1-27-2025

Staff Education to Increase Awareness and Readiness of Clinicians to Use the Clinical Decision Support for Immunization (CDSi) Tool

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This is to certify that the doctoral study by

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has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
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2025

Executive Summary: Staff Education Project

Staff Education to Increase Awareness and Readiness of Clinicians to Use the Clinical Decision Support for Immunization (CDSi) Tool

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Executive Summary Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Nursing Practice

Walden University

May 2025

Summary

Accurate evaluation and forecasting of immunization and ensuring the right vaccines are administered at the right time are essential for the success of immunization programs. Interpreting the clinically written Advisory Committee on Immunization Practice (ACIP) recommendations by individual clinicians is time-consuming and complex, increasing the risk of misinterpretation, inconsistent practice, and inaccurate immunization evaluation and forecasting. Thus, the purpose of this project is to introduce clinicians at the selected project site to an evidence based clinical decision support tool and evaluate participants readiness to utilize the tool.

Staff education on the clinical decision support for immunization (CDSi) tool was conducted using PowerPoint presentation, handouts, and practice sessions. Pre/post surveys were conducted to determine changes in awareness of the CDSi tool and readiness to utilize the tool. Seven staff members attended the staff education session and completed the pre/post-test ($N = 7$). Results indicated increased awareness by 100% and readiness to use the CDSi resources by 71%. Participants voiced positive feedback on their readiness to use the CDSi tool to improve vaccine recommendation accuracy, timeliness, and consistency. Accurate vaccine evaluation and forecasting is a relevant quality care measure for immunization programs. Thus, the project may positively impact the target population by ensuring the right vaccinations are administered at the right time. Furthermore, the project may have potential implication for positive social change by enhancing effectiveness and success of immunization programs in the reduction of many infectious diseases.

Background

Immunizations are proven to be the key success factors for the reduction of many infectious diseases and are identified as a highly cost-effective clinical preventive service (Rémy et al., 2015). Accurate evaluation and forecasting of immunization and ensuring the right vaccines are administered at the right time is crucial for this success. In the United States, recommendations on how to use vaccines to control disease are developed by the Advisory Committee on Immunization Practice (ACIP) and adopted by the Centers for Disease Control and Prevention (CDC) director before being published in the CDC's Morbidity and Mortality Weekly Report (MMWR) for public use (CDC, 2024).

Interpreting clinically written ACIP recommendations by individual providers/clinicians is time-consuming and complex, increasing the risk of misinterpretation, inconsistent practice, and inaccurate immunization evaluation and forecasting (CDC, 2024). Clinical Decision Support Systems (CDSS) are computer-based tools that can assist clinicians by analyzing data against domain knowledge and evidence-based guidelines and providing decision support at the point of care (Jing et al., 2019). Using a clinical decision support system simplifies the complexity of understanding and implementing ACIP recommendations and ensures consistency in the interpretation of the advisory committee recommendations. The Clinical Decision Support for Immunization (CDSi) is an evidence-based tool developed by the CDC. The tool provides an implementation-neutral foundation for the development and maintenance of clinical decision support engines that capture ACIP recommendations and improve the uniform representation of vaccine decision guidelines. It also allows immunization programs to automate vaccine evaluation and forecasting by integrating technology, patient information, and ACIP recommendations to provide accurate and consistent immunization evaluation and forecasting.

The purpose of the current staff education project is to introduce the CDSi tool to clinicians at the selected project site and evaluate whether staff education on the CDSi tool improves the awareness and readiness of clinic staff to utilize the tool for vaccine evaluation and forecasting.

CDSi tools have been used in multiple healthcare settings and have been shown to improve vaccine evaluation and forecasting by providing clinically accurate vaccine recommendations in accordance with the ACIP guidelines for routinely administered vaccines (Arzt, 2016). CDSi reminders embedded in the Electronic Health Record (EHR) have improved immunization uptake for several immunizations and visit types (Atem & El Ghaziri, 2023).

It has been widely documented that implementing a clinical decision support system has a positive impact both at the individual and population levels (Stephens et al., 2021; Kirtland et al., 2019; Rajamani et al., 2018). For example, CDSi resources coupled with adequate staff training and a reminder system on the existing EHR have resulted in improved vaccine recommendation behavior among providers, improved vaccination rates, and enhanced utility of the Immunization Information System (IIS; Shrader et al., 2020; Rajamani et al., 2016; Rajamani et al., 2015). Moreover, the user experience survey demonstrates that over 80% of CDSi users are satisfied with the resources and report a positive impact and improved uniformity and consistency in the implementation of immunization guidelines (Dixon et al., 2017). The above evidence suggests that implementing the CDSi tool can positively impact the accuracy, consistency, and efficiency of immunization evaluation and forecasting.

