TARGET:
Target hospitals would include Tier 1 and Tier 2 hospitals as well as government hospitals in Tier 1 cities. As the category of patients visiting such hospitals is much acquainted with the proposed technology.

The targets are categorized into a budget healthcare unit and a premium segment healthcare unit.

RESEARCH METHODOLOGY
Hospital Visits at varied locations were conducted, and conversed with the staff and the patients along with their representatives focusing on the various operational procedures with an aim to identify the pain points in the “Patient Journey” and recommendations for improvements.

Pain points of the patient:
- Admission Process
- Navigation around the hospital
- Estimation of patient care expenses
- Patient Refunds
- Long Queues at the Cash Counter
- Difficulty in Supply of Drugs and Return of Medicines

Pain points for the healthcare unit:
- Compliance to regulatory norms as applicable
- High cost of holding Inventory
- Helpdesk Operations

Changes have been proposed to address the above-stated pain points and to improve the patient’s journey. Thereby improving levels of patient’s satisfaction and bringing about operational efficiency within the healthcare unit.

STRATEGY:
**PATIENT JOURNEY**

The patient journey explores the pathway of interaction between the patient and the healthcare providers at all stages of a disease including coping up with the treatment and dealing with expectations. It also encapsulates the interaction with and between different stakeholders.

Patient Journey Mapping outlines all the patient touchpoints within each stage of the care journey. It aids in creation of strategic outreach that improves both patient engagement as well as patient satisfaction.

The "triple aim" of healthcare — better care, lower cost and a healthier population — is driving much of this effort to coordinate care across the continuum. To achieve this, healthcare providers need to learn to work together to coordinate treatment, prevent unnecessary testing, manage chronic conditions and provide cost-effective care in the appropriate setting.

**VALUE-CHAIN ANALYSIS: A HEALTHCARE UNIT**

**SUPPORT ACTIVITIES**

**Hospital Administration [Board of Directors, Medical Director, Chief of Nursing]**

**Information Services [Patient Registration, Billing & Collection, Customer Service, Medical Records, IS, Health Education, HR]**

**Diagnostic & Therapeutic Services [Lab, Diagnostic Imaging Center, Emergency Medicine, Therapy Centres, Psychiatric Centre, Pharmacy, Medical Staff & Nursing]**

**Hospital Support Services [SCM Department, Housekeeping, Maintenance and Security Services]**

**Administration**
- Emergency Room
- In-Patient Department
- Out-Patient Department

**Care**
- Clinical Evaluation
- Diagnostic Tests
- Treatment

**Discharge**
- Routine Discharge
- Discharge Against Medical Advice
- Referred to Other Healthcare Facilities

**Marketing & Sales**
- Service Pricing
- Customer Service
- Patient Experience Assessments
- Financial Aid
- Insurance: HMO

**Service**
- Ambulatory Services
- Patient Monitoring
- Referral to Wellness Centre
- Health Education
- Follow-up
PROPOSED CHANGES IN THE PATIENT JOURNEY

Though bed availability and system capacity can determine the number of patients flowing in and out of the hospital, delays often are caused due to process inefficiencies due to delays in diagnosis, discharge of in-patients, refunds, etc.

VIRTUAL CARE & AT-HOME CARE - MEDIUM TERM

Virtual Care Diagnosis shall work on an outsourced model wherein the healthcare unit shall have partnered with virtual diagnosis unit to extend the service to its patients and based on revenue sharing model. Empaneled Doctors including Physicians and Specialists shall be available for On-Call for diagnosis enabling 24*7 care for the patient at his ease.

In both the point of care, the patients can use the provided checklist of symptoms and describe their situation in detail, make note of health history, and upload any relevant files or images.

Subsequently, the doctor and patient shall interact either via HD video conferencing (Virtual Care) or via visit (At Home Care) and perform diagnosis and drug prescription. In addition, sensory devices such for measurement of body vitals shall also be provided on request.

The process shall be wrapped up by a Consultation Summary and stored as part of the Electronic Health Record of the Patient (EHRs)

MINI-HEALTH ATM

Introduction of a fully automated healthcare Kiosk that allows instant access to medication and nutrition and enables to track of body vital statistics.

Features include:

- **Over the counter Medication and Wellness Products** including Allopathic medicines (Crocin, Saridon, Gelusil etc.) and Ayurvedic medicines from brands like Himalaya and Dabur
- **Prescription Management and Online Management**
- **Body Vitals** such as BMI, BP, and Hemoglobin can be monitored and tracked.

