

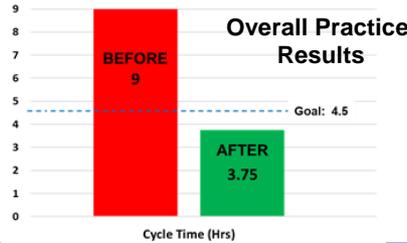
Decreasing Time Spent Obtaining Vitamin D Samples for Newborns

Sara Ritchie, MD

MUSC Children's Care Northwoods
Charleston, SC



Control: Samples were relocated to a more central sample closet that does not require a key for entry. The new system eliminates wasted time retrieving a key to the sample closet. This is estimated to save ~\$320 per year for the practice and will also decrease time that patients are waiting. Additionally, we were able to decrease the time to obtain samples by >50% which is better than our original goal.

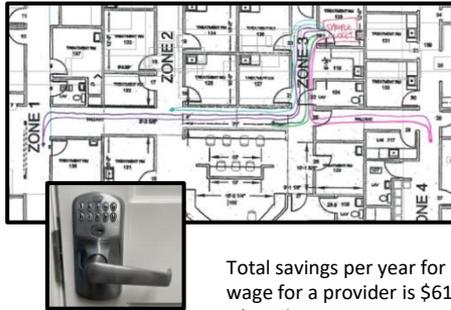


Define: Moving from exam rooms to obtain and return the key to the drug sample closet causes delays in wrapping up the patient encounter.

Process: obtaining samples for patients
CTQ: time to obtain the drug samples
Goal: decrease time to obtain samples by 50%

I created a spaghetti diagram to document the current process. VOC efforts included interviews with the other providers.

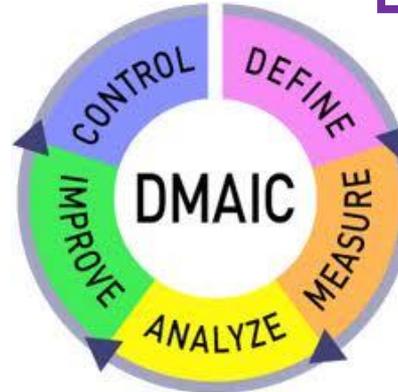
Improve: The conclusion was to move the sample closet to the medication room which is operated by a digital door lock and centrally located. The average time to obtain samples from the new sample closet was 30 seconds versus 71 seconds previously.



Pilot Results

	Before	After
Time/trip:	71 seconds	30 seconds
Trips/wk:	8.75	8.75
Time/year:	9 hrs	3 hrs 45min

Total savings per year for our clinic is 5.25 hours per year. Estimated hourly wage for a provider is \$61/hour which would result in a savings of ~\$320/year.



Measure: Y = Time to walk to obtain drug samples

Baseline: 71 seconds round trip

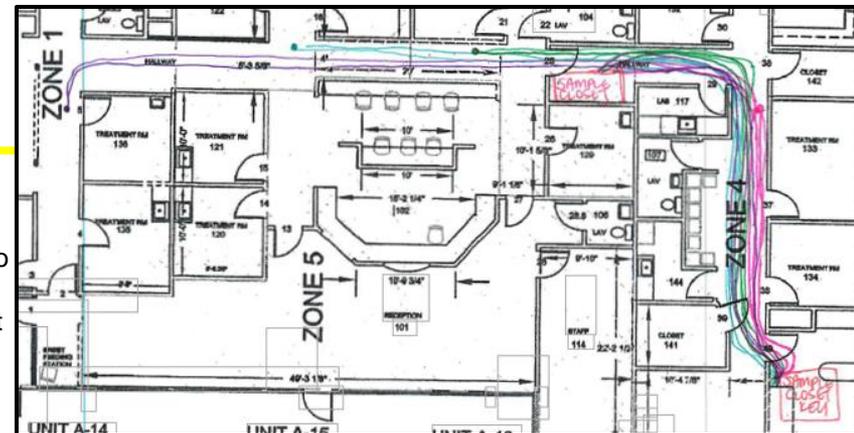
Using a Data Collection plan, the number of trips to the drug closet were observed over 4 weeks to determine the full range of operating conditions.

The average weekly number of trips was 8.75. Therefore, the average time spent monthly on obtaining drug samples is 41.5 minutes and annually 9 hours.

Summary: Providers were spending unnecessary time walking to obtain and return a key to the sample closet to obtain samples for patients.

By following the DMAIC method, we discovered the root cause which was a no-cost solution. Benefits include a savings of 5.25 hours per year for the practice and a savings of ~\$320 in addition to improved provider and patient satisfaction.

Analyze: I used a spaghetti diagram to highlight the wasted movement of the provider leaving the patient room area to obtain a sample closet key, obtain sample, return key, and return to patient room area. The waste of excess motion and transportation was obviously the source of our issue.



