

The internal validity of the process may have also been affected by response bias. It is possible that because some of the survey questions assessed compliance with recommended documentation practices, nurses may have altered their responses in an attempt to meet perceived expectations. However, the survey was administered anonymously to mitigate some of the effects of response bias. Finally, internal validity may have been diminished by the measurement tools used. For this project, documentation practices were assessed using nurse self-report via surveys. Given additional time, the project could have been improved by verifying

these self-reports with chart audits. A future quality improvement project would benefit from the use of chart audits to determine trends in nurse documentation of immunization status.

Efforts were made to minimize limitations by utilizing an anonymous link for survey completion, ensuring that no identifying information was requested, and making the surveys readily available to all staff and stakeholders.

Conclusion

Usefulness of the work

This quality improvement project was a useful first step towards improving nurse-driven screening practices in the pediatric unit. Identification of patients at risk for vaccine-preventable disease is the foundation required to increase immunization rates on a population health level. Documentation in the EHR is part of every patient admission, and emphasizing the importance of immunization screening during that process is useful in maintaining patient-centered care on the unit.

Sustainability and suggested next steps

The EHR modification itself is a sustainable change, requiring only the initial software edit to become a fixture of the universal Admission History Checklist. However, to sustain and continue progress towards improving immunization status screening and ultimately increasing opportunities for children to be brought up to date on vaccinations, further steps will be required on behalf of unit leadership and staff. Those steps should include chart audits to monitor compliance with required EHR fields, the development of a written policy for immunization documentation, and efforts to increase the availability and administration frequency of vaccines for under-immunized children admitted to the unit.

Potential for spread to other contexts

If unit leadership takes further action to track the immunization rates of admitted children and monitor inpatient vaccine administration or outpatient rates following immunization counseling, this project could become relevant as the foundation for a more widespread public health initiative. Mandatory nursing-driven immunization screening could be applied to other inpatient units aside from pediatrics, and even to outside healthcare organizations. The project may spread to an outpatient context as collaboration with health clinics and primary care offices becomes necessary to track immunization rates following inpatient counseling.

Implications for practice and for further study in the field

Implications for practice include the change in documentation workflow for some nurses on the pediatric unit and increased availability of immunization status within the EHR for all members of the care team. If immunization status is documented upon admission, nurses and providers assuming of a new patient can identify the patient's immunization status by referencing their chart. Implications for further study in the field include the opportunity to further evaluate nurse perceptions of mandatory EHR documentation, attitudes towards administering childhood immunizations during a patient's inpatient stay, possible associations between immunization status identification and immunization rates at the population health level, and the usability of screening tools within the EHR.

At the conclusion of this quality improvement initiative, further investigation is still necessary to determine nurse compliance with the EHR modification as well as their perceptions of and attitudes towards the change. Future inquiry could assess patient outcomes related to nurse-driven immunization screening and ensure that the foundational step of patient screening is followed by the clinical implementation of evidence-based disease prevention.

References

- Bechini, A., Boccalini, S., Alimenti, C. M., Bonanni, P., Galli, L., & Chiappini, E. (2020). Immunization Status against Measles, Mumps, Rubella and Varicella in a Large Population of Internationally Adopted Children Referred to Meyer Children's University Hospital from 2009 to 2018. *Vaccines*, 8(1), Article 1. <https://doi.org/10.3390/vaccines8010051>
- Cho, Y., Kim, M., & Choi, M. (2021). Factors associated with nurses' user resistance to change of electronic health record systems. *BMC Medical Informatics and Decision Making*, 21(1), 218. <https://doi.org/10.1186/s12911-021-01581-z>
- DMAIC Process: Define, Measure, Analyze, Improve, Control | ASQ*. (n.d.). American Society for Quality. Retrieved March 26, 2023, from <https://asq.org/quality-resources/dmaic>
- Dufendach, K. R., Eichenberger, J. A., McPheeters, M. L., Temple, M. W., Bhatia, H. L., Alrifai, M. W., Potter, S. A., Weinberg, S. T., Johnson, K. B., & Lehmann, C. U. (2015). Core Functionality in Pediatric Electronic Health Records: Findings. In *Core Functionality in Pediatric Electronic Health Records* [Internet]. Agency for Healthcare Research and Quality (US). <https://www.ncbi.nlm.nih.gov/books/NBK299010/>
- Ernst, K. D., COMMITTEE ON HOSPITAL CARE, Rauch, D. A., Hill, V. L., Mauro-Small, M. M., Hsu, B. S.-H., Lam, V. T., Vinocur, C. D., & Jewell, J. A. (2020). Resources Recommended for the Care of Pediatric Patients in Hospitals. *Pediatrics*, 145(4), e20200204. <https://doi.org/10.1542/peds.2020-0204>
- Kutney-Lee, A., Sloane, D. M., Bowles, K. H., Burns, L. R., & Aiken, L. H. (2019). Electronic Health Record Adoption and Nurse Reports of Usability and Quality of Care: The Role of

