



Western Michigan University  
ScholarWorks at WMU

Transactions of the International Conference on  
Health Information Technology Advancement

Center for Health Information Technology  
Advancement

11-2019

## Pressure Injury and Restraint Prevalence Surveys: Saving Time and Dollars for Patient Care by Automating Manual Chart Abstraction

Jefton Knight  
*Western Michigan University*

Melinda Gevaart  
*Bronson Healthcare Group*

Stephanie Wagner  
*Bronson Healthcare Group*

Shellie Bush  
*Bronson Healthcare Group*

JeanAnn Miller  
*Bronson Healthcare Group*  
Part of the Health Information Technology Commons

Additional works at: [https://scholarworks.wmich.edu/ichita\\_transactions](https://scholarworks.wmich.edu/ichita_transactions)

### WMU ScholarWorks Citation

Knight, Jefton; Gevaart, Melinda; Wagner, Stephanie; Bush, Shellie; and Miller, JeanAnn, "Pressure Injury and Restraint Prevalence Surveys: Saving Time and Dollars for Patient Care by Automating Manual Chart Abstraction" (2019). *Transactions of the International Conference on Health Information Technology Advancement*. 68.

[https://scholarworks.wmich.edu/ichita\\_transactions/68](https://scholarworks.wmich.edu/ichita_transactions/68)

This Article is brought to you for free and open access by the Center for Health Information Technology Advancement at ScholarWorks at WMU. It has been accepted for inclusion in Transactions of the International Conference on Health Information Technology Advancement by an authorized administrator of ScholarWorks at WMU. For more information, please contact [maira.bundza@wmich.edu](mailto:maira.bundza@wmich.edu).



## Pressure Injury and Restraint Prevalence Surveys: Saving Time and Dollars for Patient Care by Automating Manual Chart Abstraction

Jefton Knight<sup>1</sup>  
With Consultation By:  
Melinda Gevaart<sup>2</sup>  
Stephanie Wagner<sup>3</sup>  
Shellie Bush<sup>4</sup>  
JeanAnn Miller<sup>5</sup>

1 Western Michigan University Homer Stryker M.D. School of Medicine, Master of Science Student in Applied Clinical Informatics

2 Former Manager Nursing Quality and NDNQI Site Coordinator, Bronson Healthcare Group

3 Manager Nursing Quality and NDNQI Site Coordinator, Bronson Healthcare Group

4 Registered Nurse, Stomal Therapy, Bronson Healthcare Group

5 Administrative Assistant, Nursing Professional Practice, Bronson Healthcare Group

**Abstract:** Bronson Healthcare Group performs quarterly pressure injury and restraint audits as part of the National Database of Nursing Quality Indicators (NDNQI). The chart abstraction portion of the audit previously required nurses to manually abstract 31 data points. To save time and cost, we used Lean and PDSA process improvement tools to automate the chart abstraction portion of the audit, reducing the number of data points requiring manual abstraction to 2. We validated the automated abstraction by comparing it to abstractions done manually by the audit nurses. We found that an automated process has the potential to reduce the impact of human error inherent in manual abstraction.

## BACKGROUND

### Clinical Significance of Pressure Injuries

A pressure injury is defined as “localized damage to the skin and underlying soft tissue usually over a bony prominence or related to a medical or other device” (Ratliff et al., 2017). In the United States, 2.5 million people develop pressure injuries each year. In addition to being painful for the patient, pressure injuries increase the risk of infection and additional health care utilization. Hospitals must strive to prevent hospital-acquired pressure injuries (HAPIs), not only for their patients’ benefit, but because the Centers for Medicare & Medicaid (CMS) no longer reimburse hospitals for the additional care required to treat a hospital-acquired pressure injury (Dan Berlowitz et al., 2014).

In 2014, an extensive clinical practice guideline was published by international experts representing the National Pressure Ulcer Advisory Panel, the European Pressure Ulcer Advisory Panel, and the Pan Pacific Pressure Injury Alliance. This guideline consists of 575 recommendations for the care and prevention of pressure injuries (Haesler, Kottner, & Cuddigan, 2017). To develop these guidelines, experts critically examined 356 papers and assessed the level of evidence of the research in the paper. From this they assessed the strength of the evidence for the *recommendation*, and finally the strength of the recommendation itself. In this assessment, 94% of the recommendations received a strength of recommendation score indicating it “should be implemented.” (Haesler et al., 2017)

### National Database of Nursing Quality Indicators (NDNQI)

The National Database of Nursing Quality Indicators provides “a national database and Registered Nurse (RN) surveys for examining relationships between nursing and patient outcomes” and in so doing “delivers evidence to support the importance of nurse sensitive measures in overall patient experience strategy” (“NDNQI - National Database of Nursing Quality Indicators,” n.d.).

Bronson Methodist Hospital in Kalamazoo, MI we participates in NDNQI surveys as part of its overall quality improvement strategy. One component of the NDQI is the Pressure Injury and Physical Restraint prevalence survey. Bronson does its Pressure Injury and Physical Restraint prevalence surveys quarterly, on the second Tuesday of the second month of each quarter. On the day of the 1<sup>st</sup> quarter 2019 survey, there were 456 patients admitted to the 21 hospital units that are included each quarter in the survey.

