**PART - II**

**Guesstimates**

**Question 1:** Estimate the potential annual cost savings for a hospital if it reduces its readmission rate by 10%.

Assumptions:

Current readmission rate = 20%

Total patient discharges = 10,000

Average cost per readmission = Rs 15,000

New readmission rate = 20 × 0.90 = 18

Readmissions avoided = (20% - 18%) × 10,000 = 0.02 × 10,000 = 200

Cost savings = 200 × Rs 15,000 = Rs 3,000,000

So, the hospital could potentially save Rs 3 million annually by reducing its readmission rate by 10%.

**Question 2:** Estimate the potential annual revenue generated by a hospital if 20% of its consultations are shifted to telemedicine.

Assumptions:

Total annual consultations: 100,000

Average revenue per in-person consultation: Rs 300

Average revenue per telemedicine consultation: Rs 150

1. Number of consultations shifted to telemedicine:

100,000 \* 0.20 = 20,000

2. Revenue from remaining in-person consultations:

80,000 \* Rs300 = 24,000,000

3. Revenue from telemedicine consultations:

20,000 \* Rs 150 = Rs 3,000,000

4. Total revenue after shift:

24,000,000 + 3,000,000 = Rs 27,000,000

5. Original revenue (all in-person):

100,000 \* Rs 300 = Rs 30,000,000

6. Change in revenue:

27,000,000 - 30,000,000 = -3,000,000

The shift to telemedicine results in a potential annual revenue decrease of Rs 3 million in above case. However, this doesn't account for potential cost savings from reduced facility usage or increased patient volume due to improved accessibility. Telemedicine enables access to healthcare for people in remote or rural areas where medical facilities may be limited. Telemedicine will improve patient engagement.There is a good possibility of increasing revenue.

**Question 3:** Estimate the potential annual market size (in dollars) for a new medical device designed for diabetes management in the United States.

Assumptions

U.S. population: 350 million

Percentage of population with diabetes: 10%

Percentage of diabetics who would use the device: 25%

Annual cost of the device: $400

1. Number of people with diabetes:

350 million \* 0.10 = 35 million

2. Number of potential device users:

35 million \* 0.25 = 8.75 million

3. Potential annual market size:

8.75 million \* $400 = $3.5 billion

Therefore, the potential annual market size for the new diabetes management device in the United States is approximately $3.5 billion.

**Question 4:** Estimate the potential additional annual revenue for a clinic from implementing preventive care programs.

Clinic Size = 5000 patients

Patient participation in preventive care = 20%

Average cost per preventive service = Rs 150

Increase in visits due to follow ups = Assume 75% of patients who participated in preventive care make follow up visits. Appointment cost is Rs 300

Preventive service revenue = Number of patients × Average cost of preventive service

Revenue from preventive care services = 1,000 patients × Rs 150 = Rs 150000

Follow-up revenue = Number of follow-up visits × Average cost per visit

Revenue from follow-ups = 1000 ×0.75 × 300 = Rs 225,000

Total additional revenue = Preventive service revenue + Follow-up revenue

Total additional revenue = 150,000 + 225,000 = Rs 375,000 annually

**Question 5:** Estimate the potential annual cost savings for a hospital from optimizing its supply chain management.

Assumptions

Hospital's annual supply costs: 1 cr

Potential percentage reduction in supply costs: 10%

Cost savings from supply chain optimization:

1 cr\* 0.1 = 10 lakhs

Therefore, the potential annual cost savings for the hospital from optimizing its supply chain management is approximately 10 lakhs.

**PART - III**

**Scenario Based Questions**

#### **Scenario 1:**

A healthcare company offers a **chronic disease management app** that helps patients track and manage conditions such as diabetes and hypertension. The company wants to analyse patient engagement with the app and understand how frequently patients continue using it after the first month.

**Question 1**:  
How would you conduct a **cohort retention analysis** to track the monthly usage of the app by patients who signed up in different months? What metrics would you focus on?

Answer :

Metrics to Focus On:

**Monthly Retention Rate:** Key metric for understanding how many patients continue using the app.

**Average Sessions per User:** Indicates how frequently patients engage with the app.

**Feature Utilization Rate:** Shows which features are most beneficial to patients.

**Churn Rate:** Percentage of patients who stop using the app after a certain period.

**Net Promoter Score (NPS):** Measures patient satisfaction and likelihood to recommend the app.

**Question 2**:  
If you notice that retention rates drop significantly after the second month, what might be some reasons for the drop-off, and how could the company improve retention?

**Potential Reasons for Drop-off:**

**Lack of Engagement:** Users may feel that they have consumed all the valuable content or features available within the app, leading to decreased interest.If the app does not offer new or varied experiences, users may lose motivation to continue using it.

**Complexity or Usability Issues:**If users find the app challenging to navigate or understand, they may stop using it.Bugs or glitches can frustrate users and drive them away.

**Insufficient Personalization:** If the app does not tailor information or reminders based on individual patient needs, users may feel disconnected from the app.

### **Strategies to Improve Retention**

**Enhance Engagement:**Introduce new features, educational content, or challenges to keep users interested.Implement gamification elements, such as rewards for achieving health goals or milestones, to encourage consistent usage.

**Improve User Experience:**Conduct usability tests to identify pain points and improve navigation.Regularly solicit feedback to understand user pain points and make necessary adjustments.

**Personalization:**Use algorithms to personalize content, reminders, and recommendations based on user behavior and preferences.Allow users to customize their dashboards to prioritize the metrics that matter most to them.

#### **Scenario 2:**

The healthcare company is testing the effectiveness of **personalised health insights** for patients with chronic conditions. **Version A** provides general health advice, while **Version B** offers personalised insights based on the patient’s medical history and recent test results. The company wants to measure the impact of these insights on **patient engagement**.

**Question 1**:  
Design an **A/B test** to evaluate whether personalised health insights lead to higher patient engagement compared to general health advice. What metrics would you track to determine success?

Answer:

**Metrics to Track:**

**Login Frequency:** How often patients log in to the healthcare platform.

**Content Interaction:** Number of interactions with the content (clicks, time spent, etc.).

**Appointment Scheduling:** Whether personalized insights result in higher rates of scheduling doctor visits or follow-ups.

**Time on Platform:** The average time spent interacting with health insights per session.

**Engagement with New Features:** If there are specific new features or functionalities introduced in Version B, track how often patients use them.

**Question 2**:  
If **Version B** (personalised insights) leads to higher engagement but also results in more support requests from patients seeking clarification on their health insights, how would you interpret this outcome, and what recommendations would you give?

### **Interpretation of the Outcome:**

**Higher Engagement:**The increased engagement shows that personalized health insights are resonating with patients. This suggests that providing more relevant, tailored information is driving patients to interact more frequently with the platform, which is the intended outcome.

**Increased Support Requests:**The rise in support requests likely indicates that while personalized insights are more engaging, they may also be more complex or confusing for some patients. Patients may have difficulty understanding the tailored recommendations, medical terms, or how to act on the insights provided.

**Recommendations:**

**Improve Clarity of Insights:** Review the language and complexity of the personalized health insights. Simplify medical jargon, use more patient-friendly language, and provide clear action steps or explanations where needed.

**Integrated Support Options:** Integrate more streamlined support channels within the platform, such as live chat, automated chatbots for common queries, or direct links to book appointments with healthcare providers if needed.