

## Maryland Patient Safety Center's CALL for SOLUTIONS 2020

Organization: **Greater Baltimore Medical Center**

Solution Title: **Ensuring One Insulin Pen for One Patient**

### **Program/Project Description, including Goals:**

#### **Problem:**

A dose of insulin aspart (Novolog) was due for a patient in the ICU. When the nurse went to get the insulin pen from the bin in the medication room, she found several pens in the bin. This caused concern, because in addition to the three Novolog pens labeled for this patient, there was another Novolog pen in the same bin, labeled for her other patient. Unable to determine if this other patient had received a dose inadvertently from the pen labeled for the first patient, the nurse identified and reported this safety gap.

Insulin is a high-alert medication, and needs to be administered with care, due to the high risk of errors and adverse effects. In addition, in their 2017 Guidelines for Optimizing Safe Subcutaneous Insulin Use in Adults, Institute for Safe Medication Practices (ISMP) reported that sharing of insulin pens among patients, which is improper, has resulted in exposure to bloodborne pathogens such as human immunodeficiency virus (HIV), hepatitis B, or hepatitis C.<sup>1</sup> The results for blood borne pathogens came back negative for this patient.

A root cause analysis (RCA), led by the Quality department, was conducted when the nurse self-reported the possible error. Several contributing factors were identified. The major finding was that although barcode scanning was implemented, the manufacturer's NDC barcode had to be scanned instead of a both patient and dose-specific label. This was the standard process for bulk items, such as insulin pens.

The existing version of the electronic medical record (EMR), Epic, at GBMC was unable to generate labels that were both patient and product-specific that would scan for multiple orders. Any change in dose or frequency, such as sliding scale and meal time doses, would require a new label. This would have either generated waste by having to send a new pen with an updated label or caused a prolonged process of retrieving the existing pen for relabeling. To prevent these situations, nurses were directed to scan the NDC barcode. This standard work of scanning the NDC barcode, however, allowed the nurse to accidentally scan the correct medication from another patient and administer it.

Another identified contributing factor was the common occurrence of dispensing multiple insulin pens to a single patient. Pharmacists had to rely on a manual process to remember to review patient's chart when there were changes made to the order and cancel dispense if a pen had previously been dispensed. This process did not always succeed in preventing multiple dispenses.

**Goals:**

1. To improve safety around the management of insulin aspart pens by preventing accidental administration of insulin from an insulin pen for one patient to another.
2. To prevent waste due to dispensing multiple pens for the same patient.
3. To ensure that every patient ordered an insulin pen receives one pen.

**Process:**

The Epic Willow analyst at the institution worked with the analysts at Epic headquarters in Madison, Wisconsin to find solutions for generating patient and product-specific labels. This effort was not successful in finding a solution. On persistence from the executive leadership, there was a drive to keep seeking for a resolution. Calls went out to colleagues from multiple area hospitals to see how they handled this situation and a connection was made with the Medication Safety Officer from another institution. They had dealt with the same situation in their newly implemented EMR and had found a fix in their Epic labels.

**Solution:**

Based on the suggestions from the other institution, the Epic Willow analyst could work with Epic headquarters to have a label designed that was both patient and product-specific. A nurse could scan the barcode on the label instead of the manufacturer's NDC barcode. The label barcode directed the nurse to select dose from all active orders for Novolog on the patient's chart and allow for appropriate documentation. However, this did not solve the issue of multiple dispenses. The only solution that could prevent that from happening was to discontinue automatic dispenses for insulin pens. Since this new process was prone to the opposite error of a pharmacist forgetting to dispense any pens, this issue was added as a new measurable metric on Pharmacy's Lean Daily Management (LDM) board.

The LDM system is defined as, "A disciplined system for developing our staff, aligning our efforts, and building a holistic and meaningful improvement system that will help achieve our organization's goal."<sup>2</sup> This daily visual management process helps with using lean methodology in minimizing waste and improving the process.<sup>3</sup> It also helps leadership connect with front-line staff daily and helps identify barriers in meeting institutional goals.

The Plan-Do-Study-Act (PDSA) methodology was used to improve the process around the dispensing of insulin aspart pens.

**Measurable Outcomes:****Plan:**

Standard work was developed for a pharmacist to manually dispense the dose following verification of the initial order, after reviewing the patient chart to ensure that there were no previous dispenses. Extensive staff education was implemented. Handouts were used to educate pharmacy staff, nursing educators, and nurses on all shifts and during huddles. Medication Safety Committee newsletter was used to highlight the reported error and upcoming changes.