### **Pressure Injury and Physical Restraint Surveys**

The purpose of the NDNQI Pressure Injury Surveys are to track the rate of hospital-acquired and unit-acquired pressure injury occurrence, and to study the connections between nursing assessments, interventions, and the development of pressure injuries. These surveys also benefit the individual healthcare organization by helping to facilitate quality assessments and quality improvement efforts (National Database of Nursing Quality Indicators, 2018).

Required items on the pressure injury surveys assess the use of nursing skin assessments and risk assessments, the interventions used for at-risk patients, and counts of the total number of pressure injuries (including type and stage information) and counts of total hospital-acquired and hospital unit-acquired pressure injuries.

### **Origin of Process Improvement Effort**

Our project to improve this process began with the following IT Help Desk ticket submitted by our NDNQI site coordinator:

*“I was wondering about the possibility of creating a new report to streamline the monthly prevalence hospital acquired injury survey that the nursing team has to complete. The attached are two worksheets that are used every month. There are many fields that could potentially be captured from nursing documentation automatically on survey day from my way of thinking which would save a bunch of time for the auditors on survey day – I am not sure who in IT could possibly help improve this process for us.”*

## **METHODS**

### **Process Improvement - Discovery and Assessment of Existing Process**

Since the primary goal of the project was to increase efficiency and decrease waste, we decided to use the Lean Process Improvement methodology and PDSA (a methodology that often stands on its own but is also a key component of Lean). For this effort, we found it effective to use the six steps of Lean’s “A3 Problem-Solving” methodology, with a focus on the five underlying principles of Lean.

#### *A3 Problem-Solving Methodology*

According to Ozkaynak, et. al., the six steps of the A3 Problem-Solving Methodology are:

1. Defining the problem or gap in performance
2. Understanding the current process
3. Determining the root causes of the problem
4. Developing actions to address root causes
5. Implementing the plan
6. Collecting follow-up data

*Step 1: Define the problem or gap in performance*

In reviewing the site coordinator's Help Desk ticket requesting automation of the process using the EMR, several issues were identified:

- Each quarter, pressure injury and restraint surveys are done on 21 units in three of our four hospitals, and take two staff members per unit (a nurse and a patient care assistant) up to five hours to complete. The amount of time to complete varies by the number of patients on the unit at the time of the survey. Due to this time commitment, units need extra staff (at extra cost) on prevalence days in order to maintain appropriate levels for patient care.
- Much of the work involved in the survey is manual chart review, which required the surveyors to hunt through multiple different areas of the chart looking for the data points required.
- Following the surveys, the administrative assistant spends two to three full work days entering the survey results into NDNQI's website. Each patient is entered individually and there are typically several hundred patients to enter. NDNQI now has the capability to accept electronic uploads to the site, which has the potential to save most of this time spent by the administrative assistant.

With that understanding, we identified our gaps in performance as:

- We rely on manual chart abstraction to accomplish a goal that could easily be automated by the EMR's reporting tools.
- We require nurses to go to the different areas of the chart where the information is contained, rather than using available EMR tools to bring all the relevant data to them in a single location.
- We rely on manual data entry of hundreds of patients' data instead of leveraging available technology tools to automate data submission.

#### *Step 2: Understanding the Current Process*

We used workflow process mapping with the Lean principle of value stream mapping to understand the current process. This value stream mapping is discussed in detail below.

#### *Step 3: Determining the Root Causes of the Problem*

In assessing the root causes of problems 1 and 2 above, we identified that the primary cause is that while using the EMR's tools to automate these steps is *possible*, it isn't something that the surveyors would have been able to create for themselves. The task requires the kind of access and EMR expertise that IT staff have but is not typically available to end users. A contributing cause is the fact that the vendor doesn't provide a tool that works out-of-the-box for automating the prevalence survey process, even many organizations participate in the NDNQI survey.

The root cause of problem 3 is similar in that the automatic upload process requires a great deal of IT expertise to configure.

*Steps 4, 5, and 6, i.e., Developing Actions to Address Root Causes, Implementing the Plan, and Collecting Follow-Up Data,* are described in detail below.

#### ***How Lean's Underlying Principles Supported Our Problem-Solving Process***

The five underlying principles of the Lean strategy are:

1. Define value
2. Value stream mapping
3. Create flow between steps
4. Provide just in time response
5. Pursue error free work (Amador, 2013)

Step 1: Defining Value

While Lean efforts in healthcare focus on defining value *to the patient*, the value to the patient in this process is abstract. Participation in the NDNQI surveys benefits Bronson patients indirectly by helping to monitor pressure injury and restraint prevalence over time so that we can improve our rates, which benefits the patient.

We identified in this process the opportunity to provide additional value to the patient and the organization by reducing clinician time spent on the surveys, which frees up time and money for additional patient care activities, and saves the organization money in a time where most healthcare organizations, including Bronson, need to “do more with less” from a financial perspective.

