

# **Harnessing Digital Technology and AI to address IPC and AMS Objectives at Peerless Hospital**

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# The Problem Statement

Healthcare-Associated Infections (**HAIs**) and Antimicrobial Resistance (**AMR**) are global threats with serious local impact — on patient safety, outcomes, and hospital costs.

Tackling these requires a multi-disciplinary approach backed by data gathered specific to the hospital, staff and patients.

## Prior to Digitization based Intervention

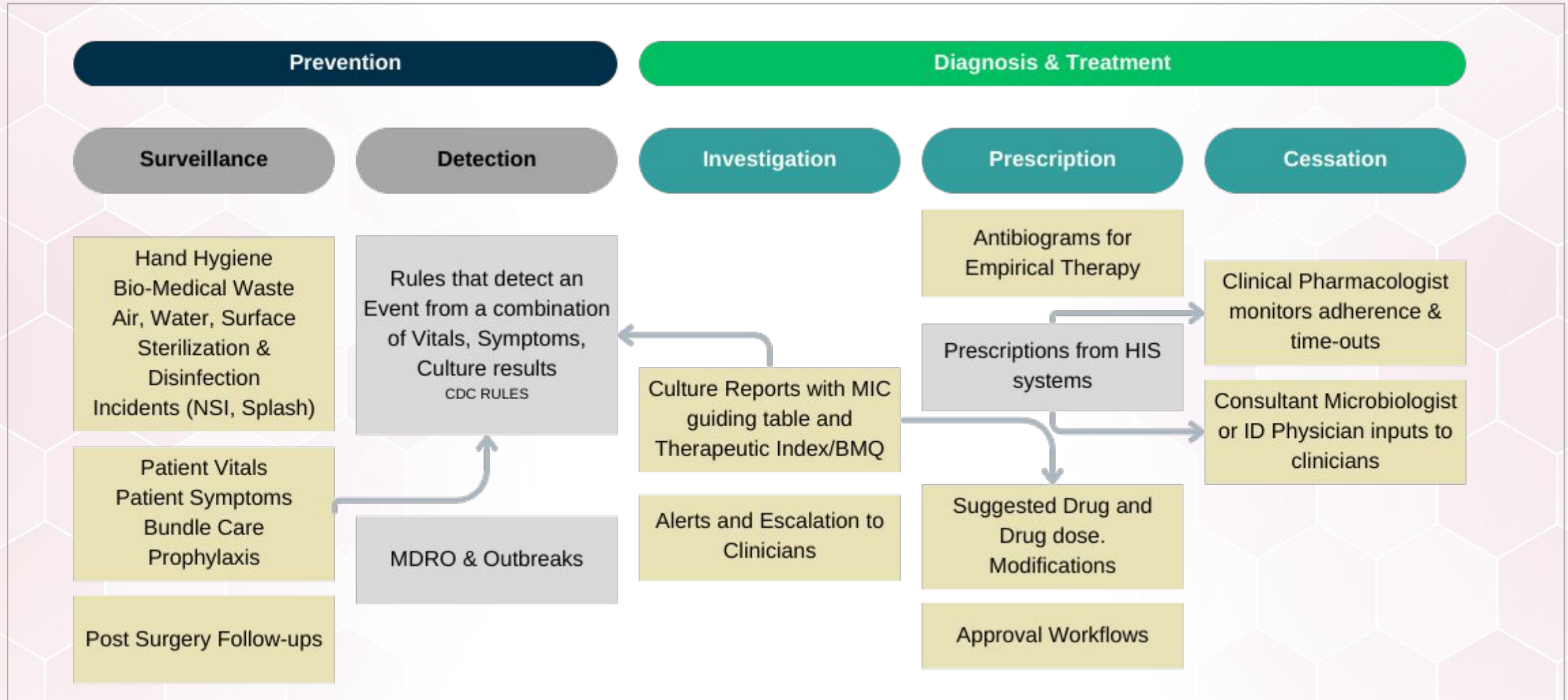
- Paper-based records and spreadsheets
- Communication challenges
- Data retrieval delays
- Limited IPC & AMS Surveillance
- Inconsistent compliance monitoring
- Lack of real-time information and insights for timely decision-making

## Key Goals set for Digitization

- Digitization of IPC and AMC processes
- Integrated Platform with Centralized Data
- Standardize Communication
- Automation of Surveillance
- Regular updates on compliance
- Provide actionable insights for all stakeholders

# Solution Approach and Methodology

Peerless implemented **Ibhar IPC & AMS** to unify infection control and antibiotic stewardship digitally.



# Outcomes and Impact

**Full NABH – HIC Audit 2024: Zero NCs**, out of 51 objective elements audited as per 5<sup>th</sup> NABH standards. HIC team received an award from Peerless Management.

