

Using Computerized Physician Order Entry to Ensure Appropriate Vaccination of Patients with Inflammatory Bowel Disease

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Background: Inflammatory bowel disease (IBD) is a disorder in which an aberrant immune response in a genetically susceptible host, with influences from environmental factors, leads to intestinal inflammation. Vaccines against influenza and pneumococcal pneumonia are indicated for all patients with IBD, while vaccines such as hepatitis A and B, human papillomavirus, and meningococcal meningitis are only indicated for patients with specific risk factor profiles. Some vaccines are contraindicated for patients receiving immunosuppressive medications; typically, these are live or live attenuated vaccines such as measles-mumps-rubella, varicella zoster, and herpes zoster. Given the importance of ensuring patients with IBD are properly vaccinated, we designed a quality improvement project to determine the perceived barriers to ordering these vaccines and to make the process easier.

Methods: At the outset of the study, providers in our gastroenterology department who treat patients with IBD received a survey about vaccinations. Based on the preintervention survey responses, we created an order panel in our electronic medical record (Epic Systems Corporation) to facilitate vaccination ordering. This order panel prompted physicians to order the vaccinations and informed them of contraindications. At the end of the 2-month implementation period, we distributed a second survey to assess the utility of the order panel.

Results: Respondents generally agreed that the Epic SmartSet order panel made vaccinations easier to order, ensured physician confidence in ordering vaccinations, was helpful for use in practice, made the clinic more efficient, and reminded physicians which vaccinations are contraindicated because of immunosuppression. Respondents were divided regarding whether a greater number of patients with IBD were actually receiving vaccinations after the order panel was implemented.

Conclusion: We used the order entry function in Epic to facilitate vaccination ordering for patients with IBD. Our results indicate that the order panel we built made ordering vaccinations easier and more efficient compared to the previous process. We hope this order panel promotes improved patient care and becomes a future area of study for how Epic and other electronic health records may be used.

Keywords: Inflammatory bowel diseases, quality improvement, vaccination

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INTRODUCTION

Inflammatory bowel disease (IBD) is a disorder in which an aberrant immune response in a genetically susceptible host, with influences from environmental factors, leads to intestinal inflammation.¹ Two patterns of disease, Crohn disease and ulcerative colitis, have been described. While these patterns are thought to represent distinct clinical entities, treatment regimens for the conditions tend to overlap. Many of these therapeutic approaches involve

efforts to manipulate the body's immune response, either by modulation of effector cells or the inflammatory cytokines that they produce.² These immunomodulatory treatment regimens, in combination with underlying immune dysregulation, increase the risk of infections, many of which are preventable via vaccination.³ Accordingly, vaccines against influenza and pneumococcal pneumonia are indicated for all patients with IBD, while vaccines such as hepatitis A and B, human papillomavirus, and menin-

gococcal meningitis are only indicated for patients with specific risk factor profiles.⁴ Some vaccines are contraindicated in patients who are receiving immunosuppressive medications; typically, these are live or live attenuated vaccines such as measles-mumps-rubella, varicella zoster, and herpes zoster.

Many gastroenterologists take the responsibility of ordering vaccinations for their patients with IBD, and resources such as the Cornerstones Checklist for IBD Patients (Cornerstones Health, Inc.)⁵ have been developed to help providers select appropriate vaccines. The intent of providers in the Department of Gastroenterology at Ochsner Medical Center is to order vaccinations for patients with IBD. However, physicians have reported inconsistent implementation of this practice, and various studies have shown substandard vaccination rates in patients with IBD.⁶⁻⁸ Given the importance of ensuring patients with IBD are appropriately vaccinated, we designed a quality improvement project to determine the perceived barriers to ordering these vaccines and to make the process easier.

METHODS

Preintervention

At the outset of the study, providers in our department who treat patients with IBD received a standard survey via SurveyMonkey (www.surveymonkey.com) that consisted of 10 questions, each with 5 answer choices, regarding their responsibility for ensuring their patients are vaccinated and the problems they encounter when ordering the vaccinations.

Intervention

Based on our preintervention survey results, we created an order panel in our electronic medical record (Epic Systems Corporation) to facilitate vaccination ordering. The order panel was listed as a searchable SmartSet and made available to all providers.