Step 2: Value Stream Mapping

Figure 1 shows the map of the existing process for the surveys at Bronson. We identified waste in four key steps:

- Reviewing charts in Epic for 31 data points
- Entering chart review info on data collection form
- Physically assessing patients
- Manually entering data into NDNQI website

Upon initial review of the data collection form (Appendix A), it appeared we would be able to eliminate all four of the wasteful steps by automatically extracting data from the EMR. However, conversation with our Site Coordinator and consultation of the NDNQI Guidelines for Data Collection clarified that *physically assessing the patient to count pressure injuries is a required part of the survey process* (National Database of Nursing Quality Indicators, 2018). Since the data reported to NDNQI is used for research on pressure injury and restraint prevalence, it is extremely important that the data submitted on the counts of pressure injuries is accurate, and therefore pulling data only from the EMR is not sufficient to achieve this level of accuracy.

We identified that eliminating waste from the steps of **Reviewing the chart for 31 data points** and **Entering chart review data on the collection form** could be accomplished via the same solution of creating a report from Epic’s real-time reporting tool (Reporting Workbench) that automatically pulls the data points that were previously abstracted manually, and could be exported and printed.

To eliminate waste from the step of **Manually entering data into the NDNQI website**, we planned to start using NDNQI’s automated upload process, which allows uploading a file with all the data, rather than manually entering the data for each patient in each of our hospitals.

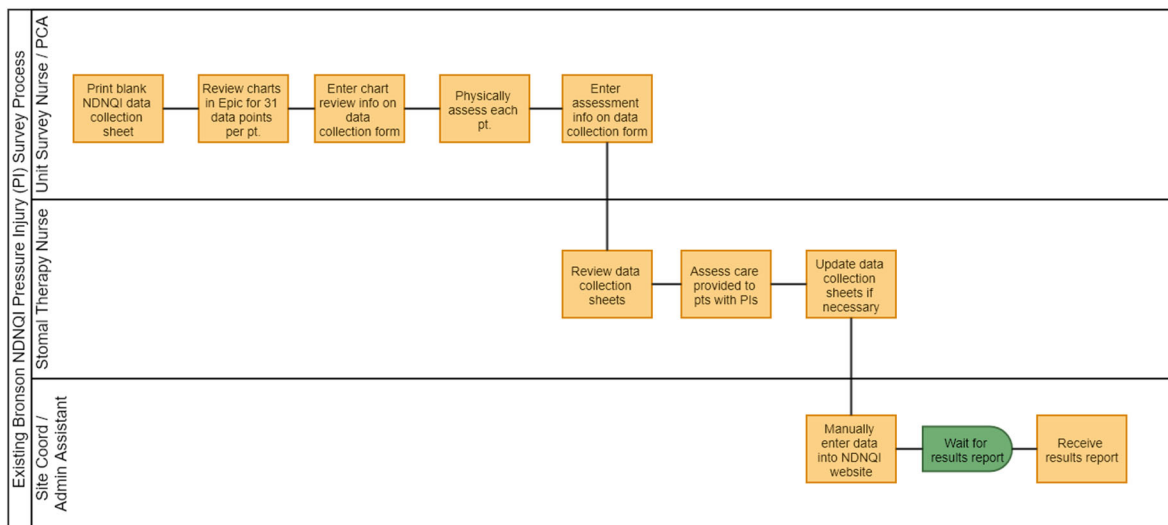


Figure 1: Map of NDNQI Prevalence Survey Process before Process Improvement

*Step 3: Create Flow Between Steps*

Challenges that we encountered in creating flow between steps and achieving automation included:

- Inability to control formatting of Excel exports from Epic
- No consistent schedule for when units begin the surveys
- Functional limitations in Epic for formatting of printed reports and inclusion of blank columns for physical assessment results

Despite these challenges, we were able to arrive at a solution that allowed for an improved work-flow between steps and met the requirement that the printed report be only one page wide in order to be a usable instrument for surveyors as they performed the physical assessment of the patient. A sample of the report the surveyors can print for data collection is included in Appendix B.

An additional opportunity to improve work-flow was found in the two remaining data points that require clinical judgment based on manual abstraction of chart data by the audit nurses. We were able to streamline abstraction by building additional information into the view of the report that the nurses would view in the EMR when they prepared to print the report.

