Comp2147 Group Project

ABC Family Medicine and Walk-in Clinic

Clinical Management System

Group 47

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Deadline: Tuesday December 2, 2025 (11:59 PM)

CONTENT

01- ABC Walk-in Clinic – System Service Request

Requested by: Abid Rana

Department: Clinic Management

Location: Greater Toronto Area, Ontario

Contact: arana@abcclinic.ca | (416) 415-5000

Date: December 1, 2025

Type of Request	[X] New System
Urgency	[X] Problem exist, but can be worked around

Problem Statement

Patient volume at ABC Clinic has increased, creating additional administrative workload for reception, nursing, and billing staff. Manual scheduling, paper-based charting, and disconnected systems have caused appointment delays, duplicate data entry, and billing errors. Staff spend excessive time reconciling records from labs, pharmacies, and insurance portals, leading to longer wait times and reduced patient satisfaction. The current manual process is not scalable for the expected 1,500–2,000 patients per week.

Service Request

We request an analysis and design of a Clinical Management System (CMS) to automate and integrate all clinic operations: appointments, check-ins, queue management, triage, clinical documentation, prescriptions, lab and referral handling, billing, AR/AP for non-covered services, reporting, and staff scheduling. The system must comply with Ontario privacy and confidentiality regulations and provide secure access for physicians, nurses, receptionists, and management.

IS Liaison: Charis Luk, IT Consultant (cluk@abcclinic.ca | 416-415-6000)

Sponsor: Abid Rana, Clinic Manager (arana@abcclinic.ca) | 416-415-5000)

02 - ABC Walk-in Clinic Prepared: November 11, 2025

Project Charter

Project Name:	Clinical Management System (CMS)
Project Manager:	Dr. Michael Park (mpark@abcclinic.ca)

Customer:	ABC Family Medicine and Walk-in Clinic
Project Sponsor:	Abid Rana, Clinic Manager(arana@abcclinic.ca)
Projected Start/End:	12/01/2025-08/31/2026

Project Overview

This project will design and implement a Clinical Management System (CMS) for ABC Walk-in Clinic to automate patient registration, scheduling, and billing processes. The CMS will replace paper-based workflows with an integrated, role-based digital platform that enhances patient throughput, improves accuracy, and ensures compliance with healthcare privacy regulations.

Objectives

- Eliminate redundant manual data entry across registration, triage, and billing.
- Provide accurate, timely access to patient and appointment data.
- Improve billing accuracy and turnaround time for government and private claims.
- Enable staff scheduling, reporting, and analytics for operational efficiency.

Key Assumptions

- The CMS will be developed using in-house + contracted IT resources.
- The interface will be web-based and accessible via secure login.
- Integration with external systems (MOH, labs, pharmacies, insurers) will be achieved through APIs or file exchange.
- All data will be stored in a secure, encrypted cloud database hosted in Canada.

Stakeholders and Responsibilities

Stakeholder	Role	Responsibility	Signature
Prof. Abid Rana	Clinic Manager	Sponsor, Project Vision, Resource Allocation	AR
Dr. Michael Park Dr.	Project Manager	Planning, Monitoring, Execution	MP
Sabrina Huda	Assistant Manager	Functional Requirements & Testing	SH
Janet Lee	Reception Lead	Workflow Design & Training	JL
Patti Visser	Head of Finance	Billing /AR-AP Integration	PV
Charis Luk	IT Consultant	Technical Architecture / Consultant Integration	CL

03- ABC Walk-in Clinic –Feasibility Analysis

Project: ABC Walk-in Clinic – Clinical Management System (CMS)
Prepared by: COMP 2147 Group (Student ID: 101573055 & 101566625)
Date: November 16, 2025
Project Budget: CAD $1,000,000

1. Introduction

ABC Walk-in Clinic provides family medicine and walk-in services to approximately 1,500 to 2,000 patients each week. The clinic still relies heavily on paper files, manual appointment logs, and scattered spreadsheets, which has resulted in longer patient wait times, duplicated or inaccurate information, delays and errors in billing, limited access to management reports, and increased compliance risks related to Personal Health Information Protection Act (PHIPA).

To address these challenges, the clinic proposes the implementation of a Clinical Management System (CMS). The system is expected to significantly improve operational performance and service quality.

2. Tangible and Intangible Benefits

Economic feasibility involves evaluating both measurable financial benefits and those improvements that contribute indirectly to operational effectiveness.

2.1 Tangible Benefits (Years 1–5)

The CMS is expected to reduce costs associated with paper, printing, overtime, and manual filing. It will also decrease Ontario Health Insurance Plan (OHIP) billing rejections and reduce data-entry errors. By improving how the clinic handles growing patient volumes, the system will help the clinic operate more flexibly without requiring additional staff. Faster patient check-in and shorter administrative cycle times will further improve efficiency. Management will gain more control through accurate reporting and analytics dashboards. Privacy compliance and enhanced patient trust will also provide added value. Altogether, these tangible benefits amount to approximately $350,000 per year.

2.2 Intangible Benefits

The project also provides several important intangible benefits. The CMS is expected to significantly improve patient satisfaction by reducing wait times and modernizing service

delivery. Staff morale is likely to improve as paperwork decreases and processes become more organized. The clinic's reputation and professionalism will be strengthened through a more integrated and responsive workflow. The system will also help ensure better compliance with PHIPA, reducing the risk of legal issues. Although these intangible benefits do not directly influence the NPV calculations, they play a critical role in building a strong business case.

3. Economic Feasibility

3.1 Cost–Benefit Analysis

The project's total budget is $1,000,000, which covers development and initial operational costs. The total present value of benefits is estimated at $1,261,350, while the present value of costs is approximately $1,150,020. This produces a net present value (NPV) of $111,330, which is positive but modest. The corresponding ROI is approximately 9.7%, which confirms that the project offers a low but acceptable level of financial return. Overall, the system is expected to reach payback in roughly four years, which is considered reasonable for a healthcare information system.

Comp2147 Group Project: ABC clinic							
ABC family medicine and walk in clinic							
Clinical Management System							
Benefits							
Year	**0**	**1**	**2**	**3**	**4**	**5**	**TOTAL**
Net Economic Benefit	0	350000	350000	350000	350000	350000	
Discount Rate 12% (0.12)	0.12	0.12	0.12	0.12	0.12	0.12	
1/(1+rate)**i	1	0.892857	0.797194	0.71178	0.63551808	0.567427	
PV of Benefits	**0**	312500	278950	248850	222431	198599	
NPV Benefits(Accumulative PVs)	0	312500	591450	840300	1062731	1261330	1261330
Costs							
Year	**0**	**1**	**2**	**3**	**4**	**5**	**TOTAL**
One Time Costs	1000000	60000	40000	40000	30000	30000	
Discount Rate 12% (0.12)	0.12	0.12	0.12	0.12	0.12	0.12	
1/(1+rate)**i	1	0.892857	0.797194	0.71178	0.63551808	0.567427	
PV of Costs	1000000	53571	31888	28471	19066	17023	
NPV Costs(Accumulative PVs)	1000000	1053571	1085459	1113930	1132996	1150019	1150019
Overall NPV							111311
Overall ROI (Overall NPV/NPV of all Costs)							0.09679

4. Break-even Analysis

A break-even review was performed to determine when cumulative discounted cash flows become positive. The results show that although the first three years continue to operate at a cumulative loss, the system begins approaching break-even during Year 4. Full break-even occurs between Year 4 and Year 5, which aligns with the expectation for a moderate-return healthcare project.

Breakeven Analysis						
Year	**0**	**1**	**2**	**3**	**4**	**5**
Yearly NPV Cash Flow	**-1000000**	**-741071**	**-494009**	**-273630**	**-70264**	**111312**
Overall NPV Cash Flow	-1000000	258929	247062	220379	203366	181576
Breakeven occurs between Year 4 and 5						
Use First Year of Positive Cash flow to calculate Break-even Fraction 70264-181576/70264 = 0.387						
Actual Break-even occurred at 4.4 Years						

5. Technical Feasibility

The technical evaluation indicates that the proposed CMS can be successfully developed and sustained by the clinic. The system will use a secure web-based architecture built on PHP or Node.js with a MySQL database. It will be hosted on a Canadian cloud provider to ensure that all data remains within Canadian legal boundaries. The platform will support HL7/FHIR standards to allow interoperability with laboratories and pharmacies and will include PHIPA-compliant authentication and audit logging. The clinic's existing IT consultant can support the system, and overall technical risks are considered manageable.

6. Operational Feasibility

Operationally, the CMS is well positioned to resolve the clinic's current workflow challenges. By eliminating paper-based processes, it will streamline patient check-in, reduce administrative delays, and improve the accuracy of clinical records. Physicians will experience smoother access to lab results and digital notes, and management will benefit from improved scheduling and billing insights. Although staff will require approximately two weeks of training, user adoption is expected to be strong because the system directly addresses long-standing pain points.

7. Schedule Feasibility

The project schedule fits within the required nine-month timeframe. One month is planned for requirements gathering and initial planning, followed by two months of system design, including the creation of ERDs, DFDs, wireframes, and overall architecture. Development will take place over the next three months, with two additional months dedicated to testing, UAT, and staff training. The final month will be reserved for deployment and post-go-live support.

8. Legal and Contractual Feasibility

The CMS complies with all relevant legal requirements. It adheres to PHIPA for patient privacy and ensures Canadian data residency in accordance with PIPEDA. All electronic billing features are designed to follow OHIP standards. Vendor agreements will explicitly address data ownership, system uptime, and security expectations, ensuring the clinic retains full control of its information.