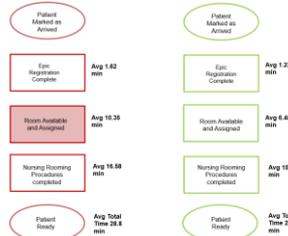
Reducing Patient Rooming Time

Blakely Amati, MD
Center for Pediatric Medicine
Greenville, South Carolina

Control: The addition of the new freezer on Side B eliminates the wasted time needed to walk multiple times to the other side of clinic to obtain live virus vaccines. **Average savings of 104 nursing hours, or \$2392 annually.** By decreasing time to obtain vaccines, we were able to **decrease room turnover by 37%** and **decrease rooming time by 6 minutes.**

	Before	After
Avg:	28.8 min	22.8 min
Range:	16-63 min	10-38 min
Sigma Level:	0.65	1.25
Yield:	19%	41%

Figure 4



Define: Providers noted that it was taking too long to room patients. We have a clinic expectation that patients will be ready for the physician to see within 20 minutes of arrival to clinic. Not meeting this has led to patient flow issues which are bound to only worsen during sick season and well as decreased patient and provider satisfaction. Our CTQ was rooming completion time (time to physician walking in to see patient with vitals in the computer) and the process was the Rooming Process. **Goal: Reduce % rooming times taking over 20 minutes from 80% to 40% by January 20, 2021.**

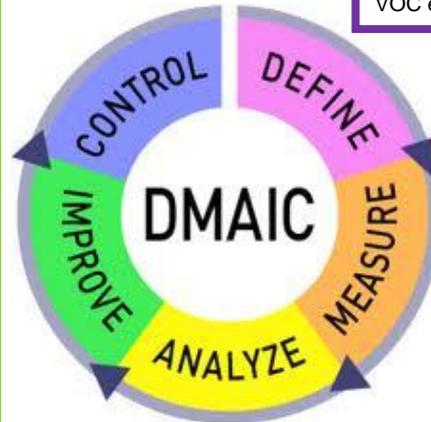
We made a SIPOC, top down chart and spaghetti diagram of the as-is process by walking the process, documenting it and timing each step. VOC efforts included nurse and provider interviews and focus groups.

Improve: Our practice was able order an additional vaccine freezer for Side B at our clinic. This has **decreased nursing time spent on this step by 75%.**

Before: 90 sec
After: 20 sec



Figure 3



Measure: Y= Rooming time (clinic arrival to patient being ready for physician)

Baseline:

Avg: 28.8 min
Range: 16-63 min
Yield: 19%
Sigma Level: 0.65

We used a C/E diagram and matrix to define X variables. We collected Epic Event Tracking log times on different days and times over a 2 week period to ensure data reliability. We also observed flow at random times.

Summary: Providers expect rooming time to take 20 minutes or less. We were averaging 28.8 minutes and only meeting expectations 19% of the time, leading to provider and patient dissatisfaction.

By following the DMAIC method, we uncovered multiple issues, and chose to focus initially on decreasing excess motion for nursing, reducing our overall average rooming time to **by 6 minutes.** We have not yet met our goal of 20 minutes consistently, but have **increased our yield to 41%.**

Date: January 21, 2021

Analyze: Through process study we found that room turnover was causing unnecessary delays in rooming subsequent patients. BOBs and WOWs showed best practices and anomalies. It seemed that there was excess motion occurring due to nurses having to walk to vaccine freezer on other side of the clinic multiple times per shift to obtain live virus vaccines.

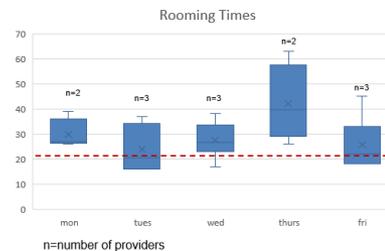


Figure 1

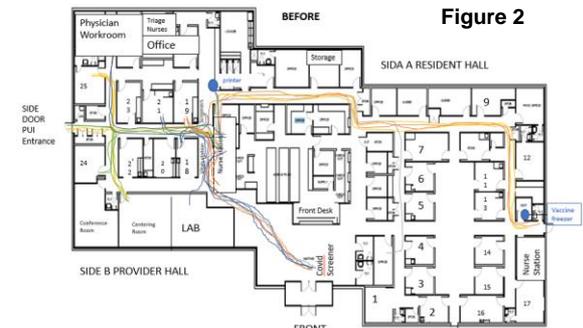


Figure 2



Cooperative Health

Faster Vaccinations

Ezra M. Ash-Malachi, MD
Hopkins Family Practice
Hopkins, SC



Control: The commonly used were placed in the rooms in an easily accessible area. The nurses were more than amenable to using the conveniently placed forms.

Non-Financial Benefit: Decreased time in patient room turnover/rooming patients.

Financial Benefit: Savings of \$677 per year. By decreasing the average vaccination time by 39 seconds, this will decrease time used by nursing staff by 390 seconds (6.5 minutes) per day. This will translate into 26 hours per year at \$26.05 per hour will result in \$677.30 more per year.

