MGH Pathology Process Redesign

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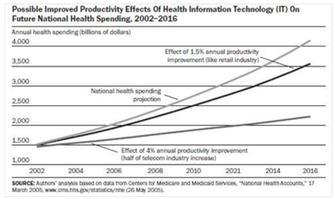
15.777 Healthcare Delivery Lab

Transition to Paperless System

Motivation

1. Improved efficiency + Patient safety
2. Environmental Impact
3. Qualitative: IT survey, Interviews

- ~40% of interviewed doctors in favor of transitioning to a paperless system.
- 94 staff / trainees of the department participated. (Fig. 1)



Survey and Interview Results

Fig. 1. Respondents by Subspecialty.

N=35 IP addresses
N=93 rows fulfilled

N=45 – Faculty – AP
N=4 – Faculty – CID
N=13 – Faculty – CP
N=5 – Fellow – AP
N=4 – Resident – AP
N=4 – Resident – CP
N=1 – Faculty - AP, Faculty – CID
N=1 – Faculty – AP, Faculty – CP
N=1 - Fellow - AP,Resident - AP,Resident – CP
N=11 - Resident - AP,Resident – CP
N=4 – Not identified

Fig. 2. Frequency of use of printed working drafts from CoPath by attending pathologists and trainees at MGH.

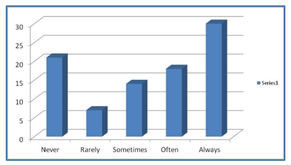


Fig. 3. Percentage of cases for which transcription service used for typing up reports in CoPath (by pathologist)

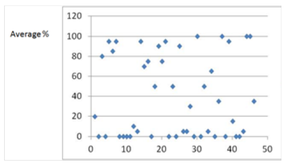
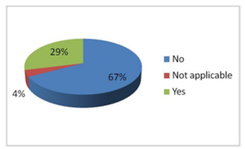


Fig. 4 Usage of Dragon for typing CoPath reports



IT Survey

Overall Takeaway: variability in utilization of IT tools within the department

●Highly variable usage of transcriptionists by pathologists (Fig. 3)

●Underutilization of Dragon in direct diagnosis entry

Key Findings from Workspace Inventory Survey*

Total number of pathologists in MGH Boston	49
Total number of pathologists surveyed	30
% of pathologists surveyed	61.2%
Average faculty office size (in sqft)	145
Average number of monitor per office	1.55
Total number of pathologists who support direct entry	13
% of pathologists who support direct entry	43.3%

~$5500 one time budget for essential hardware fitout

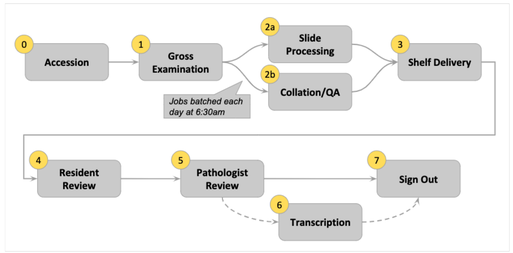
		Total Costs***
Total # of monitors needed	19	$4,750
Total # of wireless keyboard + mouse needed	12	$720
*Total # of adjustable sit-stand desk needed (estimated)***	*30*	*$11,850*

*Note: Detailed survey results and photos are available here
**Adjustable sit-stand desks are highly recommended for doctors' ergonomics and performance efficiency
***Cost assumptions are made based on market prices of $250/27" monitor , $60/wireless mouse & keyboard, and $395/adjustable desk

Problem Statement

Improve the efficiency of process reviewing and signing out cases, while maintaining excellence in resident/ fellow training and ensuring high-quality, error-free pathology reports.

Current Process



Proposed Solutions

Goal 1. Transition to a direct diagnosis entry system, which will *reduce turnaround time and cost.*.

Goal 2. Redesign the case workflow to a continuous processing system, which will *improve resource allocation and reduce turnaround time.*

Challenges

●Operational: The change would be **disruptive to current workflows** and is **difficult to implement gradually** as it requires coordination between departments.

●Organizational: There is potential for resistance due to role and shift schedule changes.

Implementation Plan

Short-Term

- **Invest** in improved hardware.
- Create **streamlined request process.**
- **Update CoPath functionality** based on common pain points.
- Offer optional **technology training** .
- Continue **adoption of paperless diagnosis entry.**

Medium-Term

- **Transition to 64bit Windows system** (in progress, done by January 2020).
- Implement **cutoff date** for direct diagnosis entry, possibly by subspecialty.
- Begin **enhanced QA review** by transcription team.

Long-Term

- Enact **continuous case processing** by transcription team.
- **Eliminate paper working draft.**
- Continue monitoring **key metrics,** i.e. turnaround time and amendment rates, to ensure no loss in quality in new system.

Simulation Model

- It is **infeasible** to **pilot** the test of hypotheses 1,2 and 3 directly in the department due to the required coordination between process steps and the need for transcriptionists to have more flexibility in their role..
- We thus **construct** a ***discrete-time simulation model*** to replicate the current pathology department and allow us to evaluate the potential effects of these changes.
- **We test 2 new scenarios in the system outlined below:**

Phase 1: Enhanced QA Review
- Transcriptionists perform more detailed review of cases (and no longer transcribe due to direct DX entry).
- **Benefits:** Reduced error rate; increased physician trust in the paperless system.

Phase 2: Continuous Processing
- Transcription team reviews cases continuously throughout the day as slides are processed and become ready for delivery.
- **Benefits:** Improved turnaround time; less idle time for slides after preparation.

Simulation Results

- We create a ***discrete-time simulation model*** that allows us to reconstruct the flow of cases through the pathology department.
- We estimate key parameters, such as case flow volume, resource availability, and time required for each step, based on empirical data from October 2018 as well as interviews with pathologists.
- We run the simulation over the course of seven business days to obtain distributional results on wait times in various steps.

Phase 1: Reduces overall **turnaround time by 3.2%**, and specifically lowers the time from resident review to signout by 14.4%.

Phase 2: Results in further **turnaround time reduction of 14.6%** and saves 30.0% of time between gross complete and shelf delivery.

Metric	Current System	Phase 1	Phase 2
Wait Time: Gross Complete to Shelf Delivery	20.34 (21.49)	20.39 (21.41)	14.09 (12.13)
Wait Time: QA to Resident Review	11.13 (10.71)	9.52 (9.44)	14.17 (10.97)
Total Turnaround Time	63.01 (67.02)	60.97 (65.31)	53.76 (49.15)

Waiting Time from QA to Resident Review

Time from Resident Review to Sign out

Turnaround Time