Using Six Sigma Methodologies to Find a Solution for Increasing Training Completions

Eunice Ndungu, Merck, North Wales PA
Shazia Khawaja, Merck, North Wales PA
Janet Low, Merck, North Wales PA
Steve Miola, Merck, North Wales PA

ABSTRACT

All company strategies require training at some point. Failure to ensure that training is completed may jeopardize the successful execution of those strategies. The goal of this paper is to share a practical application of six sigma principles. It will discuss how the use of six sigma methodologies resulted in a high impact low cost approach to increasing training completion rates to at least 95%.

1. INTRODUCTION

Under the current system of determining training completion, percentages were not uniformly at an acceptable level. In one random sample, the percent completion ranged from 73% to 104%, indicating non-completion and/or calculation errors. In addition, courses that needed to be taken for particular job roles were not well-defined nor was there a consistent process to register, track, calculate and report training completion. This paper will demonstrate details of Six Sigma methodology in finding a solution to problems identified by customers.

2. METHODOLOGY

The Six Sigma DMAIC (**D**efine-**M**easure-**A**nalyze-**I**mprove-**C**ontrol) problem solving methodology was used. These five phases guided the team from defining the problem, identifying root causes and solutions linked to the underlying causes, to implementing and sustaining the solutions.

2. a. DEFINE PHASE

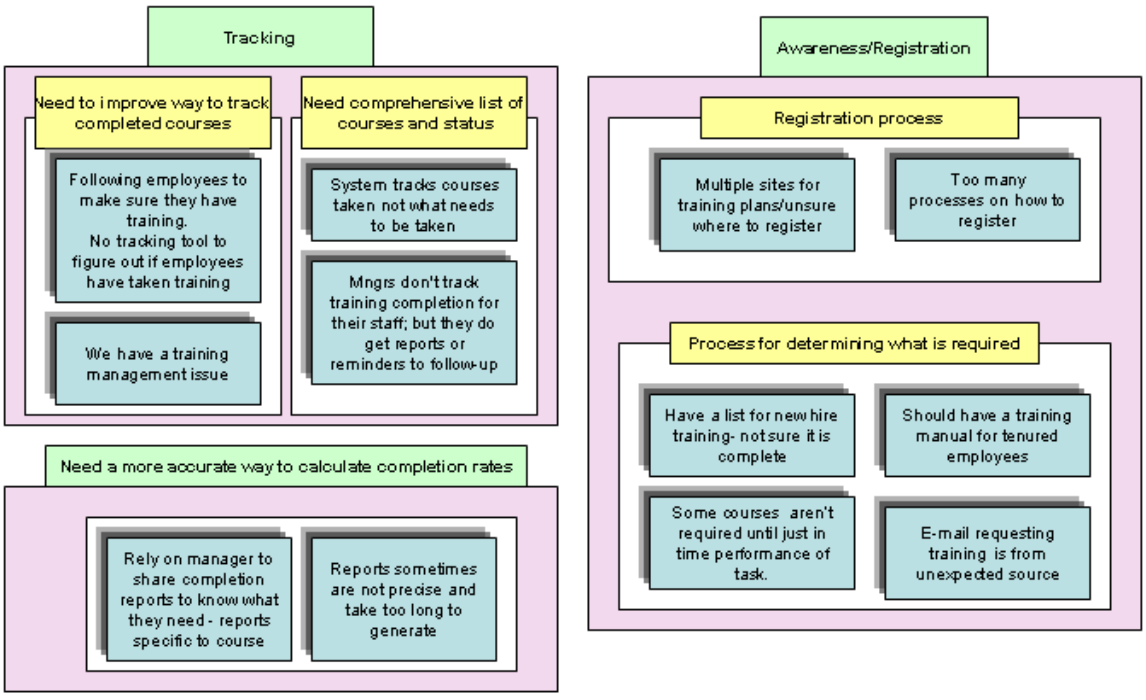
In the Define phase, the team completed a project charter that specified the project's Business Case, Problem and Goal Statements, Scope, Timelines, Project Plan, Risks and Constraints. Other deliverables were the SIPOC (Supplier(s), Inputs, Process, Output, Customer(s)) and the VOC (Voice of the Customer). The SIPOC is a high level diagram that displays key process information, including the identification of Scope and Boundaries and also confirms that all project inputs and outputs are accounted for within the process. In the VOC, we collected and categorized responses from those customers identified in the SIPOC. The responses were gathered from historical data, surveys and direct meetings with the customers. Below is an example of a SIPOC Map and analysis of VOC.

SIPOC Map

Suppliers	Input	Process	Output	Customer
• Upper Management • Department Training contacts (training coordinators) • Trainers • Various depts • Course developers	• Training database Training plan • Request received • Course itself	• Start: Awareness of required training • Seek out training • Register • Begin training • End: Complete training	• Completion measure • Training records	• US employees • Non-US BARDS employees • Upper Management • Auditors (internal or external)

From the VOC, we organized quotes into themes (affinities) that were used to develop CTQ's (Critical to Quality) requirements. See example below. CTQs are functional requirements that are measurable.

Analyzing VOC using Affinity Diagrams



The following three measurable Key Output Characteristics (CTQs) that were important to customers were identified:

1. Achieve a knowledge rating between 2 and 3 on a knowledge survey (tracking) indicating that customers know what courses to take and how to track their attendance

2. Reduce number of possible paths to registration from over 30 to fewer than 10 (registration)

3. Reduce turn around time by at least 50% to produce accurate reports and calculate training completion percentages per course for all 5 functional areas; <3minutes per course to produce reports (Calculate completion rate)