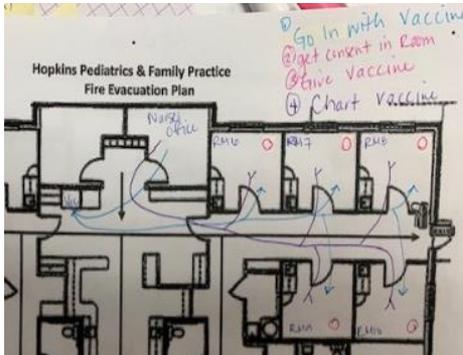


Define: In our office, Adult providers are frustrated in the turnover time of their exam rooms. The process from intake to patient receiving vaccination takes longer than expected. During the vaccinations process, it was observed that there are multiple unnecessary steps which may be contributing to increased turnover time.

CTQ: Time it takes to give vaccinations. Average time currently is 328 seconds.

GOAL Statement: Decrease turnover time from 328 seconds by 10%, ~30 secs.

I used a SIPOC and a spaghetti map. I interviewed nursing staff to find out the problems with the process in an effort to get VOC.



Improve: I placed the VIS and consent forms for the 4 vaccinations I routinely give in exam rooms 6-10. I placed them in file folders in the drawer in the rooms. The nurses then used the forms in the rooms and cut their walk time.

Pre-Intervention Avg Time	Post-Intervention Avg Time
328 seconds	289 seconds

Estimated savings per year \$677 in nurse's salary by decreasing walk time 26 hours in a year.



Measure: Y = Time it takes to give vaccination

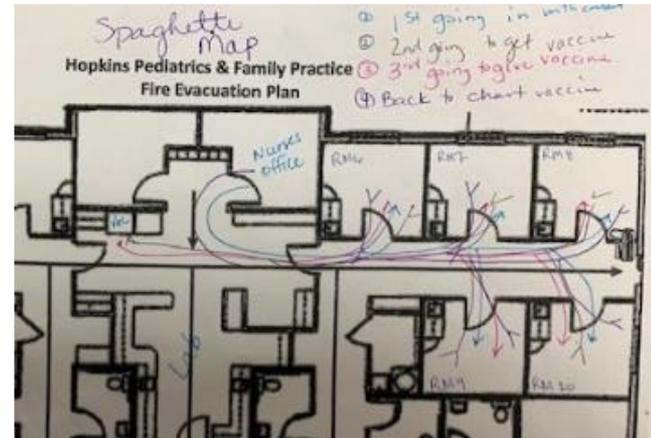
Baseline: Average Vaccination Time: 328 seconds. Range 226-376 seconds

Data collection: direct timing by nurse using stop watch. To decrease variability, I only used one nurse.

Summary: Adult providers are frustrated in the turnover time of their exam rooms. During the vaccinations process, it was observed there are multiple unnecessary steps which may be contributing to increased turnover time.

Using DMAIC, we were able to eliminate waste and decrease patient room turnover time. Which will result in a savings of \$677 per year of nursing time.

Analyze: I used a spaghetti map and found transportation and excess motion waste. I saw that there was transportation waste by the necessary forms not being where they were used but in a centralized location which required the nurses to walk twice and get them. Once this was found, I was able to find the cause for this waste with forms that were not easily accessible.



Decreasing Time Spent on NP Chart Audits

Jeniqua Duncan, DO, MBA
CareSouth Carolina, Inc.
Hartsille, SC



Control: The custom report was saved and named for easy access. The selected report continues to run in the background while charts are being reviewed which cuts out the time it takes to re-select the report. Additionally, the last variables are also saved so less time is spent changing NP name and date. The changes will save the reviewer over 12 hours annually and the corporation \$1,536.42 annually.



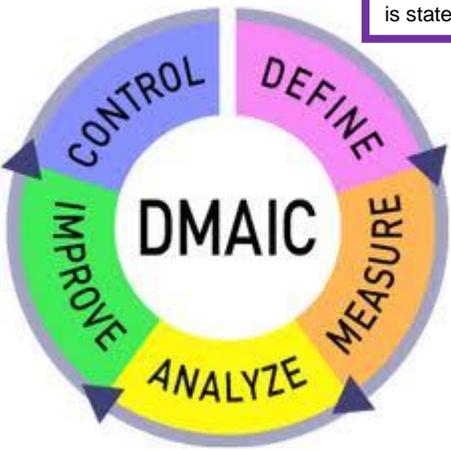
Define: To comply with the South Carolina Nurse Practice Act quarterly chart audits are performed on all nurse practitioners to evaluate safety and quality. Although improvements had already been made the process of reviewing 4 charts per 32 NPs seemed to take a long time. Our CTQ was Time from chart selection to completion of audit forms

Goal: Decrease time it takes to complete NPs audits from chart selection to form completion by 10% from the baseline 7.86 hours.

A SIPOC and process map were used to document the as is state.

