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

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

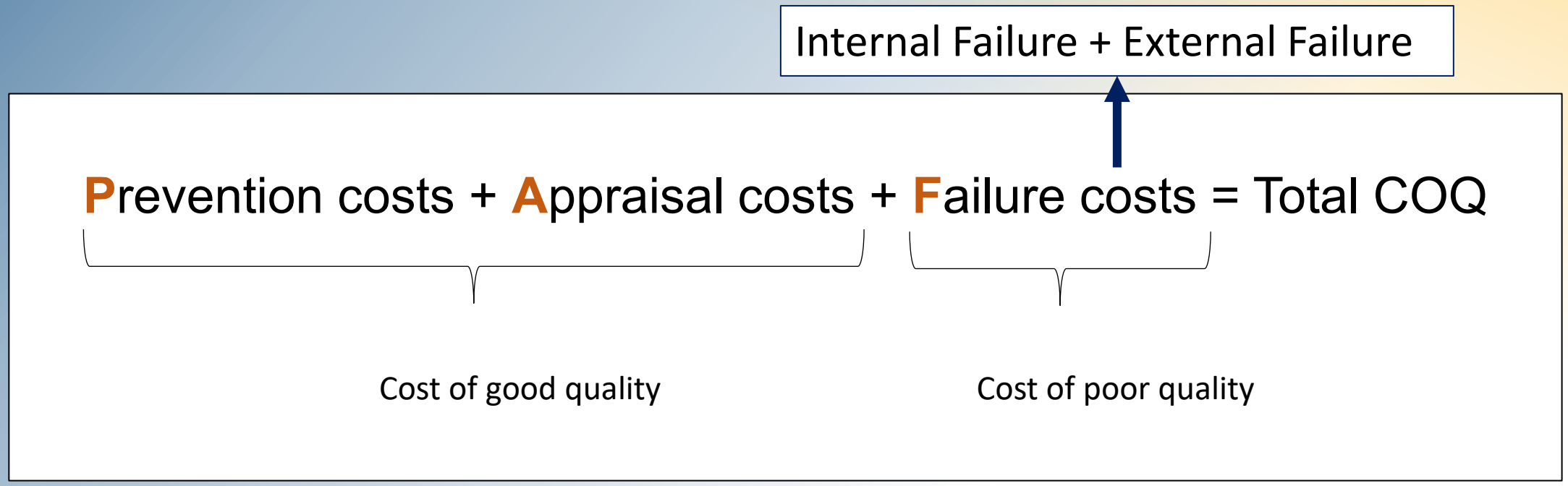
Objectives

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

1) Work with stakeholders to determine the cost items that are within the scope of your improvement work
2) Establish your assumptions
3) Acquire data that will support costs and assumptions specific to your project
4) 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



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

Cost Type	Assumptions	Cost Calculation
Activity-Based Cost (ABC)	This activity was a part of the original responsibilities of the manager. Salary was estimated with fringe. **Sources**: glassdoor	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)

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**
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**

