

Project Title

New ERA of Outpatient Lab Billing

Project Lead and Members

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Organisation(s) Involved

Singapore General Hospital

Healthcare Family Group(s) Involved in this Project

Healthcare Administration, Allied Health, Medical

Applicable Special or Discipline

Healthcare Administrator

Project Period

Start date: July 2022

Completed date: June 2023

Aims

To review and optimize the outpatient lab billing process to improve billing accuracy and completeness.

Background

Annually, there are over 1 million laboratory tests performed for our outpatients. However, the lack of integration between Laboratory Information System (LIS) and Outpatient Administrative System (OAS) results in patients and staff relying on paper-based processes, which is time-consuming and requires manual effort, to ensure that lab tests are billed accurately.

Methods

See poster appended/below

Results

See poster appended/below

Conclusion

See poster appended/below

Project Category

Technology

Digitalisation, Automation, Robotics Process Automation

Care & Process Redesign

Productivity, Time Saving,

Keywords

Laboratory Information System, Outpatient Administrative System, Pathology, Billing process, Laboratory services

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New ERA of Outpatient Lab Billing

Enhanced Experience – Revenue Recovery – Accelerating Automation

Background of the Problem

Annually, there are over 1 million laboratory tests performed for our outpatients. However, the lack of integration between Laboratory Information System (LIS) and Outpatient Administrative System (OAS) results in patients and staff relying on paper-based processes, which is time-consuming and requires manual effort, to ensure that lab tests are billed accurately.



Our Staff

- Over 576 man-hours spent per month to complete lab billing.
- Human errors resulting in inaccurate / incomplete billing.



Our Patients

- Reduced patient experience from bill disputes.

Aim

To review and optimize the outpatient lab billing process to improve billing accuracy and completeness.

Analysis of Problem

A multi-department workgroup was formed consisting of representatives from Finance, Ambulatory Services, Pathology to review the existing lab billing process. A process mapping exercise helped to identify key steps involved in the current billing process and the following areas for improvement.

- Better manage patients' expectations on lab services
- Improve billing accuracy and completeness of lab services

The workgroup subsequently used a Driver Diagram to brainstorm for potential interventions to address the improvement areas.