When the vaccination order panel was ready, we met with providers in the Department of Gastroenterology to explain how to use it. We defined a 2-month intervention period during which providers could use the order panel for their patients with IBD. We sent an email midway through the implementation period to remind providers that the order panel was available. Providers were encouraged to provide feedback periodically with any changes to the order panel they deemed necessary.

Postintervention

At the end of the 2-month implementation period, the same providers in our department were asked to assess the utility of the order panel via a second SurveyMonkey survey. The survey consisted of 10 questions: 8 were multiple choice with 5 responses each, and 2 were free response.

RESULTS

Preintervention

Thirteen surveys were distributed, and all 13 providers (6 attending physicians, 6 trainees, and 1 physician assistant) responded. Table 1 shows survey questions and the

providers' responses. All respondents somewhat agreed or strongly agreed that providers treating patients with IBD should take responsibility for ensuring those patients are vaccinated and that improvement is needed in Epic to allow easier access for providers to order vaccinations. Respondents unanimously agreed that a SmartSet in Epic would be helpful in ordering vaccinations for patients with IBD and that Epic should prompt providers to take action for vaccinations in patients with IBD. Additionally, all providers somewhat agreed or strongly agreed on the need for Epic to remind providers which vaccines are live or live attenuated vaccines. We noted variability in providers' responses regarding the perceived difficulty of ordering vaccinations in Epic, their confidence in ordering the correct vaccinations for a particular patient, and the practice of administering vaccines.

Intervention

Using the Cornerstones Checklist for IBD Patients,⁵ we worked with Epic representatives to construct an order panel that included vaccines against hepatitis A, hepatitis B, human papillomavirus, meningococcus, measles-mumps-rubella, pneumococcus, tetanus-diphtheria-acellular pertussis, varicella zoster, herpes zoster, and influenza (Figure). Each vaccination order was accessible simply by clicking a box in the SmartSet. Based on our survey responses, we incorporated a prompt to remind providers to order vaccinations, and we ensured that information was displayed about indications and contraindications for selected vaccinations. We also included a referral mandate to the infectious disease injection department (a system requirement for patients to receive their vaccinations).

Postintervention

Of the 13 follow-up surveys distributed (6 physicians, 6 trainees, and 1 physician assistant), 10 providers responded (Table 2). All respondents somewhat agreed or strongly agreed that gastroenterologists are responsible for ensuring that patients with IBD receive appropriate vaccinations. Additionally, respondents generally agreed that the SmartSet makes vaccinations easy to order, provides confidence that they are ordering the correct vaccinations, is helpful in their practice, identifies the appropriate vaccinations, makes the clinic more efficient, and reminds them which vaccinations are contraindicated because of immunosuppression. However, only 6 of 10 respondents somewhat agreed or strongly agreed that they were vaccinating a greater number of patients with IBD after the order panel was implemented. Only 1 respondent used the free response portion of the post-intervention survey, commenting that follow-up vaccinations within a series (ie, the combined hepatitis A/B vaccine) did not appear to be automatically scheduled, and it was unclear if the follow-up vaccinations actually took place. No respondents provided suggestions for ways to improve the order panel.

DISCUSSION

In many cases, patients with IBD tend to be young and unencumbered by other health problems. Consequently,

Table 1. Preintervention Survey Questions and Responses (n=13)

Question	Strongly disagree	Somewhat disagree	Neutral	Somewhat agree	Strongly agree
1. Please state your opinion on the following statement: "As a provider in the Department of Gastroenterology, it is my responsibility to ensure my patients with IBD are properly vaccinated."	0	0	0	2	11
4. Please state your opinion on the following statement: "There needs to be improvement on Epic to allow easier access for providers to order vaccinations."	0	0	0	3	10
5. Please state your opinion on the following statement: "A SmartSet for choosing vaccinations for my patients undergoing therapy for IBD would be helpful in my practice."	0	0	0	0	13
6. Please state your opinion on the following statement: "There should be a reminder on Epic to prompt providers to take action for vaccinations in my IBD patients."	0	0	0	0	13
7. Please state your opinion on the following statement: "Because certain vaccinations are contraindicated in immunocompromised patients, there should be a warning on Epic to remind providers of which vaccinations are live or live-attenuated vaccines."	0	0	0	1	12
9. Please state your opinion on the following statement: "As a provider in the Department of Gastroenterology, I regularly check the vaccinations of my IBD patients."	0	1	1	5	6
10. Please state your opinion on the following statement: "As a provider in the Department of Gastroenterology, I would like more information with regards to the process of ordering vaccinations through Epic."	0	0	0	2	11
Question	1 (Easiest)	2	3	4	5 (Most difficult)
2. On a scale of 1-5, how difficult is it to order the vaccinations for your patients in Epic?	0	2	3	3	5
Question	1 (Not confident)	2	3	4	5 (Confident)
3. On a scale of 1-5, how confident are you in ordering the correct vaccinations for a particular patient?	1	3	6	3	0
Question	Never/refer to Infectious Diseases	Rarely	Sometimes	Most of the time	Always
8. Please respond to the following statement using the answer choices: "As a provider in the Department of Gastroenterology, I provide vaccinations for my patients undergoing therapy for IBD."	1	0	4	5	3