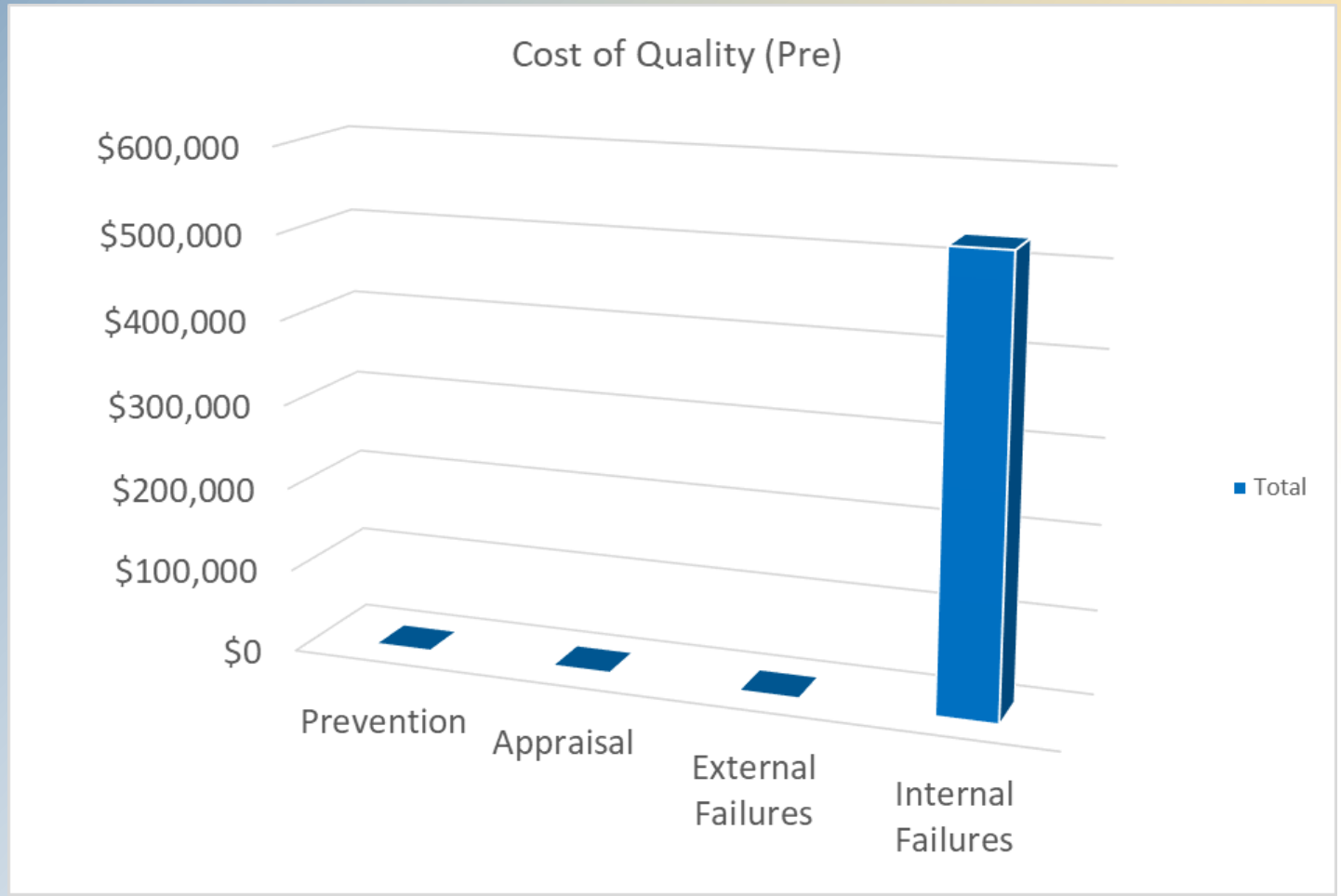
External Failure Costs (Pre)

- 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

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**

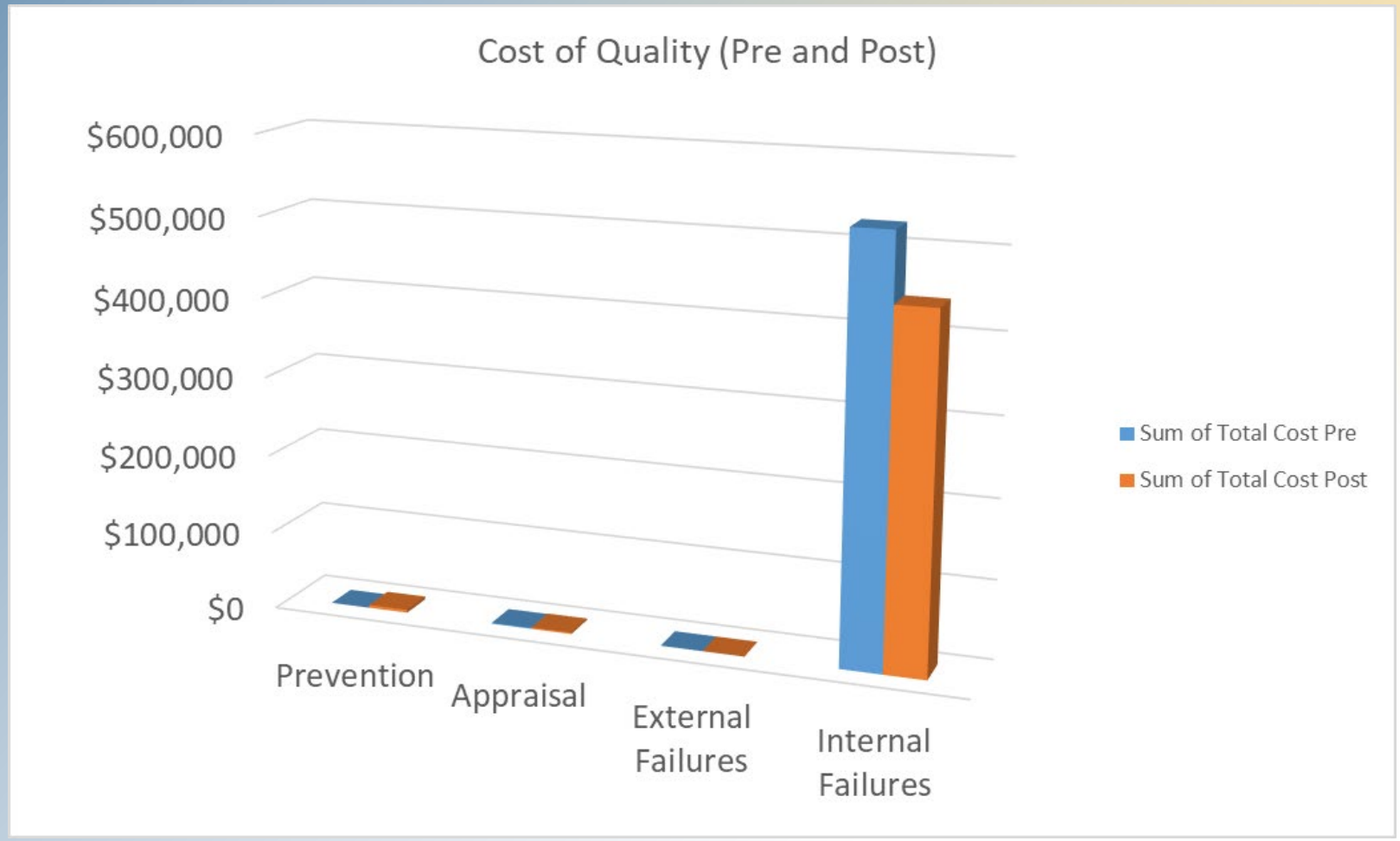
Internal Failure Costs (Post)