9. Political Feasibility

Within the clinic, there is strong stakeholder support for the project. Management sees the CMS as a necessary modernization effort. Physicians appreciate the potential for faster lab result access and more efficient digital documentation. Reception staff welcome the idea of automated scheduling and reduced repetitive work. Resistance is expected to be minimal, especially with a proper training and rollout plan.

10. Conclusion and Recommendation

The Clinical Management System is feasible from every required perspective. Economically, the project demonstrates a low but positive NPV and ROI, with a reasonable four-year payback. Technically, it can be implemented using the clinic's existing infrastructure and expertise. Operationally, it addresses clear business problems and supports significant workflow improvements. The nine-month schedule is realistic, and the project meets all legal and regulatory requirements. Politically, it is supported by all major stakeholders.

Final Recommendation

The project should proceed. While the CMS is not intended to generate high financial returns, it offers substantial operational value by improving patient service, reducing errors, enhancing compliance, and stabilizing long-term clinic operations. These outcomes align with the strategic goals of healthcare information systems and fully support the clinic's commitment to better service delivery.

04-ABC Walk-in Clinic –Intangible Benefits

The project also provides several important intangible benefits. The Clinical Management System (CMS) is expected to significantly improve patient satisfaction by reducing wait times and modernizing service delivery. As paper-based processes are reduced and digital workflows are introduced, staff morale is likely to improve because tasks become easier, faster, and more organized. A better workflow means fewer frustrations for receptionists, nurses, and physicians, leading to a more positive work environment.

The clinic's reputation and professionalism will also be strengthened. A modern, integrated, and responsive digital system enhances the public image of ABC Walk-in Clinic, positioning it as a reliable, efficient, and technologically advanced health provider. Faster service, fewer lost files, and more accurate patient records contribute to stronger patient trust and improved community perception.

The CMS will further help ensure better compliance with Personal Health Information Protection (PHIPA) and Personal Information Protection and Electronic Documents Act (PIPEDA), reducing the risk of privacy breaches and legal issues. More accurate record-keeping, improved audit trails, and standardized documentation practices support safer long-term data handling and regulatory adherence.

In addition to these direct advantages, the system also delivers broader intangible benefits commonly associated with information system development, such as:

- Improved decision-making, supported by more accurate and timelier clinical and administrative data.
- Enhanced accuracy of information, reducing transcription or duplication errors common in paper systems. 10
- Better service to the community, through reliable patient follow-up, chronic disease tracking, and continuity of care.

- Improved communication within the clinic, enabling smoother coordination between reception, nursing, physicians, and external partners such as labs and pharmacies.
- Greater organizational learning, as staff gain familiarity with standardized digital processes that improve training and long-term operational maturity.

Intangible benefits play a critical role in building a strong business case for adopting the CMS. Together, they support higher-quality service delivery, long-term organizational stability, and stronger patient trust, outcomes essential for a modern healthcare practice.

05 - ABC Walk-in Clinic

Project Scope Statement

Prepared by: Dr. Michael Park

Date: November 13, 2025

General Project Information

Project Name:	Clinical Management System (CMS)
Sponsor:	Abid Rana, Clinic Manager(arana@abcclinic.ca)
Project Manager:	Dr. Michael Park

Problem / Opportunity Statement

Rapid patient growth has outpaced ABC Clinic's existing manual processes. Paper files and spreadsheets make it difficult to track appointments, billing, and medical records efficiently. A new digital solution is needed to support the clinic's expanding operations and enhance patient experience.

Project Objectives

Develop and implement an integrated Clinic Management System (CMS) that manages all patient and appointment records electronically, streamlines check-in, check-out, and walk-in queue management, automates government and private billing workflows, provides comprehensive reports for management and compliance, and ensures data security in adherence to Ontario's privacy standards.

Project Description

The CMS will centralize all patient-related data and automate clinical workflows by supporting appointment scheduling and walk-in queue management with triage priority, electronic documentation of visits, vitals, prescriptions, and lab requisitions, automatic billing generation for government and non-covered services, integration with third-party systems such as labs, pharmacies, and accounting, and a reporting dashboard that provides daily, weekly, and monthly summaries.

Business Benefits

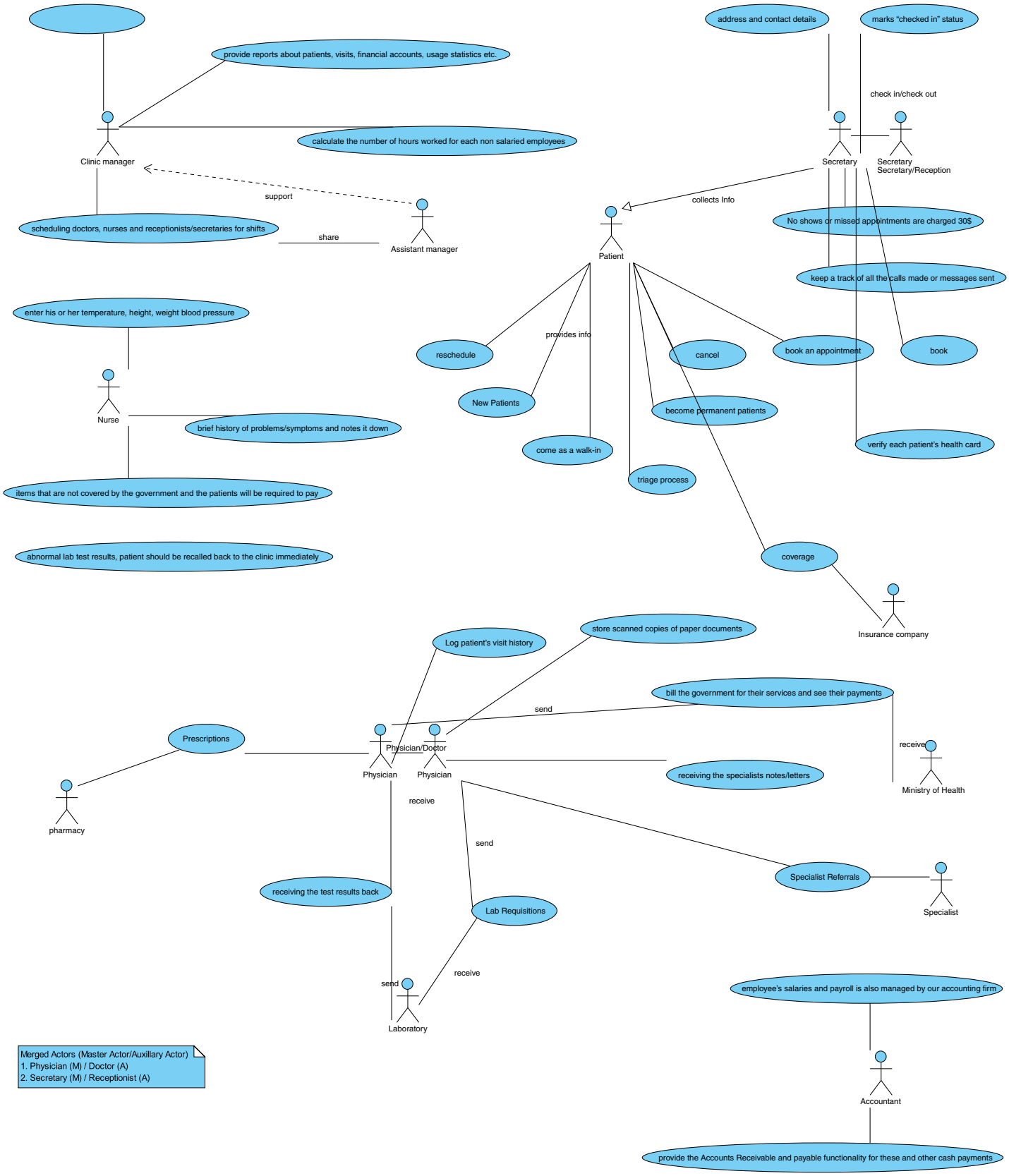
1. Reduced patient wait times and administrative workload.
2. Improved data accuracy, billing turnaround, and financial reporting.
3. Enhanced compliance with PHI privacy laws.
4. Scalable digital foundation for future clinic expansion.

Project Deliverables

1. CMS Requirements Analysis and System Design Documents.
2. CMS Application (Web Interface + Database).
3. User Training Manual and Implementation Guide.
4. Test Plan and Pilot Deployment Report.

