

Evaluating the implemented changes in the Patient Portal

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INFO-B 535: Clinical Information Systems

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October 31, 2022

Evaluation is a systematic assessment of the proposed design, changes, and implementation process for improving the outcomes and decision making. There are numerous evaluation approaches to suit the needs to the given scenario.

However, evaluating a health information system (HIS) is quite complex and challenging according to Andargoli et al. (2017). Andargoli et al. (2017) note that the health care domain is quite content sensitive which makes evaluation a multifactorial dependent process. This is further supported by Scott et al. (2014) stating that health informatics do not have an organized approach to measure the outcomes by mentioning the example of clinical decision support system (CDSS). Scott et al. (2014) added that healthcare has well established methods and instruments to measure the efficiency of the outcome variables. In this paper, we aim to evaluate the two recently incorporated changes in the patient portal system which include the text reminders to get COVID-19 booster vaccinations and request to fill the patient information form. These changes are assessed immediately after implementation, three months following the implementation and a year after implementation.

As evaluation is a comprehensive process, I would like to work as a team and include hospital administrative board, project manager, IT developer, physician, nurse, clinical data analyst, and patient as my teammates. The primary responsibility of hospital administration board is to make final decisions of the changes during different phases of implementation and evaluation. The board is also responsible for the approval process of data collection. The project manager is in charge of delegating tasks to team members and plan the evaluation phase in accordance with the implementation phase. Ensuring coordination among various teams is the duty of project lead as well. The unpredicted technical challenges (e.g., system crashes, bug reports, and general troubleshooting) that may arise during implementation phase are to be fixed

by the IT developer. Physicians and nurses constitute an important part of evaluation team as they are responsible to monitor and provide opinion constantly to the implemented changes during implementation. Additionally, nurses discharge multiple duties like recording the vaccinations in the EHR during appointments, educating the patient on how to use the patient portal and aid them with the filling of patient information request forms. Various patterns present inside this recorded data is to be analyzed so that it can be compared with previous statistical data documented in past studies to determine effectiveness and ongoing viability. This is primarily done by clinical data analyst who also applies statistical modeling on the analyzed data to form predictions and generate meaningful reports out of the analyzed data for general population. Finally, patients play a key role in the overall success or failure of the implemented changes due to being the primary source of analytical and personal data. Patients serve the purpose of verification and assessment of the overall process through their contribution to survey and questionnaire data.

As this entire process involves the interest of hospitals and health information systems, specific stakeholders have been identified. Stakeholders are responsible for contributing the ideas and experience to help the project meet its desired objectives. Stakeholders can either have positive or negative impact on the project (Huotari & Havrdová, 2016). Patients benefit by having more convenient means of interfacing with healthcare providers, save time on forms filled, and are able to develop digital literacy through patient portal engagement. At the same time, they constitute an important group of stakeholders for this evaluation as they provide feedback on the implemented changes through the surveys and questionnaires which can be analyzed by the clinical data analyst to propose the needed changes in the patient portal for effective functioning. Physicians will have a complete picture about the patient history before the

clinical encounter which can improve the quality of care delivered. The duty of nurses to send constant reminders to patient regarding their vaccination gets automated when the changes in the patient portal are functionally effective. Nurses also play an important role in taking these changes to the patients, educating them on how to use the patient portal and encourage them to become self-aware of their health. The feedback from physicians and nurses is critical in evaluating the proposed changes in the patient portal. Their feedback helps to determine the effectiveness of the changes incorporated and also provide scope to include any amendments to the ongoing changes in the portal. Clinical data analyst will have the chance to understand the effectiveness and impact of the proposed changes on the population through data analysis methods. The hospital administrative staff usually fulfills the duty of recording the patient information in the portal at the hospital. They are to be included as a part of stakeholders as the proposed changes in the patient portal can reduce the workload for staff so that they can divert their time to fulfil meaningful activities like monitoring the clinical workflows in the hospital.

At the time of implementation- Text remainder for COVID-19 booster vaccination.