**Greater Baltimore Medical Center  
Department of Pharmacy**

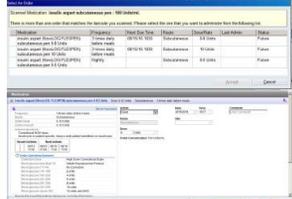
**Safe Use of Subcutaneous Insulin**

**Patient-Specific Subcutaneous Insulin**

- Insulin aspart (Novolog) will be the only insulin pen to be used at GBMC.
- EACH PEN WILL BE USED FOR ONE PATIENT ONLY!**
- CAUTION:** Using pen from one patient to another may lead to possible blood contamination with a risk of infection with blood borne pathogens.
- Nurse will scan NEW patient-specific label, which will point to patient and medication.
- This new label can be used to scan multiple active orders of insulin aspart.
- Pharmacy will cross out/ and then cover the manufacturer's NDC barcode. **Manufacturer's Barcode should NOT be scanned for insulin aspart.**



**SCANNING AND ADMINISTRATION**

- Open the appropriate patient's chart and navigate to the MAR activity.
  - Scan the patient's wristband barcode.
  - Scan the barcode on the patient-specific medication label flagged on the insulin pen.
- Select the correct order and chart the appropriate dose
 
- Alert if wrong patient is scanned:
  - The product insulin aspart (Novolog) FLX PEN Subcutaneous pen 0.2 Units that was scanned is for a different patient.



**GO-LIVE  
MAY 1st, 2018**

**Greater Baltimore Medical Center  
Department of Pharmacy**

**Safe Use of Subcutaneous Insulin: PHARMACY**

**Patient-Specific Subcutaneous Insulin**

- Insulin aspart (Novolog) is the only insulin pen to be used at GBMC.
- EACH PEN IS USED FOR ONE PATIENT ONLY!**
- CAUTION:** Using pen from one patient to another may lead to possible blood contamination with a risk of infection with blood borne pathogens.
- Nurse scans patient-specific label, which points to patient and medication.
- This label can be used to scan multiple active orders of insulin aspart.



**PHARMACY PROCESS**

- PHARMACIST: Order Verification**
  - Order for insulin aspart will default to 'DO NOT DISPENSE'.
  - Review the patient's medication profile using the encounter tab.
  - Dispense a dose if (and only if) no pen has been sent before.
- TECHNICIAN: Preparing the dose and delivering the pen**
  - Scan the label in MedEx. Scan the pen.
  - Place the label on top of the manufacturer's barcode.
  - Place a clear tape on the Aztec barcode to prevent smudging.
  - After pharmacist verification, hand deliver pen to patient's medication bin.
  - COMPLETE THE PROCESS FOR ONE PRODUCT AT A TIME!!**
- PHARMACISTS & TECHNICIANS:**
  - If not initially dispensed, dispense the pen using following steps:
    - Dispense from GC Central with Dispense Code of 'Multidose Scan'
    - For re-dispense, reprint from 'Label Hx'

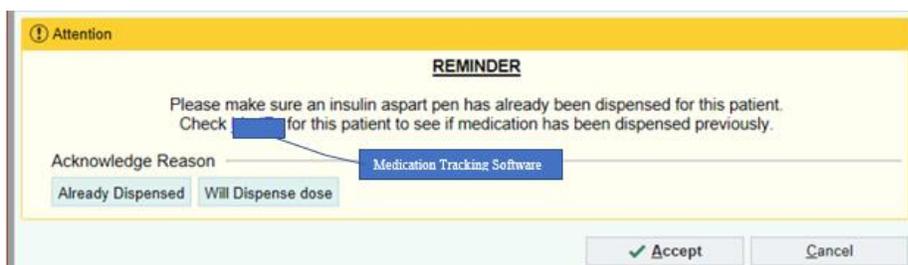
## Do:

An LDM metric was developed with a goal that every patient with an order for Novolog has a pen dispensed. With the support of multiple disciplines, including pharmacy, nursing, IT, and leadership, this program was implemented in the beginning of May 2018. A daily report was built to assess all patients who were to receive an insulin pen. Data was collected on all missed dispenses, then presented at LDM board to the executive team daily. A pareto chart was used to narrow down the causes for missed dispenses.