Improve: The solution was to create a custom report in the EMR which could be run for each NP at time of chart audit. The report search produced office visits by a certain NP which occurred after a date. The output displays patient name, date of visit, and reason for visit. The chart can be entered by double clicking on the patient line. Four different NPs were reviewed using the newly created report. Again, care was taken to include NPs "similar" to the baseline NPs reviewed. Significant improvements were made. A 38% reduction in time exceeded our goal of 10%.

Category	Hours
Before	7.86
After	4.84
Goal (10% Reduction)	7.07



Measure: Y = Time from chart selection to audit form completion

Baseline: 7.86 hours

A Cause and Effect Diagram was used to determine X factors. Four NPs were reviewed and time data collected to extrapolate a total time for 32 NP reviews. The 4 baseline NPs varied in practice length and patient populations to get a full spectrum of all practicing NPs.

Summary: Physicians expressed frustration about the time needed to complete NP reviews. By following the DMAIC method we determined causes for the extended time. Two process steps had root causes in the view being used in the EMR. By changing how the EMR was used time spent was decreased from 7.86 hrs to 4.84 hrs which is a 38% change, exceeding our goal of 10% reduction. This change will improve job satisfaction for reviewers and additionally help ensure that we remain compliant with the law.

Analyze: 5 Whys and FMEA were utilized to analyze and determine root cause. This work showed that the view used in the electronic medical record (EMR) did not provide prevention controls. The process step with the highest RPN on the FMEA did not have actions within the scope of this improvement project. The process steps with the second and third highest RPN were both related to accessing the EMR. The conclusion was to address process steps related to the EMR.

Process Step	Potential Failure Mode	Potential Effect(s) of Failure	Severity	Potential Cause(s)/Mechanism(s) of Failure	Prevention Controls	Detection Controls	RPN	Rank
Open schedule and pick patient on day	Physician did not see patients that were open on day	Must select another date	5	Schedules are variable & I don't have the schedule ready available	nothing	nothing	10	200
Select patient	Physician didn't to review past visits. Missed physicians	Must select another patient	5	visit types are not shown in the schedule view on GE	nothing	nothing	5	75
Review Chart	Poor documentation or management requiring further investigation in the chart	extra time spent looking through the chart	5	individual clinician practices	nothing	nothing	10	50
	an indication of appropriate management	extra time spent researching/unfamiliar	7	depends on my training and memory	nothing	nothing	5	35
Complete form	Complete form incorrectly	Must retype form	5	missed up information or forgot component	nothing	double check information before filing out form	5	25
		Must retype form	5					

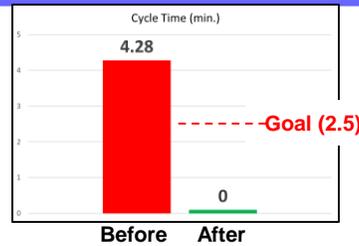
Sweetgrass Pediatrics



Decreasing time spent obtaining paperwork for patients

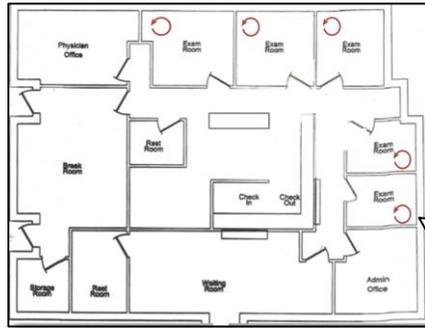
Kate Herwig, MD
Sweetgrass Pediatrics
Charleston, SC

Control New desk top filing boxes were placed in each patient room and the top 10 most utilized documents needed for patient assessment or documentation were placed in alphabetical order with **Kanban slips** inserted to know when to refill. The new system eliminates the wasted time needed to walk to the single central filing cabinet. This is estimated to **save \$1854 a year** per provider and will also decrease time that patients are waiting.



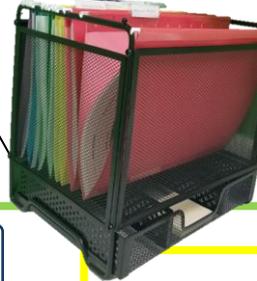
Define: There are various forms utilized to screen patients (PHQ 19, Vanderbilts, etc.) and other forms frequently requested by patients to be filled out by providers (School med, physicals, etc.). They are currently located in a filing cabinet that is outside of the patient rooms.

Goal: Our CTQ (Y) is paperwork retrieval time. The objective is to decrease the amount of time spent obtaining paperwork from an average of 4.28 min to less than 2.5 min daily.



After Spaghetti Diagram

Improve: I obtained desktop filing boxes to be placed in each patient room and have each of the top 10 most utilized documents in each one. This also **reduced cycle time to 0** as I was able to utilize **parallel processing** and continue discussions and initiate filling out forms while never leaving my work station..

