

From Bits to Brilliance: Enhancing the Efficiency of Cancer Registry Coding Quality Review by Human-factors engineering digitalization at a Medical Center in Taiwan

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INTRODUCTION

Accurate cancer registration coding through medical record reviews is crucial. The current review process includes **case selection, reviewer assignment, form printing, binding, distribution, statistical analysis, and final reviews**. However, the return rate of reviewed forms after one month is **only about 50%,** with an average **completion time of two months**. Significant time is spent on follow-ups, often due to misplaced paper forms that require reprinting and incomplete fields after form retrieval.

AIM

The primary objective is to identify factors affecting the review process through an interdisciplinary team, with the goal of implementing strategies to **achieve a 50% reduction in overall review time.**

METHOD

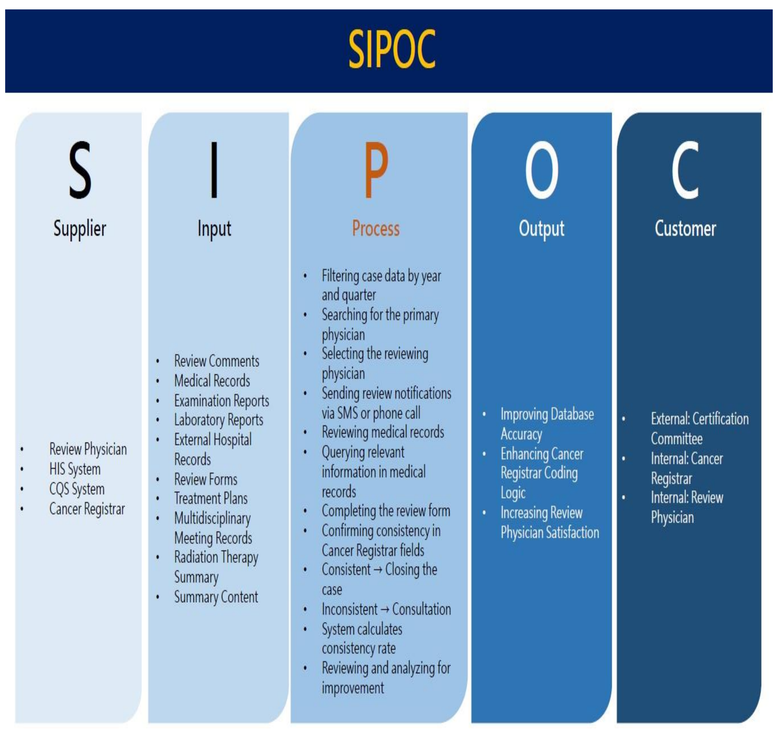
This study surveyed 38 review physicians on the review process, using an expert-validated questionnaire. We applied the SIPOC Model for interdisciplinary discussion, enhanced by ChatGPT's analysis. A **user-centric approach with human-factors engineering** minimized errors and streamlined tasks. This integration is designed to filter cases and **automatically assign 15% of newly diagnosed cases** for review. Following validation by cancer registrars, the system then assigns tasks to review physicians, and **streamlining communication through SMS**. The process was then optimized by ECRS method, to construct an intelligent structured information system for quality review. A statistical analysis of review records is conducted to calculate computer operation steps and process timing, affirming the improvements.

CONCLUSIONS

Our digitalization by **user-centric approach with human-factors engineering achieved a 71.2% reduction in overall review time.** Implementing structured information systems with digital enhancements and electronic forms streamlined the review process significantly **improving the completion rate and reducing workload**. Digitalization may improve healthcare operations, particularly in cancer review and overall care quality**.**

RESULTS

SIPOC Model Breakdown of Cancer Registration Review Workflow



Automated SMS Notification Sent After Form Assignment Completion



Survey results show that 61% of physicians delay tasks due to time-consuming review steps, particularly handling paper forms and dealing with misplacement issues. Implementing a human-factors engineering digitalization system allows for convenient computer-based reviews within the hospital or via VPN. Statistical analysis reveals a **reduction in operation steps from 16 to 11 per record** and a significant **decrease in total review time from 19,199 to 7,048 minutes (71.2% decrease), achieving a 126.5% completion rate and a 63.3% progress rate**. This streamlined process reduces workload, saves resources, and facilitates a **transition to paperless operations.**

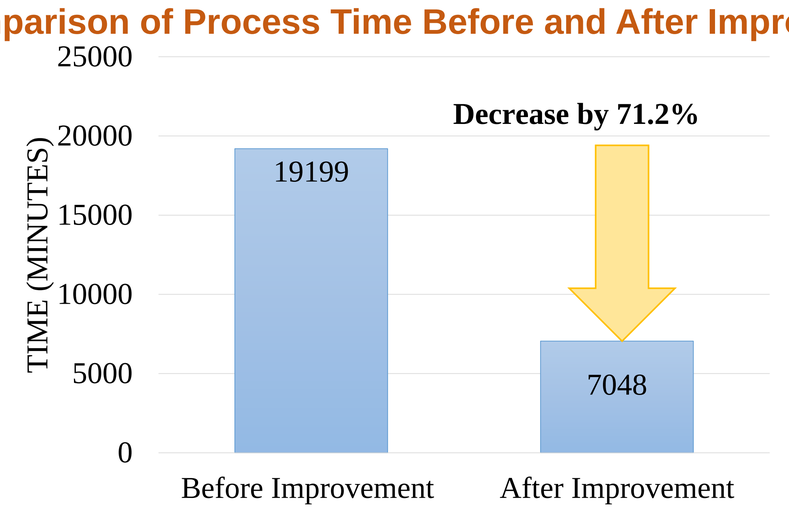
ECRS analysis method optimized operating procedures

Flowchart application case (after improvement)

Work name: Cancer registration coding quality review
Working department: Cancer Control Center Cancer Registration Section
Researcher: Yan-Qing Chen
time: 2022/10/3
Place: Cancer Control Center Office
Reviewed by: Wei-Mei Chen

Job Instructions	Symbols	distance (meter)	quantity (pieces)	time (minute)	Improvement points: Eliminate	Combine	Rearrange	Simplify
1.Query Review List	○ ⇨ □ D ▽		14.0	4.7				
2.Confirm Review Cases	○ ⇨ □ D ▽		45.0	1.5				
3.Check Responsible Physician for Review Cases	○ ⇨ □ D ▽		45.0	67.5				
4.Select Review Physician and Assign Cases	○ ⇨ □ D ▽		45.0	0.8				
5.System Automatically Sends SMS Reminder	○ ⇨ □ D ▽		45.0	0.0				
6.Call to Verbally Remind the Physician	○ ⇨ □ D ▽		10.0	10.0				
7-1.Physician Responds to Review Form	○ ⇨ □ D ▽		45.0	6912.0				
7-2.Visually Compare for Consistency	○ ⇨ □ D ▽		45.0	48.8				
8.Confirm Status of Cancer Registrar Coding Quality Review Form	○ ⇨ □ D ▽		45.0	2.3				
9.System Automatically Generates Consistency Rate Report	○ ⇨ □ D ▽		45.0	0.2				
10. Draft a Review and Improvement Report, Archive	○ ⇨ □ D ▽		0.0	0.0				
Grand Total				7047.8				

Comparison of Process Time Before and After Improvement





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