The first metric I would measure would be the level of accessibility present for the COVID-19 text reminders to the patients in the first iteration of the patient portal through patient-provided data. For this to be put into action, there are two sequential steps needed to be done through patient portals. Computers today are well equipped with software that is capable of binning the related data collected to present it in a more meaningful way (Owens et al., 2021, p. 181). Initially after completing the development and coding of the patient portal, the IT developer would program the patient portal to send out an automatic “YES” or “NO” prompt to the patients verifying the arrival of the text reminders. Dichotomous responses from the patients

are recorded in the admin page of the portal which will be evaluated by the clinical data analyst through a simple quantitative method using relative frequency analysis (Mertler, 2021, p. 382). In order to measure the outcome of the implemented change, I will need the total count of text remainders sent from the system, total number of patients who responded “YES” in the prompt sent from the system and count of those who responded “NO” in the prompt. This helps me to compare the numbers regarding the accessibility of text remainders in terms of total remainders sent from the portal to actually the count of people who are able to access the remainders thus measuring the metric validity.

Rationale:

The primary goal of this change is to remind the patient to get COVID-19 booster vaccination. So, to evaluate the change implemented, we tend to determine if the patient is able to receive the text remainder sent from the system in the first place. If not, it suggests that there might be errors in the recorded patient information by hospital staff or a technical error while sending the remainder. Such type of problems can be fixed during the initial phase if the root cause is known (Granja et al., 2018).

At the time of implementation- Request to fill patient information form.

Patient information is usually filled by the medical or the administrative staff at the hospital during the clinical encounter. To avoid unnecessary delays in the appointment, a form requesting the patient to fill their information prior to hospital visit is sent through the patient portal. So, to determine if the patient is actually able to access this form, I would like to use accessibility metric to evaluate the change. If the patient is able to log in to their portal and view

the request from, their visit should be logged in to the admin page of the portal. The necessary functionality will be developed and incorporated into the portal by IT developer. This log helps us to determine if the patients are able to access the forms or not. Further this data can be analyzed by the clinical data analyst using univariate statistical analysis which is a part of descriptive statistics as it provides insights about a single variable (Canova et al., 2017). In order to measure the efficiency of the implemented change, I will need the total number of patients in the patient portal, total number of patients who are able to view and access the request forms and those who are not able to view the forms. All this information can be fetched from the admin page of the patient portal as all the visits will be recorded / logged here. These numbers give us a picture of the accessibility of patients to the request forms in the portal. This can be further used to explain the validity of the metric as well. In addition, a frequency distribution table can be used to display and compare the number of visits to the request form in the portal to the total number of patients in the portal. Also, this can be visualized using bar plots as well.

Rationale:

At the time of implementation, primarily we are interested to evaluate if the patients are able to access the changes (request form) in the portal or not. If they are able to access the form, it shows that patient is able to successfully log in into the portal and if they aren't able to access the form, it shows the need to address the technical challenges in the portal.

Three months after implementation- - Text remainder for COVID-19 booster vaccination.

After three months of implementation, I would like to assess the user adoption to the implementation of text reminders in the portal. In this study, the users are patients, and I would

like to evaluate how the patients have perceived and adopted to the change incorporated in the patient portal. User adoption turns out to be positive if the users believe that the outcome of the proposed change will be beneficial to them. Evaluating the user adoption metric also helps me to determine if the proposed changes have met the intended objectives. To evaluate this, the IT developer will automate a prompt to be sent from the patient portal to the patients who have scheduled an appointment for COVID-19 booster vaccination. The prompt includes, “Did you schedule an appointment to receive COVID-19 booster dose based on text reminders sent?” Their responses are documented in the admin page of the patient portal. Further the responses are analyzed by the clinical data analyst by simple quantitative method using relative frequency analysis (Mertler, 2021, p. 382). This implementation can be measured by counting total number of people who got vaccinated for COVID-19 in the three months to total count of people who responded “YES” in the prompt sent from the system and total number of people who responded “NO”. All this information can be drawn from the admin page of the patient portal as all the responses get documented. However, this metric can be validated by comparing the total count of people who got vaccinated in three months with total count of people who got vaccinated based on the text remainders. All this data can be used to determine how the users have perceived the implemented change after three months.

Rationale:

Successful implementation can be evident when the change is accepted by the users. So, patient adoption tells us how useful the feature of text remainders is to schedule an appointment to get the vaccination. It also provides insights about patients who aren’t interested to receive these remainders as they might be previously vaccinated or plan to get vaccinated in future. So,

this provides a scope to include a functionality into the patient portal to filter out patients who had already received vaccination for COVID-19 and avoid sending them text reminders.

Three months after implementation- - Request to fill patient information form.