IBD, inflammatory bowel disease.

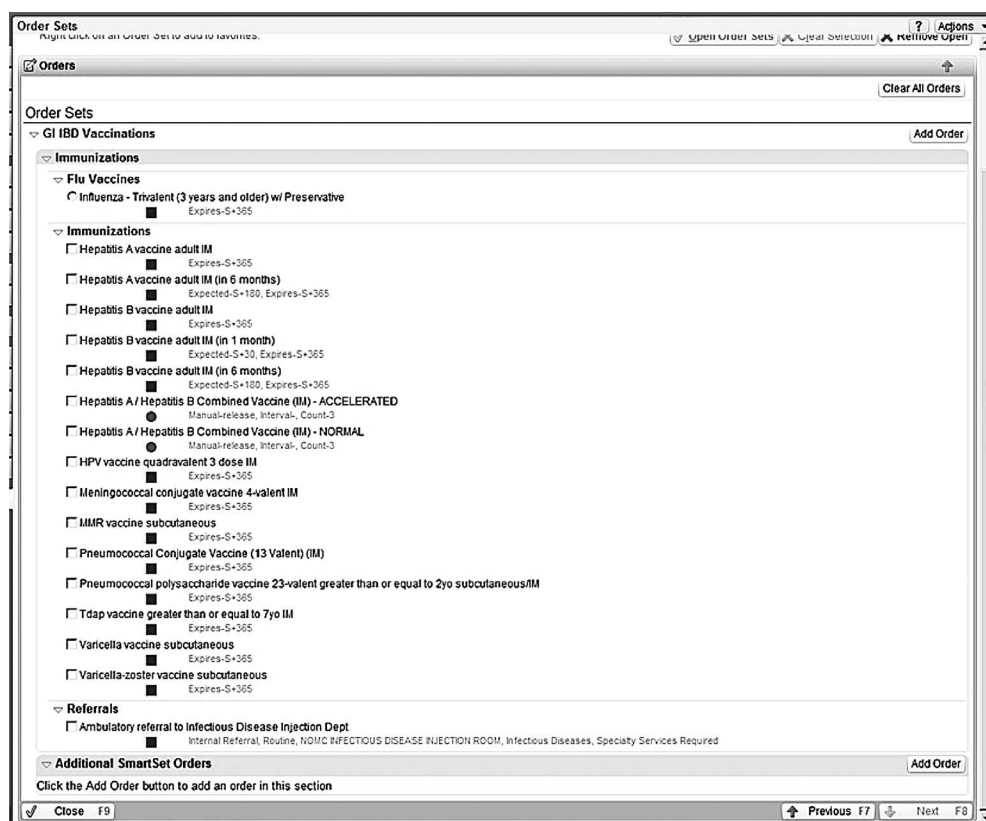


Figure. Epic vaccination order panel for patients with inflammatory bowel disease.

for patients with IBD, their gastroenterologist may be the only physician they see on a regular basis. Therefore, if gastroenterologists do not order vaccinations for patients with IBD, they are unlikely to receive the vaccinations. As noted previously, our providers recognized this fact and consistently agreed that physicians in the gastroenterology department are responsible for ensuring that their patients with IBD receive appropriate vaccinations.

During the preintervention period, we found that providers had different comfort levels with ordering the correct vaccinations in Epic. Consequently, we designed our order panel to facilitate vaccination orders. Although we may have introduced an element of leading bias by administering 2 different surveys, respondents seemed to agree that our order panel made the process easier. Additionally, respondents somewhat agreed or strongly agreed that their clinic encounters with patients with IBD were more efficient after the order panel was implemented.