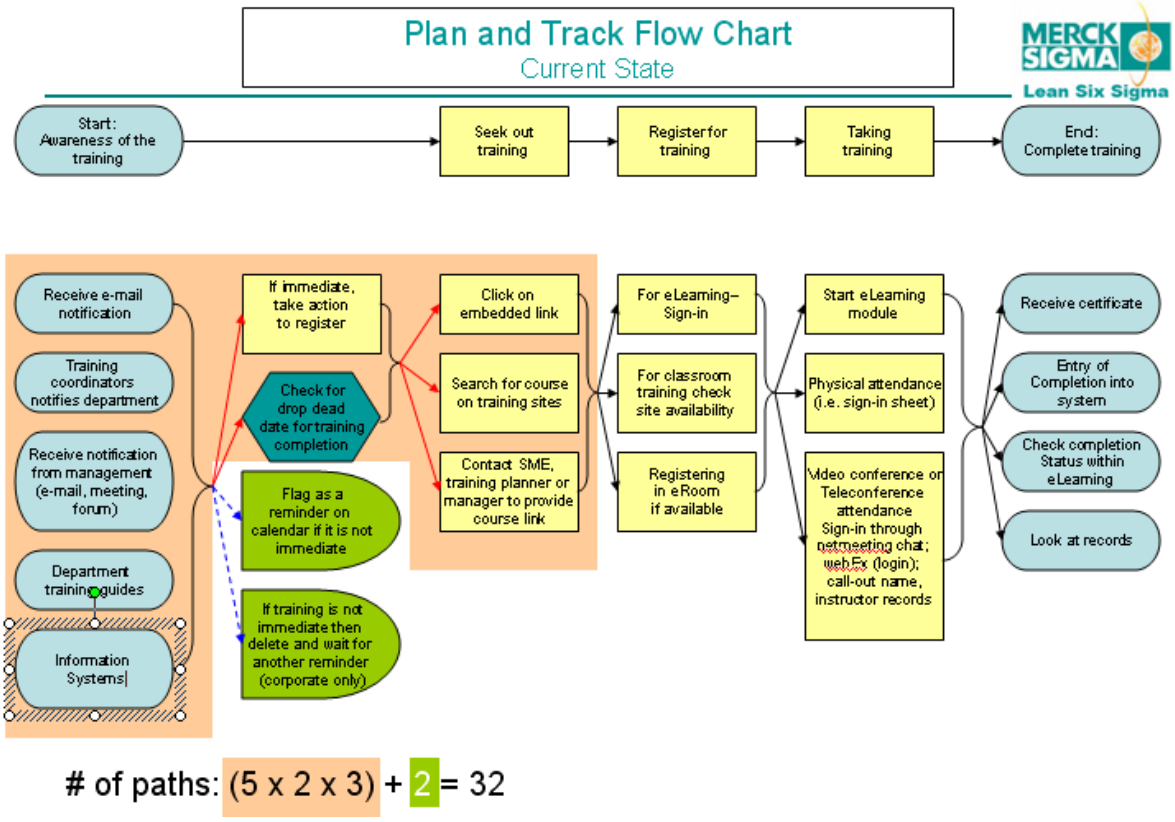
These customer requirements are specific, measurable and convey customer needs, and not solutions.

2. b. MEASURE PHASE

This phase was used to gain a deeper understanding of the current process. We collected baseline data of critical inputs and outputs that would be used to measure defects, variation and the Process Sigma, which is an overall measure of variability in our current process. The measurement system that would be employed was also validated. This phase produced the following deliverables:

Current State Value Stream Map

We developed the detailed process map below to help us identify underlying root causes.



We learned that our customers were confused by the variety of ways they were contacted about a required course. Once made aware that they had to take a

course, moreover, they had difficulty finding that course and registering for it. It is important to note that at this point we understood that their non-completion was not a matter of attitude, that is, their resistance to taking the course; rather, it was a problem with the process itself.

Data Collection

To collect data for the 3 main CTQs that were identified in the Define phase, we developed a data collection plan for each. We also defined the Operational Definition for each of the plans. These are clear and precise instructions on how to collect and measure data so that the process is repeatable and reproducible, regardless of who is taking the measurements.

Data Collection Plan for Tracking Training Completion

- Sample a minimum of 10 employees and gauge their knowledge level on tracking their training courses using the measurement scale below. This would be done pre and post improvement.

  0 = Don't know how to do this
  1 = Able to get limited results
  2 = Can get most of the results (i.e. missing one or 2 courses)
  3 = Can get all results

Data Collection Plan for Registering for Courses

- Poll a minimum of 20 employees and ask them to count the number of paths it takes to determine what training they need to take. This would provide a measure for the number of ways people are informed of courses and take subsequent actions. Perform this pre and post improvement.

Data Collection Plan for Obtaining Training Completion Percentages

- Sample real data from a course offered in a specific functional area and, record the number of minutes it takes to generate accurate training completion reports.

Measurement System Analysis

To ensure accurate, reliable and consistent data, we performed an analysis of the measurement system to ensure that any differences identified in the output measurements were due to actual difference in units being measured and not due to variation in the measurement method itself. We used a measurement type called Gauge R&R (Gauge Repeatability and Reproducibility). This best fit our process of having 4 operators (codes) repeatedly taking different measurements.

To validate our measurement system, we sampled 10 courses (two per functional area (FA)) – see chart #1. Four operators measured completion in randomized order – see chart #2.

A total of **794 training records** were examined within 5 FAs: 52 (FA-V) + 121 (FA-W) + 129 (FA-X) + 77 (FA-Y) + 18 (FA-Z) = 397 x 2 (two courses per FA) = 794.

Chart # 1

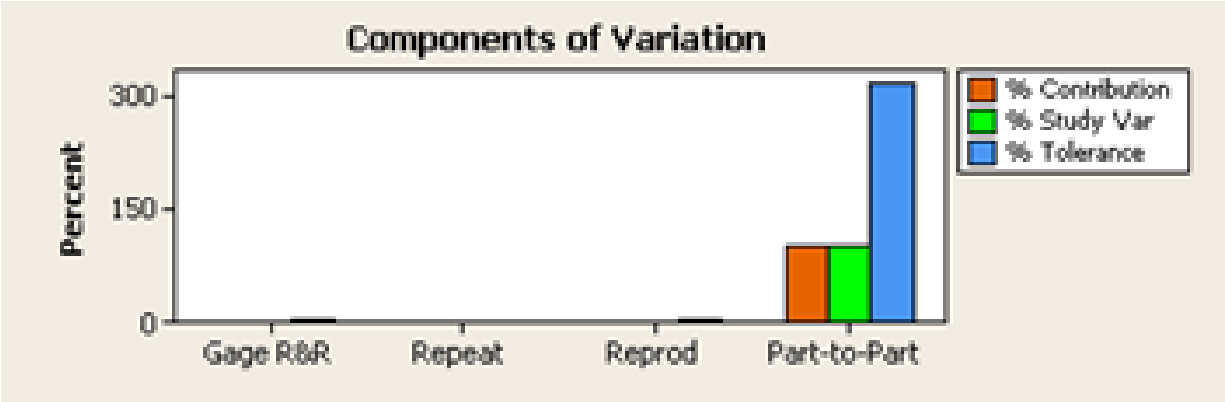
No.	Course Title	Training Completion				
		FA-V	FA-W	FA-X	FA-Y	FA-Z
1	A			F		
2	B		D			
3	C					J
4	D		C			
5	E					I
6	F				H	
7	G	A				
8	H				G	
9	I			E		
10	J	B				

