Advancing the education and fostering the utilization of immunization information systems through student pharmacists

Authors: Kevin W. Cleveland, PharmD, ANP[1], Renee Robinson, PharmD, MSPharm, MPH[2], Kathy Eroschenko, PharmD[1], Catherine Oliphant, PharmD[1], Elaine Nguyen, PharmD, MPH[1]

[1]Idaho State University College of Pharmacy – Meridian Campus
[2]Idaho State University College of Pharmacy – Anchorage Campus

Corresponding author:
Kevin W. Cleveland, PharmD, ANP
Idaho State University College of Pharmacy
Meridian Health Science Center
1311 East Central Avenue
Meridian, ID 83642
Email: KevinCleveland@isu.edu
Phone: (208) 373-1872
Fax: (208) 373-1834

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Background

Vaccinations are one of the most powerful tools to prevent infectious disease.[1,2] Over the past several decades, when a vaccine is introduced, the rate of illness from preventable diseases drastically declines.[1] In order to maintain an adequate level of protection in a community, it is essential that the majority of people are vaccinated and that records of vaccination are kept and shared among health providers and systems.[1,2]

To support the capture and sharing of vaccine records among health providers and systems, many states have established statewide immunization information systems (IIS) to support vaccination recordkeeping, evidence-based vaccination reminders, and on-time delivery of vaccinations. However, in most states, utilization of IIS is not required and only providers that participate in the Vaccinations for Children (VFC) program are required to enter administered vaccinations into their state IIS.

Pharmacy personnel are increasingly recognized for their important role in vaccination efforts. On August 19, 2020, the US Department of Health and Human Services authorized pharmacists to provide all Advisory Committee on Immunization Practices (ACIP)-recommended vaccines to children aged 3-18 years during the coronavirus disease-2019 (COVID-19) public health emergency, supporting pharmacy-based initiatives to increase access and support administration of vaccines.

Pharmacists and other health entities can utilize IIS to increase vaccination rates, as well as to meet national priorities such as Healthy People 2030 objectives.[3] In order to meet the preventive health, data capture, and sharing needs of patients, faculty at Idaho State University (ISU) College of Pharmacy (COP) worked with student pharmacists to develop and launch an IIS train-the-trainer program. The objectives of this work were to:
1. Educate ISU student pharmacists on the importance of and the use of IIS and leverage student pharmacists to advance IIS use in community pharmacies.
2. Increase student pharmacists' real-world utilization of IIS during Operation Immunization events.

Methods

Objective 1

In order to increase the knowledge and utilization of IIS as well as leverage student pharmacists as IIS advocates to community pharmacy sites, education and specific training modules for Alaska and Idaho were created and made available to all ISU COP student pharmacists on all three campuses (in Pocatello, Meridian, Anchorage). Module materials were available via Moodle, ISU's online learning management system. Module contents were developed in collaboration with student pharmacist leaders participating in ISU COP's Operation Immunization efforts. IIS training materials from Idaho's Immunization Reminder Information System (IRIS) (provided by the Idaho Department of Health and Welfare) and VacTrack (provided by the Alaska Department of Health and Social Services) were used to tailor the

education provided to fit the unique educational needs and role of student pharmacists. In addition, clinical pharmacy faculty members created assessment quizzes for the state specific IIS training.

The first module consisted of recorded presentations and resources on IIS systems in Idaho and Alaska. Objectives of this module were to: 1) understand the importance of documentation within a state immunization registry; 2) review the steps for activating an IIS account for your pharmacy, logging in, using the patient search, and entering new patient information or editing existing patient information; 3) work through new and pre-existing patient cases using knowledge gained through module education; and 4) create an IIS account to be utilized at experiential sites during the summer break.

The second module covered how student pharmacists can serve as advocates of IIS to advance its use within community pharmacies during their community experiences (introductory and advanced pharmacy practice experiences [IPPEs and APPEs, respectively]). The objectives of the second module were to: 1) create a student-driven and site-specific plan to help educate and train current and future employers and preceptors to utilize the IIS system; and 2) establish comfort and ease of utilizing the IIS system within community pharmacies throughout the state of Idaho and Alaska.

To further assist student pharmacists with advancing community IIS utilization, student pharmacists were provided with a toolkit of talking points that could help facilitate communication and education of IPPE and APPE preceptors on incorporating IIS in vaccine workflow. The toolkit included student-specific information to help them in their role as IIS-use advocates as well as printed materials that can be utilized at all community pharmacy practice sites even after the student has finished their rotation.