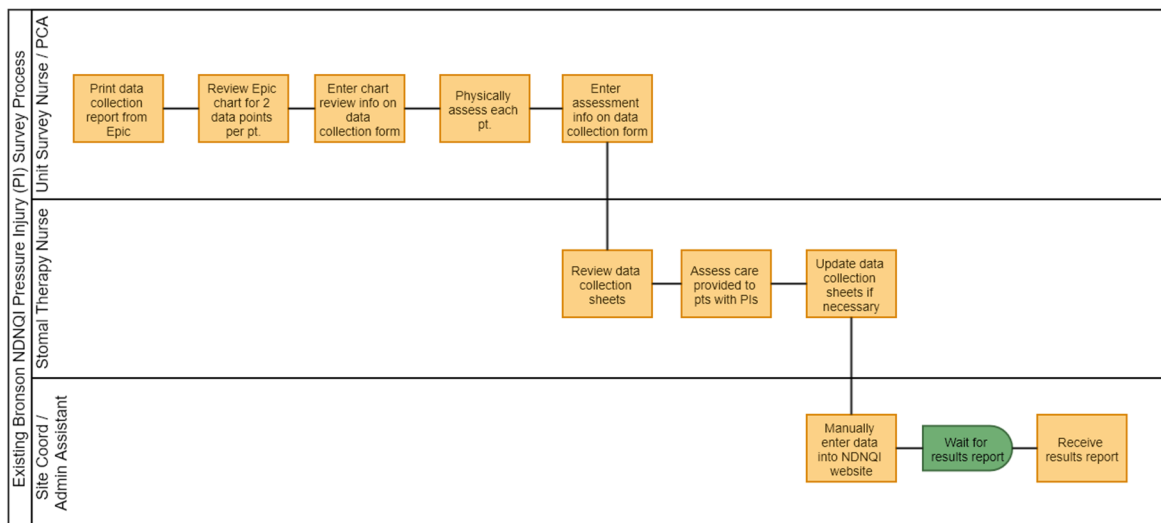
*Step 4: Provide Just-in-Time Response (or “Establish Pull”)*

Providing just-in-time response was achieved effort by implementing a new work-flow between steps allowing nurses to generate the report at the moment they were going to start the survey, rather than “pushing” it out to them.

*Step 5: Seek Perfection (or “Pursue Error-Free Work”)*

We established a methodology for validating the report, verifying its usefulness, and continuing to improve it.

Figure 2 shows the map of the final, revised process we arrived at through this process improvement, as it was on the day the new process was piloted.



**Figure 2: Map of Final Process after Improvement Process**

***Development of Requirements and Prototype, and Concept Validation with Users***

*Development of Requirements and Prototype*

After initial investigation into the technical details of the automatic upload process, we determined that due to time constraints it was necessary to split the project into two phases, with the first phase focused on addressing the waste in the data collection process, and the second phase focused on adoption of the automated upload process.

In the first phase we created an automated report in a test environment similar in structure and content to the manual data collection spreadsheet surveyors were filling out in the existing process. Data in the automated report was validated by our NDNQI site coordinator as meeting all NDNQI data collection guidelines (National Database of Nursing Quality Indicators, 2017, 2018).

We then built a working prototype with real patient data and gave a demonstration to the site coordinator and five of the surveyors. After analysis, we determined that there were too many documentation values fully automate the process of reporting the full data set for each patient. Clinician interpretation of the data was still required. However, it was determined that we could pull enough relevant information into the report to greatly assist surveyors in making the clinical judgments.

### *Implementation*

To implement the plan (Lean A3 step 5), we devised a pilot process to test the effects of the improved process and to validate the accuracy of the report (Lean A3 step 6). We piloted the report in large units with many patients to insure that it would work in the real setting in Q1 of 2019, with the goal of rolling it out to all units for Q2 2019.

Training the surveyors who would pilot the process was conducted using provided tip sheets with step-by-step instructions for printing the report and instruction in how to use the report to facilitate their survey efforts.

### *Collecting Follow-Up Data (A3 Step 6)*

To test the effects of the new process, we collected anecdotal feedback about the ease of the new process compared to the existing process from the pilot units as well as information about how much time each unit (pilot and non-pilot) spent doing the survey, especially in comparison with previous surveys using the old process.

Validating the accuracy of the report was accomplished by also running reports for the units that were NOT participating in the pilot (the control group) and comparing what the report returned against the surveyors' manual chart abstraction. We then investigated each discrepancy between what was on the report and what the surveyor reported to determine the cause of the discrepancy.

## **RESULTS**

### *Execution of Validation, Investigation, and Classification of Discrepancies*

We reviewed 82 patients, with 105 individual discrepancies, since a single patient could have multiple discrepancies. To investigate the causes of each discrepancy and determine whether the report was accurate or the surveyor was accurate, we opened each chart to examine the documentation associated with the data point in question, and documented the summary of the findings. We identified the following types errors:

- If the surveyor or the report simply did not match what was in the chart, we counted each occurrence as a "Report Error" or "Surveyor Error." (If the Surveyor or the Report made a systematic mistake, such that a large number of patients would have been categorically affected, we counted this as a single error but tracked the number of patients affected.)
- If the discrepancy was "time-dependent" and the report was shown to be correct based on the time it was run, we did not count this as a true error.
- If the discrepancy was the result of incorrect or incomplete specifications found in the requirements-gathering step, we counted each specific cause once as "Incorrect/Incomplete Requirements" and tracked the number of patients affected.
- If an error was made but was inconsequential because the data could easily be assumed to not be necessary, we labeled this as "Inconsequential."
- If users made data entry errors when charting this was classified as "Error in source documentation"
- Situations where there might have been clinical judgment involved that we couldn't validate but the report was correct based on the specifications of the NDNQI guidelines we classified as "Can't classify, Report correct."