The Kiosk towards logging out shall redirect towards Healthcare Unit Website and App asking for basic registration details and generating UHID.

**Target locations:** Schools, Corporate Institutional Towers, etc.

**Benefits:** Better Patient Care before hospital, Target Marketing, Increase in Patient Conversion Rate
PATIENT PORTAL: Mobile App and Website for E-Health

Propose to introduce patient portal operative via an application and website by using the Cognitive Solutions and Business Intelligence to cater to patient needs and digitalizing the patient experience at various stages.

It shall include the customer data based on the unique health id (UHID) generated and the various other databases which include price master (examinations, medicine prices, room rent), drug dosage record, doctor prescription, doctor consultation fees, etc. among all the backend data required for cost estimations of the patient care.

In addition to patient registration at the time of sign-up (creating UHID), it shall provide following features:

- Doctor availability and appointment scheduling/rescheduling (including Virtual Care and At-Home Care)
- Request for ambulatory care via emergency services
- Access to the patient’s EHRs (Secured Download option available)
- Expense Estimator
- Bill Payment and Refunds
- Drugs and Consumables Management
- Patient Assessment
- Personal Health Manager (via Query Chatbot)
- Request for post-hospitalization care at home
- Externally embedded provider search that helps in nearby hospital and other point of care location.

Expense Estimator – Short Term

*Insurance funded patients*: Patients get access to the extent of coverage of treatment borne by the Insurance Firm as per SLAs. In case of absence of hospital tie-up with the Insurance Firm, patient details along with copy of insurance document shall be sent to the Insurance Company and confirmation with advance shall be obtained by hospital on behalf of patient.

Drugs and Consumables Management – Short Term

Include an option for **medicines return** for the patients so that the attendants would save out on their time as the nurse would collect it from them and return it back to the pharmacy.

We also would have a feature of showing the **medicines availability** and whether the prescribed medicines are ready to be delivered or not. This would reduce the waiting time for the patients and their attendants and also reduce queues at the pharmacy counter.
Patient Assessment – Short Term

A real-time patient feedback system that includes both qualitative as well as quantitative factors to understand the patient expectations. Automated Reports highlighting priority improvement areas can be derived.

Patient estimates *basis their diagnosis and health examinations* enable better patient financing. It shall include a detailed report on the actual expenses being incurred under various heads such as medicines, room rent, nurse fees, doctor fees, meals etc.

*This shall be accessible within the hospital via 1-2 tablet per floor with designated nurse on each floor to enable the less affluent people also have access.*

E-Bill Payment and Refund Counter - Medium Term

Online transaction facility would enable patients to make payments and receive refunds at the click of a button.

Personal Health Manager – Short –Medium Term

Provide clinical alerts and reminders with respect to routine or follow-up appointments, drug dosage, drug purchase requirements and requests for purchase of medical equipment’s. It shall also provide consumer driven personalized healthcare plans and Query Chatbot. **Benefits:** Better Patient Financing; Reduction in Financial Write-offs; Availability of Virtual and At home Care; Reduced TAT in Patient Journey, Better Patient Relationship Management

**New Patients register on the portal and generate their UHID.**

**Existing Patients login the portal with their registered UHID**

**Expense Estimator** would incorporate data from the price master, drug dosage record, doctor prescription, doctor consultation fees etc. enabling patient to get an estimate and compare the same with actual bill amount.

**Online portal will include Menu Options enabling patient access the services**

Periodic expense updates would be provided to the patient and his family in order to help them in arranging fund.

Add-on features include **Drugs return facility** for the patients in case of incorrect or change in medication prescribed.

**Medicines availability status and the estimated time to delivery would be available on the online portal which would lead to reduction in the waiting time at pharmacy counters**

**The nurse would come and collect the medicine from the ward and return it to the pharmacy. This would lead to higher operational efficiency and better time management in the return process.**
To address the long queues and waiting time, propose to install *Self Service Kiosks* at the reception area. Initially the kiosks would be manned for short term to assist patient or patient representative.

Kiosks can be basic which would include just a screen for feeding in the details and a provision for fee payments through cards. Advanced Kiosks would also have a feature of payment through cash and cash refunds. The choice of kiosk would be based on the healthcare unit’s budget.

Kiosks would include patient registration (Unique Health ID, Symptoms & Diagnosis), Doctor availability, Doctor Appointment scheduling/rescheduling, Payment through payment gateways with an option for Auto Credit in case of any refunds and total estimate for OPD (MRI, X-Ray etc.) patient care if required by the patient. The interface of the Kiosk Machine will be in 3 languages – English, Hindi and Local Regional Language.