Objective 2
To increase real-world utilization of IIS and better prepare student pharmacists to participate in statewide immunization tracking efforts as practicing pharmacists, immunizations administered at Operation Immunization events were recorded in IIS. Immunization events during the project time period focused on COVID-19 vaccines, with student pharmacists collaborating with other community entities such as pharmacies (e.g., Albertsons) or healthcare systems (e.g., St. Luke's Health System) to serve as vaccinators or in other supportive roles. Due to the necessity for COVID-19 vaccination tracking, IIS use was required and done with the collaborating entity.

Evaluation Strategy
Objective 1
The training/education module impact was evaluated using electronic pre- and post-module evaluations administered to student pharmacists. Evaluations assessed student pharmacist perceptions and experience regarding IIS use (ease, access), and training module learning objectives. Module evaluations were administered via Google Forms. The pre-module

evaluation was completed by students beginning on February 2, 2021. A post module evaluation was sent out after completion of the training module, with students taking the evaluation on/after July 20, 2021.

Evaluation of the impact of student pharmacists as IIS-use advocates and educational interventions by students were tracked through student response forms administered via Google Forms.

Objective 2
To evaluate student pharmacists' real-world utilization of IIS during Operation Immunization events, the number of events (including those in collaboration with community entities) were recorded.

Descriptive statistics (counts and percentages) were utilized for all evaluation metrics.

Results
Objective 1
The pre- and post-module evaluations have been completed by 60 and 20 students, respectively (pre-evaluations completed from March 2, 2021 through September 7, 2021, and the post-evaluations completed from July 20, 2021 through August 16, 2021). Results are available in **Table 1**.

Table 1. Pre- and Post-Module Evaluation Results

Module Objectives						
Statement	Pre (n=60) Post (n=20)	Strongly Disagree, n (%)	Disagree, n (%)	Neither Agree nor Disagree, n (%)	Agree, n (%)	Strongly Agree, n (%)
I understand the importance of documenting in my state's IIS.	Pre	1 (1.7)	2 (3.3)	1 (1.7)	15 (25.0)	41 (68.3)
	Post	0 (0.0)	0 (0.0)	2 (10.0)	4 (20.0)	14 (70.0)
I know how to register for an account and create a profile in my state's IIS.	Pre	19 (31.7)	20 (33.3)	11 (18.3)	4 (6.7)	6 (10.0)
	Post	0 (0.0)	1 (5.0)	5 (25.0)	5 (25.0)	9 (45.0)
I know how to log-in and navigate my state's IIS, including searching for patients.	Pre	19 (31.7)	21 (35.0)	6 (10.0)	8 (13.3)	6 (10.0)
	Post	0 (0.0)	0 (0.0)	5 (25.0)	5 (25.0)	10 (50.0)
I know how to enter new patient information and edit existing patient information in my state's IIS.	Pre	20 (33.3)	20 (33.3)	6 (10.0)	6 (10.0)	8 (13.3)
	Post	0 (0.0)	1 (5.0)	5 (25.0)	7 (35.0)	7 (35.0)

	Pre / Post					
I can train others how to register and use my state's IIS to track vaccinations.	Pre	24 (40.0)	20 (33.3)	4 (6.7)	5 (8.3)	7 (11.7)
	Post (n=19)	0 (0.0)	2 (10.5)	7 (36.8)	5 (26.3)	5 (26.3)

IIS Perceptions						
Question	Pre (n=60) Post (n=20)	Not at all, n (%)	Slightly, n (%)	Moderately, n (%)	Very, n (%)	Extremely, n (%)
How important do you believe it is for you to utilize your state's IIS?	Pre	0 (0.0)	1 (1.7)	7 (11.7)	14 (23.3)	38 (63.3)
	Post	0 (0.0)	0 (0.0)	4 (20.0)	4 (20.0)	12 (60.0)
How important do you believe it is for others to utilize your state's IIS?	Pre	0 (0.0)	2 (3.3)	7 (11.7)	16 (26.7)	35 (58.3)
	Post	0 (0.0)	0 (0.0)	4 (20.0)	4 (20.0)	12 (60.0)
How important do you believe it is that IIS data is used to guide state public health initiatives?	Pre	0 (0.0)	1 (1.7)	7 (11.7)	18 (30.0)	34 (56.7)
	Post	1 (5.0)	0 (0.0)	3 (15.0)	4 (20.0)	12 (60.0)

