An Approach to Quality Improvement Projects in Cytopathology

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Quality Improvement

What is QI?

- Systematic, data guided, activities designed to bring about immediate improvement in health care delivery.
  - More specifically, activities that seek to improve outcomes such as reducing atypical rate, insufficiency rate, diagnostic error rates or shortening turnaround time.

LHSC PaLM Quality Improvement

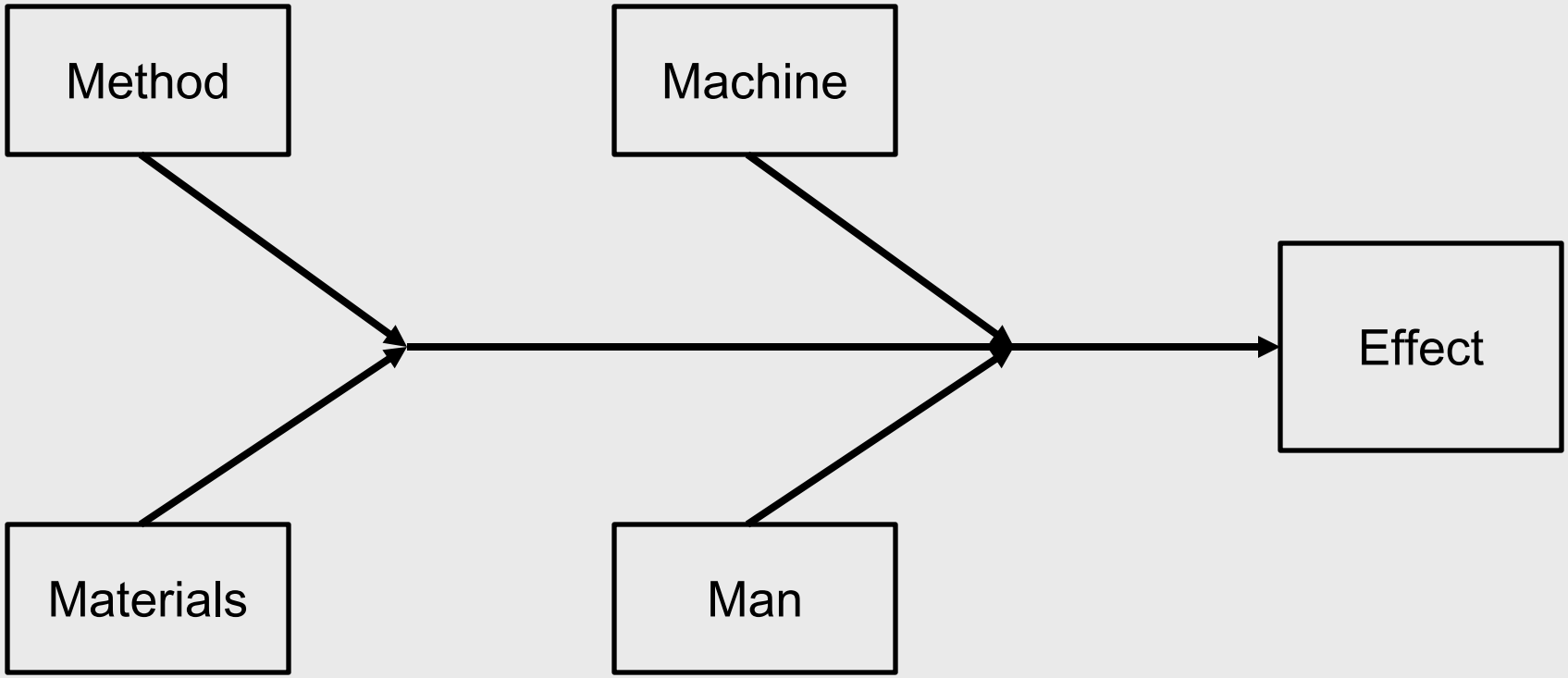
Approach:

- Focused on solving everyday problems
  - Simple problems that are observed at Gemba
  - Large scale issues are addressed via special projects
- Team-based
  - Representation from all relevant sub-teams and leadership
  - Resources to gather and summary data from issue forms
  - Expert resource to guide use of quality improvement tools
  - Meetings to ensure discussion of all perspectives

Method

- Process Review
  - Map current state
- Problem Description
  - What + How + Which + When + Where + Who = Problem Description (Problem Statement)
- Determination of Root Cause
  - Categorize or group potential causes in a clear and consistent manner
    - E.g. Fishbone Diagram to explore 6Ms (Man, Machine/Tools, Materials/Inputs, Methods, Measures, EnvironMent)

Fishbone Diagram



5 Whys

Possible Cause	Why?	Why?	Why?	Why?	Why?
	???	???	???	???	???
	Because →	Because →	Because →	Because →	Because →

- 5 Whys are typically required to dive deep enough to get to the root cause

Method

- Action Plan Development
  - What will we do?
  - Who will do it?
  - When will we do it? Progress/Status?
    - Clarity on the root cause and change required to fix it = make the change (e.g. fix the equipment, update the SOP, etc.)
    - Clear on root cause but unclear of change required to fix it = test a change via a PDSA cycle (e.g. process change to address root cause)

PDSA Cycle

- Simple, powerful, action oriented tool for testing change in the work setting

ACT

TEST CHANGES:
MEASURE OUTCOME :
PLAN FOR ANOTHER CYCLE :

PLAN

AIM:
TARGET:
TIME LINE:
DATA COLLECTION:

STUDY

ANALYZE DATA:
SUMMARIZE WHAT WE LEARNED:
IDENTIFY/SELECT CHANGES WITH ACTION PLAN:

DO

CARRY OUT PLAN:
RECORD DATA:
DOCUMENT OBSERVATIONS:

Method

- Verify outcomes
  - Confirm expected outcome was achieved via data
- Standardize and Spread
  - Ensure all relevant documentation and processes are updated to reflect the change
  - Ensure training and communication has occurred to all relevant parties to ensure the change is supported, spread, and sustained

Maximizing Diagnostic Yield in Biliary Brush Cytology:

A QI Project

Susan McRae *(Senior Cytotechnologist)*

Biliary Brush Cytology

Problem Raised by Clinicians (Early 2016)

High Atypical rate

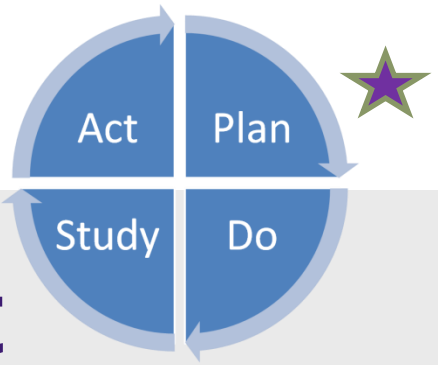
Poses Difficulty for Clinical Management

Objectives:

- ❑ **Evaluate the current performance characteristics of ERCP biliary brush cytology service at LHSC**
- ❑ **Design a QI project to improve the diagnostic accuracy of this test**

PDSA cycle

PLAN



Time Line for QI Project

Early 2016	• **IDENTIFY PBOBLEM**: Conversation between ERCP physician and Dr. Joseph - discussed high proportion of atypical diagnosis
March 2016	• **PLAN:** Initial data collection to identify specific issues
October 2016	• **DO**: Design the QI project with an AIM statement • Slide review with cytotechs and cytopaths
April 2017	• **STUDY:** Analyze data • Review by statistician, summarize what we learned
October 2017	• **ACTION**: :Initiate action plan, • Move to next cycle