## Study & Act:

In the beginning of the implementation, it became apparent that a sustainable, hardwiring of the process could not be accomplished with education, because education alone is not a reliably effective intervention. Several tests of change were considered and implemented.

A pharmacist forgetting to manually dispense the pen was the most common pareto reason for not meeting the stated goal, and had resulted in missing dispenses. The Pharmacy team worked with Epic to hardwire the process by developing a best practice advisory (BPA) pop-up during verification of insulin pen orders that acted as a reminder to the pharmacist to dispense the pen. Pharmacists are forced to acknowledge the reminder during the verification process.



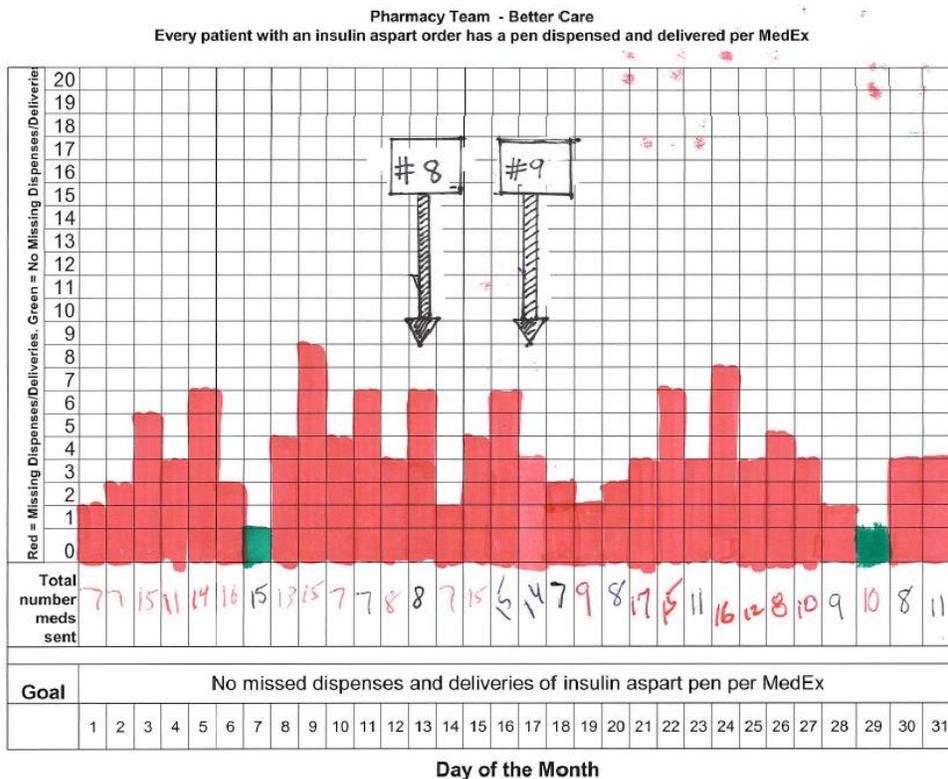
One other finding was that most of the misses were occurring in the late hours of the day and night. A morning report was built to assess any missed doses. In addition, a nightly automated email to the night shift pharmacist was generated to remind the pharmacist to reconcile the insulin orders and dispenses at 2 am and 6 am. This would help catch any missed dispenses.

☆	<b>GC RX Find orders: Insulin Aspart Orders AM</b> Look up INSULIN ASPART U-100 100 UNIT/ML SUBCUTANEOUS PEN with specified time and other criteria. Report is defaulted to search ACTIVE orders
☆	<b>GC RX Find orders: Insulin Aspart Orders Night</b> Look up INSULIN ASPART U-100 100 UNIT/ML SUBCUTANEOUS PEN with specified time and other criteria. Report is defaulted to search ACTIVE orders
☆	<b>GC RX Find orders: Insulin Aspart Orders PM</b> Look up INSULIN ASPART U-100 100 UNIT/ML SUBCUTANEOUS PEN with specified time and other criteria. Report is defaulted to search ACTIVE orders

Pharmacy leadership reached out to the individual pharmacists who were outliers. They also received daily emails reminding them of standard work until the process was effectively embedded.