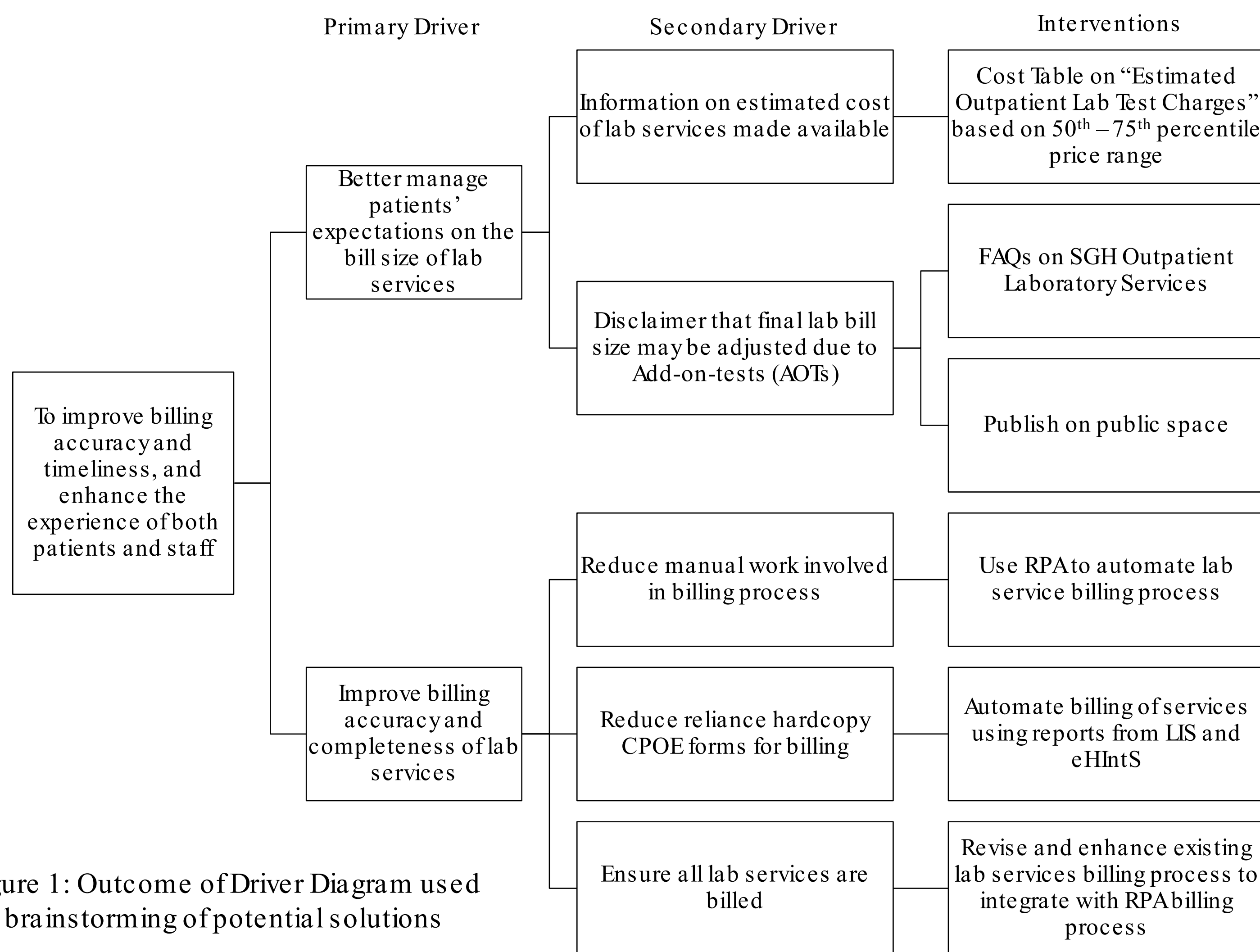
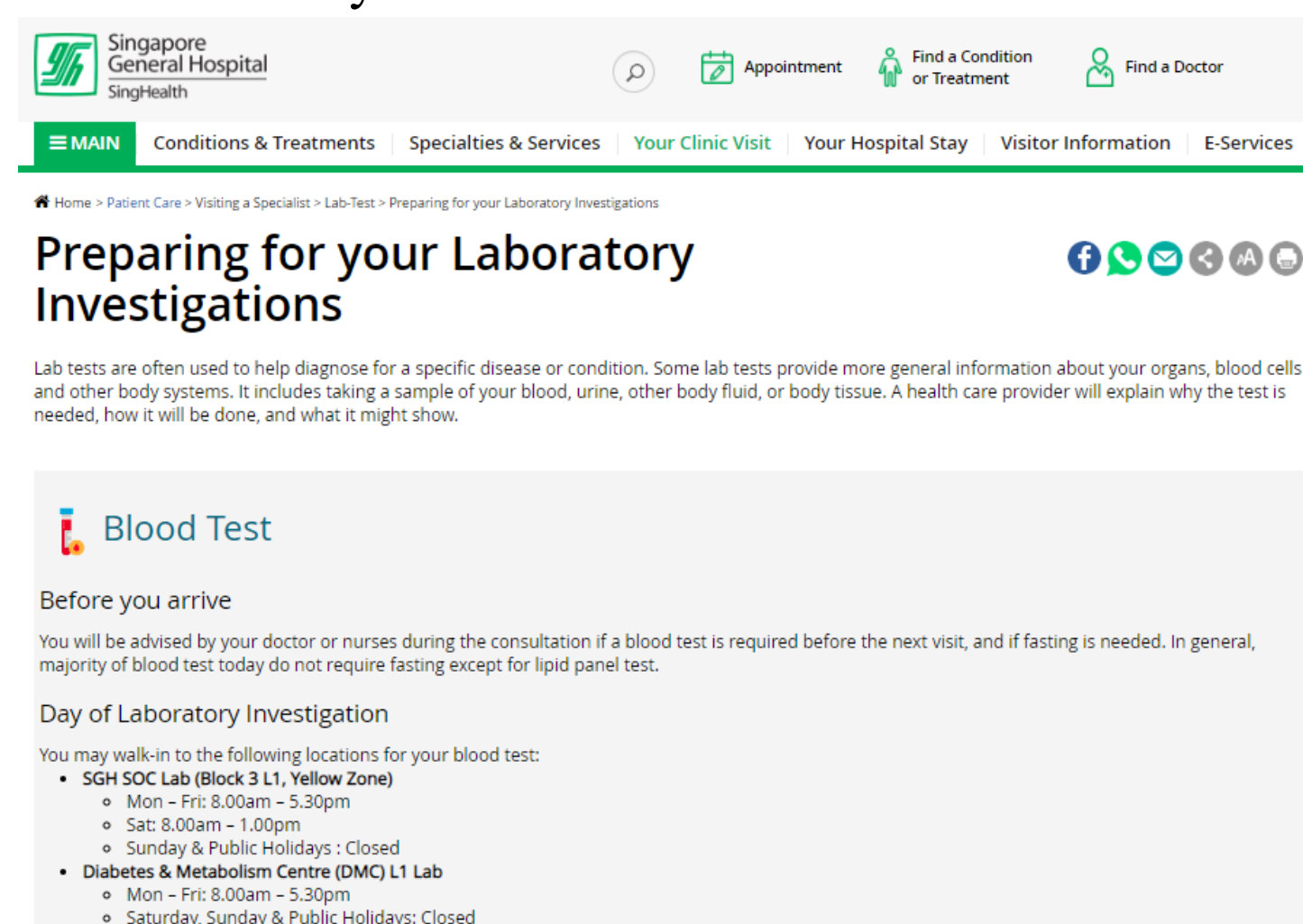