*Report Validation - Errors*

The number of errors and affected patients for each error classification are shown in Table 1.

**Table 1: Error Counts by Classification and Affected Patients**

<b>Error Classification</b>	<b>Number of Errors</b>	<b>Affected Patients</b>
Report Error	7	26
Incomplete Requirements	3	13
Surveyor Error	38	38
Systematic Surveyor Error	2	49
Time-Dependent	11	11
Inconsequential	3	174*
Can't classify, report correct	4	4
Error in Source Documentation	1	1

\* Each of the 3 inconsequential errors affected the same 58 patients, for a total of 174.

*Report errors*

Aside from the report errors categorized as incomplete or incorrect requirements, there were 7 report errors that affected 26 patients.

Causes of the errors were identified and the report modified to try to eliminate them. At the time of this report, revalidation had not yet occurred.

*Time Savings*

On the Extended Medical Care Unit (EMCU) a non-pilot unit that had 33 patients on survey day, the surveyors spent an hour doing the manual chart review and 1.5 to 2 hours doing the physical assessments. On the Neonatal Intensive Care Unit (NICU), a non-pilot unit which had 41 patients on survey day, it took less than an hour to do their survey.

For the Oncology unit, a pilot unit with 31 patients on survey day, it took only 50 minutes to do the survey, which does suggest improvement over the non-pilot EMCU.

However this time savings data is imprecise and incomplete because we did not do an effective job of capturing objective data on the time savings with the new process and relied on anecdotal reports of the surveyors

**DISCUSSION*****Value of the Process Improvement Effort****Reduction in Workload*

Using the paper data collection sheet surveyors had to manually search for, abstract and record up to 31 unique data points for each patient surveyed. After introduction of the automated report, surveyors were only required to manually abstract 2 of those 31 data points, and only in a subset of patients who were classified as "at risk". While as noted above, we did not have good objective measures of time savings, it is reasonable to conclude that the large reduction in the number of data points requiring manual abstraction will lead to significant time savings for the surveyors.

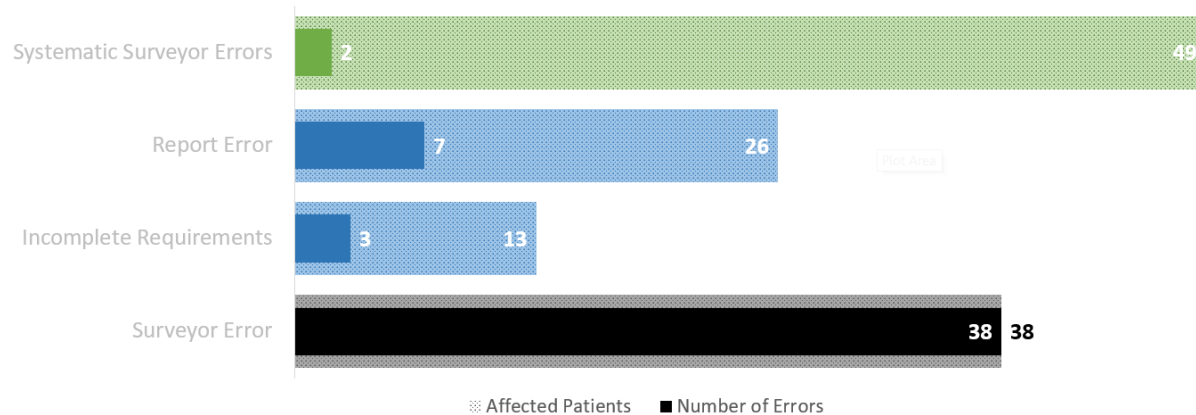
*Improvement in Accuracy*



Our new process also resulted in improved accuracy by reducing the impact of human error. During the validation process we identified 10 errors generated by the automated report affecting 39 patients. In contrast, the validation of the data manually abstracted by surveyors uncovered 38 transcription errors affecting 38 patients, and 2 systematic abstraction process surveyor errors that affected 58 patients each. We determined that errors in the automated report were due to faulty with logic or incorrect identification of requirements which we were able to correct. But there no similarly easy way to systematically reduce the human errors. Despite the fact that surveyors undergo a program of initial training as well as subsequent review training before each survey and an annual inter-rater reliability study (National Database of Nursing Quality Indicators, 2018), we saw 38 instances of surveyor error in our validation sample of 82 patients.

Systematic errors - whether of **human** or **system** origin - affect more patients per error than **Surveyor errors**.

However, systematic errors can be *systematically* fixed.



#### *Potential Uses of the Tool Beyond Survey Day*

Along with our surveyors, we observed that new report had other unanticipated value beyond the quarterly survey. Since the report was easy for users to run, it could be run on a daily basis to help unit leaders spot gaps in care for individual patients. Similarly, the report could catch patients who have not had timely skin or risk assessments done, or who are at-risk and do not have adequate interventions in place. It could also be used to catch data entry errors in the documentation.

