MELDING LEAN AND BARCODE TECHNOLOGY TO REDUCE IN-PROCESS SURGICAL PATHOLOGY MIS-IDENTIFICATIONS

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> **"There are no big problems, just a lot of little ones"**
> ***-Henry Ford***

ABSTRACT

Introduction

Improving the accuracy of patient identification is the #1 laboratory national patient safety goal.

Materials & Methods

Using our LEAN work culture and measurement tools developed in the Henry Ford Production System, we documented baseline Surgical Pathology (SP) in-process mis-identification defects and root causes in 2006. In 2007-2008 we redesigned laboratory workflow with simplified connections and pathways reinforced by a barcode technology innovation of our design to specify and standardize work processes. We also adopted just-in-time pre-stain slide labeling with solvent impervious barcoded slide labels applied at the histology microtome station eliminating pencil labeling of slides and a loop-back downstream work step conducive to slide label mis-identifications.

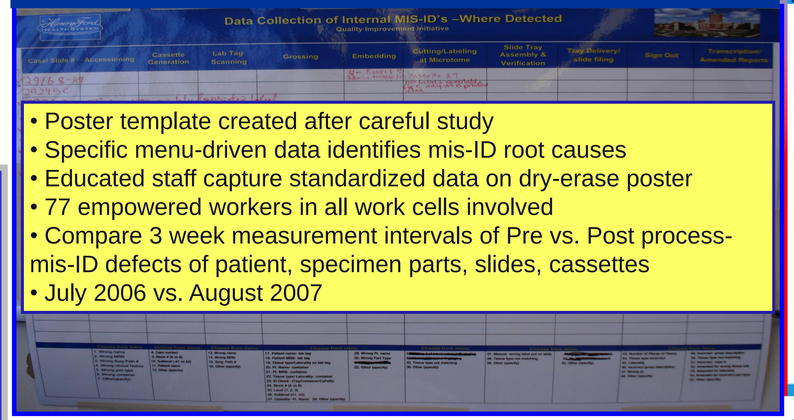
Results

SP cassette and slide mis-identification defects arising in-process were reduced by 63%, from 1.67% to 0.63% of cases (p<.001), with 85% reduction in the histology cassette and slide mis-identifications. Moreover, work redesign resulted in a 125% increase in technical throughput at the histology microtome station, or an annual manpower savings of 0.37 FTE.

Conclusion

We have innovated a barcode system analogous to an 'electronic kanban' to specify and standardize work processes that can reduce mis-identification defects and improve efficiency in the SP laboratory.

VISUAL DATA MEASUREMENT POSTER



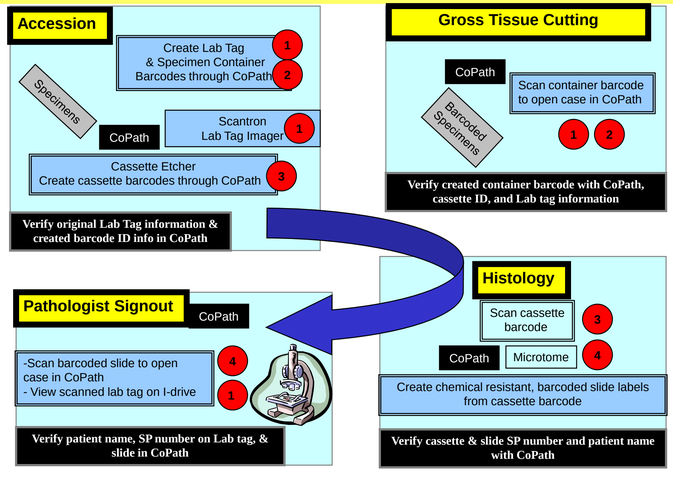
- Poster template created after careful study
- Specific menu-driven data identifies mis-ID root causes
- Educated staff capture standardized data on dry-erase poster
- 77 empowered workers in all work cells involved
- Compare 3 week measurement intervals of Pre vs. Post process-mis-ID defects of patient, specimen parts, slides, cassettes
- July 2006 vs. August 2007