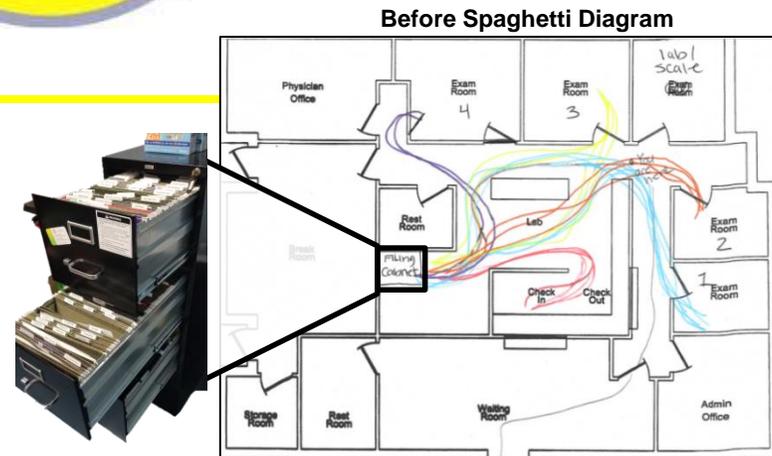


Measure: Time spent daily retrieving documents required for patient care, based on an average time of **32.8 sec per trip** and an **average of 7.8 trips daily**

Baseline – Based on 6 days of documenting the number of times I leave the patient room, I average 4.28 min daily obtaining paperwork. Financial impact was calculated using a waste calculator. 4.28 min wasted per day X 5 days a week X 52 weeks a year/60 sec – **18.54 hours a year** which would be a savings of **\$1854 per year**.

Summary: By following DMAIC and utilizing spaghetti diagrams, Kanban, and parallel processing, I was able to reduce non-value added time spent retrieving paperwork by over 18 hours a year at a savings of over \$1800/yr per provider.

Analyze: I analyzed which forms where most utilized and used Spaghetti diagrams to highlight the wasted movement of the provider leaving the patient rooms multiple times daily to obtain paperwork. The waste of excess motion and transportation was obviously the source of our issues.



Before Spaghetti Diagram



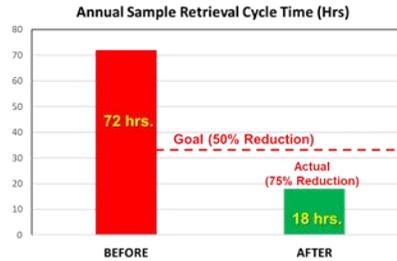
Decreasing Time Spent Obtaining Drug Samples for Patients
 Christine McGinley, D.O.
 Little River Medical Center
 Little River, SC



Control: A new policy was created and implemented for a total of three Physicians at Little River Medical Center. Staff received training on the new process including keeping the closet properly stocked to avoid any unnecessary trips to the further closet.

Overall Practice Results

	Before	After
Time/year	72 hour	18 hours
Cost per year	\$7,200	\$1,800



Define: Moving between my exam rooms and the drug sample closet causes delays in the schedule/ wasted time that could be utilized for other tasks.

Process: obtaining samples for patients

CTQ: time it takes to obtain the drug samples

Goal: decrease time to obtain samples by 50% and decrease delays in the schedule.

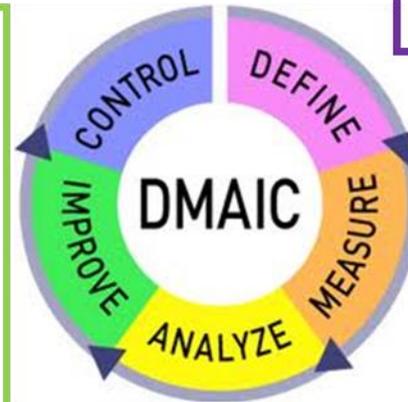
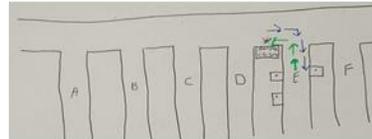
I created a SIPOC and a spaghetti diagram to document the current process. VOC efforts included interviews with the patients and nursing staff.

Improve: The conclusion was to move the sample closet closer to the exam rooms and therefore save time in transportation. A study was piloted in my hallway and the time to walk to the new sample closet was 15 seconds vs 60 seconds with the previous closet location.

Pilot Results

	Before	After
Time/trip:	60 seconds	15 seconds
Trips/month:	120	120
Time/year:	24 hours	6 hours

Spaghetti Map (After)



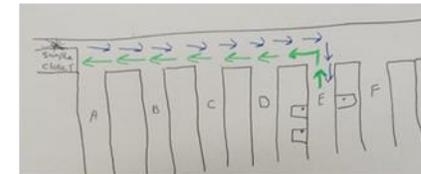
Measure: Y= Time it takes to walk to the pharmaceutical closet to obtain samples.

Baseline: 60 seconds round trip

Using a Data Collection plan, the number of trips to the drug closet were observed over 4 weeks to determine the full range of operating conditions.