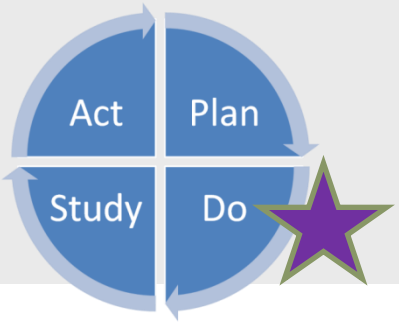
DO

Biliary Cytology QI Project

Aim Statement

Reduce atypical diagnoses from 36% to 25%

in one year



Analyzed Possible Factors

Pre-analytical	• Brush collection techniques (sampling issue) • Cytopreparation techniques
Analytical	• Diagnostic criteria (interpretation) • Use of 2014 Pap Society Pancreaticobiliary guidelines • Interpretative variations amongst CT & CP
Post-analytical	• No site specific retro review of atyp/susp

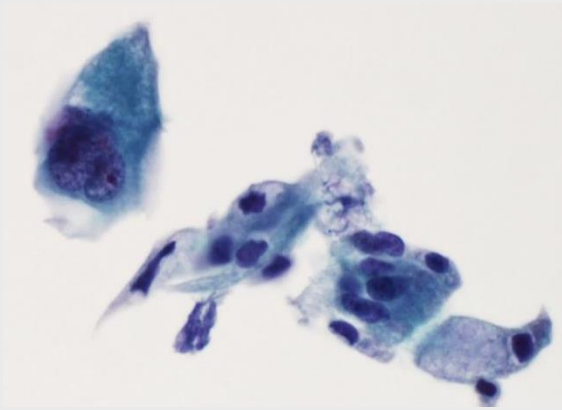
PAP Society 2014: Pancreaticobiliary Cytology

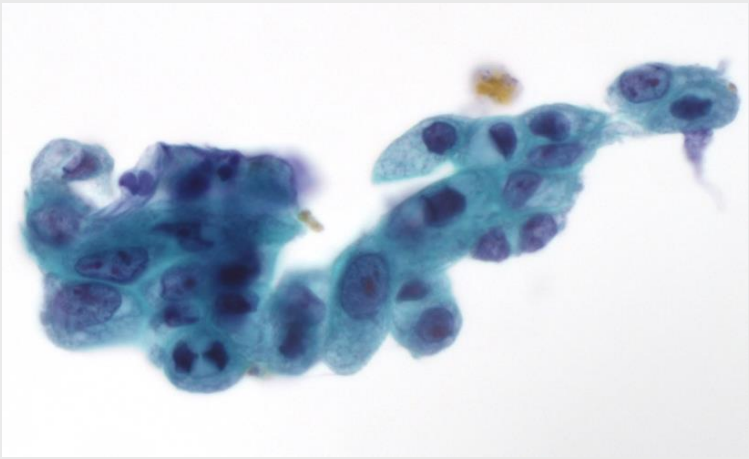
- The category of **atypical** should be applied when there are cells present with cytoplasmic, nuclear, or architectural features that are not consistent with normal or reactive cellular changes of the pancreas or bile ducts, and are insufficient to classify them as a neoplasm or suspicious for a high-grade malignancy. The findings are insufficient to establish an abnormality explaining the lesion seen on imaging. Follow-up evaluation is warranted
- Heterogeneous category, multiple scenarios

Martha Pittman, Lester Layfield: Cytopathol. 2014;42:338–350

Slide review
Cytomorphology

- ❑ Overall cellularity
- ❑ Abnormal group cellularity
- ❑ Atypical single cells
- ❑ Loss of polarity
- ❑ Nuclear features
  - Nuclear enlargement, N/C ratio
  - Anisonucleosis
  - Hyperchromasia
  - Chromatin clumping
  - Chromatin clearing
  - Irregular nuclear contour
- ❑ Cytoplasmic vacuolation

