Quality Improvement (QI) Projects

The PDSA Cycle & Example

Overview

This document contains information on what QI projects entail, how to generate an appropriate protocol and methodology, and how to evaluate the results of the project and implement the new workflow. Included in this packet an example of a QI project done at NCHC, and information relating to the "Plan" stage of the PDSA cycle. Information in this document can be used for anyone conducting a QI project of a workflow or other process at North Country Healthcare, including students, residents, and employees.

What is QI?

Quality Improvement (QI) is a systematic, cyclical process that evaluates how an organization works and how to improve its processes. QI projects involve identifying and describing workflows or other organizational processes, developing a methodological plan for collecting data or proposing an intervention, and evaluating the outcomes in order to learn, implement, and revise solutions.

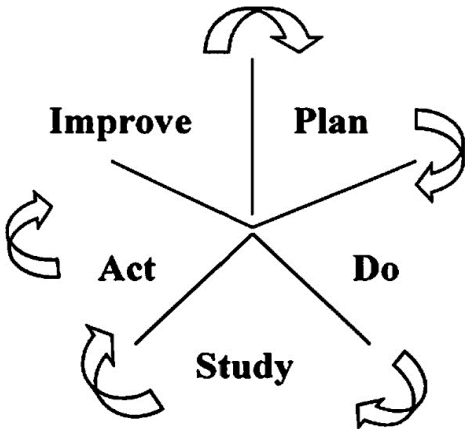
NCHC QI Objectives

North Country Healthcare (NCHC) is committed to continuously improving the quality of care delivered by our providers, outreach programs, pharmacy, care management, and other support personnel. The purpose behind conducting QI projects stems from a philosophy, both at NCHC and across the scientific community as a whole, to continuously evaluate the state of workflows and develop organizational protocols that are effective, efficient, productive, and contribute to staff and patient satisfaction.

At North Country, QI projects usually involve a variety of individuals and departments. The initial oversight of QI projects occurs in the Research Committee and the Continuous Quality Improvement Committee. Both of these entities have developed plans and procedures for how to create, facilitate, review, and evaluate quality improvement projects in a manner that is efficient and standardized.

PDSA Cycle

NCHC utilizes the PDSA Cycle for planning and structuring QI projects. Each of the following steps encompasses actions for which the investigator should either plan for or undergo throughout the lifespan of the project.



The PDSA model encourages testing and multiple cycles to increase the belief that change will result in improvement, provide a prediction of improvement, learn how to adapt change to conditions in the local environment, evaluate costs and side-effects of change, and minimize resistance upon implementation of change.

Plan

The "Plan" stage is without a doubt the most important step in creating a QI project, as all of the remaining steps in the PDSA cycle will rely on what you have delineated here. A well-articulated and thoroughly planned project will ensure that any results, anticipated or not, produce outcomes that remain useful and elucidating for NCHC. Because this step requires the most extensive and comprehensive work upfront, the following components have been listed and described below. This should provide you with more structure in planning your project, and also ensure that all project components have been systematically thought through.

Identify and Describe

- *Identify* the change or workflow to be evaluated.
- *Describe* the current state of the workflow.
- Explicate the *impetus* behind why the workflow needs to be changed, including components that are or are not currently effective or efficient.
- Identify the *objective* of the workflow.

Methodological Plan

- Outline the precise *measures and materials* will you use to collect data.
- Outline the *timelines* for data collection, as well as points at which key decisions and/or milestones will take place.
- Identify the NCHC *staff resources* that will be required to support this project.
- Identify the NCHC *data or technological resources* that will be required to support this project.
- Anticipate the *qualitative or quantitative analyses* you may want to conduct during the evaluation of the project.

Predict Outcomes

- *Predict* the methodological issues or roadblocks that may occur if carried out as planned.
- *Predict* the outcomes, ideal or otherwise, that may result once the project is conducted.

Do

The "Do" stage involves carrying out the methodological plan that you outlined above. The more detailed and precise you were in the "Plan" stage, the more effortless it will be to manage and run data collection. While you are collecting data, document any problems or issues that arise, as well as any unexpected observations. Keeping detailed records in this stage will help guide and inform data collection protocols for others who may implement subsequent evaluations of the identified workflow after your project is complete.

Study

The primary component of the "Study" stage is to conduct all qualitative or quantitative analyses of the data you have collected. Evaluate how the outcomes of your project compare with how the workflow was being operated prior to the study, and compare the outcomes with any predicted outcomes you anticipated in the "Plan" stage.

Act

The "Act" stage involves takes next steps with the project based on what was learned from the results of the study. Discuss the results with other team members and identify next steps. Reflect on what went well, what did not go well, and how this affected the revised workflow. This may involve developing and piloting a new workflow based on the success of the present project, or this may involve identifying what could be better and returning to the "Plan" stage for another cycle iteration.

PDSA Cycle Review

If you are preparing a QI project for review by NCHC, this should give you an indication of the level of preparation that should be taken to adequately formulate a project and facilitate its success. The remaining information in this document consists of an example of the "Plan" stage for a QI project that has been approved and conducted in the past.