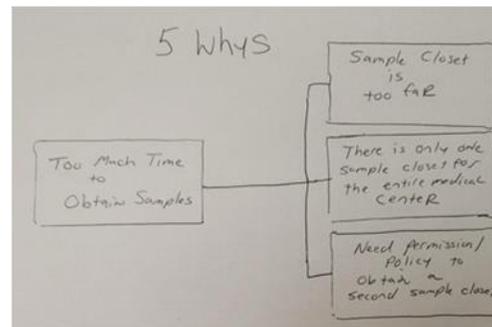
The average weekly number of trips was 30 and the number of monthly trips was 120. Therefore, the average time spent monthly on obtaining drug samples is 2 hours and annually 24 hours.

Spaghetti Map (Before)



Summary: Physicians were spending unnecessary time walking to the sample closet to obtain samples which was causing delays in the schedule. This resulted in dissatisfaction for both Physicians and patients. By following the DMAIC method, we discovered the root cause which was a no-cost solution. Benefits include a **savings of 54 hours per year for the practice and a savings of \$5,400** in addition to Physician and patient satisfaction.
 Date: 1.22.2020

Analyze: Root cause analysis was performed using 5 Whys and a spaghetti diagram. The root cause was determined to be excess distance between the drug closet and the exam rooms which caused increased time in obtaining samples.



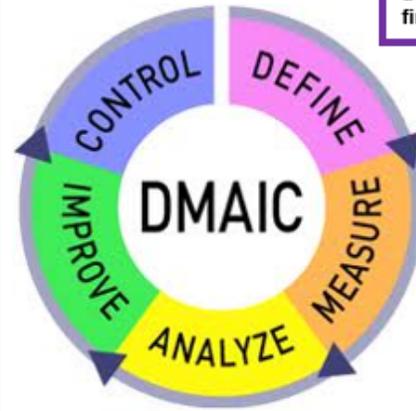
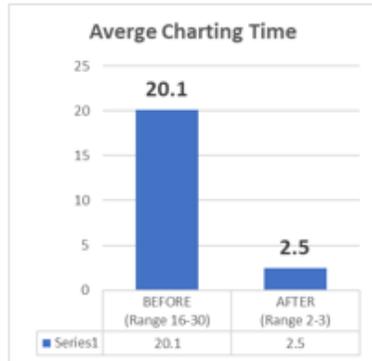
Control: Charting time was **reduced from an average of 20.1 seconds/chart to 2.5 seconds/chart**. Charting the assessment for viral URI diagnosis was costing \$130/month prior to the institution of text macros and was reduced down to \$12.45/month which represents a **cost savings of \$117.55/month and \$1410/year**.



Define: Charting takes up a large amount of time throughout the day and reduces workflow and productivity and therefore revenue. Viral upper respiratory infection is a very common pediatric diagnosis for which documenting the plan is repetitive and time consuming. The **goal** of my project is **to reduce charting time for viral URI diagnosis by 10% in one week**. A SIPOC and Top Down chart was used to help define the problem. The CEO and CFO were queried about keystrokes used/chart, percent chart closure/day and the financial value of time spent charting.

Improve: The use of **text macros** was instituted as a short cut to reduce charting time. This solution was arrived upon via **brainstorming** and chosen for it's relative ease and speed on implementation.

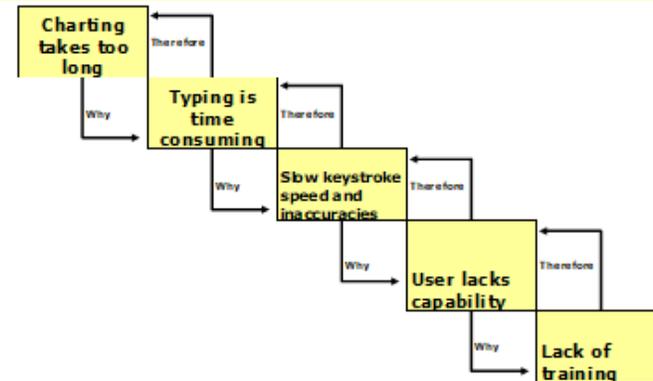
BEFORE	AFTER
Average 20.1 sec	Average 2.5 seconds
Range 16-30 sec	Range 2-3 seconds



Measure: **Baseline charting time** for viral URI assessment and plan was **22 seconds/chart** Data was collected by timing the length of charting for 14 different charts over the span of 2 days and then averaged. The financial impact was calculated by adding up the amount of time spent charting and using a fully burdened cost rate estimate of \$160/hour. An average of 49 minutes/month was used charting for viral URI assessment and plan at a **total cost of \$130/month or \$1568/year**.

Summary: By instituting the use of text macros for the assessment and plan portion of documentation for the diagnosis of Viral URI, I was able to quickly reduce charting time from an average of 20.1 seconds to 2.5 seconds/chart resulting in a net estimated cash savings of \$1410/year.