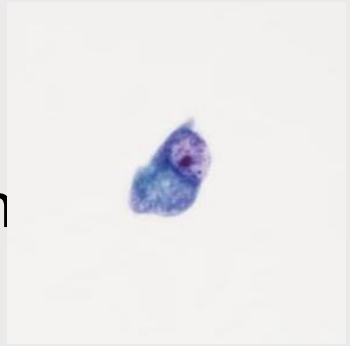


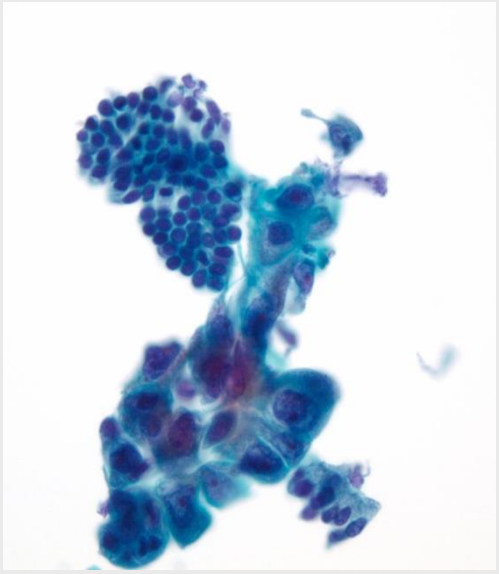


Heath et al: Journal of the American Society of Cytopathology 2015, 4: 282-289

Features favour malignancy

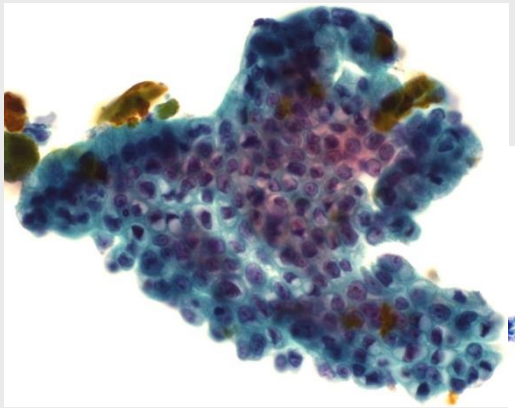
- ❑ Atypical single cells
- ❑ Two distinct cell population
- ❑ Anisonucleosis

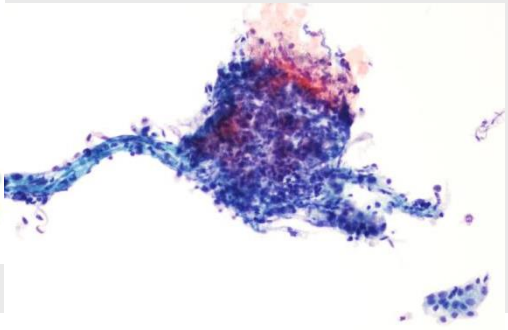




Features favour benign

- ❑ Distinct cell borders
- ❑ Acute inflammation

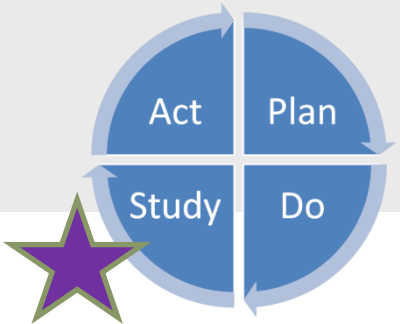




STUDY

Identify Action Plan

- Review and reclassify all atypical cases using newly defined criteria (Heath and ours)
- Stratify "atypical category" into
  - favour benign
  - NOS
  - favour suspicious for malignancy
- Reanalyze data to determine whether the above approach has an impact on 1) reducing atypical rate and 2) improving diagnostic accuracy



ACT

Future Implementation

- Provide in service to CTs and CPs
- Encourage peer internal consultation of atypical cases
- Ongoing QA monitoring of atypical rate

Move to Next Cycle

PLAN

- Discuss sampling technique with clinical colleagues in an attempt to improve sample cellularity
- Evaluate role of ancillary technique (FISH) for atypical cases – expensive test

- ✓ Design and implement a QI project for cytology using PDSA cycle model
- ✓ Address strategies that may reduce atypical rate and improve diagnostic accuracy of biliary brush cytology
- ✓ Implement and evaluate these strategies in future

Improve Patient Care

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