**Benefits:** Reduced patient waiting time; Patient Database; Reduced cost per patient; Ease of payment & refunds
ELECTRONIC HEALTH RECORDS – SHORT-MEDIUM TERM

Manual records storage results in increased cost of storage due to warehouse requirements, insurance costs, personnel cost for management, etc.

These can be reduced via transitioning from paper-based records to digitalized records in the following ways:

- **Digitalized Doctor Prescription and Drug Administration:** Doctors would be provided with a digital writing pad and a stylus which would help reduce the paperwork and also the doctor prescription will be mapped against the patient id and would be visible on the online portal.

- **Enhanced Patient File Management:** As per regulatory norms, specific patient files such as Transplant Records, PNDT Records, MLC File etc. follow certain coding and security locations. These files can be easily secured via restricted access. Furthermore, it will result in ease of access of records.

- **Automated ICD Coding:** As per regulations ICD coding of diseases is mandatory for hospitals. The servers would be pre-installed with ICD Coding mapped for each diagnosis and shall be automatically updated and statutory reporting performed.

- **Risk Management:** EHRs can detect patterns of potentially related adverse events and enable at-risk patients to be notified quickly thereby enabling Preventive Diagnosis. Improving aggregation, analysis, and communication of patient information, it is easier to consider all aspects of a patient’s condition with easy access. Hence enabling evidence-based decisions at point of care.

**Benefits:** Automated regulatory reporting and compliance; Cost Savings from reduced Insurance & Warehouse Costs; Improved Risk Management via preventive diagnosis, clinical reminders, etc.; Enhance Research & Monitoring thereby improving Clinical Quality
NAVIGATION SCREENS – SHORT TERM

Navigation Screens shall enable addresses the difficulty in maneuvering around the hospital for the patients and their representatives.

Based on the type of hospital and the budget constraints, the type of navigation screens (interactive or photo navigation) would be installed. Helper assistance inform of Red Press Button on the navigation screen would also be provided for people who are unable to access the navigation screens.

**Benefits:** Reduced patient search time; Increased patient satisfaction

WORKFLOW AUTOMATION – SHORT-MEDIUM TERM

To overcome operational inefficiencies, we propose the following

- **Vendor Managed Inventory**
  - We propose that the hospitals should go for **Vendor Managed Inventory** rather than actually purchasing inventory and having it on. This would lead to a decrease in the inventory costs and working capital requirements
  - **For high value & critical items** such as Stents etc. the vendor's inventory can be stored & managed by the hospitals which would lead to a decrease in the warehousing costs for the vendor and also an assurance of the consumption of his parts

- **Medicine Barcoding**
  - **Automation in the barcode scanning** process would lead to a **real time mapping** of the prescribed dosage with the one being provided and any errors would immediately show up on the online portal
  - This would lead to a **reduction in the risk of incorrect medication** and would also help in **curbing the financial losses** that the hospitals would have to bear
  - This would lead to increased satisfaction to the customer and financial benefits to the hospital as well

- **Inventory Level Updations**
  - Predictive Data Analytics via Cognitive Solutions shall enable **real-time updation of inventory levels** such as maximum inventory, minimum inventory, re-order levels and other such critical metrics.
  - **Based on the patient data analytics** with regards to the consumption and growth.
  - However, as these inventory levels shall be subject to approval to ensure that no extraordinary situation impacting data results in higher inventory carrying costs

**Benefits:** Collaborative Relationship Management; Better Drug Administration; Reduced Costs in terms of Inventory Management
POST CARE: DIGITAL HEALTH INTEGRATION

Clinician sets health goals and targets for patients

Option 1: Connected app or Sensor for condition management

PATIENT Downloads THE APP AND OBTAINS SENSOR DEVICE
- Patient starts collecting data via active (e.g., measuring blood pressure) and/or passive (using an actigraph) method
- For patients who are not required to purchase any sensor for condition management, they would update their condition manually in the app

Data is recorded and analysed by the app

ALERTS TRIGGERED BY THE APP
- Regular alerts regarding drug dosage, drug refilling, follow-up consultations, etc., would be sent to the patient as a part of after-care service
- Alerts would also be sent by the app to the clinician and the patient when the health values are in a concerning range

Option 2: Recommends Full Digital Health Disease Management Program

PATIENT Downloads THE APP AND OBTAINS SENSOR DEVICE
- Patient who don’t own a sensor device opt for the Virtual Diagnosis through the patient portal
- Patient keys in the current condition through video call with the doctor

Patients visit the clinician for follow-up or first-time consultations based on the App alerts
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