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: 33.76% (**reduction of 5%)** Cost per isotopes used in visit= $2,000 273 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)

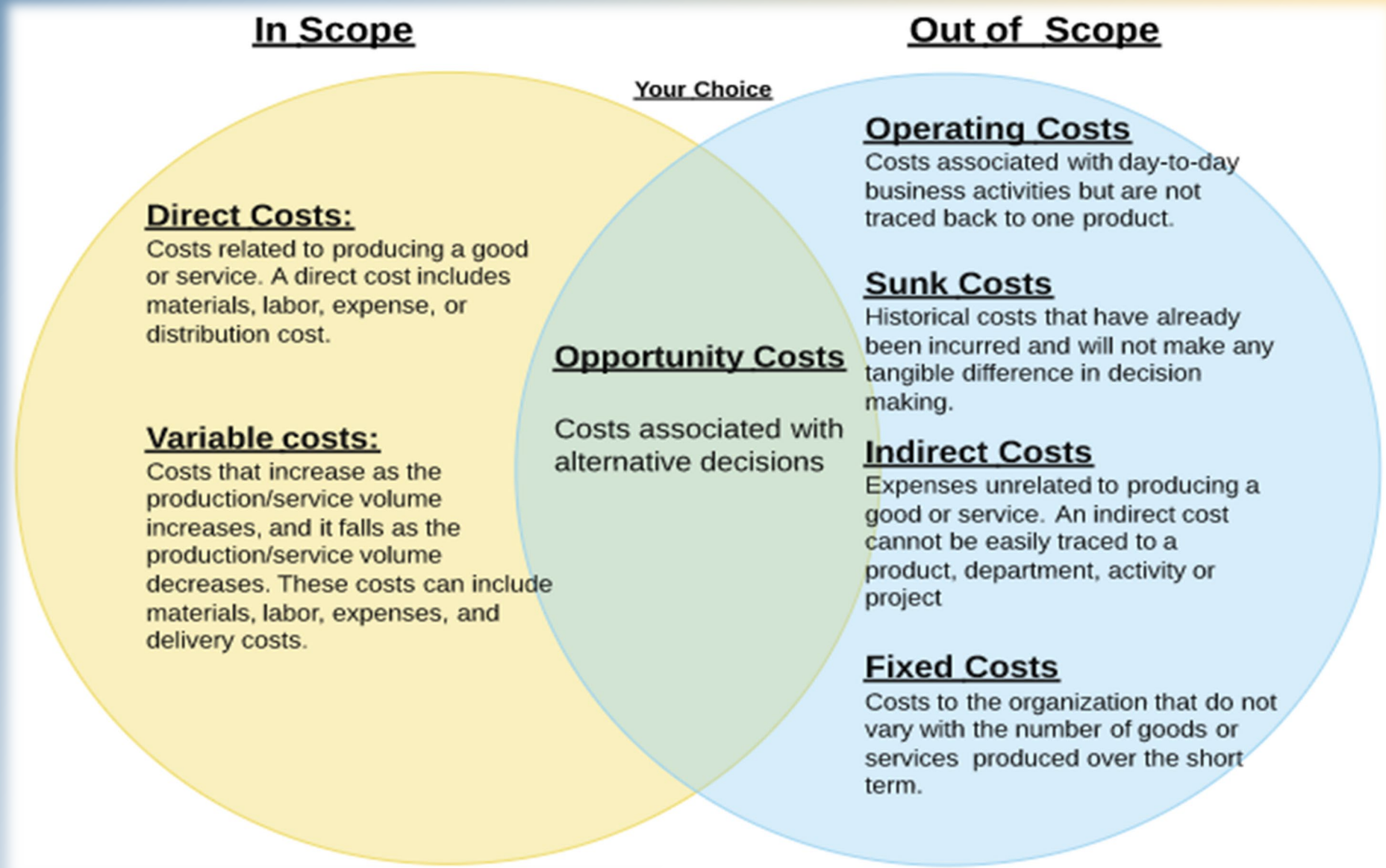


Total cost reduction: **$ 80,351.31**

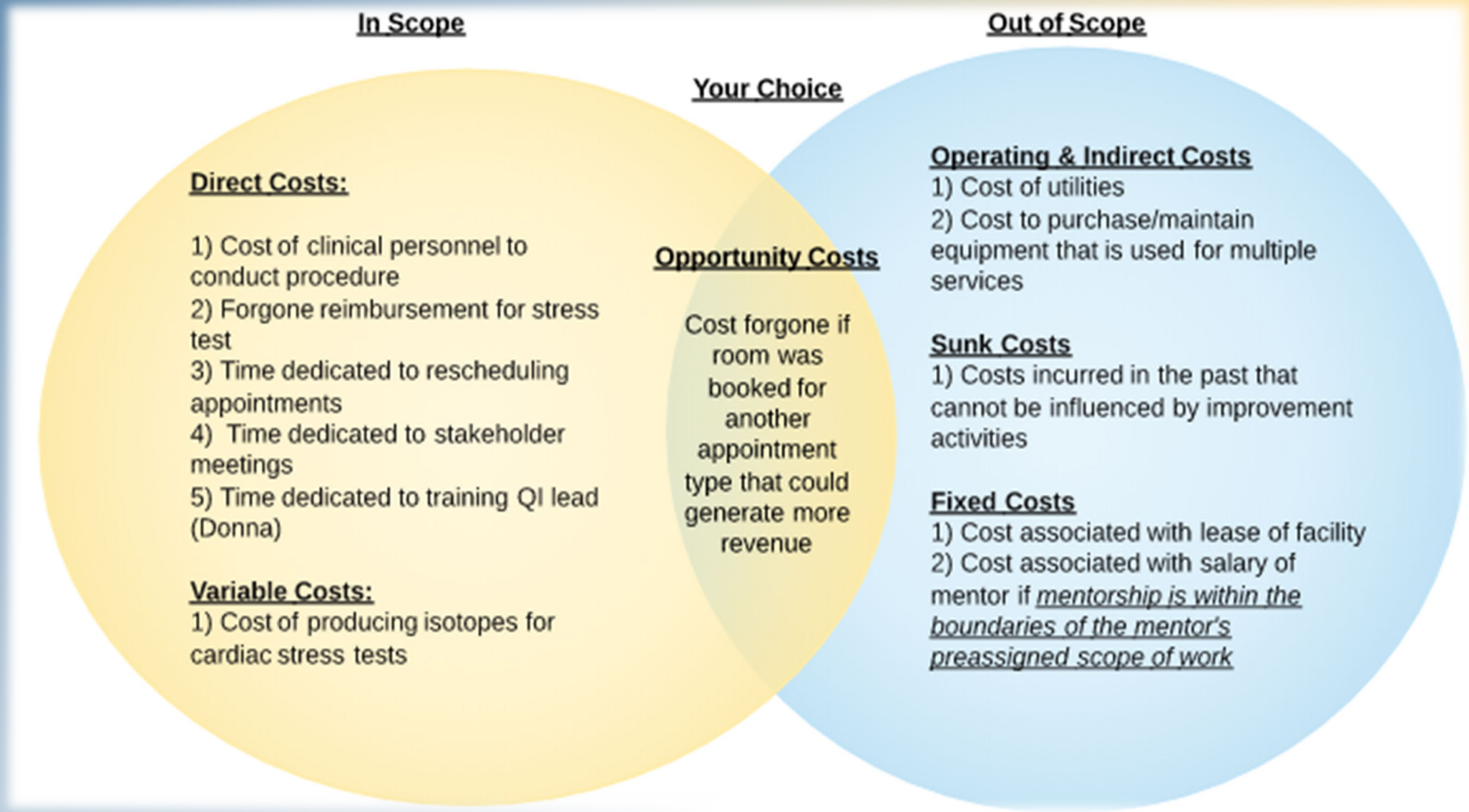
Total reduction in missed appointments (both exams): **5%**

Time frame: **12 months**

Defining Parameters for Cost Items to Include



Scoping for Radiology Case Example



Common Calculations

Internal/External Failure Costs:

1) **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 Dawn.sorel@bmc.org 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 database • Market Research	• Email Dawn.sorel@bmc.org 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	• EPSI • Learners 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!