Estimated Duration

9 months (December 01, 2025 – August 31, 2026)


provide reports about patients, visits, financial accounts, usage statistics etc.
Clinic manager
calculate the number of hours worked for each non salaried employees
support
scheduling doctors, nurses and receptionists/secretaries for shifts
share
Assistant manager
address and contact details
marks "checked in" status
check in/check out
Secretary
Secretary
Secretary/Reception
collects Info
Patient
No shows or missed appointments are charged 30$
keep a track of all the calls made or messages sent
enter his or her temperature, height, weight blood pressure
Nurse
brief history of problems/symptoms and notes it down
items that are not covered by the government and the patients will be required to pay
abnormal lab test results, patient should be recalled back to the clinic immediately
reschedule
provides info
New Patients
come as a walk-in
cancel
book an appointment
book
become permanent patients
triage process
verify each patient's health card
coverage
Insurance company
store scanned copies of paper documents
Log patient's visit history
bill the government for their services and see their payments
send
Prescriptions
Physician/Doctor
Physician
Physician
receiving the specialists notes/letters
receive
Ministry of Health
pharmacy
receive
send
Specialist Referrals
Specialist
receiving the test results back
Lab Requisitions
send
receive
Laboratory
employee's salaries and payroll is also managed by our accounting firm
Accountant
provide the Accounts Receivable and payable functionality for these and other cash payments
Merged Actors (Master Actor/Auxillary Actor)
1. Physician (M) / Doctor (A)
2. Secretary (M) / Receptionist (A)

ABC Clinic Case Description by clinic manager

eight receptionists and two Assistant managers to help me in running the day to day affairs of the clinic. Our clinic will be open

No.	Candidate Class	Extracted Text	Type	Description	Occurrence	Highlight
1	Assistant manager	Assistant managers	Generated M...	supports the manager, shares permissions for scheduling and administration	1	
2	Clinic manager	clinic manager	Generated M...	staff scheduling, payroll hours, reporting	1	
3	Patient	patient	Generated M...	register, book/cancel/reschedule, walk-in, pay, receive results	12	
4	Nurse	nurses	Generated M...	record vitals and medical history & symptoms	2	
5	Laboratory	Laboratory	Generated M...	receive requisition, send results	1	
6	Specialist	Specialist	Generated M...	receive referral, send notes	1	
7	Accountant	accountant	Generated M...	receive payroll report, process credit cards	1	
8	pharmacy	pharmacy	Generated M...	receive electronic prescription	1	
9	Physician	physician	Generated M...	iagnose, prescribe, order labs, referrals, billing	2	
10	Ministry of Health	Ministry of Health	Generated M...	health card check, billing payment	1	
11	Insurance company	insurance company	Generated M...	external insurance system for claims, approvals, and patient billing	1	
12	Doctor	doctors	Generated M...	diagnose, prescribe, order labs, referrals, billing	4	
13	Secretary	secretary	Generated M...	check-in, queue management, verify health card, payment handling	2	
14	Receptionist	receptionists	Generated M...	check-in, queue management, verify health card, payment handling	2	
15	come as a walk-in	come as a walk-in	Generated M...	walk-in patient is checked in, added to a queue, and assigned to doctor	1	
16	verify each patient's health card	verify each patient's health card	Generated M...	verify health card and mark the patient as arrived for their appointment	1	
17	marks "checked in" status	marks "checked in" status	Generated M...	verifies the patient's health card in real-time with the Ministry of Health system, confirms contact details, and marks the appointment	1	
18	store scanned copies of paper documents	store scanned copies of paper docu	Generated M...	upload paper-based results or letters into the system	1	
19	calculate the number of hours worked for each non salaried employ	calculate the number of hours work	Generated M...	track hours worked for payroll processing	1	
20	bill the government for their services and see their payments	bill the government for their servic	Generated M...	send physician claims to the Ministry of Health electronically	1	

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ABC Clinic Case Description by clinic manager

c. Lab Requisitions (print out given to the patient or sent to the Laboratory electronically; and receiving the test results back)

No.	Candidate Class	Extracted Text	Type	Description	Occurrence	Highlight
21	book an appointment	book an appointment	Generated M...	schedule a visit with a physician	1	
22	Log patient's visit history	Log patient's visit history	Generated M...	schedule a patient visit with a selected doctor at an available time	1	
23	reschedule	reschedule	Generated M...	reschedule Appointment	1	
24	brief history of problems/symptoms and notes it down	brief history of problems/symptom	Generated M...	records symptoms	1	
25	keep a track of all the calls made or messages sent	keep a track of all the calls made o	Generated M...	record all commnication with the patient	1	
26	enter his or her temperature, height, weight blood pressure	enter his or her temperature, heigh	Generated M...	record Vitals	1	
27	receiving the specialists notes/letters	receiving the specialists notes/lette	Generated M...	receive referrals electronically from specialist offices	1	
28	accept payments in cash or via a major credit card	accept payments in cash or via a m	Use Case	payment processing	1	
29	abnormal lab test results, patient should be recalled back to the clin	abnormal lab test results, patient sl	Generated M...	notify and document follow-up communication with patients.	1	
30	No shows or missed appointments are charged 30$	No shows or missed appointments	Generated M...	no show/missed appointments	1	
31	managing medical clinics	managing medical clinics	Generated M...	manager generates reports on patient visits, revenue, physician activity, usage statistics, and operational performance	1	
32	employee's salaries and payroll is also managed by our accounting	employee's salaries and payroll is a	Generated M...	manage payroll and salaries	1	
33	book	book	Generated M...	make appointment	2	
34	items that are not covered by the government and the patients will	items that are not covered by the g	Generated M...	handles payments for uninsured patients or services not covered by the government., accepts cash or credit card and issues receipts	1	
35	provide the Accounts Receivable and payable functionality for these	provide the Accounts Receivable ar	Generated M...	handle Accounts Payable, handle Accounts Receivable (Insurance/Cash)	1	
36	coverage	coverage	Generated M...	goverment health coverage	2	
37	provide reports about patients, visits, financial accounts, usage stat	provide reports about patients, visi	Generated M...	generates reports on patient visits, revenue, physician activity, usage statistics, and operational performance	1	
38	Prescriptions	Prescriptions	Generated M...	generate and print/send medication prescriptions electronically	1	

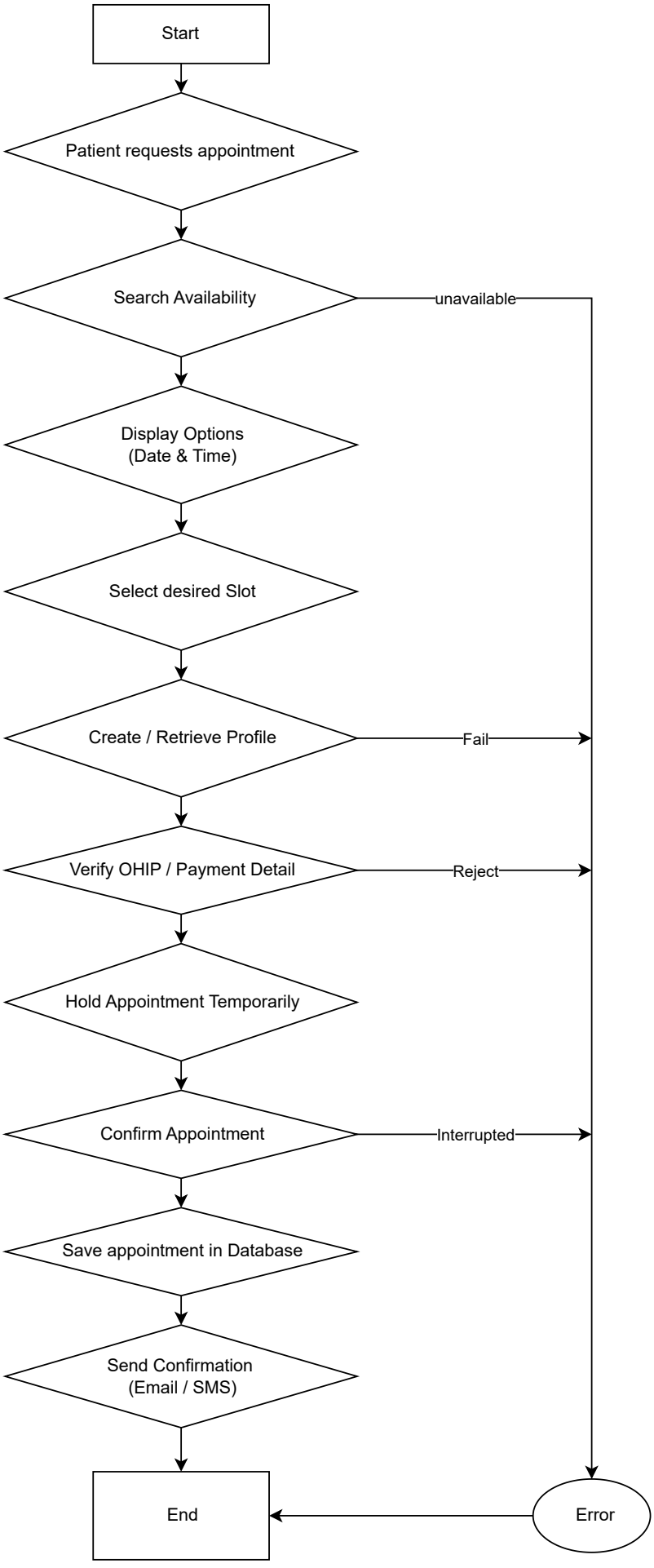
ABC Clinic Case Description by clinic manager