Previous studies show improved adherence to various treatment guidelines with the use of order panels.⁹⁻¹³ We hoped that greater efficiency in ordering vaccines would lead to more vaccinations among patients with IBD. However, only 4 of 10 respondents strongly agreed that they were ordering vaccines more frequently. One possible explanation for this response is that those who responded neutrally or in the negative may have already been ordering all the necessary vaccinations for their patients with IBD. Another possible explanation is that the 2-month interven-

tion period was not enough time to demonstrate a difference in patterns. A worthwhile follow-up to this project would be to determine if more patients with IBD are receiving these vaccinations.

While our results indicate that the vaccination order panel is generally useful, it is not without flaws. Most notably, establishing follow-up appointments for vaccinations in a series is a difficult task and a problem that predates our study. We attempted to address follow-up by specifying the time intervals in which the vaccinations were to take place; however, it is not clear if patients are receiving follow-up appointments. Patients receive their vaccinations in the infectious disease injection department, a separate department from the gastroenterology clinic. Even though the orders for subsequent vaccinations in a series can be specified, the appointments must be scheduled. The requirement for multiple visits to the infectious disease injection department to obtain a series of vaccinations can have an impact on patient adherence. Follow-up will likely require coordination with the infectious disease injection department. However, coordination may prove difficult because staff in the infectious disease injection department only administer injections and are not directly involved in ensuring patient compliance with vaccination schedules. Therefore, if a patient misses a vaccination appointment, no default rescheduling process exists, and the patient may easily be lost to follow-up. An alternative is to keep a stock of series-based vaccines in our clinic facility.

Table 2. Postintervention Survey Questions and Responses (n=10)^a

Question	Strongly disagree	Somewhat disagree	Neutral	Somewhat agree	Strongly agree
1. Please state your opinion on the following statement: "As a provider in the Department of Gastroenterology, it is my responsibility to ensure my patients with IBD are properly vaccinated."	0	0	0	1	9
4. Please state your opinion on the following statement: "The IBD Vaccination SmartSet for choosing vaccinations for my patients undergoing therapy for IBD is helpful in my practice."	0	0	0	1	9
5. Please state your opinion on the following statement: "I am vaccinating a greater number of my IBD patients now that the IBD Vaccination SmartSet is available."	1	0	3	2	4
6. Please state your opinion on the following statement: "The IBD Vaccination SmartSet has made seeing IBD patients in clinic more efficient."	0	0	0	2	8
7. Please state your opinion on the following statement: "The IBD Vaccination SmartSet makes all appropriate vaccinations I would need for my IBD patients readily available for me to order."	0	0	0	3	7
8. Please state your opinion on the following statement: "Because certain vaccinations are contraindicated in immunocompromised patients, the warning on Epic to remind providers of which vaccinations are live/live-attenuated vaccines is helpful in my practice."	0	0	0	3	7
Question	1 (Easy)	2	3	4	5 (Difficult)
2. On a scale of 1-5, how difficult is it to order the vaccinations for your IBD patients through Epic, now that the IBD Vaccination SmartSet is in place?	8	1	0	0	1
Question	1 (Not confident)	2	3	4	5 (Confident)
3. On a scale of 1-5, how confident are you in ordering the correct vaccinations for your IBD patient now that the IBD Vaccination SmartSet is available?	0	0	0	1	9
Question	Free response				
9. Are there any issues you have encountered while using the IBD Vaccination SmartSet?	Follow-up vaccinations within a series did not appear to be automatically scheduled, and it was unclear if the follow-up vaccinations actually took place. ^b				
10. Are there any ways the Vaccination SmartSet can be improved?	[No responses received.]				

^aThirteen surveys were distributed. Ten surveys were returned.^bOne respondent provided a free response comment.

IBD, inflammatory bowel disease.

CONCLUSION

We used the order entry function in Epic to facilitate vaccination ordering for patients with IBD. Our results indicate that the order panel we built made ordering vaccinations easier and more efficient compared to the previous process. We hope this order panel promotes improved patient care and becomes a future area of study for how Epic and other electronic health records may be used.

ACKNOWLEDGMENTS

The authors have no financial or proprietary interest in the subject matter of this article.

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This article meets the Accreditation Council for Graduate Medical Education and the American Board of Medical Specialties Maintenance of Certification competencies for Patient Care, Medical Knowledge, Systems-Based Practice, and Practice-Based Learning and Improvement.