Chart # 2

		Operator 1	Operator 2	Operator 3	Operator 4
A	1	A	D	E	F
B	2	J	G	B	H
C	3	B	C	F	A
D	4	C	I	I	C
E	5	H	E	G	J
F	6	G	F	H	D
G	7	E	A	A	I
H	8	F	H	C	B
I	9	D	J	D	G
J	10	I	B	J	E

Gage R&R for Completion

In the chart below, the taller part-to-part bars confirmed that most of the variation is due to true difference in the completion rates of the courses and not due to Repeatability (differences due to a single operator) or Reproducibility (differences due to different operators measuring the same item).



The Study Variation below supports further that the measurement system will meet its expected performance

Gage R&R

Source	VarComp	%Contribution (of VarComp)
Total Gage R&R	4.79	0.42
Repeatability	0.00	0.00
Reproducibility	4.79	0.42
Code	0.00	0.00
Code*CourseCode	4.79	0.42
Part-To-Part	1146.27	99.58
Total Variation	1151.06	100.00

Upper process tolerance limit = 100

Source	StdDev (SD)	Study Var (6 * SD)	%Study Var (%SV)	%Tolerance (SV/Toler)
Total Gage R&R	2.1884	13.130	6.45	22.68
Repeatability	0.0000	0.000	0.00	0.00
Reproducibility	2.1884	13.130	6.45	22.68
Code	0.0000	0.000	0.00	0.00
Code*CourseCode	2.1884	13.130	6.45	22.68
Part-To-Part	33.8566	203.140	99.79	350.85
Total Variation	33.9273	203.564	100.00	351.58

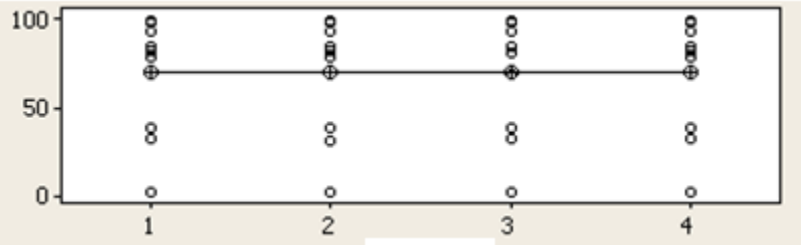
Number of Distinct Categories = 21

The % Study Variation is < 10% so the measurement system is good, i.e., little variation is due to measurement system itself; most is true variation among courses.

Completion by Operator

This chart shows that each of the four operators obtained similar completion percentage calculation for each course as the other operators.