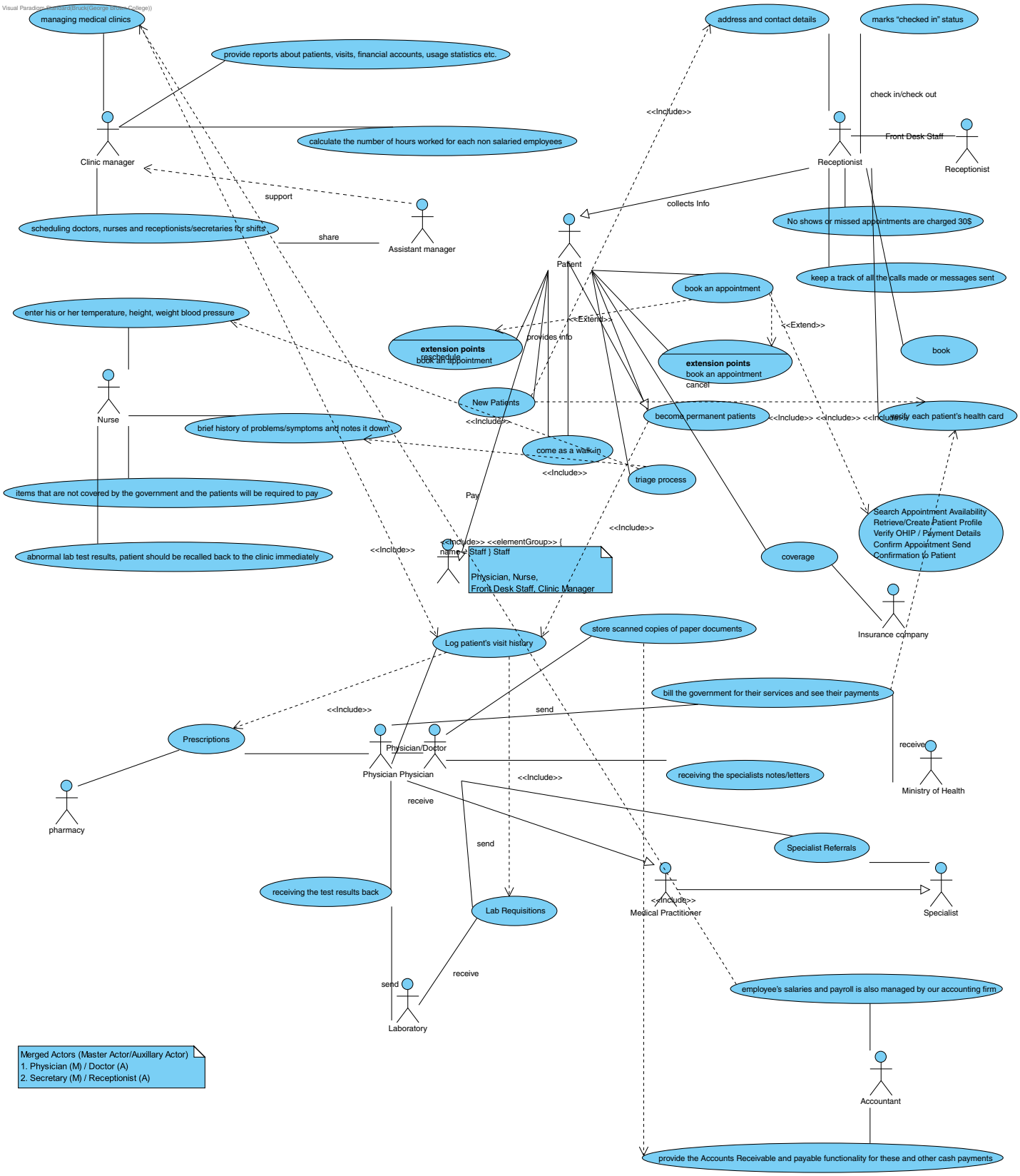
change the status accordingly: booked, canceled, arrived, Checked IN, Checked OUT, LWT(left without treatment), No show

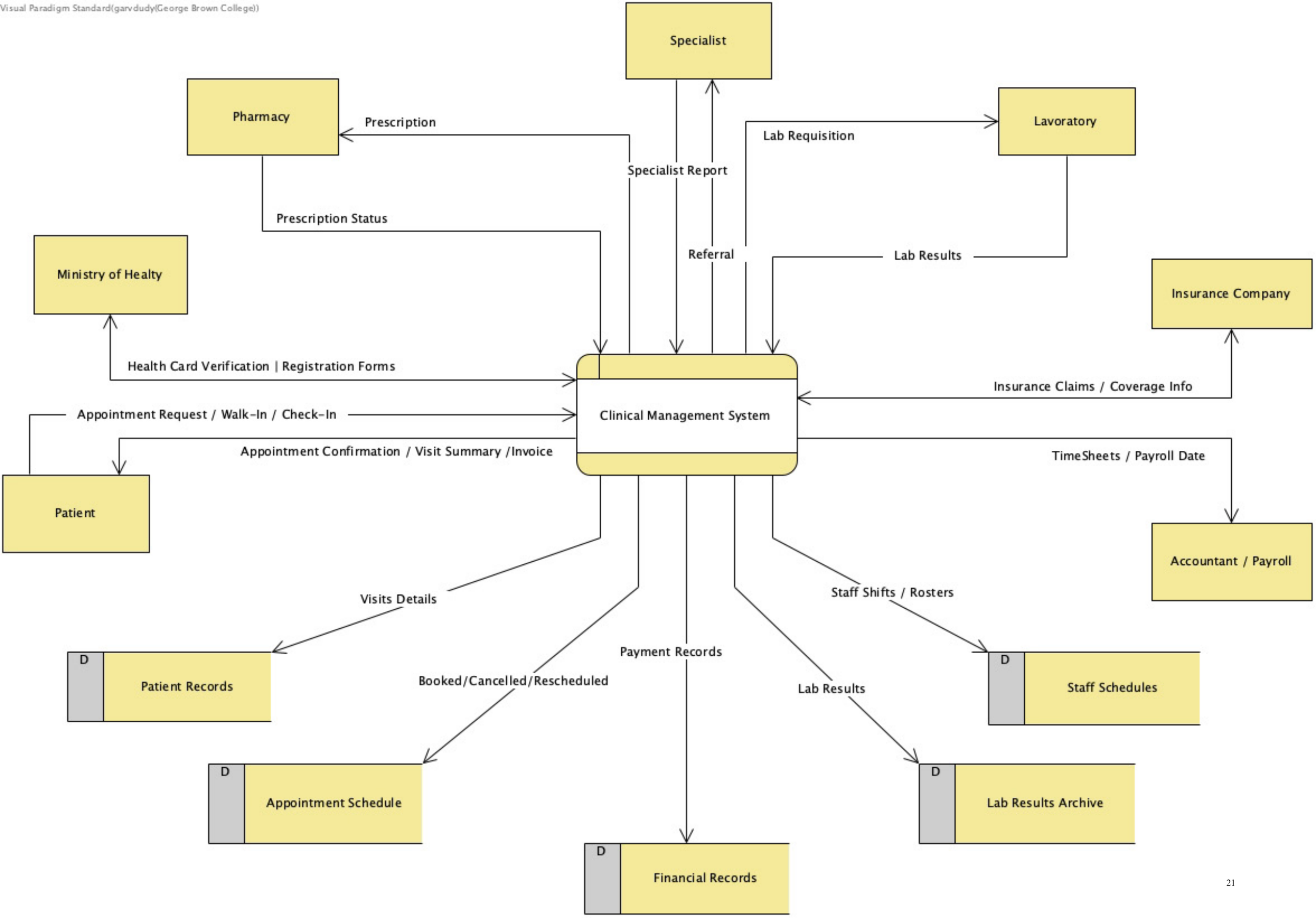
No.	Candidate Class	Extracted Text	Type	Description	Occurrence	Highlight
29	abnormal lab test results, patient should be recalled back to the clir	abnormal lab test results, patient s	Generated M...	notify and document follow-up communication with patients.	1	
30	No shows or missed appointments are charged 30$	No shows or missed appointments	Generated M...	no show/missed appointments	1	
31	managing medical clinics	managing medical clinics	Generated M...	manager generates reports on patient visits, revenue, physician activity, usage statistics, and operational performance	1	
32	employee's salaries and payroll is also managed by our accounting	employee's salaries and payroll is a	Generated M...	manage payroll and salaries	1	
33	book	book	Generated M...	make appointment	2	
34	items that are not covered by the government and the patients will	items that are not covered by the g	Generated M...	handles payments for uninsured patients or services not covered by the government., accepts cash or credit card and issues receipts	1	
35	provide the Accounts Receivable and payable functionality for these	provide the Accounts Receivable ar	Generated M...	handle Accounts Payable, handle Accounts Receivable (Insurance/Cash)	1	
36	coverage	coverage	Generated M...	goverment health coverage	2	
37	provide reports about patients, visits, financial accounts, usage stat	provide reports about patients, visi	Generated M...	generates reports on patient visits, revenue, physician activity, usage statistics, and operational performance	1	
38	Prescriptions	Prescriptions	Generated M...	generate and print/send medication prescriptions electronically	1	
39	receiving the test results back	receiving the test results back	Generated M...	electronic lab report	1	
40	address and contact details	address and contact details	Generated M...	edit patient contact or personal details	1	
41	scheduling doctors, nurses and receptionists/secretaries for shifts	scheduling doctors, nurses and rec	Generated M...	create work schedules for doctors, nurses, and receptionists	1	
42	Specialist Referrals	Specialist Referrals	Generated M...	create referrals and send electronically to specialist offices	1	
43	Lab Requisitions	Lab Requisitions	Generated M...	create lab test orders and send or print them for the patient	1	
44	New Patients	New Patients	Generated M...	create a new patient profile with personal and health card information	1	
45	cancel	cancel	Generated M...	cancel or change an appointment up to 24 hours before	1	
46	become permanent patients	become permanent patients	Generated M...	cancel a previously booked appointment	2	
47	triage process	triage process	Generated M...	chest pain, wound treatment	1	