Work Environment. *Applied Clinical Informatics*, 10(1), 129–139.
<https://doi.org/10.1055/s-0039-1678551>

Mihalek, A. J., Kysh, L., & Pannaraj, P. S. (2019). Pediatric Inpatient Immunizations: A Literature Review. *Hospital Pediatrics*, 9(7), 550–559.
<https://doi.org/10.1542/hpeds.2019-0026>

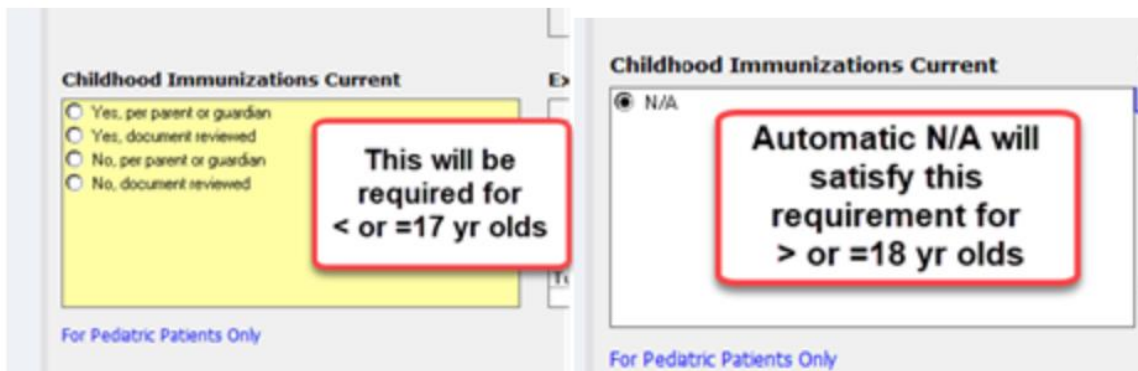
Singh, P., Dhalaria, P., Kashyap, S., Soni, G. K., Nandi, P., Ghosh, S., Mohapatra, M. K., Rastogi, A., & Prakash, D. (2022). Strategies to overcome vaccine hesitancy: A systematic review. *Systematic Reviews*, 11, 78. <https://doi.org/10.1186/s13643-022-01941-4>

Thomas, K. E. H., Kisely, S., & Urrego, F. (2018). Electronic Health Record Prompts May Increase Screening for Secondhand Smoke Exposure. *Clinical Pediatrics*, 57(1), 27–30.
<https://doi.org/10.1177/0009922816688261>

Appendices

Appendix A

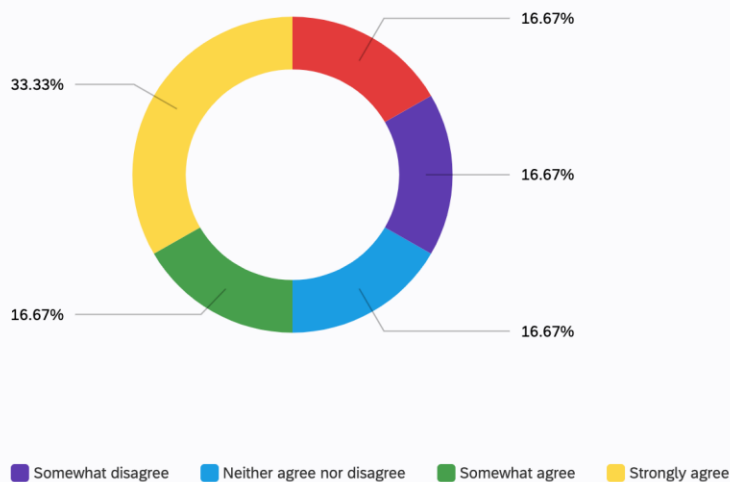
Visual of EHR change provided by nursing informatics to staff



Appendix B

Admission History perceived ease-of-use for immunization documentation (pre -intervention)

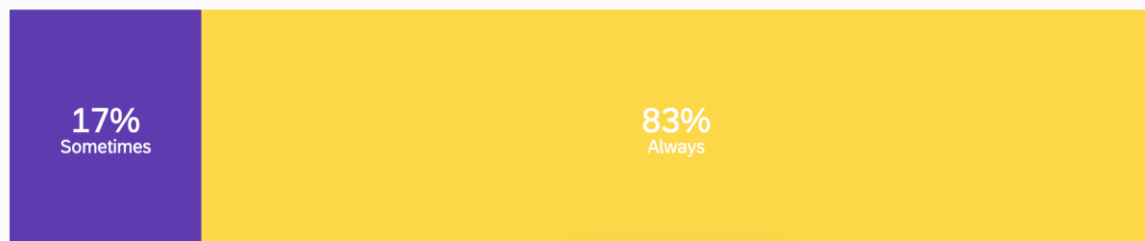
"My perception of the Admission History checklist in the EHR is that it is easy to document immunization status on admission."



Appendix C

Visual of discrepancy between assessment and documentation practices (pre-intervention)

"I routinely ask patient immunization status during admission."



"I document patient childhood immunization status while completing the Admission History"