**Results:**

In the beginning: **May 2018**

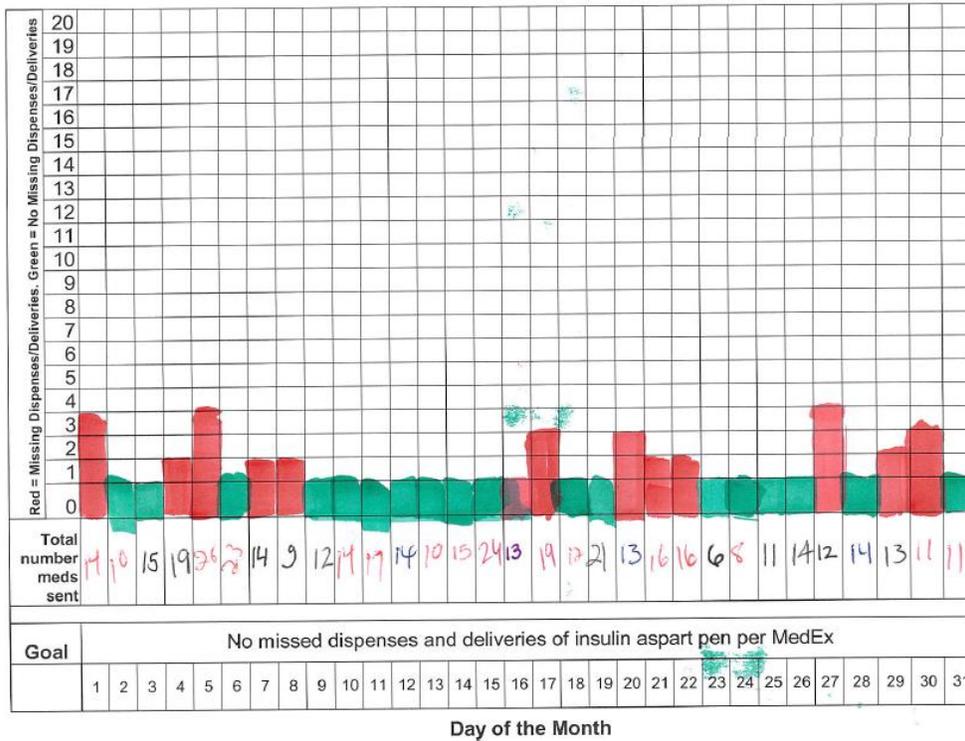


May 2018



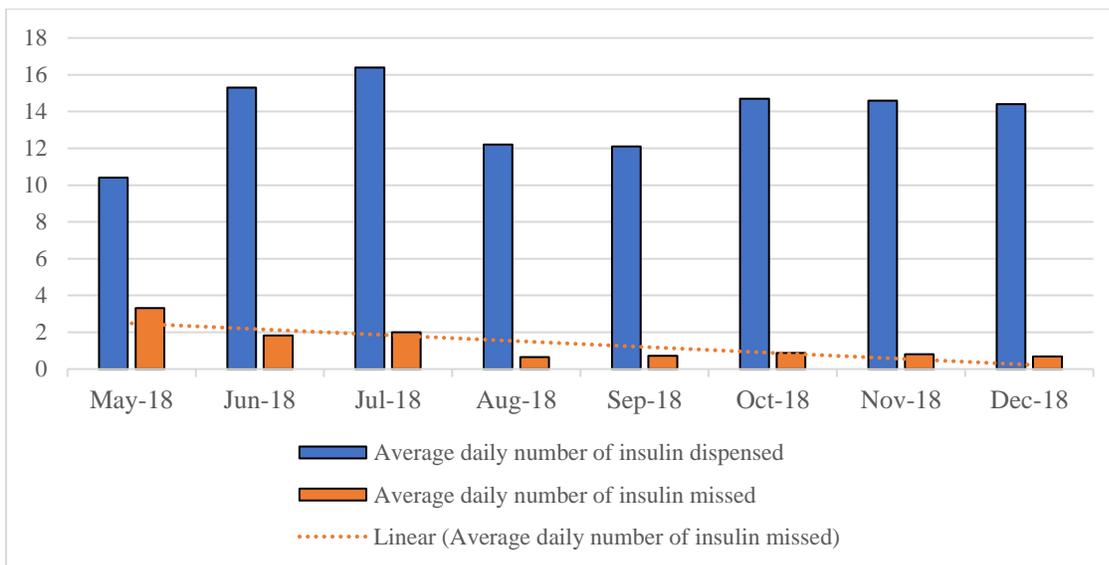
At the end: **December 2018**