Comfort with IIS						
Question	Pre (n=60) Post (n=20)	Not at all, n (%)	Slightly, n (%)	Moderately, n (%)	Very, n (%)	Extremely, n (%)
How comfortable are you navigating your state's IIS system?	Pre	39 (65.0)	6 (10.0)	7 (11.7)	5 (8.3)	3 (5.0)
	Post	0 (0.0)	3 (15.0)	9 (45.0)	5 (25.0)	3 (15.0)
How comfortable are you entering and editing vaccination records in your state's IIS?	Pre	39 (65.0)	6 (10.0)	6 (10.0)	6 (10.0)	3 (5.0)
	Post	1 (5.0)	2 (10.0)	11 (55.0)	3 (15.0)	3 (15.0)

IIS Advocate Role						
Question	Pre (n=60) Post (n=20)	Not at all, n (%)	Slightly, n (%)	Moderately, n (%)	Very, n (%)	Extremely, n (%)
To what extent do you believe pharmacists are responsible for advocating for IIS use?	Pre	0 (0.0)	2 (3.3)	12 (21.7)	19 (31.7)	26 (43.3)
	Post	0 (0.0)	1 (5.0)	8 (40.0)	7 (35.0)	4 (20.0)
To what extent are you an advocate for IIS use?	Pre	12 (20.0)	4 (6.7)	10 (16.7)	17 (28.3)	17 (28.3)
	Post	0 (0.0)	2 (10.0)	8 (40.0)	5 (25.0)	5 (25.0)
To what extent do you have the resources to be an effective advocate for IIS use?	Pre	12 (20.0)	8 (13.3)	13 (21.7)	12 (20.0)	15 (25.0)
	Post	0 (0.0)	3 (15.0)	7 (35.0)	7 (25.0)	3 (15.0)

During summer 2021, seven students indicated that they had provided IIS training during their community IPPEs (n=6) and APPEs (n=1). Training was provided to 21 individuals, including preceptors, other pharmacists at the practice site, technicians, and interns. Of note, some students commented that they did not provide IIS training during their community experiences because personnel at their practice site were already familiar with and using IIS.

Objective 2
From February 26, 2021 through April 16, 2021, ISU COP student pharmacists participated in twelve Operation Immunization events where IIS were used.

Discussion
The overall goals of this project work were met, with the IIS training modules achieving their objective and increased student pharmacist comfort with using IIS. Overall, student pharmacists felt that IIS utilization was important, but there continue to be opportunities to increase their beliefs and role in advocating for IIS use.

Although the grant project period for this work has concluded, this work is ongoing with faculty members continuing to encourage student pharmacist IIS training and use. At the time of this report, there were only 20 student pharmacists who had completed the post-module evaluation whereas 60 had completed the pre-module evaluation. This discrepancy in sample size and resultant percentages should be considered when interpreting results. Of note, individual-level pre- and post-statistical comparisons were not made, but may be considered in future analyses with greater sample sizes.

In the future, ISU COP faculty will utilize evaluation results to update the training modules. There are also plans to make training mandatory and incorporate it in the curriculum of first-year student pharmacists when they learn how to administer vaccines. As part of this continued initiative, there are also plans to improve evaluation and tracking efforts.

This pilot project had several limitations. Changes were made from the original proposal due to the COVID-19 pandemic. This includes changes in student pharmacist experiences and roles in IPPEs and APPEs. Operation Immunization events were also different this past year with student pharmacists focusing on COVID-19 vaccinations and support to community partners. Related to the pandemic, it was difficult to incentivize participation in a non-mandatory training with high student stress and burnout. This likely contributed to our low sample sizes. Lastly, there was legislative pushback with use of IIS due to political concerns for patient privacy and tracking.

Conclusion
Use of IIS is imperative, especially during the COVID-19 pandemic with multidose regimens. Community pharmacies are increasingly being used for patient and public health vaccination needs given their high accessibility. As such, it is important that pharmacy personnel utilize IIS to evaluate and communicate patient vaccination needs with other healthcare stakeholders. Student pharmacists can be trained on IIS utilization and leveraged as advocates for its use, especially during their community IPPEs and APPEs. Lessons learned from this pilot project will be used to incorporate required IIS training into the curriculum at ISU COP.

References

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