User adoption is the metric I will be using to evaluate the change after three months of implementation. This helps me to know the patient experience with the portal's implemented change of requesting to fill information form. The admin page of patient portal system records the entire data filled in by each patient through the request forms. This information is stored to make further analysis of user adaptation metric by the clinical data analyst. The total number of patient visits to the hospital in the past three months, count of patients who filled the requested patient information form and number of patients who did not fill the form is recorded in the system to measure the given change. All this data stored inside the patient portal system is collected by the clinical data analyst to perform univariate statistical analysis as it is used to describe the characteristics of single variable distribution (Canova et al., 2017). Descriptive statistics usually provide deeper insights like the measures of central tendency, measures of validity about the measuring variable. Frequency table can be used to show the variations in the distribution of numbers for the above-described data. To validate the metric, the clinical data analyst compares the total count of people who filled the form prior to the hospital encounter to total number of patients visited the hospital. This comparison shows us the willingness of people to complete the form prior to appointment.

Rationale:

This metric shows the count of patients who are actually interested to complete the form prior to the appointment without any assistance. If the number is high for people who did not fill the request form, it either shows they aren't tech savvy or need assistance to fill the form. This also helps us with information needed to make necessary amendments in the patient request forms uploaded in the patient portal. Changes like providing online assistance to complete the request forms through live chats is one of the steps taken to help people who find it challenging to complete the request forms. This is archived with incorporating the technical advancements like artificial intelligence (AI) and natural language processing (NLP) in the patient portal.

1 year after implementation- Text remainder for COVID-19 booster vaccination.

After a year of implementation of the change, effectiveness metric needs to be evaluated to actually determine if the proposed changes are meeting the intended goals and objectives. To evaluate this metric, the information that is required from the patient portal is the total number of vaccination appointments recorded in the system before the implementation of text reminders in the patient portal to the total number of appointments recorded in the portal after implementing the change. The results from the portal can then be analyzed by the clinical data analyst using univariate time series analysis as it helps the analyst to understand the underlying patterns associated with the given data over a period of time (Donatelli et al., 2022). This data can also be visualized by the data analyst using tableau dashboards. The graphical representation of numbers in the form of dashboards helps to compare the effectiveness of the implemented change with the numbers in the patient portal before implementing the change, thus validating the metric.

Rationale:

Effectiveness of any change incorporated is compared with previous state before implementation of the change. So, increase in the number of appointments in the patient portal after sending text reminders indicate the change is effective. If the number remains constant, role of text reminders is not effective and remains neutral. This indicates the necessity to incorporate modifications to the change put into action. Added to this, opinion of the patients on receiving the text reminders to get booster vaccination for COVID-19 can be polled by sending surveys and analyzed by clinical data analyst using Likert scale.

1 year after implementation- Request to fill patient information form.

The effectiveness of asking the patients to fill the request form prior to hospital visit is assessed. To evaluate this metric, different responses recorded are compared to determine the feedback to the implemented change. The clinical data analyst develops a qualitative questionnaire survey specifically for the patients, nurses, and physicians. Qualtrics is the tool that can be used to develop this survey and send it to the physicians, nurses and patients to their email registered in the patient portal. The questions in the survey include, “Do you find it useful to prefill the patient information form prior to the appointment?”, “Express your opinion on prefilling the patient information request form.” All the responses from the physicians, nurses and patients are recorded for further analysis by clinical data analyst. The first question contains dichotomous responses which can be analyzed by the clinical data analyst using relative frequency analysis (Mertler, 2021, p. 382). The second question containing the personal opinion of the person can be analyzed using thematic content analysis or text analysis by the data analyst (Pathuri et al., 2021). Various responses analyzed by the data analyst from physicians, nurses and patients is compared with each other and validated to form feedback on the implemented change.

These analyzed responses help to understand the effectiveness of the patient portal functioning with incorporated changes after a year of implementation.

Rationale:

Usually, during the clinical encounter, filling the history form is time consuming for both patient and clinician. Also, there is a lot of scope for manual errors by staff. Prefilling of these forms even help physician to know detailed history of the patient before the clinical appointment. The responses from patient, physician and nurse indicate how effective prefilling of patient request form is.

Conclusion:

The implementation of text reminders to get COVID-19 booster vaccination and requesting the patients to fill the personal information forms prior to the appointment are evaluated immediately, three months after implementation and one year after implementation. Accessibility, user adoption and effectiveness of the implemented changes are the metrics used to evaluate the changes in the patient portal in the given timeline. These are then measured and assessed by comparing with the previous numbers registered in the patient portal. Also, the opinion of physicians, nurses, and patients on the implementation of the proposed changes are documented through surveys and analyzed by clinical data analyst to determine the effectiveness of the stated goals and objectives. This validates the proposed metrics.

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