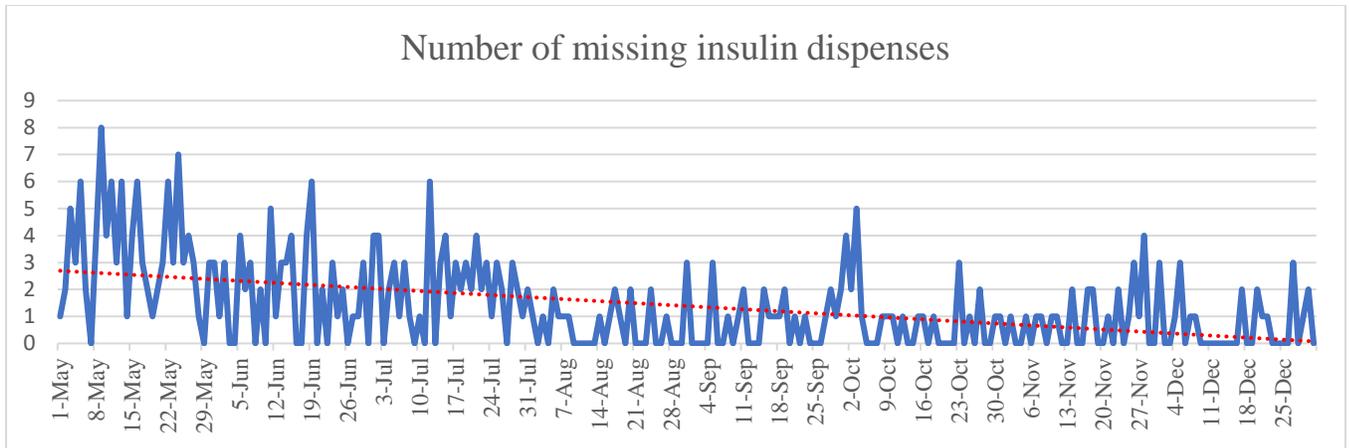
Pharmacy Team - Better Care  
 Every patient with an insulin aspart order has a pen dispensed and delivered per MedEx