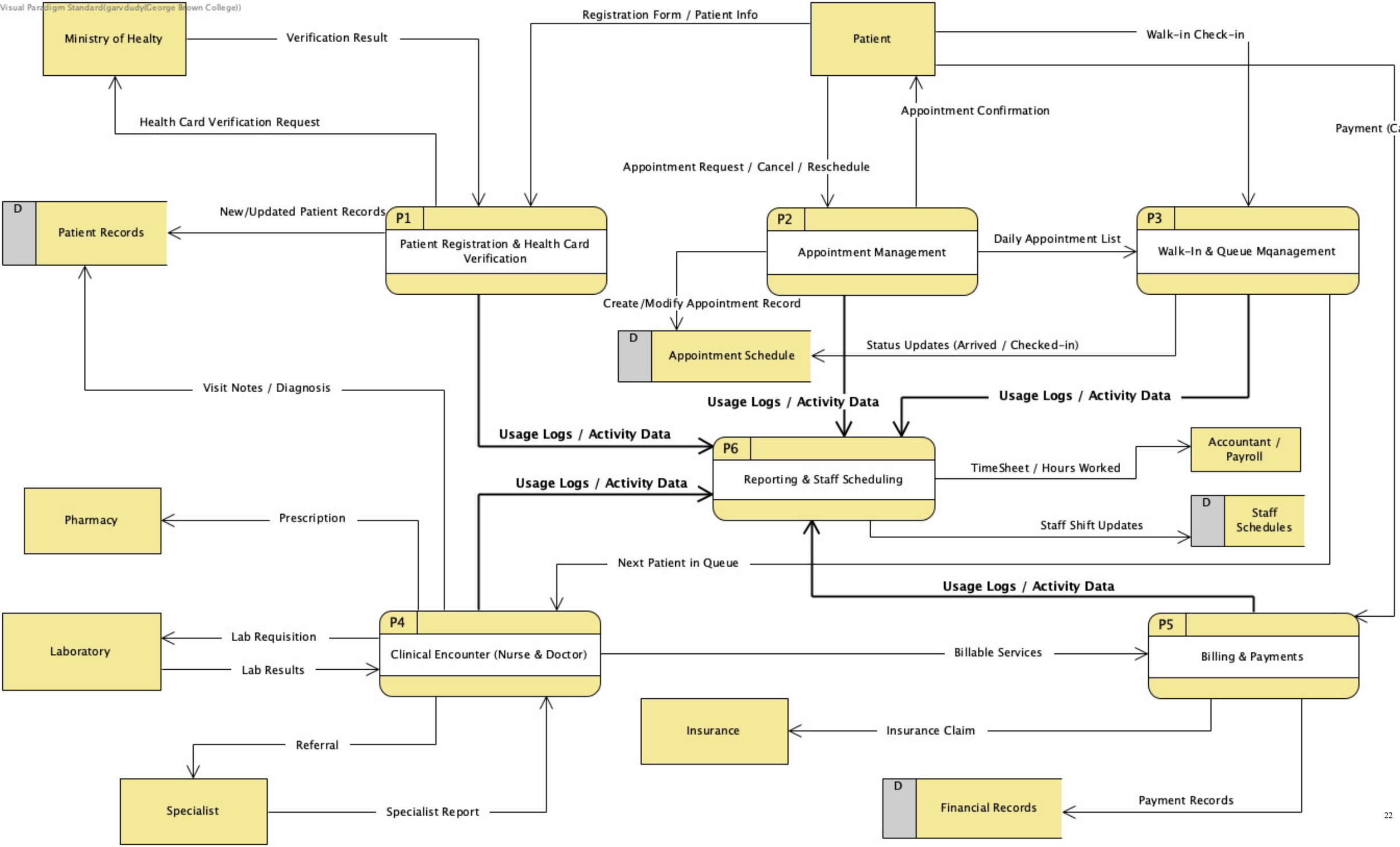
08- ABC Walk-in Clinic – **Written Use Case – KITE Level**

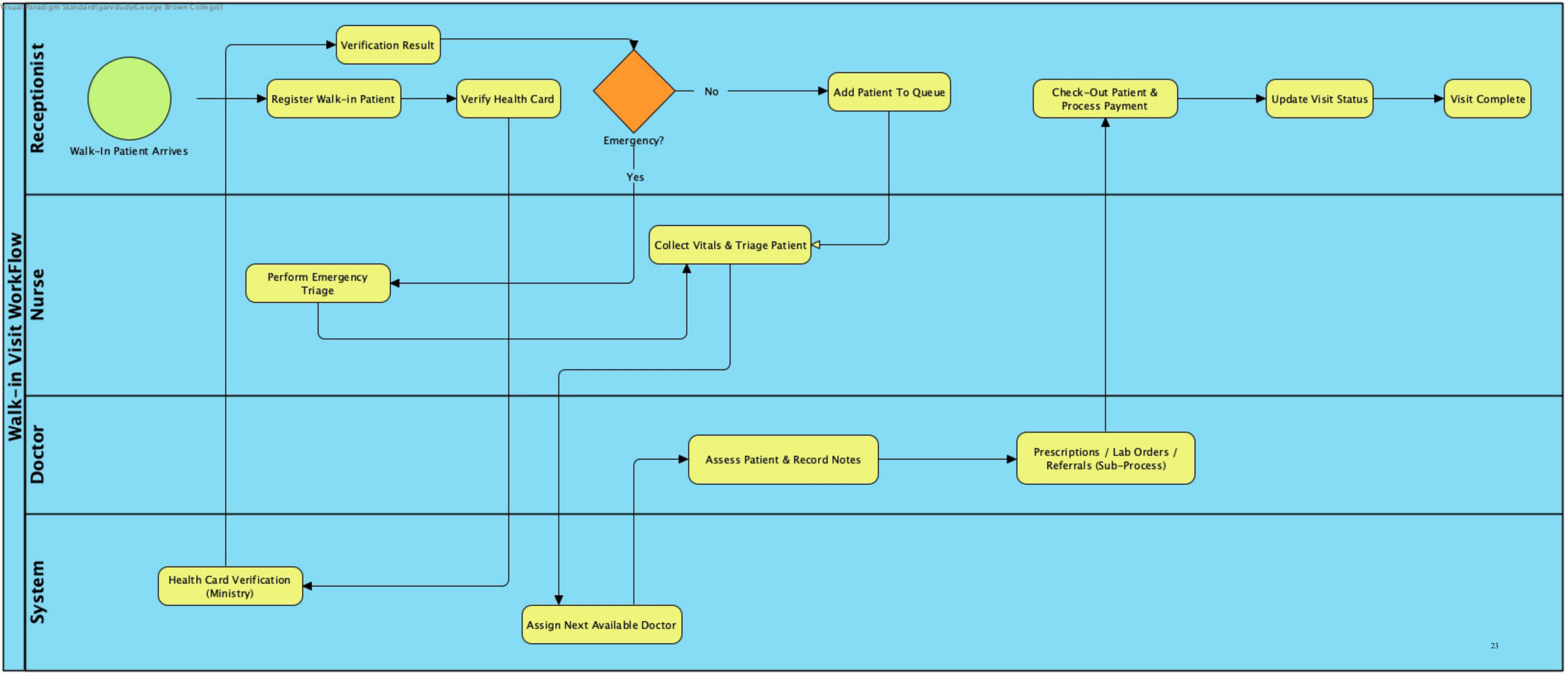
Use Case Title	**Manage Patient Appointment**
Primary Actor	Patient
Level	Kite (summary)
Stakeholders	Patient, Receptionist, Physician, OHIP Billing System
Precondition	Patient accesses the clinic website or contacts the clinic. Clinic CMS is online and operational
Minimal Guarantee	Any incomplete appointment request is rolled back with no partial data stored
Success Guarantee	Appointment is successfully booked, stored in CMS, and confirmation is issued to the patient
Trigger	Patient requests to book an appointment (online, phone, or in-person).
Main Success Scenario	1. Patient accesses the ABC Clinic CMS (web portal or phones reception)
	2. Patient searches for available appointment slots with preferred doctor or service
	3. Patient selects an available date and time.
	4. CMS retrieves patient record or creates a new record for first-time users
	5. CMS verifies patient eligibility (OHIP validation or payment method)
	6. CMS holds the appointment slot temporarily
	7. Patient submits final confirmation
	8. CMS stores the appointment in the database and marks the time slot as unavailable
	9. CMS sends confirmation (email/SMS/portal)
Extensions	1a. Appointment search function unavailable
	1a1. Patient notified that the system is temporarily unavailable
	1a2. Patient quits or retries later
	1b. No appointments available for selected physician/service
	1b1. Patient offered next available staff/clinic location
	1b2. Patient selects alternative OR quits the process
	2a. CMS cannot retrieve patient profile
	2a1. System prompts patient to re-enter required details
	2a2. Patient retries OR cancels request (transaction rolled back)
	5a. OHIP eligibility cannot be verified
	5a1. Patient notified of issue.
	5a2. Patient chooses to provide alternate payment method OR
	5a3. Patient quits (transaction rolled back)
	7a. Confirmation transaction interrupted
	7a1. Patient notified and offered alternate confirmation method
	7a2. Patient quits (transaction rolled back)

