







Boston Medical Center **HEALTH SYSTEM**

Boston Accountable Care Organization

BMC's QI Hub is your resource for all things quality improvement.

Visit <u>bucme.org/BMCQIHUB</u> or email <u>QIHub@bmc.org</u> for access to professional coaching, educational tools, support, mentorship, and much more!



Objectives

Faculty and learners will understand the following:	Process
How to identify the categories of cost associated with improvement projects	Understand the dimensions of quality cost in terms of conformance and non-conformance
How to leverage the PAF model to conduct a cost of quality analysis	 Establish assumptions for your analysis Apply specific model to case example from Radiology Identify failure costs through considering the 8 wastes of LEAN
How to communicate cost savings to the organization through graphical display	Pre/Post graphical display of cost savings
The steps in completing a typical COQ analysis	 Identifying, collecting and analyzing data Common Calculations



Methods

- Work with stakeholders to determine the cost items that are within the scope of your improvement work
- 2) Establish your assumptions
- Acquire data that will support costs and assumptions specific to your project
- Conduct a pre-improvement cost analysis, representative of your baseline performance period
- 5) Conduct post-analysis, representative of improved performance period, attributable to your project
- 6) Communicate cost savings to the organization, stakeholders and leadership, including the QI Hub



PAF Model - Feigenbaum



Prevention costs + Appraisal costs + Failure costs = Total COQ

Cost of good quality

Cost of poor quality



Case Example COQ for Improvement Project

Reducing Incomplete Appointments for Cardiac Stress Test in PET/CT

(REST/STRESS MIBI CARDIAC AND REST/ STRESS RB-82 CARDIAC)

Aim *To reduce NM/PETCT stress cardiac incompletion rate to less than 5% by September 1, 2019.



Prevention Costs

 Developing systems, procedures, or communication systems to prevent errors

Appraisal Costs

Activities dedicated to assessing the level of quality/conformance



Prevention Costs (Pre)

None

Appraisal Costs (Pre)

 Cost of analyzing no-show data

Activity-Based

Cost (ABC)

Cost Type

This activity was a part of the original responsibilities of the manager. Salary was estimated with fringe.

Sources: glassdoor

Assumptions

Cost Calculation

Time: 2 hours/mo Hourly rate: \$52.58

2hr*12mo*\$52.58=

\$1,261.97



Internal Failures

- Internal failure cost is the cost associated with failures that are identified before the failure has reached the patient OR before the patient has completed the visit.
- Non-correctable failures not resulting in harm to the patient beyond the patient visit
- System failures that did not result in harm to the patient

Internal Failure Costs (Pre)

Internal	nal Failure Costs (Pre)				
Cost Name	Cost Type	Assumptions	Cost Calculation		
Expired Radioisotope- PET(Rb82)	Supply	Cost based on amount paid per isotope by radiology department. All forgone appointments result in expiration of isotope (24 hour shelf life). Data based on all data per appointment type acquired in FY18. Source: Cost accounting data; BMC Radiology	Appointments per year: 273 Rate of incomplete appointments: 38.76% Cost per isotopes used in visit= \$2,000 273 Appt. * .3876 *\$2000= \$211,629		
			2/0/ pp. 100/0 42000 4220/020		
Expired Radioisotope- SPECT	Supply	" Source: Cost accounting data; BMC Radiology	Appointments per year:809 Rate of incomplete appointments: 28.3% Cost per isotopes used in visit: \$500.00 809 Appt. * .283 *\$500= \$114,473		
Cost of forgone procedure PET	Visit	Cost based on mean actual reimbursement paid to BMC by all payors. Cost of reimbursement for isotope use was removed. Source: EPSI	Appointments per year: 273 Rate of incomplete appointments: 38.76% Mean reimbursement: -\$378.48 273 Appt. *.3876 * -\$378.48= \$40,048		
Cost of forgone procedure SPECT	Visit	" Source: EPSI	Appointments per year:809 Rate of incomplete appointments: 28.3% Mean reimbursement: \$1,046.27 809 Appt.*.283* \$1,046.27= \$239,540		
Time to reschedule procedure	ABC	Salary was estimated with fringe for admin coordinators. Time to reschedule was based on rescheduling activities for both appointment types over the span of FY18. Source: Payscale Sources: XXX	Time per year: 10 hours Hourly rate: \$32.12 10hrs*\$32.12= \$321		



External Failure Costs (Pre)

- Correctable failures caught after the patient visit
- Non-correctable failures resulting in harm to the patient beyond the patient visit

*None associated with the Radiology No-Show project



Failure Costs Further Defined

8 Wastes

The 8 Wastes are eight types of process obstacles that get in the way of providing value to the customer.