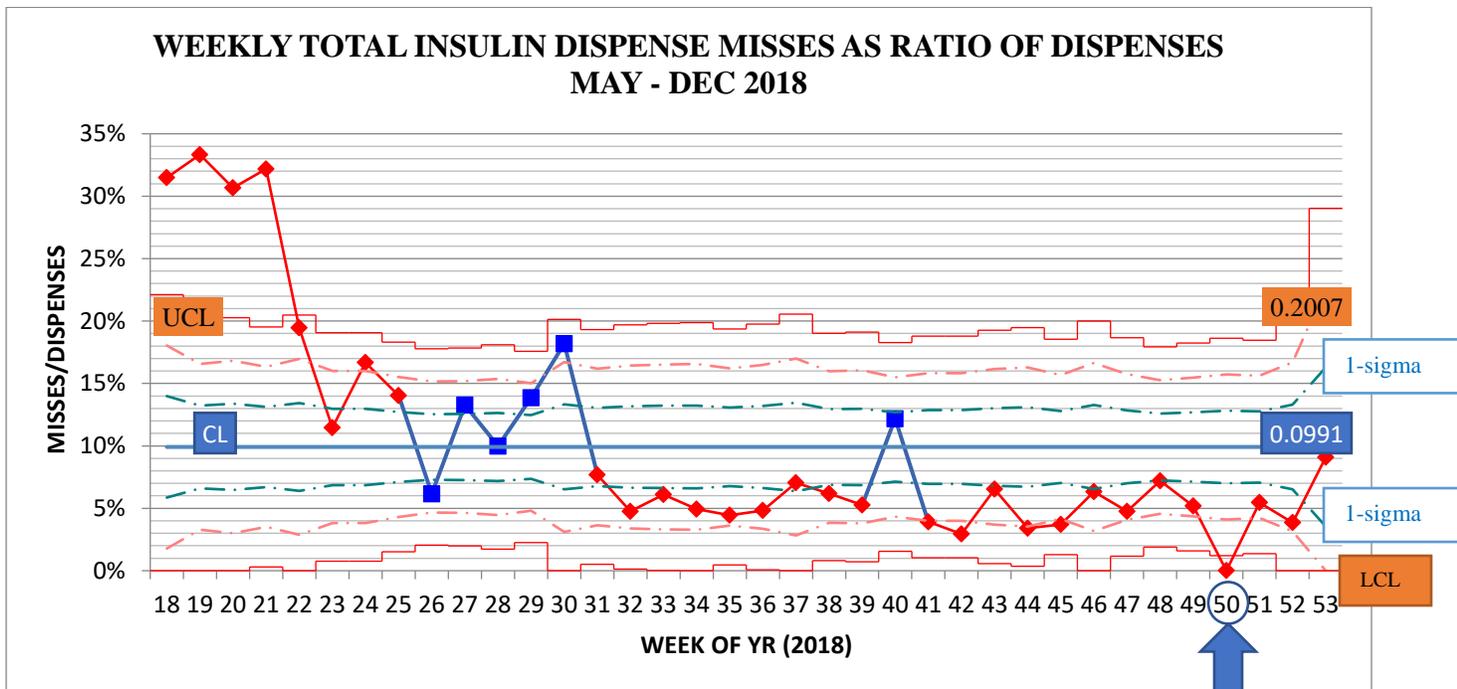
DECEMBER 2018

Overall number of missing insulin dispenses decreased over the study period from May 1 to December 31, 2018. The rate of missed dispenses of insulin pens went down from an average of 3.32 missed dispenses per day in May to 0.68 of those in December.





The downshift in the number of missed insulin pen dispenses is statistically significant with a p-value less than 0.05. For the base period in question of May to December 2018, the data points in red are special causes and are highly unlikely to occur at random. Week 50 of 2018 shows a value below the lower control limit with a p-value less than 0.003. See image below.



UCL: Upper Control Limit  
 CL: Control Limit  
 LCL: Lower Control Limit

The LDM metric was graduated at the end of December 2018 when the data showed that it had reached a level of reliability, standard work was established, and there were no new opportunities for learning.

**Sustainability:**

Pharmacy leadership team conducts intermittent audits to ensure that the interventions are sustainable. There have been 0 to 2 misses per observation on intermittent audits.

**Role of Collaboration and Leadership:**

This project could not have been successful without the collaboration and support of leadership and colleagues from various departments. Partners in this project included the Chief Medical Officer and VP of Quality in driving the project; Medication Safety team, Quality and Patient Safety team, and Nursing leadership in helping in collaboration with resources at other area hospitals; Epic Willow analysts in working with other hospitals and Epic in building a new process; Pharmacy leadership in establishing and monitoring the LDM metric; and most importantly, Pharmacy and Nursing staff in implementing the program.

**Patient and Family Integration:**

When a new, safer process was developed, the executive leadership and pharmacy leadership reached out to the patient and family to inform them of the learning from the event and changes that had been made to the standard work around dispensing of insulin pens. The family was pleased to hear that their unpleasant experience had resulted in the redesigning of care and will have a positive impact on all future patient care.

**Culture of Safety/Innovation:**

This project was a great example of how **culture of safety** and continuous improvement are embedded in the day-to-day activities at GBMC. A new nurse could self-report an issue when she identified a safety gap points to the presence of just culture in the institution.

This was also an example of **innovation** and creativity. When there were no solutions available through routine avenues, the team did not accept status quo and reached out to colleagues from other hospitals for solutions. Using some of the ideas and solutions that had worked for them, we created a process that would increase safety by reducing the major risk of passing bloodborne pathogens by not using an insulin pen intended for a different patient.

Overall, it was also a great example of teamwork, both within and outside of Pharmacy, to make this process safer for the patient.

**Related Tools and Resources**

1. 2017 ISMP Guidelines for Optimizing Safe Subcutaneous Insulin Use in Adults. Available at <https://www.ismp.org/sites/default/files/attachments/2017-11/ISMP138-Insulin%20Guideline-051517-2-WEB.pdf> Accessed November 2019.
2. Berlanga, G. and Husby, B. (2016). *Lean daily management for healthcare field book*. Boca Raton: Taylor & Francis, pp.15-23.

3. Lawal AK, Rotter T, Kinsman L, et al. Lean management in health care: definition, concepts, methodology and effects reported (systematic review protocol). *Systemic Reviews* 2014;3:103. Published 2014 Sep 19. doi:10.1186/2046-4053-3-103

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