Figure 1: Outcome of Driver Diagram used for brainstorming of potential solutions

Interventions / Initiatives

- 1) Dedicated webpage on SGH Website (<https://www.sgh.com.sg/labtest>)
 - a. To help patients have a better idea of what to expect for their lab test visit and bill size
 - b. Information on estimated cost of lab services for common specialties are displayed, using 50th – 75th percentile of the bill sizes incurred by patients in FY2021
 - c. FAQs written in the flow of the patient's journey
 - d. Disclaimer to inform patients that additional tests may be performed based on clinical needs and charges will be billed accordingly

Figure 2: Webpage published on laboratory services



Cost of your laboratory investigations

Lab test investigations are required to be conducted to ascertain your medical condition and for the management of your medical needs. You may refer to the table below as a reference for price estimation for your lab tests in SGH.

Information on Estimated Outpatient Lab Test Charges in SGH

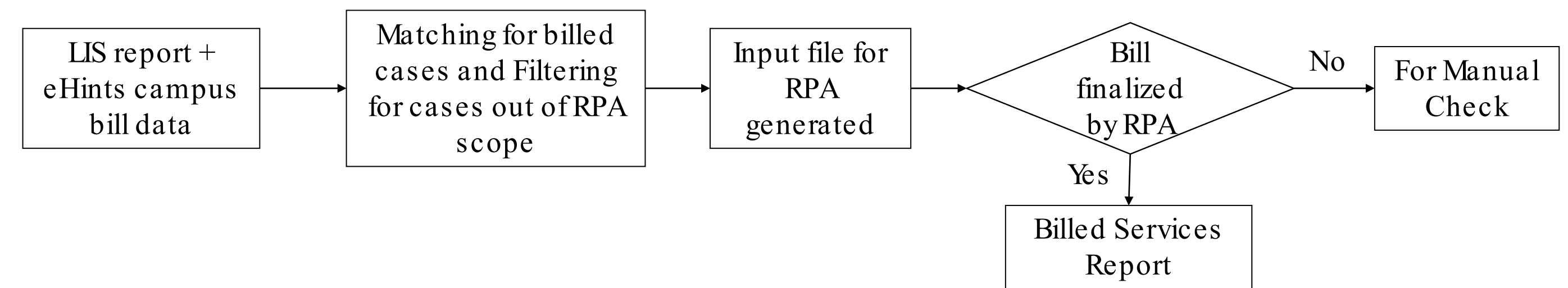
Specialty	Estimated Price Range	
	Private	Subsidised
Other Conditions	\$180 - \$335	\$62 - \$126
Renal Medicine	\$304 - \$631	\$152 - \$300
Rheumatology & Immunology	\$407 - \$687	\$154 - \$276
Blood Cancer	\$531 - \$1,340	\$163 - \$461
Liver Transplant	\$462 - \$869	\$279 - \$650

Information accurate as of 1st Jan 2024.