#### **Strengths and Limitations**

Strengths of the new process include the dramatic reduction in data points that must be manually abstracted. A reduction from 31 data points to 2 could make a significant difference in the work effort required from the surveyors. It also has the potential to improve nursing satisfaction with the EMR, since streamlining workflows and being able to easily “get data out of the EMR” tend to be some of the ways in which clinicians feel that the EMR has fallen short of its promise.

This project was also a good model of a way to make any recurring manual abstraction task easier by both pulling data automatically where possible, and where not possible, pulling the relevant data into one place so that users don’t have to jump around the different areas of the chart looking for it.

One significant limitation of the new report is the technical complexity. In order to facilitate the complex NDNQI requirements in a way that accommodated our users’ documentation, the logic was complicated and often involved several layers of records to accomplish a single data point. This is a challenge because it will make support and maintenance of the report difficult in the future. Even the IT analyst who built it will likely have to study the build each time an issue comes up in the future or a change is made to NDNQI requirements or the way our nurses document. Analysts who are not intimately familiar with the build will have even more difficulty troubleshooting the report. To mitigate this limitation, we plan to make careful diagrams of the way the build records fit together as a way of visual

aid. Using this documentation, we can facilitate conversations with other analysts to help them understand how it works. Figure 3 shows a simplified example of such a diagram. This example illustrates the relationships between the records for one data point of the report.

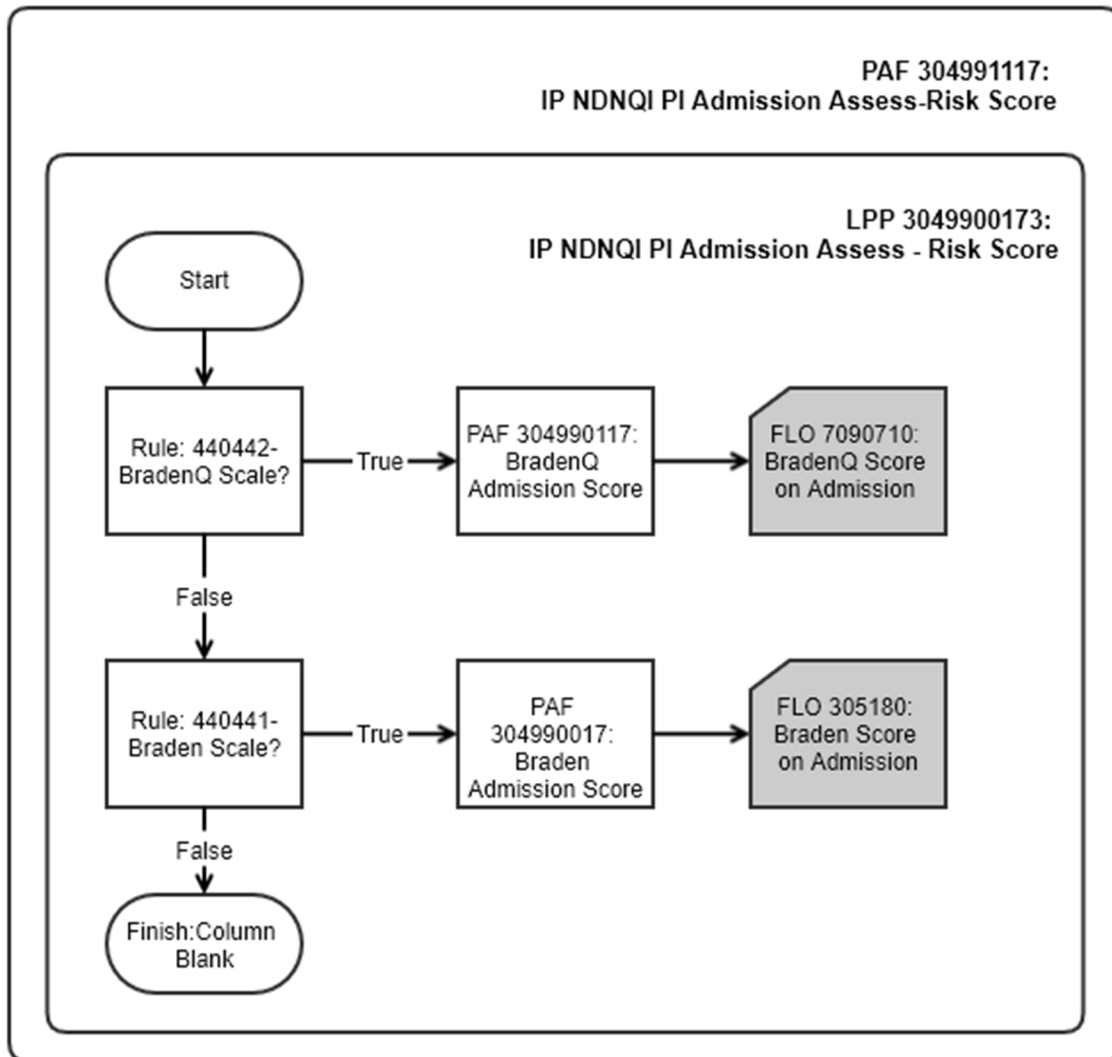


Figure 3: Simplified Build Diagram Illustrating Relationships between the Records for a Single Column