Staff Education Project Development

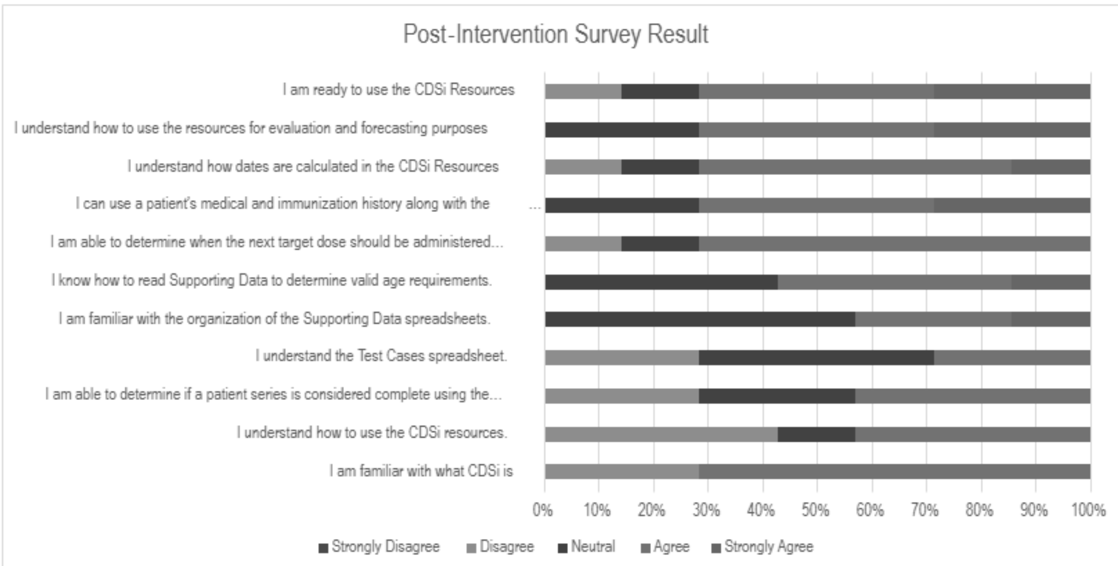
This project took place in an outpatient occupational health clinic located in Washington, DC. Databases including MEDLINE, CINAHL Plus, Academic Search Complete, Academic Search Index, and Complementary Index were used to search for peer reviewed and academic journals published between 2015 and 2024 to collate the most recent literature on clinical decision support for immunization. A review of the literature on the use of clinical decision support for immunization to improve vaccine evaluation and forecasting practice was evaluated. A PowerPoint presentation on CDSi was created and delivered to purposively selected clinic staff at the project site. Participants' awareness and readiness to use the CDSi tool were assessed using a survey administered before and after the staff education session. The pre-intervention survey included a question assessing familiarity and awareness with the CDSi tool and had "yes" and "no" response options (N = 7), and the post-intervention questions assessed knowledge of the CDSi tool and readiness to use the tool in practice using a 5-point Likert scale (N = 7). Increased awareness and readiness to use the tool was the outcome measure used to indicate the effectiveness of the staff education intervention. A descriptive analysis was conducted, and results were presented using a bar graph.

Results

A total of seven staff members attended the staff education session and completed pretest and posttest (N = 7). The questionnaire assessed pre- and post-intervention knowledge scores and readiness to use the CDSi tool. Awareness of the CDSi tool increased by 100%, and readiness to use the CDSi tool increased by 71%. Participants voiced positive feedback on their readiness to use the clinical decision support system, vaccination evaluation, and forecasting resources. Post-intervention responses are presented below.

Figure 1

Participants' Response on Knowledge and Readiness to Use CDSi Resources



Impact on Organization

Time-consuming and complex tasks of interpreting clinically written ACIP recommendations by providers/clinicians increase the risk of misinterpretation of vaccine recommendations, resulting in inconsistent and inaccurate immunization evaluation and forecasting. Proper risk-based vaccine screening, forecasting, and administration using an automated clinical decision support system is a low-risk intervention that aligns with the project site's ongoing effort to modernize medical services and organizational priority to ensure workforce health protection.

Implications for Nursing Practice, Positive Social Change, Diversity, Equity, and Inclusion

The project has potential implications for nursing practice, positive social change, diversity, equity, and inclusion. Immunizations are shown to be the key success factors for the reduction of many infectious diseases and are identified as a highly cost-effective clinical preventive service (Rémy et al., 2015). Effective vaccination can save healthcare costs by reducing the costs associated with treating the disease and possible long-term disability, thereby contributing to positive social change. Accurate evaluation and forecasting of immunization and making sure the right vaccines are administered at the right time are crucial for this success. The introduction of information technology and decision support systems into the delivery of immunization services can play a crucial role in helping organizations improve patient safety and care quality and reduce costs associated with care provision. This, in turn, can contribute to improved nursing practice and equitable healthcare across the continuum of care.

Conclusions

The project site primarily serves international travelers at an increased risk of acquiring and spreading infectious diseases that are not common in the United States. Without proper risk-based vaccine screening, forecasting, and administration, the workforce of the organization remains at increased risk of getting and spreading infectious diseases. The project was developed to introduce an evidence-based automated tool that improves vaccine evaluation and forecasting accuracy and ensures the right vaccines are administered at the right time. The intervention applies to the problem and answers the PICO questions thereby paving the way for practice change.

Recommendations

Accurate vaccine evaluation and forecasting is a relevant quality care measure that is essential for immunization programs regardless of the practice setting. Participants voiced positive feedback on the clinical decision support system and vaccination evaluation and forecasting resources, as shown by the survey results. CDSi can be promoted without introducing an additional burden to the clinical staff or drastically altering the current clinic workflows. However, technological limitations and restrictions due to a lack of compatible electronic medical records systems are imminent, indicating the need for adequate planning and coordination to accommodate barriers to implementation.

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