Interventions / Initiatives (continued)

- 2) Automation of lab billing with Robotic Process Automation (RPA)
 - a. Preparation of data source
 - Using data from LIS as the source of truth, lab tests are now billed when the tests are performed, rather than when the specimen is collected
 - This ensures precise charges posted to the patients and accurate recovery of revenue for the services rendered.

b. Summary of the RPA workflow for lab billing



- a. Scope of RPA
 - Currently, the scope of RPA covers 80% of existing outpatient lab billing workflows.
 - The remaining 20% comprises certain locations and types of cases that are excluded due to data limitations, special workflows, or existing separate RPA solutions.
- b. Selection of payer at bill finalization
 - The robot adopts the payer type from the most recent billed visit of the same case and finalizes the bill for these payer types: self-pay, staff benefit (all SingHealth institutions) and MCPS/CSC.
 - For all other payment methods, including Medisave (all schemes), the bills will be checked and finalized by a staff.

Outcomes

Lab Test Webpage Performance

Since its roll out in July 2022, the new webpage featuring details about SGH laboratory services and estimated costs has experienced a gradual increase in views.

- 90.1% of traffic came from Google search engine
- Close to 8,600 total views
Highest monthly views: 1,046
- 72.8% of viewers accessed via mobile device

RPA Billing Performance

RPA has been running daily since June 2023 to bill an average of 695 patients per day.

- 80% Manual workload alleviated
- 91% Accuracy rate^[1]

[1]: 9% attributed to system lag or errors encountered during 3rd party payer validation

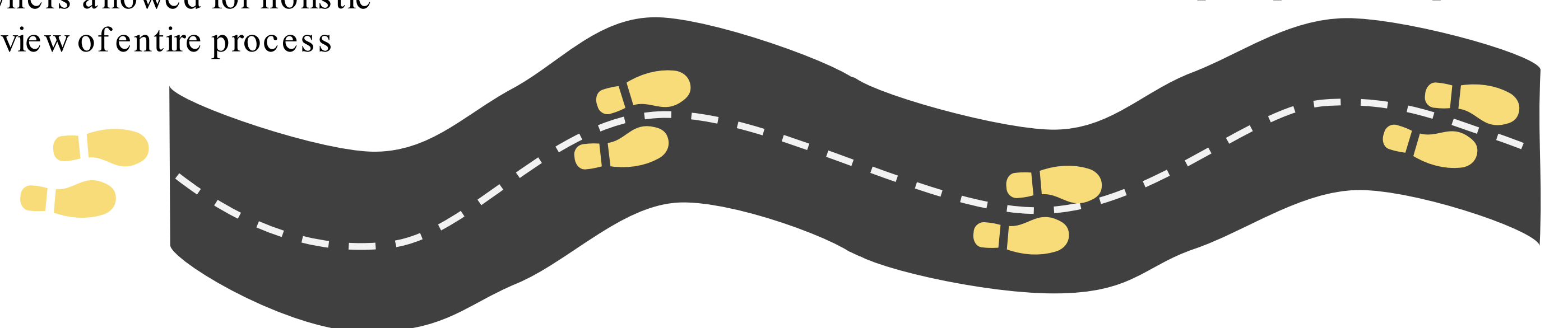
Benefits of Implementation

- Saved 3,211 man-hours involved in lab billing processes per year^[2]
- Reduced 50% of billing inaccuracies caused by billing oversights and variations in practices, amounting to >\$574k of revenue gained^[2]

[2]: Estimated based on data from June – December 2023

Learning Points

- Cross-Department Coordination: Inputs from different process owners allowed for holistic view of entire process
- Harmonized Workflow: Elimination of variations in practices between different clinics and departments is necessary to maximise the efficiency of RPA.
- Not the end but the start of a NEW workflow: Constant reviews and updates of the RPA logic to be aligned with hospital policies & processes



Adopting Automation
Repetitive and high-volume manual processes justified the use of RPA and helped staff to gain a better understanding of its capabilities and limitations

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1. Finance & Accounting, 2. Patient Financial Services, 3. Histopathology, 4. SOC Clinical Laboratory, 5. Specialist Outpatient Clinic-Operations, 6. Artificial Intelligence & Automation, 7. Process Transformation and Improvement