## CONCLUSIONS

### *Lessons Learned*

We learned that when making the plan for testing the change in the PDCA cycle, it's critical to go into great detail and have a specific, formal plan for collecting the data necessary to measure effectiveness. Despite holding planning meetings in the weeks leading up to the pilot, and assurances from the site coordinator that we would be able to get information from the surveyors about how much time they spent on the survey, we were not successful in getting this information from most units. This was likely because we relied on informal reach-outs from the site coordinator to the surveyors (via phone and email), rather than a formal instrument for collecting this information. It would also have been helpful to have communicated directly with all of the surveyors (pilot and non-pilot) in advance to make sure

each understood the importance of capturing this data. In addition to information on the time spent, a more formal approach could have helped us get better data from the pilot units on the new process and how we might improve it before rolling out to all units.

It would have been helpful to establish relationships with the non-pilot units before the survey day. Most of the units not piloting the new process weren't aware that a new process was being trialed. We were so focused on developing the new tool that our collaborations with surveyors was almost exclusively with the units that planned to pilot the new process. While the lack of awareness on the part of the non-pilot units might have had some benefit in blinding the non-pilot users to the trial, it meant that we didn't have the opportunity to follow up with them on questions about their responses on the data collection form as we performed the validation. In particular, it would have been helpful to have some of the non-pilot surveyors involved in reviewing their own discrepancies and providing insight on what led them to a conclusion that conflicted with the data in the chart and the report. Leading up to the pilot, our work was incredibly focused on the *new* process and the users who would pilot it, while our work after the pilot was heavily shifted toward validating the new report against those who used the *old* process.

## SUMMARY

Effective use of the EMR and the support of IT analysts can automate the abstraction process for any particular audit. This saves time, improves accuracy, and gives back time for patient care, saving the organization money and improving care.


To have confidence in the impact made, it is important to give as much thought to the process of how to measure the improvement as it is to the technical details of the planned intervention. A validation approach involving comparing users' manual assessments with the output of the automated tool is a valuable way to find errors in the design, misunderstood requirements, and situations where the real-world documentation does not match what we expect is happening.


## REFERENCES

- Amador, J. (2013). Applying Lean Principles to Improve Healthcare Quality and Safety Applying Lean Principles to Improve Healthcare Quality and Safety. *Ul Llc*, 7. Retrieved from [http://www.ul.com/global/documents/library/white\\_papers/UL\\_WP\\_Final\\_Applying\\_Lean\\_Principles\\_to\\_Improve\\_Healthcare\\_Quality\\_and\\_Safety\\_v11\\_HR.pdf](http://www.ul.com/global/documents/library/white_papers/UL_WP_Final_Applying_Lean_Principles_to_Improve_Healthcare_Quality_and_Safety_v11_HR.pdf)
- Bronson Management System FAQ. (n.d.). Retrieved from [https://inside.bronsonhg.org/web\\_content/2112/BMS\\_FAQ\\_Bronson\\_Management\\_System.docx](https://inside.bronsonhg.org/web_content/2112/BMS_FAQ_Bronson_Management_System.docx)
- Bronson Methodist Hospital Receives National Honor for Nursing - Bronson Healthcare. (n.d.). Retrieved April 25, 2019, from <https://www.bronsonhealth.com/news/bronson-methodist-hospital-bmh-receives-highest-national-honor-f/>
- Dan Berlowitz, M. D., VanDeusen, C., Victoria, L., Parker, Silver, A. N. J., & Logan, C. (2014). Preventing Pressure Ulcers in Hospitals: A Toolkit for Improving Quality of Care. Retrieved from <http://www.ahrq.gov/professionals/systems/long-term-care/resources/pressure-ulcers/pressureulcertoolkit/putool3.html>
- Haesler, E., Kottner, J., & Cuddigan, J. (2017). The 2014 International Pressure Ulcer Guideline: methods and development. *Journal of Advanced Nursing*, 73(6), 1515–1530. <https://doi.org/10.1111/jan.13241>
- Institute for Healthcare Improvement: Science of Improvement: Testing Changes. (n.d.). Retrieved March 16, 2019, from <http://www.ihl.org/resources/Pages/HowtoImprove/ScienceofImprovementTestingChanges.aspx>
- National Database of Nursing Quality Indicators. (2017). Guidelines for data collection and submission on physical restraint prevalence indicator, (January), 26.