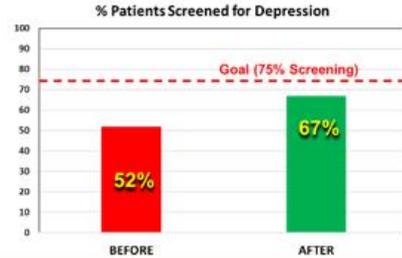
Analyze: The **5 Whys** were used in efforts to determine the root cause of charting time taking too long. Charting takes too long because of **typing speed and errors** which are related to use skill and training.



Increasing Depression Screenings for Primary Care Patients

Lisa Lanning Lowther, D.O., M.S.
Hope Health

Control: Nursing Staff **posted reminders** on white board "Do Depression Screening on Every Patient" and committed to do this for a month. At the end of one month intervention, significant improvement was noted, encouraging nursing staff to continue screening efforts to bring screening back to threshold and above target as we had previously exceeded depression screening for our patients until reporting was stopped in mid-2018.



Define: A significant drop-off in depression screening occurred from 4Q18 into most of 2019.

Process: Screening patients for depression

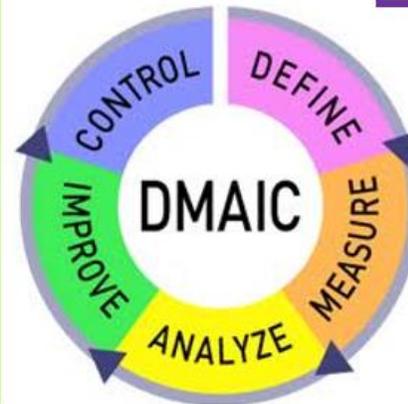
CTQ: % Patients screened for depression

Goal: Increase screening % from Nov 2019 baseline of 52% to target of $\geq 75\%$

Improve: When we realized screenings had fallen precipitously, we used the Lean technique of **brainstorming** to develop simple **quick win solutions** that we **fast and inexpensive**. We made an effort to screen ALL patients with PHQ-2 (followed by PHQ-9 if positive). Within two months we demonstrated a 15-point improvement in patients screened for depression, increasing to 67% screened. With continued application, we anticipate meeting and exceeding the 75% benchmark for mandatory Depression Screening within the first quarter of 2020.

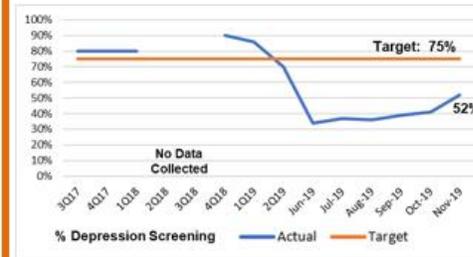
Pilot Results

	Nov 2019	Jan 2020
	<u>Before</u>	<u>After</u>
% Screened	52%	67%



Measure: Y= % patients screened for depression per month. (Target: $\geq 75\%$)

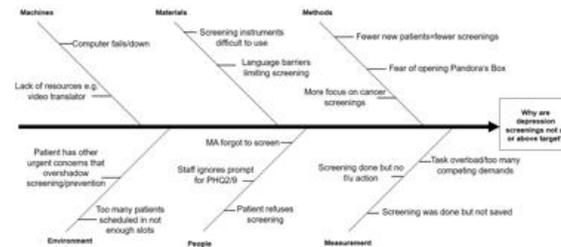
Baseline: Although we were above target in prior years, a decline began at the end of 2018, ultimately hitting our lowest level of 37% in June of 2019. (Data was not collected for half of 2018.) Nov. 2019 baseline = 52%



Summary: UDS requires annual Depression Screening using validated instrument for all patients ages 12 and older served by FQHCs, and follow-up plan documented if screening is positive. We noticed Depression Screening scores fell dramatically between 2018-2019 and via a quick-win DMAIC project reversed the trend from a baseline of 52% to 67% and continue toward the goal of 75%

Analyze: Root cause analysis was performed using a **fishbone diagram**.

Several leading causes for the decline were uncovered.





Reducing Approval Cycle Time on Special Funding Process
 Temisha Budden, PA-C
 Sandhills Medical Foundation, Inc.
 Sumter, SC



Healthcare Lean Six Sigma

Control: Prior to roll out of the final process, updated fillable pdf request forms were sent to all clinicians with instructions on how to complete the form and how to submit requests. Dummy “testing” emails were sent to the committee members with instructions on how to open the email and click the “voting” option. Screen shots of each step were included in the email for visuals.