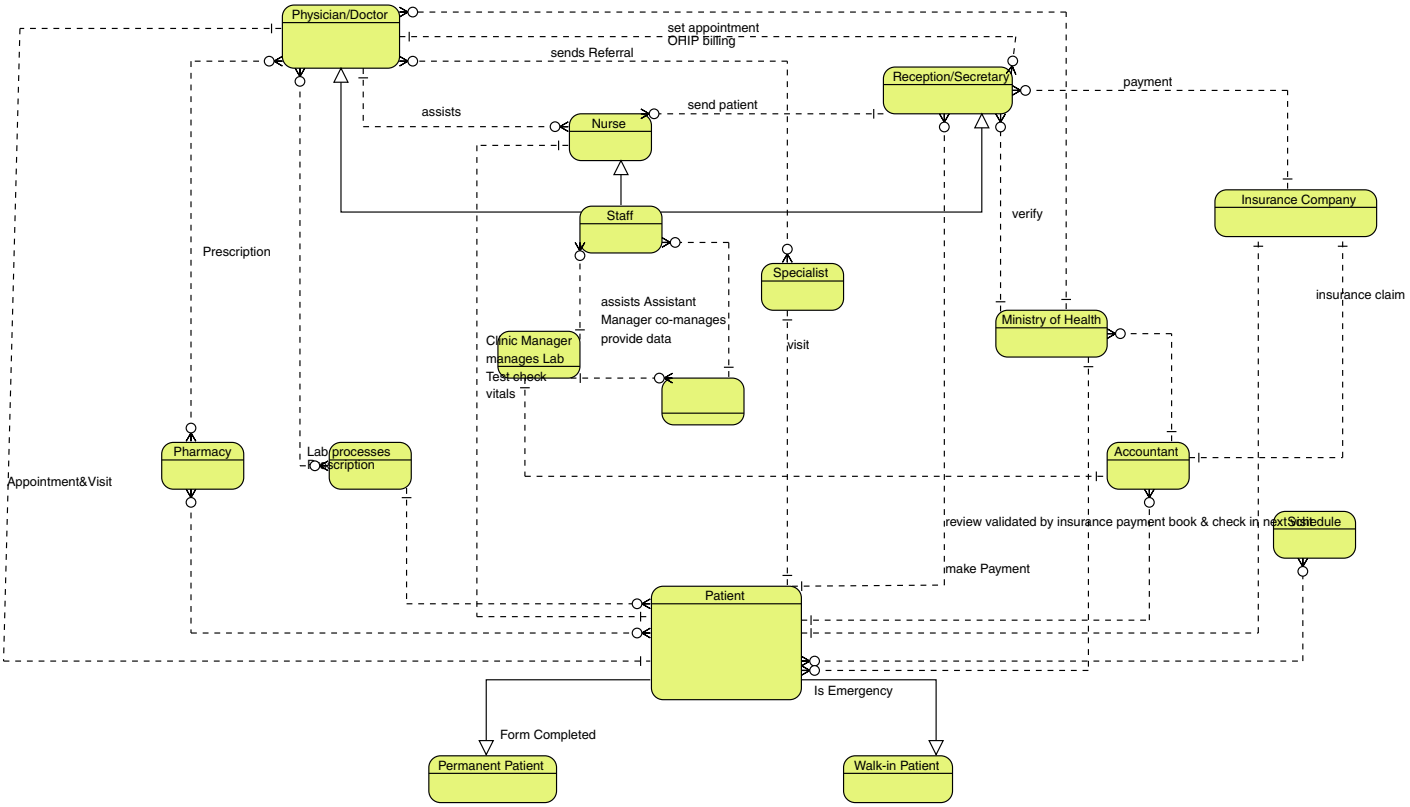

Start
Patient requests appointment
Search Availability
unavailable
Display Options
(Date & Time)
Select desired Slot
Create / Retrieve Profile
Fail
Verify OHIP / Payment Detail
Reject
Hold Appointment Temporarily
Confirm Appointment
Interrupted
Save appointment in Database
Send Confirmation
(Email / SMS)
End
Error


managing medical clinics
provide reports about patients, visits, financial accounts, usage statistics etc.
Clinic manager
calculate the number of hours worked for each non salaried employees
support
scheduling doctors, nurses and receptionists/secretaries for shifts
share
Assistant manager
address and contact details
marks "checked in" status
<<Include>>
check in/check out
Receptionist
Front Desk Staff
Receptionist
collects Info
No shows or missed appointments are charged 30$
keep a track of all the calls made or messages sent
Patient
book an appointment
<<Extend>>
<<Extend>>
book
enter his or her temperature, height, weight blood pressure
provides info
extension points
reschedule
book an appointment
extension points
book an appointment
cancel
Nurse
New Patients
<<Include>>
become permanent patients
<<Include>> <<Include>> <<Include>>
verify each patient's health card
brief history of problems/symptoms and notes it down
come as a walk-in
<<Include>>
triage process
items that are not covered by the government and the patients will be required to pay
Pay
Search Appointment Availability
Retrieve/Create Patient Profile
Verify OHIP / Payment Details
Confirm Appointment Send
Confirmation to Patient
<<Include>>
<<Include>>
<<Include>> <<elementGroup>> {
name = Staff } Staff
Physician, Nurse,
Front Desk Staff, Clinic Manager
abnormal lab test results, patient should be recalled back to the clinic immediately
coverage
Insurance company
store scanned copies of paper documents
Log patient's visit history
bill the government for their services and see their payments
<<Include>>
send
Prescriptions
Physician/Doctor
Physician Physician
receive
Ministry of Health
receiving the specialists notes/letters
<<Include>>
pharmacy
receive
Specialist Referrals
send
receiving the test results back
Lab Requisitions
<<Include>>
Medical Practitioner
Specialist
send
receive
Laboratory
employee's salaries and payroll is also managed by our accounting firm
Accountant
provide the Accounts Receivable and payable functionality for these and other cash payments
Merged Actors (Master Actor/Auxillary Actor)
1. Physician (M) / Doctor (A)
2. Secretary (M) / Receptionist (A)