QI Project Example – The "Plan" Stage

Title of Project: Infrared (IR) Skin Thermometers for COVID-19 Fever Screening: Analysis and Improvement of Current Organizational Protocol

Identify and Describe

- Identify the change or workflow to be evaluated.
  - COVID-19 employee fever screening protocol

- Describe the current state of the workflow.
  - All employees working across all clinic locations are required to undergo fever screening before entering the building.
  - Infrared (IR) non-contact thermometers are used to measure employee's temperatures.
  - Employees are also asked a series of questions pertaining to their symptoms or other friends/family members who might be sick.
  - Any detected fevers (at or above 37.5 degrees Celsius) are sent home.

- Explicate the impetus behind why the workflow needs to be changed.
  - The current employee screening workflow was developed in response to the COVID-19 pandemic.
  - Fevers are highly associated with carrying COVID-19.
  - All employees who enter the building are being fever screened in an attempt to limit the spread of the virus to our patients and other staff.
  - Staff conducting fever screening have reported significant temperature differences between different IR thermometers, and between the same thermometer at different outside temperatures.
  - There is concern that the IR thermometers are not precise and/or accurate enough to reliably detect fevers in order to stop spread of COVID-19.

- Identify the objective of the workflow.
  - Objective #1: Determine if there are statistically significant differences in employee temperature readings as a function of the device being used (IR or control) and the location the reading takes place (outside or inside the building).
  - Objective #2: Establish appropriate, data-driven cut-off temperature values representing 3 standard deviations above the mean of our population for which an employee may need a second reading. This may also be correlated with ambient outdoor temperature, such that there may be different cut-off values for different ranges of outdoor temperature.
  - Objective #3: Implement the above results and establish a new protocol that more accurately and reliably screens employee fevers.

Methodological Plan

- Outline the precise measures and materials you will use to collect data.
    - Each employee who consents to participate in the study will have three body temperature measurements taken from them.
    - Primary measurements: outdoor IR reading, indoor IR reading, indoor control device reading (either oral or tympanic thermometers)
    - Secondary measurements: outdoor ambient temperature, indoor ambient temperature, time, precipitation and wind conditions, and notes about employees who wear headgear or exercise immediately before coming into work.
    - Materials needed: informed consent, IR thermometer, control thermometer, ambient temperature thermometer, data collection protocol, PPE, data collection recording sheet and pen.

- Outline the timelines for data collection, as well as points at which key decisions and/or milestones will take place.
    - Data collection will occur at five NCHC clinic locations: Flagstaff-4th, Williams, Round Valley, Show Low, Grand Canyon, and Kingman.
    - Data collection timelines will vary by clinic, but it is anticipated that no more than 3 days per clinic will be required to collect all data.
    - Timelines for how data will be collected will be specifically delineated in a formal study protocol.
    - Generally, employees will first undergo an outdoor IR measurement, where the data collector will also record the ambient temperature, time, weather conditions, and other notes about headgear or exercise before work.
    - Data collectors will then follow-up with employees in the clinic 20 minutes to 3 hours after the initial outdoor measurement.
    - Employees will then undergo an indoor IR measurement and a control measurement, where the data collector will also record ambient temperature and time.

- Identify the NCHC staff resources that will be required to support this project.
    - NCHC will need to provide two staff members per clinic location to collect data for this study (independent of the normal COVID-19 screening protocol).
    - NCHC employee participation will be necessary, though any employee who does not consent to participation is allowed to do so without consequence.

- Identify the NCHC data or technological resources that will be required to support this project.
    - NCHC will need to provide the measurement devices (thermometers).
    - Although data collection is done on paper, NCHC will need to provide an individual to enter the data electronically and analyze the data statistically (as well as appropriate analysis software to do so).

❖ Anticipate the qualitative or quantitative analyses you may want to conduct during the evaluation of this project.

- Primary analysis: Repeated-measures ANCOVA controlling for ambient temperature and clinic location.
- Secondary analysis: Correlations between measurements and ambient temperature, and descriptive analyses specifying cut-off values that represent non-normal temperature measurements.

Predict Outcomes

❖ Predict the methodological issues or roadblocks that may occur if carried out as planned.

- There may be issues recruiting two employees to spend a few hours for multiple days collecting this data.
- There may be timeline issues at some clinic locations (issues collecting data in a timely manner), specifically at the Flagstaff-4th St. clinic.
- Because this is similar to the established COVID-19 screening workflow, we do not anticipate any other methodological issues or roadblocks.

❖ Predict the outcomes that may result once the project is conducted.

- We predict there will be differences in temperature readings across devices.
- We predict that the outdoor IR temperature will be correlated with and be influenced by the outdoor ambient temperature.
- If there are no differences across devices, we predict to continue using the outdoor IR thermometer for employee screenings.
- Regardless of differences, we expect to develop data-driven cut-off values for each clinic that represent temperature values that are beyond a normal distribution of scores for our employee population.