Defects

Efforts caused by rework, scrap, and incorrect information.



Overproduction

Production that is more than needed or before it is needed.



Waiting

Wasted time waiting for the next step in a process.



Non-Utilized Talent

Underutilizing people's talents, skills, & knowledge.



Transportation

Unnecessary movements of products & materials.



Inventory

Excess products and materials not being processed.



Motion

Unnecessary movements by people (e.g., walking).

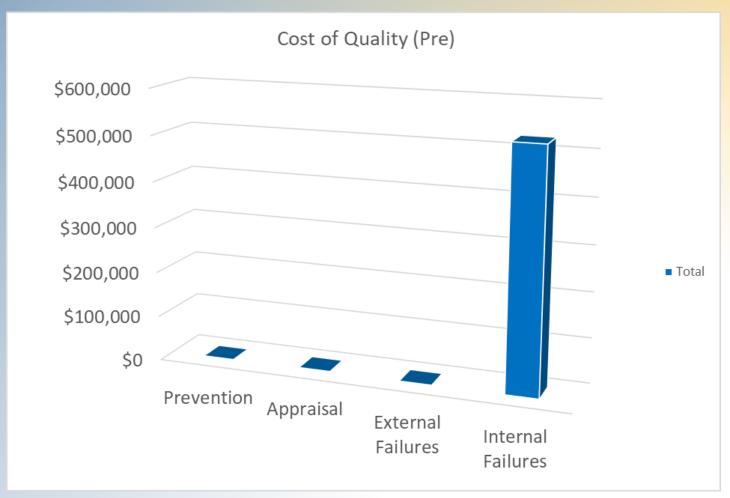


Extra-Processing

More work or higher quality than is required by the customer.



Cost of Quality (Pre)



Total cost: \$ 527,176.97

Average No-Shows PET: 39%

Average No-Shows SPECT: 28.3%

Time frame: 12 months



Prevention Costs (Post)

Cost Name	Cost Type	Assumptions	Cost Calculation
QI Training	ABC	Cost was calculated using average cost per participant in the 2019 Improvement Leadership Academy. Total cost encompasses time dedicated to course trainings by faculty and learners over a 9 month time frame. Salary costs include fringe. Source: XXXX	Learner(s) in ILA: 1 Average Hourly Rate: \$112.16 Course sessions: 13 Hours of session: 1.5 13 sessions* 1.5 hrs* 1 Learner*\$112.16= \$2087.12
QI Mentorship	ABC	This cost was calculated based on the total time dedicated by learner and mentor to mentorship meetings. Salaries were estimated with fringe. Sources: XXX	Time: 1 hours/mo Combined hourly rate: \$175.28 1hr*9mo*\$175.28= \$1,577.52



Appraisal Costs (Post)

Cost Name	Cost Type	Assumptions	Cost Calculation
Cost of analyzing, communicating and interpreting no-show data	Activity-Based Cost (ABC)	Salary was estimated with fringe. Hours dedicated to data analysis and review were heightened during the project period. Sources: XXX	Time: 3 hours/mo Hourly rate: \$52.58 3hr*12mo*\$52.58= \$1,892.88

Internal Failure Costs (Post)

		1		
	ΥП		100	
	1		41	

Cost Name	Cost Type	Assumptions	Cost Calculation
Expired Radioisotope- PET(Rb82)	Supply	Cost based on amount paid per isotope by radiology department. All forgone appointments result in expiration of isotope (24 hour shelf life). Data based on all data per appointment type acquired in FY18.	Appointments per year: 273 Rate of incomplete appointments: 33.76% (reduction of 5%) Cost per isotopes used in visit= \$2,000
		Source: Cost accounting data; BMC Radiology	273 Appt. * .3376 *\$2,000 = \$184,329
Expired Radioisotope- SPECT	Supply	" Source: Cost accounting data; BMC Radiology	Appointments per year:809 Rate of incomplete appointments: :23.3% (reduction of 5%) Cost per isotopes used in visit: \$500.00 809 Appt. * .233 *\$500= \$94,248
Cost of forgone procedure PET	Visit	Cost based on mean actual reimbursement paid. Mean was calculated using mean of each payor type with respect to the payor configuration unique to BMC. Cost of reimbursement for isotope use was removed. Source: EPSI	Appointments per year: 273 Rate of incomplete appointments: 33.76% (reduction of 5%) Mean reimbursement: -\$378.48 273 Appt. *.3376 * -\$378.48= -\$34,883
Cost of forgone procedure SPECT	Visit	" Source: EPSI	Appointments per year:809 Rate of incomplete appointments: :23.3% (reduction of 5%) Mean reimbursement: \$1,046.27 809 Appt. *.233* \$1,046.27= \$197,219
Time to reschedule procedure	ABC	Salary was estimated with fringe for admin coordinators. Time to reschedule was based on rescheduling activities for both appointment types over the span of FY18. Sources: XXXX	Time per year: 9.5 hours Hourly rate: \$32.12 9.5hrs*\$32.12= \$305.14