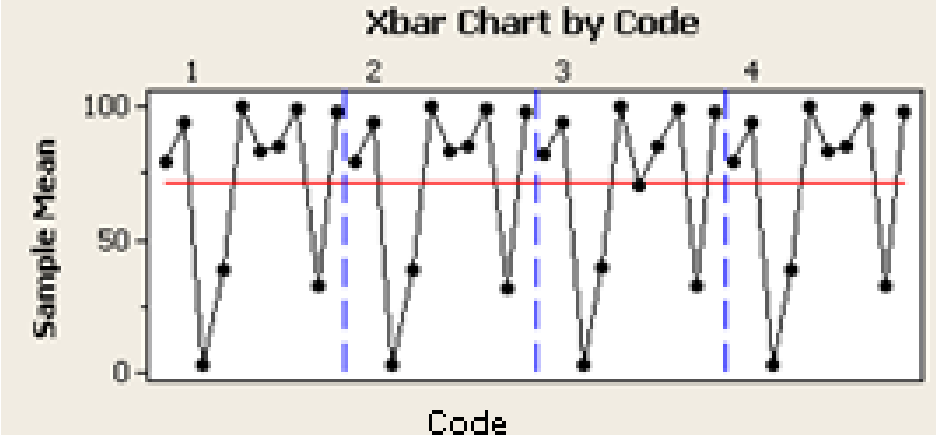
Completion Percentages by Operator



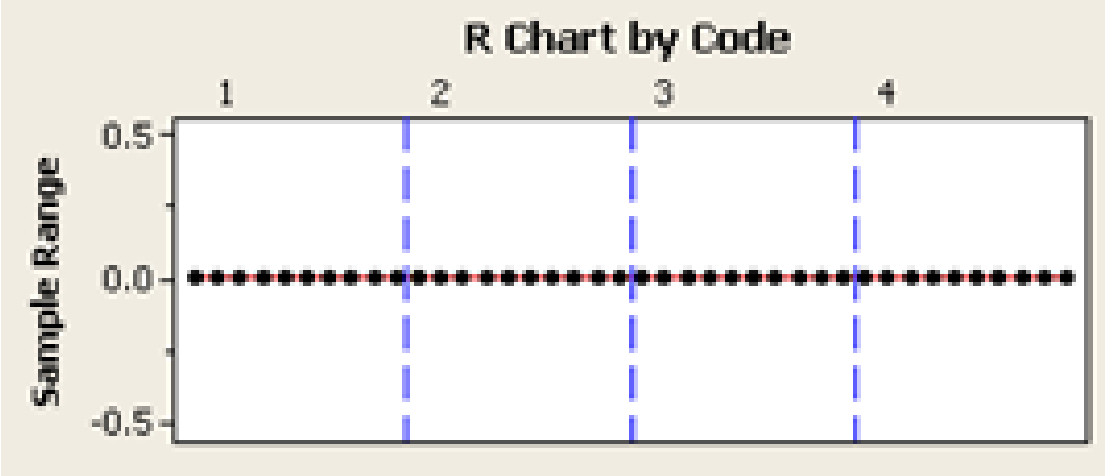
Operator

Reproducibility

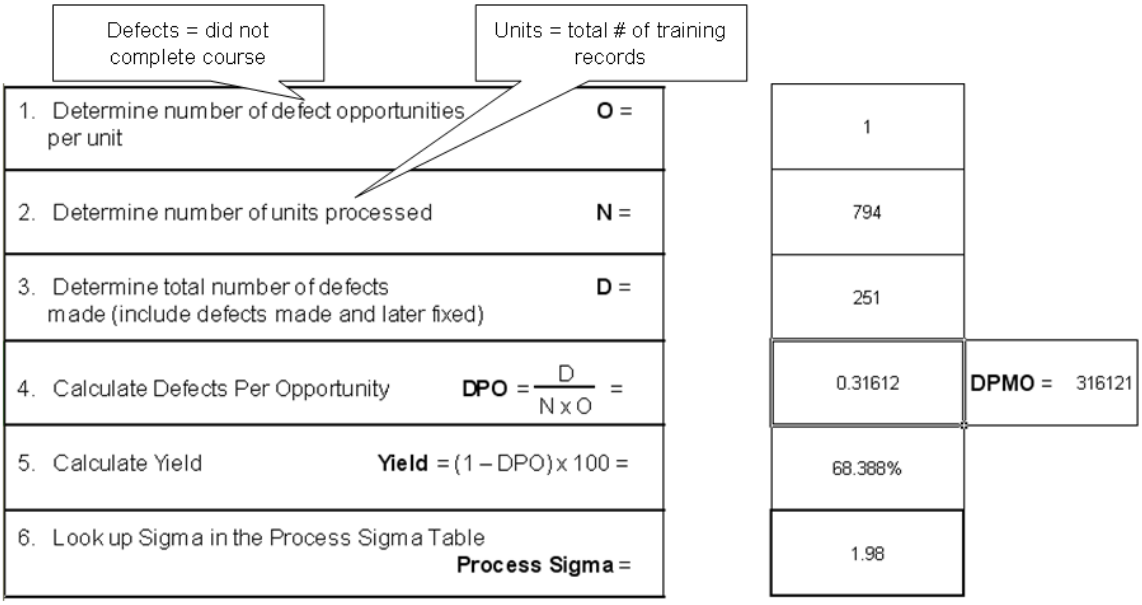
In the graph below, it is evident that there is no significant difference in the data produced by each of the 4 operators (code) while measuring the completion rates of 10 courses.



Repeatability
This chart shows that there is not much variation in repeated measurements made by the same operator on the same course.



Baseline of Current Process Performance
Using data collected from the current state, we calculated the baseline Sigma value.



2. c. ANALYZE PHASE

It is in the Analyze phase that we identify and verify key potential root causes.

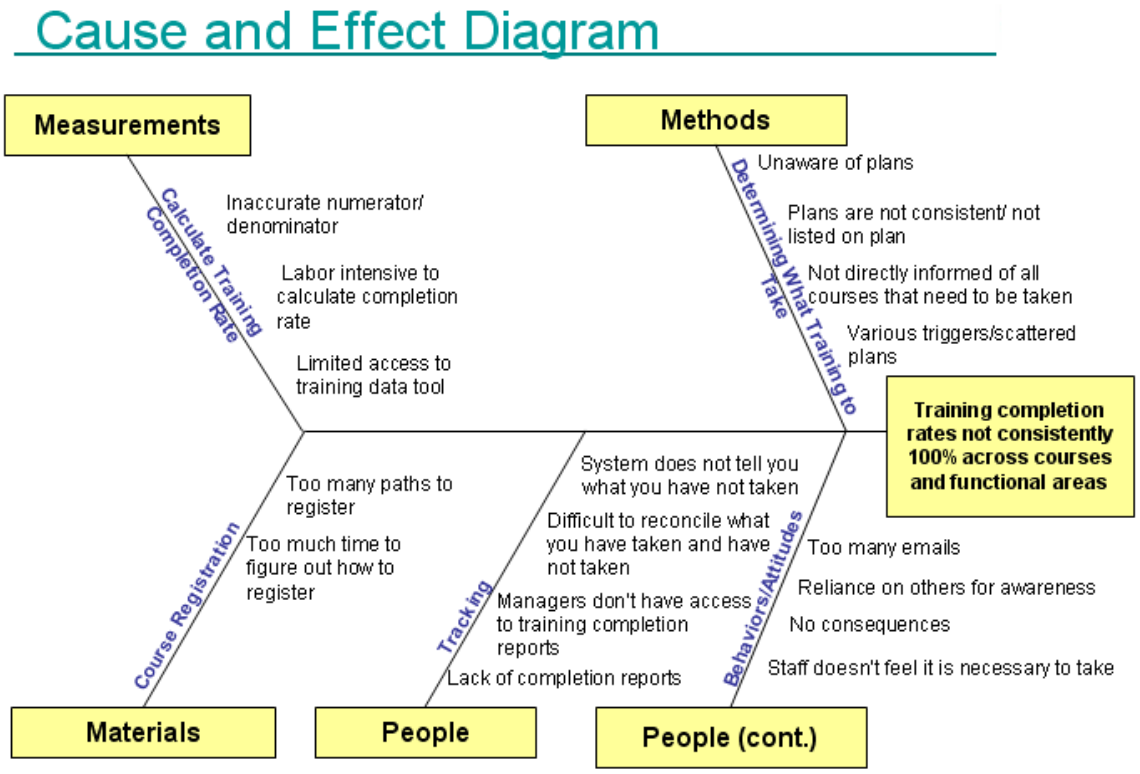
Cause and Effect (Fishbone) Diagram

This approach ensures that no key root causes are overlooked. We used a tool called 5 whys. We picked each cause from the Fishbone diagram below and asked why that was happening. We continued drilling down until we got to the root cause.

A root cause can be reached in less than five steps.

Example
"Why was student held back?"… Because he failed his exams…
"Why did he fail his exams?"… Because he could not read…
"Why couldn't he read?"… Because he is legally blind…

Here, blindness is the root cause



Details of how we applied the 5 Whys in this project are presented after the Cause and Effect matrix below.

Cause and Effect Matrix

In order to identify the key process inputs from VOC (column2 below) that needed to be addressed, we rated all the inputs against the CTQs based on the strength of their relationship. Higher scores on the last column depict what matters most to the customers. Higher totals on the last row reveal the relative importance of the CTQ to the customer.