PRE- & POST BARCODE MIS-IDENTIFICATIONS

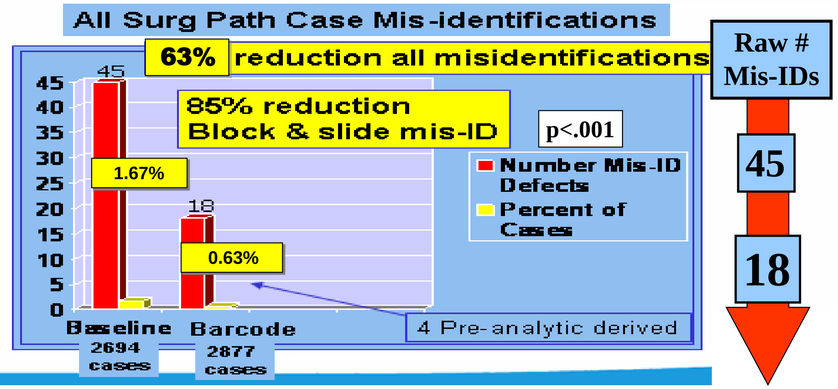
	Pre-Barcode	Post-Barcode
Surgical Cases	2,694	2,877
Specimen Parts	4,413	4,725
Tissue Cassettes	8,776	9,167
Slides	14,270	17,927
Mis-ID Defects	45	18
Case Defect Rate	1.67%	0.63%
Reduced Cassette/Slide Defects		**85%**
Overall Defect Reduction		**63%**

LINKED BARCODE SPECIFIED WORK

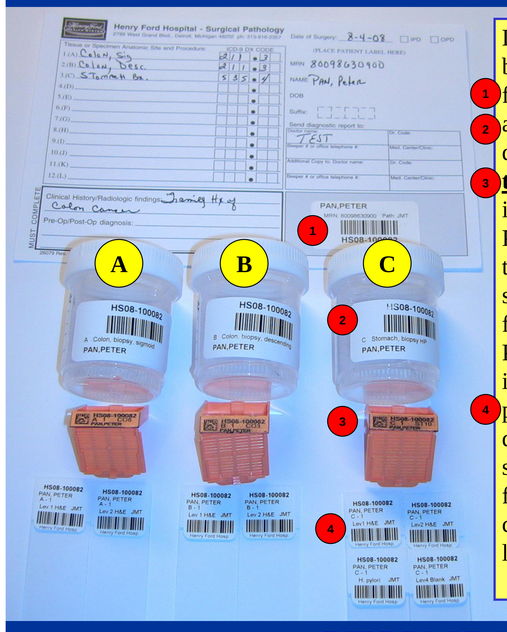
An "electronic kanban" of barcodes connects work cells and defines, standardizes and mistake-proofs the work processes of surgical pathology. Manual quality control checks are shown in the lower, black box of each work station.



RESULTS POST BARCODE REDESIGN



MIS-ID DEFECTS REDUCED BY BARCODE DRIVEN WORK STANDARDIZATION & LEAN DESIGN



LIS interfaced one-dimensional barcodes are printed on adhesive labels for attaching to **specimen containers** and **laboratory requisitions** while 2-dimensional barcodes are laser etched on **tissue cassettes**. This case is submitted in 3 specimen containers consisting of Part A - sigmoid colon biopsy, Part B - transverse colon biopsy and Part C - stomach biopsy with standing preorder for Helicobacter pylori immunostain. Protocol driven information is reflected in the chemical resistant **slide labels** printed at the microtome station that dictate 2 levels cut for each part. The stomach biopsy protocol, Part C, calls for an additional two blanks slides to be cut for the immunostain and a 4th level left unstained.

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