DDD/1000 (2599 → 2413) 7.2% ▼  
AMS Practice Indicator

Unsafe triple-antibiotic use % (1.6 → 0) (>3 days) Eliminated ▼  
AMS Practice Indicator

Standardized Mortality Ratio (1.28 → 0.62) ▼  
Clinical Indicator

MDR % (40.6 → 32.9) , XDR % (25.1 → 11.7) ▼  
Resistance Prevalence Indicator

VRE Prevalence % (44 → 26) ▼  
Resistance Prevalence Indicator

CRAB Prevalence % (95 → 87) ▼  
Resistance Prevalence Indicator

HAI Benchmark % (0.26 → 0.17),  
CDI Rate % (0.18 → 0.13) ▼  
Operational Indicator

ALOS days (4.8 → 4.3) ▼  
Operational Indicator

## OUTCOME INDICATORS

Diagnostic Stewardship % (87 → 97) ▲  
Compliance Indicator

SAP Choice % (88 → 94) ▲  
Compliance Indicator

SAP Duration Compliance % (57 → 51) ▼  
Compliance Indicator - Remains an area of concern

De-escalation Rate % (46 → 65) ▲  
AMS Compliance Indicator

Hand Hygiene Adherence Rate % (67 → 76) ▲  
Compliance Indicator

CL Care Bundle %  
(Flushing 87 → 93.7, Hub decontamination with alcohol swab 80.3 → 98.9, Assessment of readiness to removal 89.7 → 99.4) ▲

UC Care Bundle %  
(Separate jug, Closed drainage system 89.9 → 99.7) ▲

VT Care Bundle %  
(Cuff pressure monitored 81.8 → 99.5) ▲

## PROCESS INDICATORS



# Process Innovation – Implementation and Problem Solving

Peerless formed two dedicated teams: IPC & AMS, led by the Microbiology Dpt., with the ICN team expanded to five ICNs for over 450 beds.

**Continuous training** was delivered to both ICNs and HCWs on IPC.

Existing software (Ibhar IPC and AMS) **was adapted for Peerless to drive process innovation**, particularly in **SSI tracking** within IPC.

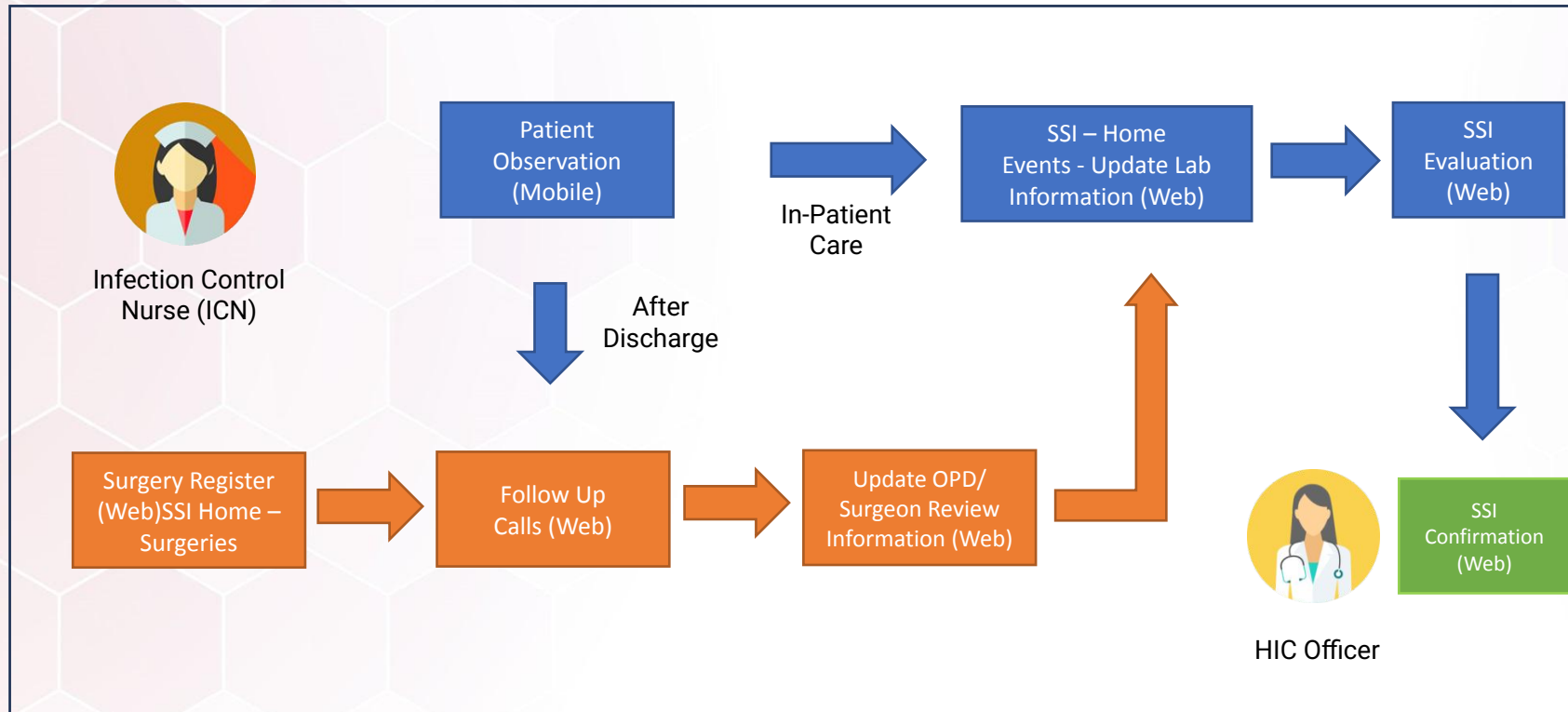
**One Team, One Goal**  
**Zero preventable infections**