Before it was taking anywhere from same day response to **up to 7 days** to respond. **After**, responses were received immediately upon opening email which have been **no longer than 24 hours**. **Before** a minimum of **10 sheets** of paper per requests were being printed. **After** a minimum of **1 sheet** is being printed

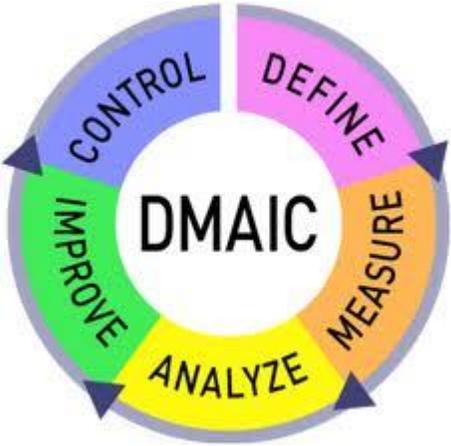


Define: Committee members where complaining too many requests were being sent and too much paper being wasted printing out requests for review. It was taking up to a week to receive responses from committee members. The expectation was a response w/in 72 hours for standard requests and w/in 24 hours for urgent requests. We failed to meet the expectation. **Goal was to reduce amount of paper being printed and respond to request within 72 hours of receipt.**

Improve: Using brainstorming, we created several solutions and discussed with the IT department to see which would be the best option for a “quick win”. The solution was to convert the document in to a “fillable” pdf file for those making the request, then utilize the Outlook software to create emails using voting buttons for responses. Each committee member would be able to review the request submitted via email and respond immediately using the voting options: 1. Approve 2. Disapprove or 3. Need More Information. The responses would be automatically directed to the sponsor of the email. Once all responses received by sponsor, an email would be forwarded to the CMO for final approval from the CEO

Automated Voting

Fillable PDF



Measure: Y= Approval cycle time.

Baseline: (Committee Response to Requests)
 Range: .25-7 days

Target: ≤ 3 days

Multiple past requests were reviewed to determine the range of approval times.

Summary: Committee members were feeling overwhelmed and frustrated with the amount of requests and papers to print	BEFORE:	AFTER:
	Time: .25-7 days	0 – 1 days
By following the DMAIC method, we were able reduce approval cycle time to less than 24 hours with a no-cost solution, reducing wasted paper and obtaining immediate responses to requests. This should lead to improvements in both clinician and patient satisfaction	Paper: 10 sheets	1 sheet

Analyze: We found it was taking longer for some to review requests due to:

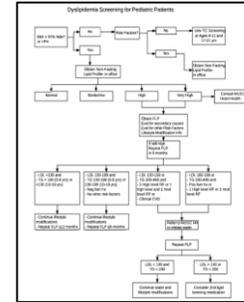
- overabundance of emails and requests getting “lost” in the shuffle
- committee members being out of the office with limited access to emails and work day schedules
- the amount of requests received varied from week to week

Control: In order to ensure we held the gains on these results going forward we will:

- Announce cholesterol screening rates monthly to practice providers
- Query providers for feedback on process monthly for 6 months
- Implement recommended updates/changes from providers

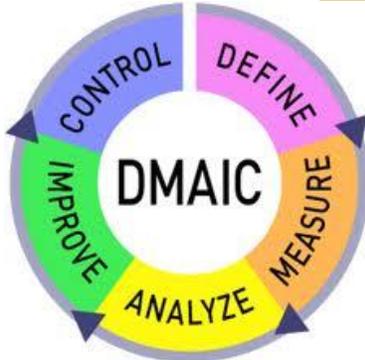
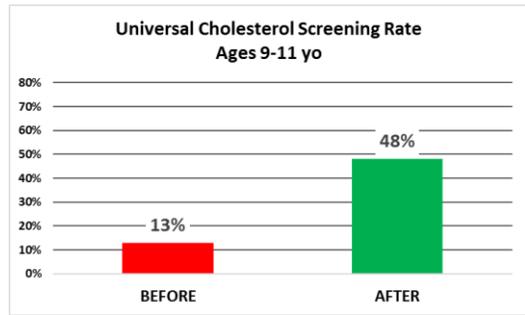


Define: Elevated cholesterol in pediatric patients can impact their future health and is often hard to detect. Our practice implemented a screening protocol aligned with AAP guidelines. **Goal: To increase the % of eligible patients screened.** We created a *SIPOC* and a detailed *process map*. Additionally, we looked at the *Voice of the Business* to improve the process.



Improve: To improve the follow-up rates we implemented the following changes and realized an improvement from 13% to 48%:

- Created/delivered educational update for Providers and MAs
- Simplified clinical decision-making flowchart with MUSC HH Program
- Created new reminder flag in EMR



Measure: Y = % eligible patients screened

Baseline: 13%

Target: 35%

We completed a Cause & Effect (Fishbone) Diagram to determine which factors (X) may be impacting the problem.

Summary: By following the DMAIC method, we improved the pediatric cholesterol screening rates from 13% to 48%, exceeding our goal of 35%.

This can help lead to better future health for our patients

Analyze: In studying the potential X-Factors that caused the screening levels to be less than desired, we determined the most likely *root causes* to be:

- Providers: Current guidelines confusing and controversial
- Medical Assistants: Focus on vaccines, not screening prior to provider evaluation