- National Database of Nursing Quality Indicators. (2018). Guidelines for data collection and submission on pressure injury indicator, 26.
- NDNQI - National Database of Nursing Quality Indicators. (n.d.). Retrieved March 16, 2019, from <http://www.pressganey.com/solutions/clinical-excellence/nursing-quality>
- Ozkaynak, M., Unertl, K. M., Johnson, S. A., Brixey, J. J., & Haque, S. N. (2015). Clinical Informatics Study Guide. *Clinical Informatics Study Guide*, 135–161. <https://doi.org/10.1007/978-3-319-22753-5>
- Ratliff, C. R., Droste, L. R., Bonham, P., Crestodina, L., Johnson, J. J., Kelechi, T., ... Carroll, B. (2017). WOCN 2016 Guideline for Prevention and Management of Pressure Injuries (Ulcers): An Executive Summary. *Journal of Wound, Ostomy and Continence Nursing*, 44(3), 241–246. <https://doi.org/10.1097/WON.0000000000000321>


### APPENDIX A. Restraint and Pressure Injury Data Collection Sheet





**Restraint & Pressure Injury Survey Monthly Report**

(For data collection purposes only) See NDNQI® Guidelines for data collection directions. See Pressure Injury Training on how to stage pressure injuries and differentiate from other types of wounds.



---

**Date:** \_\_\_\_\_ **For Year:** \_\_\_\_\_ **For Month:** \_\_\_\_\_

**Unit Name:** \_\_\_\_\_ **Hospital ID Code:** \_\_\_\_\_

**Unit Census:** \_\_\_\_\_ **Number Surveyed:** \_\_\_\_\_ **Not on Unit:** \_\_\_\_\_ **Refused:** \_\_\_\_\_ **Unscale for PI:** \_\_\_\_\_

**Unit Acquired Pressure Injury Reporting:** Yes  No

**Risk Assessment (RA) Scale Used on This Unit:** Braden (B) \_\_\_\_\_ Braden (BQ) \_\_\_\_\_ NSRAS (NS) \_\_\_\_\_ Norton (N) \_\_\_\_\_ Multiple Scales \_\_\_\_\_ Clinical Factors (CL) \_\_\_\_\_

Patient Number	Age	Gender	Restraint in Use	Restraint Type (check all that apply)	Restraint Survey			Pressure Injury Survey									
					Restraint Category (check one)	Clinical Justification for Restraint (check all that apply)	Admission Assessment	Last Assessment					Types of Prevention Interventions in Use Within Past 24 Hours for At Risk Patients only				
					Restraint Category (check one) Restraint Type (check all that apply) Acute Med/Surg Behavioral Unknown Prevent falling/getting out of bed Prevent removing equipment/therapies Reduce harm to self Reduce harm to others Other Unknown	Skin Assessment Risk Assessment RAC Score (Only if used B, BQ, BOD, NS, N) Indicate RAC Scale or if "O/C" used Y= Yes /N=No /P=Pending	Time Since Last Pressure Injury (check one) > 72 Hours - 1 Week > 48-72 Hours > 24-48 Hours > 12-24 Hours > 0-12 Hours Never assessed for risk (skip to R Pressure Injuries) Indicate RAC Scale or if "O/C" used RAC Score (Only if used B, BQ, BOD, NS, N) Y= Yes /N=No /P=Pending	Scale & Score Patient at Risk Prevention in Use Y= Yes /N=No /P=Pending	Skin Assessment Y= Yes /N=No /D= Documented Contradiction Pressure Redistribution Y= Unnecessary for PI /P= PI Refused Repositioning Y= Yes /N=No /D= Documented Contradiction Nutritional Support Y= Yes /N=No /D= Documented Contradiction Moisture Management Y= Yes /N=No /D= Documented Contradiction	Each Patient Hospital Acquired (this unit & other unit) Total	At Each Stage of Acquired Pressure Injuries Stage 1 Stage 2 Stage 3 Stage 4 Unstageable PI Deep Tissue Pressure Injury (DTPI) Mucosal Membrane Pressure Injury Non-Viable pressure injury	Medical Device related Pressure related Injuries Total Number of Unit Acquired Pressure Injuries related to medical device	Medical Device related Pressure related Injuries Total Number of Hospital Acquired Pressure related to medical device				

APPENDIX B. New Data Collection Form with Automated Chart Abstraction

Page: 1  
Printed: 4/6/19 10:18 AM

IP NDNQI PI Survey Report - Data Collection		BRONSON HEALTHCARE GROUP																				
Run by KNIGHT, JEFTON [217828]		LOS	AgeSex	Restr?	Limb	Vest	Other	Cat	Falls	Equip	Self	HarmOth	Oth	Unk	AASkin	AARisk	AAScore					
MRN	Rm/Bd	LA:Score	LA:Score	Risk	Prev	Use	StoAm	Redistr	#	Repos	Nutr	MstMgt	TopPI	HAPI	S1	S2	S3	S4	Unalg	DT	MM	
Time Since RA																						
	E202 01 Braden	4d 19	N	83	F	No																
>0 to 12 hours																						
	E203 01 Braden	2d 12h 17	Y/RA	62	F	No	Y	Y														
>0 to 12 hours																						
	E205 01 Braden	23h 20	N	72	M	No																
>12 to 24 hours																						
	E206 01 Braden	2d 11h 17	Y/RA	47	F	No	Y	8	N													
>0 to 12 hours																						
	E207 01 Braden	8d 23h 21	N	60	M	No																
>0 to 12 hours																						
	E208 01 Braden	1d 19h 21	N	53	F	No																
>0 to 12 hours																						