**Interdisciplinary teamwork** involved **Admin, Microbiology, Nursing, Pharmacy, IT, and Clinical** team collaborating for digital infection control.

**Real-time dashboards** enabled shared visibility, timely action, and unified decision-making.

**Regular review** moved infection control from an individual task to a **collective mission**, improving **accountability, communication, and proactive prevention**.

**Top Management's support** **critical** for resource allocation and success.



# Prescription – Empirical, Targeted & Cessation

- Up-to-date Antibigram data is available on Web and Mobile to assist in Empirical prescriptions of Antibiotics.
- Advanced Clinical Microbiology Reporting enables Identification of “Drug-of-Choice” as per hospital’s Antibiotic Policy and cascade reporting.

## Antibiotic Timeout Audits

ibhar

Home

VAMR Study

VAMR Data

VAMR Analysis

Routine Antibigram

Culture Register

Culture Reports

Antibiogram

HICC

Settings

ANTIMICROBIAL SUSCEPTIBILITY TEST - VITEK

SAMPLE NO : 307202002

307202002

MIC 307202002275

Pseudomonas aeruginosa	ACINETOBAC	TRIMETHOPRIM / SULFAMETHOXAZOLE				20.0	40.0
Antimicrobial	ACINETOBAC	AMIKACIN		2.0	4.0	8.0	16.0
Levofloxacin	Report	CEFEPIME		1.0	2.0	4.0	8.0
Ceftazidime	Group	CEFOPERAZONE SULBACTAM				8.0	16.0
Ciprofloxacin	ANTIBIOTIC SU	MINOCYCLINE			1.0	2.0	4.0
Gentamicin	<input type="checkbox"/> An Ag	PIPERACILLIN TAZOBACTAM			4.0	8.0	16.0
Amikacin	<input checked="" type="checkbox"/> LEV	COLISTIN			0.5	1.0	2.0
Cefepime	<input checked="" type="checkbox"/> SUL	DORIPENEM		0.12	0.25	0.5	1.0
Cefoperazone sulbactam	<input checked="" type="checkbox"/> CIP	IMIPENEM			0.25	0.5	1.0
Piperacillin tazobactam	<input checked="" type="checkbox"/> CEF	MEROPENEM			0.25	0.5	1.0
Meropenem	<input checked="" type="checkbox"/> GEN						
Imipenem	<input checked="" type="checkbox"/> CEF						
Doripenem	<input checked="" type="checkbox"/> CEF						
Colistin	<input checked="" type="checkbox"/> SUL						

TRIMETHOPRIM / SULFAMETHOXAZOLE IS DOC

22:35

Treatment Guidelines

Causes

Uncomplicated UTI

Antibiotics

Sub-Group

Organism

All

First Line

Second Line

GRAM NEGATIVE BACILLI

ESCHERICHIA COLI

NITROFURANTOIN

86.14

GENTAMICIN

79.77

TRIMETHOPRIM/ SULFAMETHOXAZOLE

51.10

Male 35

Area - Surgical Ward 1

Antibiotic Prescribed : Azithromycin

Start Date - 21-01-2024

Dose - 250mg

Route - Oral

Duration - 6 Days

Stop Date - 27-01-2024

Prescribed by - Dr. Harvey Williams

72h

Reason Antibiotic Prescribed

Antibiotic Appropriateness

Red Flags

☒ Antibiotic is ordered for more than 7 days

☐ Antibiotic inconsistent with organism sensitivities

☐ There is no stop date on antibiotic order

☐ No labs are available

☐ IVroute

☐ Catheter

☐ Penicillin allergy

• S-SENSITIVE (Indicates clinically effective when used in standard therapeutic dose.)