0 = Does not affect CTQ at all 1 = Has a slight affect on CTQ 3 = Has moderate affect on CTQ 9 = Has a large affect on CTQ		Training completion should be 100%	Simple way to determine what training to take and register	Quick and accurate way to calculate training completion	Ability to track	
CTQ Scale: 6 = High; 0 = Low		6	6	4	5	
Process Inputs		Y	CTQ1	CTQ2	CTQ3	Total
1	Current system does not tell you what you have NOT taken	9	9	0	9	153
2	Unaware of plans	9	9	0	1	113
3	Not directly informed which courses to take	9	9	0	1	113
4	Lack of training completion reports	9	1	0	9	105
5	Managers don't have access to training completion reports	9	0	0	9	99
6	Inaccurate numerator/denominator	9	0	9	1	95
7	Too many paths to register	3	9	0	0	72
8	Plans are not consistent/not listed on plan	3	9	0	0	72
9	Staff doesn't feel it is necessary to take	9	0	0	0	54
10	No consequences	9	0	0	0	54
11	Labor intensive to calculate training completion	0	0	9	3	51
12	Limited access to training system	0	0	1	9	49
13	Labor intensive to reconcile courses on plan vs other sources	0	0	0	9	45
14	Various triggers/scattered plans	3	3	1	0	40
15	Too many emails	1	3	3	0	36
16	Too much time to figure out how to register	3	3	0	0	36
17	Reliance on others for awareness	3	1	1	0	28
Total		528	336	96	255	

For each of the key CTQs we drilled down further to identify root causes.

CTQ1: Determining What Course to Take / Course Registration

1. Why?

Staff largely unaware of various plans

- Unaware that 3 plans exist
- Never directly informed of these plans

2. Why?

- Staff seems to be more reliant on emails, especially from training completion tracking groups

3. Why?

Emails provide active information and convey a sense of urgency as opposed to plans which are passive

- Emails not sufficient: Staff received email notification on only 10/18 of courses
- Email notifications are unpredictable and only pertain to one course at a time

Conclusion: Need to create a single training plan and inform staff

CTQ1: Determining What Course to Take / Course Registration

1. **Why?**

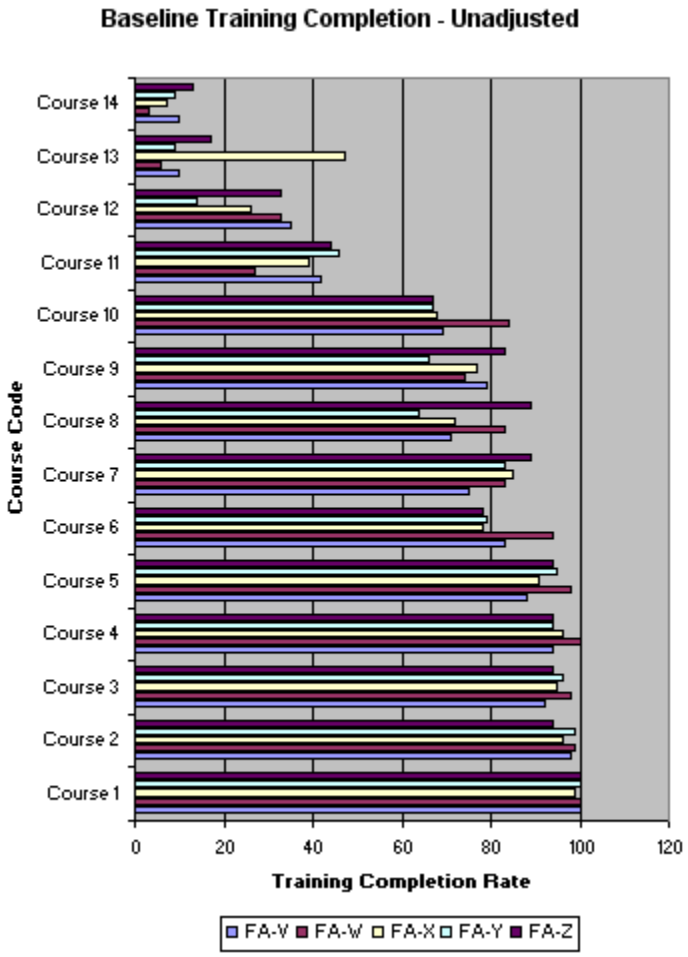
Too many paths to register

- There are 32 different paths one can take from awareness to seeking out training

Conclusion: Need to reduce the number of paths

CTQ2: Calculate Training Completion, Current

Non-target audience for a certain course inflated the numerator if they took it. We verified that employees took a course that was not for their job role (Course 3 below). Some staff also took a course that was not targeting their grade (Course 4).



C**TQ2: Calculate training completion rate, revised calculation**
Job Role Specific Course
Here, the targeted audience was identified only in the title of the course and not on the plan. When we reran the report manually filtering on targeted audience, the completion rate increased from 37 to 97%.
Interestingly, a total of 82 non-target audience completed this course but shouldn't have.

Grade Level Specific Course
When we reran the report manually filtering on the specified grades, the percentage training completion increased from 83 to 97%

Conclusion: Need to improve how calculations are performed

CTQ3: Tracking

1. **Why?**
   - Current reports are incomplete

2. Why?
   - Current system only provides listings of courses completed but not those that were NOT completed
   - Current reports do not identify which courses need to be taken.

3. Why?
   - Because there are no training completion reports readily available
   - Individuals must perform a manual process of matching plans to course completion reports
   - Managers have no way to track completion for their group unless they figure out a similar manual process
   - Available upon request only and requests occur infrequently

Conclusion: Need to know what you have and have not taken

SUMMARY
How and why does the following impact training completion:
1. Determining what needs to be taken
Inconsistent plans impact training completion percentage:
   - For those courses that are not on all plans (n=10), the completion rates varied (7-96%)
   - For those courses that are on all plans (n=4) the completion rate was high (94-99%)

Proactive notification impacts completion percentage:

- Those courses for which emails were sent directly to the audience (n=8) with an embedded link, the completion was high (73-96%)
- Those courses for which emails were not sent directly to the audience (n=7) with an embedded link, the completion varied (7-96%)

2. Calculate completion
    - After adjusting the denominator to account for the correct target audience, completion score rose to 97% for both courses
3. Tracking
    - There is a need to inform the staff what courses need to be taken and that they have and have not taken
    - Time consuming; error prone; confusion about which plan is the appropriate one to use
    - No opportunity for managerial enforcement due to lack of reports
4. Course Registration
    - People need a straightforward path from awareness to registration
    - Can quickly register if they are told they must take a course and that course is available
    - If not told they must take a course and it is not available

2. d. IMPROVE PHASE

In this phase, the team generates several solutions and uses Sigma tools to select those that will best satisfy the customer and be easy to implement. The selected solutions are then piloted and the results used to create improved process maps and to demonstrate improvement from baseline. The following are the deliverables:

Solution Selection

Our solution should answer the following questions:

- How can we improve awareness to staff of what is needs to be taken and reduce the number of paths to registration?
- How can we be sure that the calculations of training completion are less time consuming and accurate?
- How can we be sure that everyone can track which courses they have and have not taken?