External Failures (Post)

None



Cost of Quality (Pre and Post)



Total cost reduction: \$80,351.31

Total reduction in missed appointments (both exams): 5%

Time frame: 12 months



Defining Parameters for Cost Items to Include

In Scope

Your Choice

Direct Costs:

Costs related to producing a good or service. A direct cost includes materials, labor, expense, or distribution cost.

Variable costs:

Costs that increase as the production/service volume increases, and it falls as the production/service volume decreases. These costs can include materials, labor, expenses, and delivery costs.

Opportunity Costs

Costs associated with alternative decisions

Out of Scope

Operating Costs

Costs associated with day-to-day business activities but are not traced back to one product.

Sunk Costs

Historical costs that have already been incurred and will not make any tangible difference in decision making.

Indirect Costs

Expenses unrelated to producing a good or service. An indirect cost cannot be easily traced to a product, department, activity or project

Fixed Costs

Costs to the organization that do not vary with the number of goods or services produced over the short term.



Scoping for Radiology Case Example

In Scope

Your Choice

Opportunity Costs

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Cost forgone if room was booked for another appointment type that could generate more revenue

Out of Scope

Operating & Indirect Costs

- 1) Cost of utilities
- Cost to purchase/maintain equipment that is used for multiple services

Sunk Costs

 Costs incurred in the past that cannot be influenced by improvement activities

Fixed Costs

- Cost associated with lease of facility
- Cost associated with salary of mentor if mentorship is within the boundaries of the mentor's preassigned scope of work

Direct Costs:

- Cost of clinical personnel to conduct procedure
- Forgone reimbursement for stress test
- Time dedicated to rescheduling appointments
- Time dedicated to stakeholder meetings
- Time dedicated to training QI lead (Donna)

Variable Costs:

 Cost of producing isotopes for cardiac stress tests



Common Calculations

Internal/External Failure Costs:

 Failure cost= Total opportunities for failure x Rate of failure occurrence x Cost of failure

Ex. 6,000 patients per year x .3 (30%) rate of error x \$46.85 per error= \$84,330 /year

Prevention and Appraisal:

2) Activity based cost= Amount of time dedicated to activity x Cost(s) associated with activity x Frequency of activity in a given time period

Ex. 4 hrs/mo dedicated to error investigation x \$32.50 hourly rate of investigator x 12 months= \$1,560/year



Where will I find this data?

Data Type	Data Sources	Methods to obtain
Rates of failure occurrence (i.e. 30% No-Show rate)	 Baseline data accrued through chart sampling, audits, EPIC reports, and etc. 	 Baseline data from QI project QIHub@bmc.org to facilitate acquisition of missing information
Internal Failures Costs (i.e. supply costs, cost of missed appointments, cost of repeat testing)	 EPSI database governed by Decision Support team 	 Email <u>Dawn.sorel@bmc.org</u> with data request form to obtain desired costs incurred by BMC.
External Failure Costs (i.e. repeat testing, expired products, patients leaving without treatment, correcting medication errors/test results, sentinel events)	EPSI databaseMarket Research	 Email <u>Dawn.sorel@bmc.org</u> with data request form to obtain desired costs incurred by BMC. Market research can be sufficient to define estimates for certain costs for which you cannot acquire data
Prevention and Appraisal Costs	EPSILearners and faculty	 Lauren to send cost estimates to LCC project teams Learners and faculty can estimate time dedicated



Takeaways

- 1) Not all costs will be exact to our organization
- 2) This analysis provides a holistic cost impact analysis by taking into account systems costs inherent to improvement projects
- 3) An increase in cost to our organization can be justified if quality metrics are demonstrating tangible improvement
- 4) We are here to help!