• R-RESISTANT (Indicates clinically ineffective when used in standard or increased therapeutic dose.)

• I-INTERMEDIATE (Indicates that the drug may still be clinically effective when used with increased dose/frequency if the patient vital parameters permit, however established clinical trails are not available. It may also indicate therapeutic efficacy in physiologically concentrated sites.)

10 th Edition

CAHTECH

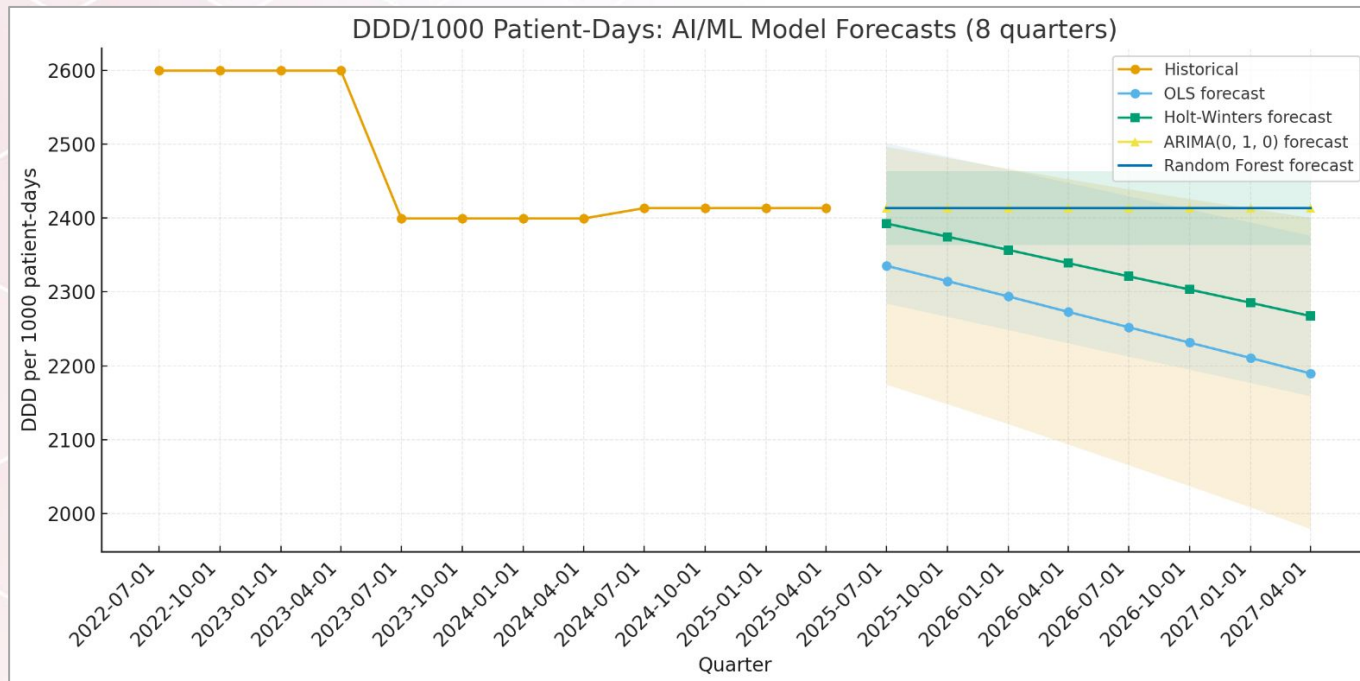
2025

# Innovation, Learning and Application of AI/ML Insights for Decision Making

- Mobile apps are used optimally for point-of-care data capture, leveraging browser-based features and analytics.
- Process Innovations like closed loop SSI Monitoring.
- Timely access to antibiogram and drug-of-choice information empowers HCPs with actionable insights.
- AI/ML models are applied to guide reduction of DDD/1000 patient days through advanced statistical and algorithmic projections.

DDD Analysis with Projection of reducing the DDD/1000 Patient Days guidance using AI/ ML models

Statistical and AI Algorithmic projection on the path leading to reducing the DDD/1000 patient days



## INSIGHTS

**Historical Trend :** Historical DDD/1000 patient-days remained high (~2600) until mid-2023; AMS interventions led to sustained reductions (~2400).

**Forecasts (2025–2027):** OLS and Holt-Winters forecast models predict a steady downward trend in DDD/1000 patient days with ongoing stewardship.

**ARIMA and Random Forest models** suggest stabilization near 2400 without further interventions—emphasizes consistent monitoring and adapting AMS strategies.

**Overall Interpretation:** Antibiotic consumption is improving but still above optimal stewardship targets.

**Future reductions** will likely require data-driven and behavioral interventions rather than structural or process-based changes alone.