We generated nine potential solutions (options) through brainstorming. Some of these solutions, however, addressed only one or two of the CTQs

Option #1	Appoint Training Coordinators per functional area who are trained on what resources are available; proactively communicates to staff location of plan and any changes to it; develop job aids for them to calculate training completion and grant access to system tool to generate attendance reports
Option #2	Identify training website as the single source/plan
Option #3	Create the plan that is maintained by training planners including rationale and independent from training website
Option #4	Send a list of courses that need to be taken and where to register, to managers periodically
Option #5	Place a link on the Department web site
Option #6	Instruct managers to review the courses in their mid-year, end-of-year, and status meeting discussions with direct reports; Managers have in their objectives the task to track their staff's training completion to 100%
Option #7	Automate training completion calculation and report generation with supplemental software
Option #8	Publish quarterly reports to all staff identifying who has/has not taken which courses (attendance reports)
Option #9	Develop a "self-serve" resource so that staff can see their training completion profile

We then employed a Pugh Matrix to visually see the strengths and weaknesses of each option. This is an iterative process designed to help assess the solutions, resulting in a few strong solutions

The Criteria that we used consisted of the previously identified CTQs plus any other characteristics of the solution that we believed should be considered based on the voice of the business and insight into the problem, e.g., independent of which system tool is available, adaptive to staff changes.

We chose our current state process as our baseline (datum) for comparison. The list of the other alternative solutions was listed across the top of the matrix. We rated each of the solutions based on their positive, negative or neutral effect on the CTQs

Pugh Matrix First Iteration

Critical to Quality	Datum	Option1 Current state	Option2 Appoint Training Coordinators	Option3 Training site as only plan source	Option4 Create new plan	Option5 Send list to Mgrs	Option6 Link from dpt website	Option7 Mgrs ' PPG	Option8 Automated reports	Option9 Quarterly reports Self-serve reports
Simple way to determine what needs to be taken	S	+	-	+	+	+	+	s	+	s
Quick & accuarate way to calculate training completion	S	+	s	s	s	s	s	+	+	+
Ability to track	S	+	s	s	s	s	s	+	+	+
Simplified method to register for courses	S	s	s	+	s	s	s	s	s	s
Staff motivated to take courses	S	s	s	+	+	s	+	+	+	+
Independent of tool	S	+	s	s	s	s	s	+	s	+
Adaptive to staff changes	S	s	s	s	s	s	s	s	s	s
Clear ownership of process from awarness thro' tracking	S	+	-	+	+	s	+	s	s	+
Ability to expand to functionally required courses	S	+	s	+	s	s	s	s	s	+
Capable of dealing with a dynamic set of courses that need to be taken	S	+	s	+	s	s	s	s	s	+
	Sum of +'s	**7**	**0**	**6**	**3**	**1**	**3**	**4**	**4**	**7**
	Sum of -'s	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	Total Score	**7**	**-2**	**6**	**3**	**1**	**3**	**4**	**4**	**7**

Pugh Matrix Analysis

We brainstormed the positives and negatives of each option. Weak solutions were decomposed and their strong parts combined with other solutions. The solutions that were not practical or did not add value relative to the CTQs were dropped. The table below gives more details of the activity

	Option	Analysis	Action
#1	Appoint Training Coordinators	**Strong positives that address every aspect of solution as defined by CTQs. Does not address the creation of a training plan or reinforcement of attendance**	Combine
#2	Training web site	**Negative scores imply that the solution is less desirable than the current state because current state already includes training plan among other valuable resources**	Drop
#3	Create new plan	**Plan is locally relevant and positions us to develop plans for all courses. Also provides clear ownership of the process and employee motivation. However, it does not calculate training completion or provide a tracking mechanism for individuals.**	Combine
#4	Send list to Mgrs	**Identifies managers as key players in the success of the solution. Provides active communication of what needs to be taken. However, it does not address training completion and tracking.**	Combine
#5	Link from dept. web site	**It is easily and constantly accessible. However, it does not address training completion and tracking and may cause confusion**	Drop
#6	Mgrs objectives	**Managers are accountable and measured for their staffs' training completion. Not considered substantially better than current state.**	Combine
#7	Automated reports	**Will provide standardized report generation, efficiency in training completion calculation as well as a tracking mechanism. However, it does not help determine what needs to be taken and resources currently not available**	Combine
#8	Quarterly reports	**Able to address tracking and identification of courses that need to be taken, but is not a readily available way to calculate training completion.**	Combine
#9	Self-Serve reports	**Although this option tells us that individuals need to have access to their own profiles, it does not address the awareness and registration. Not feasible for short-term implementation. Resources not available now but anticipated in the near future.**	Drop

In the second Pugh matrix iteration, we further enhanced the positives and eliminated the negative, resulting in four options.