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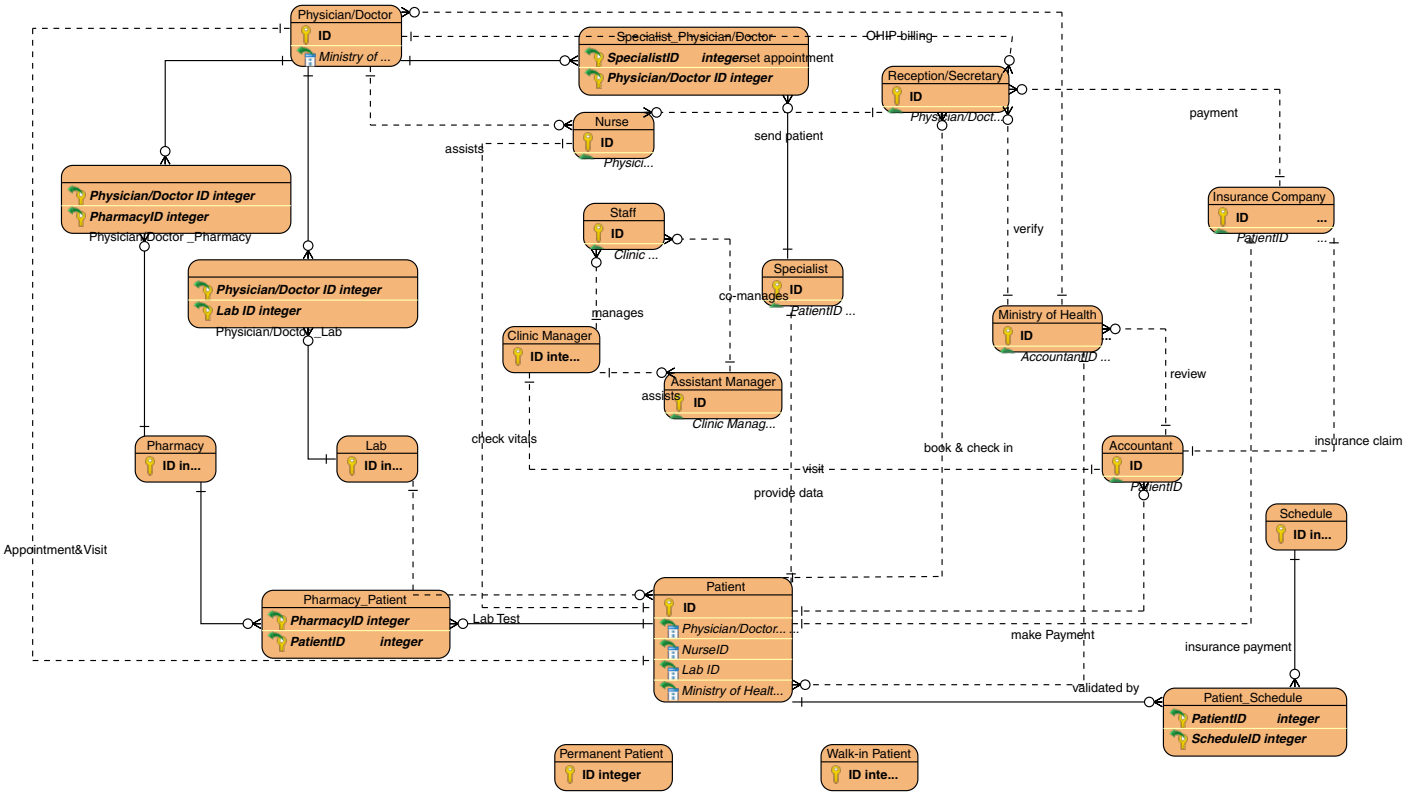
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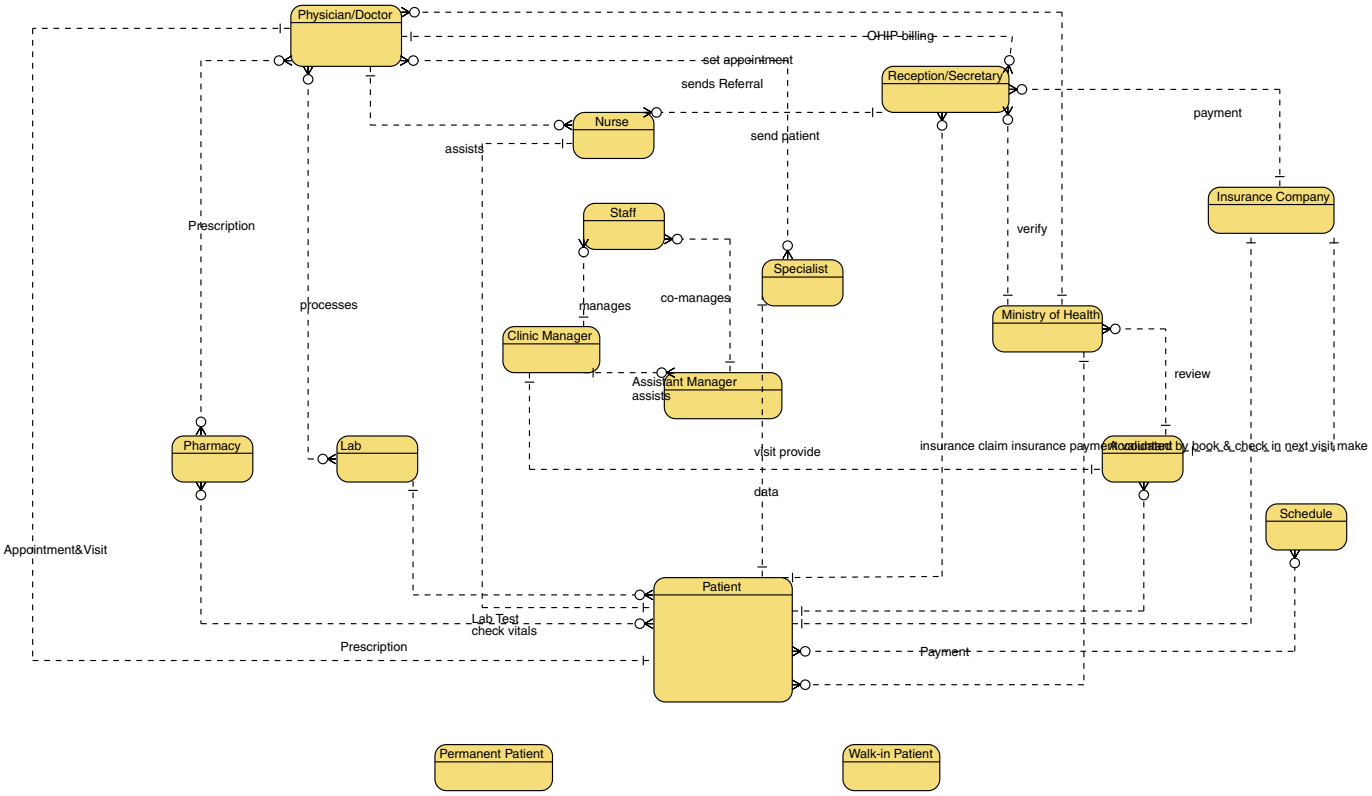
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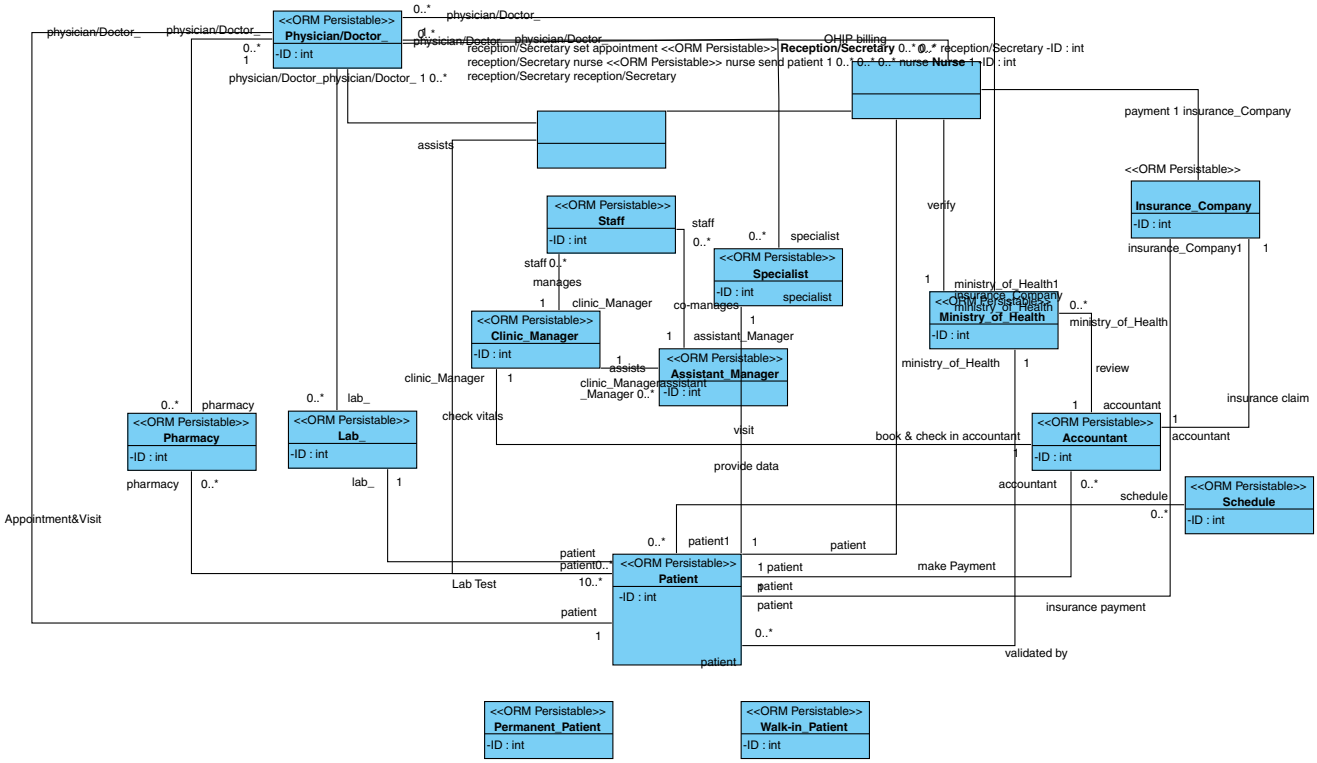
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ABC

