



# Smart Pharmacy Management System

**Category:** Healthcare

**Course:** PL/SQL

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# Project Overview

This PL/SQL-driven Smart Pharmacy system enhances medication safety and operational efficiency.

## Safety & Compliance

Reduces medication errors and ensures regulatory audit trails.

## Inventory Management

Manages batch-level inventory with expiry dates.

## Automated Checks

Checks for drug interactions and patient allergies at dispense time.



# Key Objectives

## 1 Batch & Expiry Tracking

Track medication batches and expiry-driven inventory.

## 2 Prescription Validation

Validate prescriptions against allergies and drug interaction rules.

## 3 FIFO Dispensing

Reserve and decrement batch quantities using FIFO by expiry.

## 4 Automated Alerts

Generate alerts for low stock and near-expiry batches.

## 5 Full Audit Trail

Maintain a complete audit trail of all pharmacy actions.



# Core Database Schema

The system relies on a robust database structure to manage all pharmacy operations.

- **MEDICATIONS:** Details of all drugs.
- **BATCHES:** Inventory by batch and expiry.
- **PATIENTS:** Patient demographics and allergies.
- **PRESCRIPTIONS:** Prescription details.
- **PRESCRIPTION\_LINES:** Specific medications in prescriptions.
- **DRUG\_INTERACTIONS:** Rules for drug safety.
- **DISPENSE\_LOG:** Records of dispensed medications.
- **AUDIT\_LOG:** Comprehensive activity log.
- **STOCK\_ALERTS:** Notifications for inventory.



# MEDICATIONS Table

medication_id	Unique identifier	101	Primary Key
name	Brand name	Tylenol	VARCHAR2
generic_name	Generic name	Acetaminophen	VARCHAR2
requires_prescription	Prescription needed?	Y/N	BOOLEAN
active_status	Is medication active?	Active	VARCHAR2

# BATCHES Table

batch_id	Unique batch ID	B001	Primary Key	
medication_id	Associated medication	101	Foreign Key	MEDICATIONS
expiry_date	Expiration date	2025-12-31	DATE	
qty_on_hand	Current quantity	150	NUMBER	
purchase_price	Cost per unit	5.75	NUMBER	

# DRUG\_INTERACTIONS Table

interaction_id	Unique ID	DI001	Primary Key	
med1_id	First medication	101	Foreign Key	MEDICATIONS
med2_id	Second medication	102	Foreign Key	MEDICATIONS
severity	Interaction severity	High	VARCHAR2	
description	Interaction details	Increased drowsiness	VARCHAR2	



# Innovation & Improvements

## Atomic Safety Checks

In-database checks prevent bypass and ensure auditable overrides.



## Batch-level FIFO

Expiry-driven FIFO allocation reduces waste and optimizes stock.



## Mandatory Override Reasons

Captures reasons for overrides, supporting compliance and auditability.



## Configurable Rules

Interaction rules stored in DB for easy tuning and updates.



# System Impact

The Smart Pharmacy Management System significantly improves pharmacy operations and patient safety.



# Conclusion

This project demonstrates a practical and powerful solution for modern pharmacies.

The Smart Pharmacy Management System with Drug Safety Checker is a simple yet powerful solution that enhances pharmacy operations and patient safety.

It leverages PL/SQL features like triggers, procedures, functions, and exceptions to automate tasks, improving accuracy, saving time, and increasing patient safety.

This system offers a strong understanding of PL/SQL programming and provides safer, more efficient services.