Solution Selection

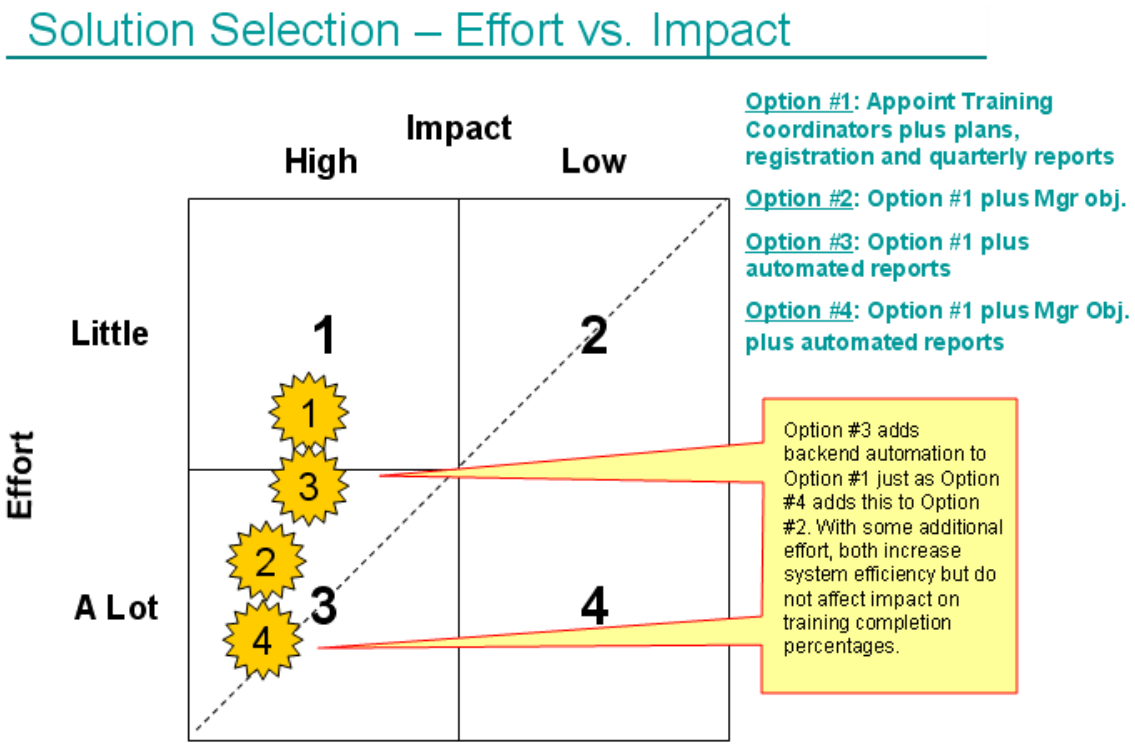
Pugh Matrix

Analysis

Datum	Appoint Training Coordinators per functional area who are trained on what resources are available; proactively communicates to staff location of plan and any changes to it; develop job aids for them to calculate training completion and grant access to tool to generate attendance reports
Option #1	Appoint Training Coordinators per functional area who are trained on what resources are available; maintain function-specific training plan; proactively communicates to staff location of plan (which includes where/how to register) and any changes to it; develop job aids for them to calculate training completion and grant access to tool to generate attendance reports that are issued quarterly to staff or as needed
Option #2	Option 1 plus Mid, End of year, and Status mtgs: Managers have discussions with reports to review what needs to be taken; Managers have objective to track their staff's attendance to 100%
Option #3	Option 1 and Automate training completion calculation and report generation with supplemental software
Option #4	Option 1 + Mid year + Automated training completion calculation

Effort vs. Impact

The four solutions were further evaluated using the Impact vs. Effort tool. This would help us prioritize the implementation of the solutions. A solution with high impact and low effort would be optimum.



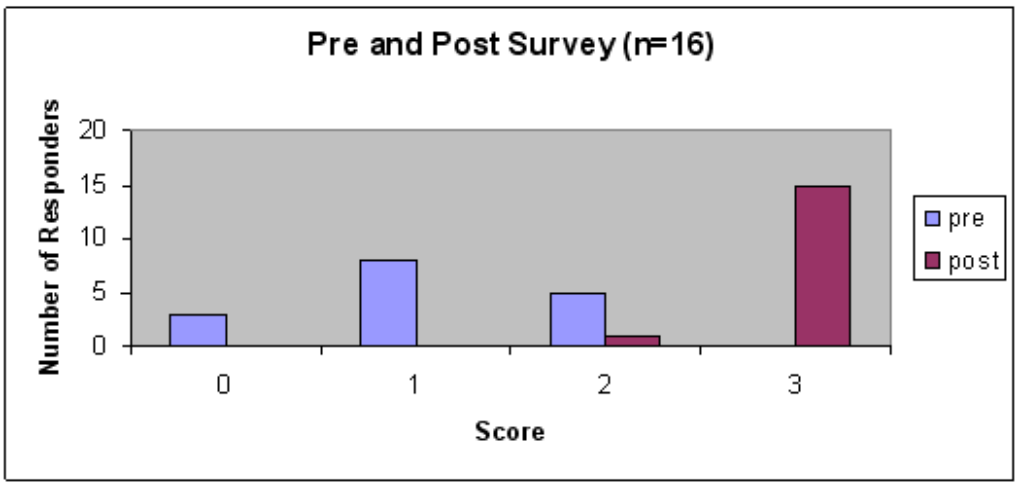
Pilot Results

To perform a pilot test of option #1, we selected courses that had a training completion rate of less that 95% at baseline. We sampled employees who had not taken the course. The results of the pilot showed that completion rose to targeted level.

Course	Functional Area 1		Functional Area 2*	
	Baseline	Final	Baseline	Final
A	79%	98%	77%	94%
B	69%	98%	84%	92%
C	83%	98%	94%	98%

*Several individuals were involved with a high priority filing during the time of the pilot and were unable to complete the course during the pilot

On the ability to track, pre and post pilot results show that success was achieved as shown in the graph below.



Success is defined as '3', 94% (15/16) attained goal in post survey

All showed improvement from pre score and this was statistically significant (p<.01) using the Sign test.

0=Don't know how do this
1=Able to get limited results (4 or less courses)
2=Can get most of the results
3= Can get all results

Demonstrate New Process Capability

As shown below, statistical tests on before and after assessment data confirmed that the pilot made a significant difference in training completion rates.

	Defects	Units	Opportunities	DPMO	Sigma
Baseline (Before Project)	251	794	1	316121	1.98
New (After Project)	21	506	1	41502	3.23

C1-T	C2	C3
Pilot	Defects	Completion
Pre	251	543
Post	21	485

Categorical Test

Chi-Square Test: Defects, Completion

Expected counts are printed below observed counts
Chi-Square contributions are printed below expected counts

	Defects	Completion	Total
1	251	543	794
	166.13	627.87	
	43.358	11.472	
2	21	485	506
	105.87	400.13	
	68.036	18.002	
Total	272	1028	1300

Chi-Sq = 140.868, DF = 1, P-Value = 0.000

2 Proportions (Test and Confidence Interval)

Summarized data

	Events:	Trials:
First:	251	794
Second:	21	506

Test of Proportions

Test and CI for Two Proportions

Sample	X	N	Sample p
1	251	794	0.316121
2	21	506	0.041502

Difference = p (1) - p (2)
Estimate for difference: 0.274619
95% CI for difference: (0.237905, 0.311333)
Test for difference = 0 (vs not = 0): Z = 14.66 P-Value = 0.000