ABC family medicine & walk in clinic

About us contact us

Search

Home Family Practice Patients Doctors

Book your Appointments Online

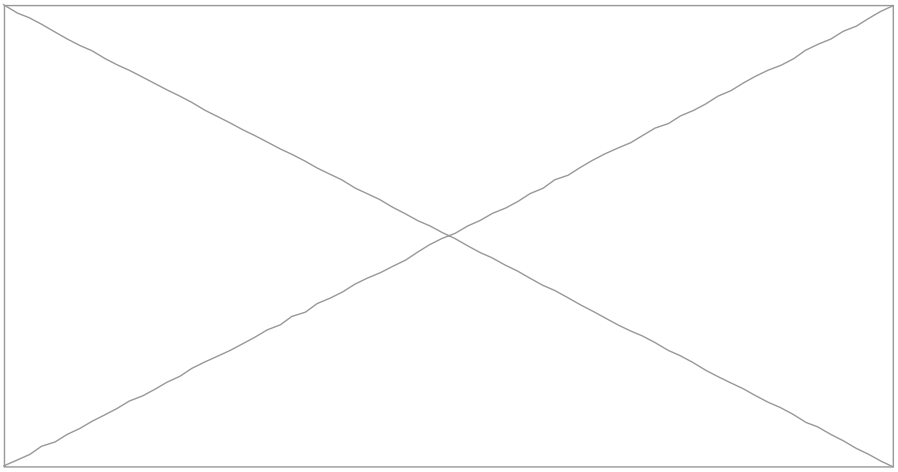
Google Map Direction

Emergency Walk-In

Patient Visit History

Blood test requisitions

Payment Entry Form

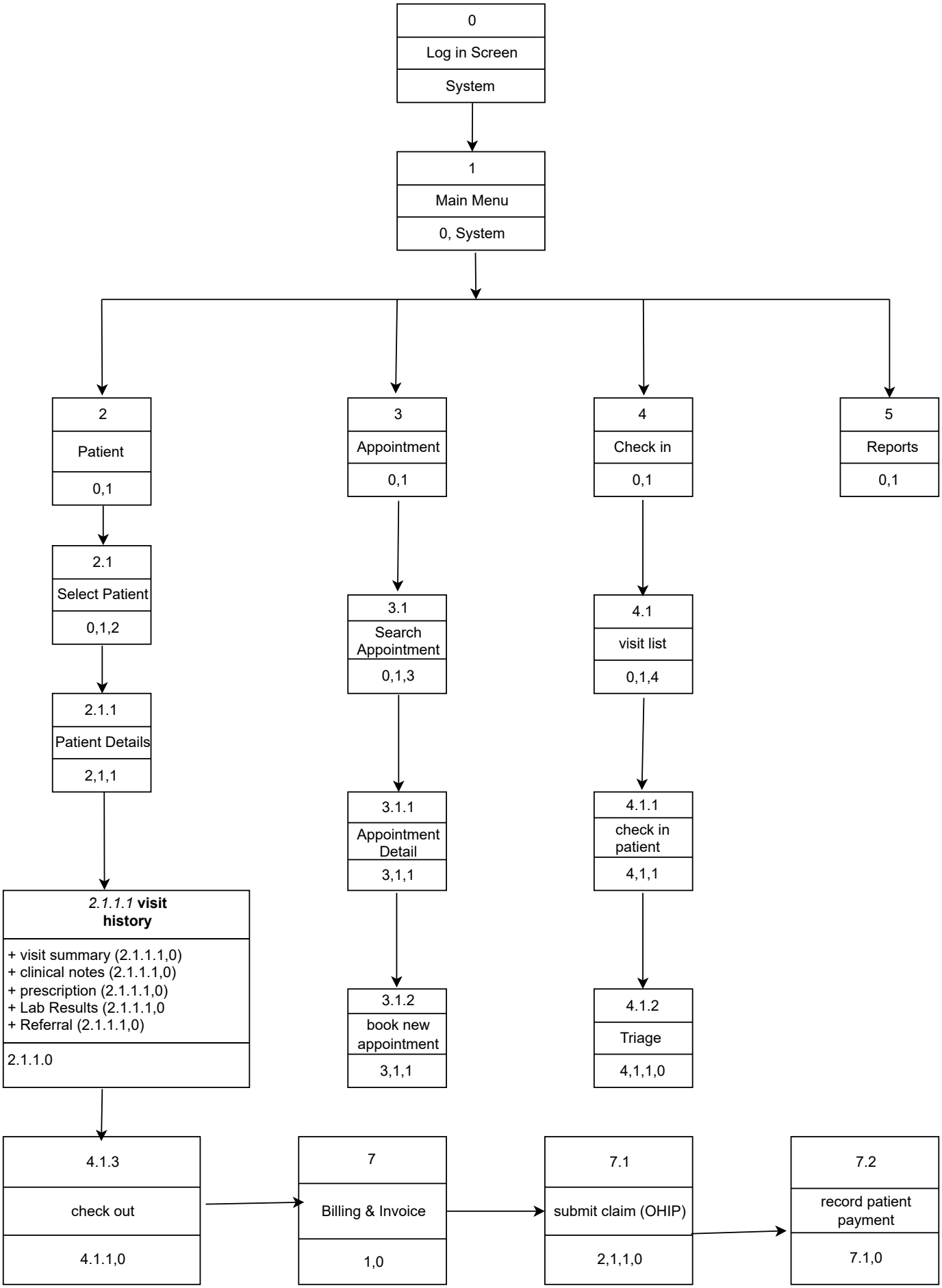


book an appointmentregister to join practice

Schedule hours
Monday 8am - 8pm
Tuesday 8am - 6pm
Wednesday 8am - 6pm
Thursday 8am - 8pm
Friday 8am - 6pm
Saturday 8am - 2pm
Sunday 8am - 2pm

Family Medicine &
Walk in Clinic
Location

Find our locations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+ prescription (2.1.1.1,0)
+ Lab Results (2.1.1.1,0
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19- ABC Walk-in Clinic –System Implementation and Maintenance Plan

19.1 Introduction

The System Implementation and Maintenance Plan outlines how the Clinical Management System (CMS) designed for ABC Walk-in Clinic will be deployed, tested, trained, supported, and maintained. This implementation plan aligns with the nine-month project schedule (Dec 2025 – Aug 2026) described in the Project Scope Statement and the Feasibility Study.

All implementation steps directly support the business needs identified in the System Service Request: reducing wait times, automating registration and billing, consolidating clinical workflows, and ensuring PHIPA/PIPEDA compliance.

19.2 Implementation Strategy

Chosen Strategy: Phased & Single-Location Pilot

This approach best fits the clinic's operation and minimizes risk. This phased approach also aligns with the Feasibility Study's recommendations by distributing operational impact over multiple months, supporting the clinic's low NPV but acceptable ROI strategy.

Why this strategy?

- ABC Clinic operates a single physical location, simplifying deployment.
- Phased rollout reduces staff overwhelm and isolates issues early.
- Healthcare operations cannot tolerate downtime, so phased rollouts ensure continuity.

Phase Breakdown (9-Month Schedule)

Phase 1 — Infrastructure & Setup (Month 1–2)

- Cloud hosting setup (Canada-only residency)
- Database schema deployment (based on conceptual & logical ERDs)
- VPN, secure login, role-based access control
- Initial configuration of audit logging & backup policies

Phase 2 — Core Administrative Modules (Month 3–4)

- Patient registration
- Appointment booking, walk-in queue management
- OHIP eligibility verification workflow
- Staff login & security permissions

Phase 3 — Clinical Workflow Modules (Month 5–6)

- Nurse triage (vitals, symptoms)
- Physician visit documentation (SOAP notes)
- Lab requisitions, prescriptions, referrals
- Scan & store paper documents

Phase 4 — Billing, AR/AP & Reporting (Month 7)

- OHIP billing integration
- Non-covered services invoicing
- Insurance integrations
- Management & compliance reports

Phase 5 — Training, UAT & Go-Live (Month 8)

- End-to-end workflow validation based on the written use case
- Staff training manuals and hands-on sessions
- Beta operations with paper fallback

Phase 6 — Post-Implementation Review (Month 9)

- 30-day monitoring
- Bug fixing
- Enhancements based on user feedback

19.3 Testing Plan

Testing is structured according to the System Implementation principles

19.3.1 Testing Types

1. Unit Testing

Performed by developers for:

- Registration functions
- Appointment booking
- OHIP validation API calls
- Billing calculations
- Visit documentation & data entry forms

2. Integration Testing

Covers full workflows defined in the Use Case and Activity Diagram

(appointments → check-in → triage → visit → billing).

Examples:

- Appointment search → confirmation
- Triage → labs → billing
- Lab results flowing back into patient chart

3. System Testing

Validates complete system behaviour against the business requirements in the Scope Statement:

- Role-based access for Receptionist, Nurse, Physician, Manager
- Queue management for walk-ins
- Document scanning
- Error handling for OHIP failures

4. User Acceptance Testing (UAT)

Performed by clinic staff (Receptionists, Nurses, Physicians, Finance) using real scenarios:

- Booking appointments 33
- Checking in walk-ins
- Recording vitals
- Entering SOAP notes
- Submitting OHIP claims

Pass criteria:

- All major workflows must complete without manual fallback
- No critical defects
- Staff must sign UAT acceptance forms

All workflows must show full PHIPA-compliant logging, role separation, and secure data handling.

19.4 Data Migration Plan

As noted in the System Service Request, the clinic currently uses:

- Paper files
- Spreadsheets
- Separate billing portals

Migration Activities

- Extract demographic information from spreadsheets
- Digitize active patient files (minimum: last visit, allergies, medications, chronic problems)
- Import upcoming appointments for the next 30–60 days
- Scan critical documents (lab results, specialist letters, imaging)

Migration Validation

- Reconciliation counts (patients, appointments, unpaid invoices)
- Spot-checking accuracy against paper files
- Staff verification of critical patients (e.g., chronic disease follow-ups)

19.5 Training Plan

Training is based on the staff roles defined. This traning duration matches the schedule feasibility analysis, confirming that traning can be completed within the planned two week period.

Role Based Modules	Training Includes
Receptionists/Secretaries	Registration, check-in, OHIP validation, queue management, appointment scheduling
Nurses	Triage, vitals entry, symptoms/history notes
Physicians/Doctors	Visit documentation, prescriptions, lab requisitions, referrals
Accountant	AR/AP, OHIP submissions, payment processing
Clinic Manager/Assistant Manager	Reporting, staff scheduling, audit logs

Training Delivery Methods

- Hands-on workshops
- Training videos & quick-reference sheets
- Sandbox/test environment
- User Manual prepared as per project deliverables

Training Duration

Estimated 2 weeks, aligning with feasibility findings (Operational Feasibility).

19.6 Documentation Plan

System Documentation

- Architecture diagrams
- ERD (conceptual + physical)
- Data dictionary
- Security and access control documentation
- API and interoperability specifications (labs, OHIP, insurers)

User Documentation

- Receptionist workflow guide (check-in, schedule, billing)
- Nurse triage workflow
- Physician clinical workflow
- Billing and financial documentation
- Troubleshooting guide

19.7 Support Plan (Post-Go-Live)

Support Levels

Level 1 – Front-Desk Support / Superusers

- Reception lead and assistant manager handle minor issues

Level 2 – Technical Support (IT Consultant)

- Handles login, performance, and configuration issues

Level 3 – Vendor / Developer Support

- Handles defects, enhancements, API failures

Support Tools

- Ticketing system (escalation level -Critical, Major, Minor)
- Error logs
- Audit trails for PHIPA compliance

30-Day Stabilization Period

- Daily check-ins during Week 1
- Weekly review for the first month
- Monthly system review meetings afterwards

19.8 Maintenance Plan

Maintenance follows the four classical maintenance types.

1. Corrective Maintenance

Fixing bugs discovered post-launch (e.g., missing OHIP codes, form validation errors).

2. Adaptive Maintenance

Adapting to changes:

- New OHIP billing codes
- Updated PHIPA regulations
- New insurer integrations

3. Perfective Maintenance

Enhancements requested by clinic:

- Additional dashboard analytics
- Faster triage forms
- Better appointment search filters

4. Preventive Maintenance

- Code refactoring
- Database indexing
- Regular security patches
- Backup and recovery testing

Maintenance Logs & Governance

- Change Requests (CRs) tracked using ticketing system
- Version control and controlled deployments
- Monthly maintenance reports to the Clinic Manager

19.9 Risk Mitigation for Implementation

Risk	Mitigation
Staff resistance	Early training, phased rollout
Data migration errors	Validation, parallel runs
System downtime	Cloud redundancy, backup procedures
Privacy/security risks	PHIPA-compliant logging, encrypted database
OHIP integration errors	Pre-go-live testing with sample claims

19.10 Conclusion

The proposed Implementation and Maintenance Plan ensures that the Clinical Management System (CMS) can be deployed safely, efficiently, and in alignment with the nine-month project timeline.

By leveraging phased installation, strong testing procedures, structured training, data migration controls, and a robust support model, the CMS will deliver the operational improvements, compliance, and patient-service enhancements identified earlier in the project.

This plan completes the lifecycle from requirements → design → feasibility → implementation → long-term sustainability, ensuring the CMS can fully support ABC Clinic's growth and modernization goals.