Fisher's exact test: P-Value = 0.000

H_0=There is no difference between the baseline and the new Process Capability

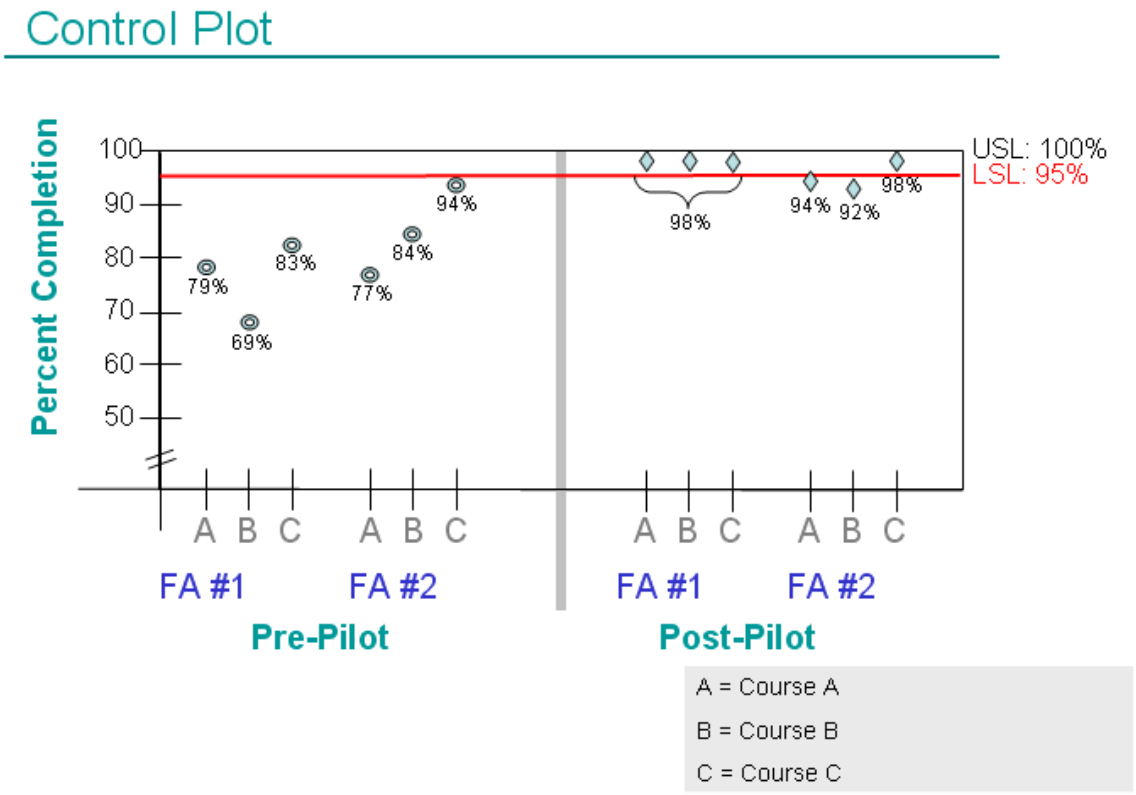
H_A = There is a difference between the baseline and the new Process Capability

FMEA
In order to identify and mitigate risks to the implementation of our solution, we performed the Failure Modes and Effects Analysis (FMEA). We identified specific failure modes and potential effects of failure. We then rated these in terms of the likelihood of occurrence and detection and the severity of a failure should it occur. Some risks identified were:

- Failure to follow TC job aid, resulting in inaccurate training completion reports
- Failure of TC to update training plan with new training information
- TC does not receive notification of what courses need to be taken

2. e. CONTROL PHASE

Control Plot
Using McNemar's test for discrete data, we observed that the increase in training completion percentages for all six comparisons were statistically significant (noting p=.07 for Functional Area (FA) #2 C) below.



Control Plan

To ensure that we sustained our gains from implementing the optimum solution, we developed a control plan for monitoring the risks identified in the FMEA. Specific actions in column eleven below, would be taken if the metric identified in column one was not within the expected range in columns four and five.

			Spec/ Req								
Metric	Unit of Measure	Specification Characteristic	USL	LSL	Measurement Method	Sample Size	Frequency	Who Measures	Where Recorded	Decision Rule/ Corrective Action *	SOP Reference
Calculating Training Completion	minutes	time it takes to define the course & the target audience, generate reports and calculate training completion	2.5 minutes per course	1 minute per course	time from "select report" to "Run Report"	# of functional areas X each course	quarterly	TC's	Posted in issue log on team site	Retrain (retake eLearning)	Job Aid for TC's
Tracking	Categorical scale of knowing how to track: 0=Don*t know how do this; 1= Able to get limited results; 2=Can get most of the results; 3= Can get all results	measure of non-awareness of TC role and plan among new hires	3 on scale	2 on scale	Test pre and post score by asking how to find plan and examiine their training record	every new hire	yearly	TC's	Posted in issue log on team site	Train them how to access training plan and retrieve training records	Job Aid for TC's
Failure of TC to update the plan and notify the new courses	# of courses that need to be taken but are not included in plan	# of missed courses that need to be taken but are not included in plan	0	0	Cross-reference against other FA training plans	all courses that need to be taken	quarterly	TC's	Team Site	Email staff regarding new course that needs to be taken and update plan	Job Aid for TC's
Generating correct training completion report using correct denominator and numerator	Match between the right people for the intended population and population is correct.	Correct number of people of denominator and numerator	Absense of errors in the denominator	Absense of errors in the denominator	Cross-reference attendance reports against staff listing	intended course population	quarterly	TC's	folder in TC's team site	Fix the mistake and verify staff listing and recalculate training completion	Job Aid for TC's

3. CONCLUSION

After discovering that our department's percent completion for required courses was not at an acceptable level, we defined our project to address the underlying causes of both attendance and metrics. Applying Sigma methodology, we identified awareness gaps, process flaws, lack of tracking tools, and calculation errors. We addressed each of these causes and demonstrated that our training completion percentages could be raised to over 95%. We developed a control plan to ensure that our solution would be in effect over time.

4. CONTACT INFORMATION

Your comments and questions are valued and encouraged. Contact the authors at:

351 N. Sumneytown Pike
P. O. Box 1000
North Wales
PA 19454-2505
Phone 267-305-6866
Eunice_ndungu@merck.com