PART II-Guesstimates

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

Assumptions:

1. **Average Cost per Readmission**: Assume the average cost per readmission is ₹50,000
2. **Current Readmission Rate**: Assume the hospital has a readmission rate of 15%.
3. **Total Admissions per Year**: Assume the hospital has 20,000 admissions annually.
4. **Target Reduction in Readmission Rate**: 10% reduction in readmission rate.

Estimation:

1. **Current Number of Readmissions**:
    - Current readmission rate = 15% of 20,000 admissions
    - Total readmissions = 20,000 * 15% = 3,000
2. **Number of Readmissions after 10% Reduction**:
    - New readmission rate = 15% - (15% * 10%) = 13.5%
    - New total readmissions = 20,000 * 13.5% = 2,700
3. **Reduction in Readmissions**:
    - Reduction in readmissions = 3,000 - 2,700 = 300
4. **Cost Savings from Reduction**:
    - Cost savings = 300 * ₹50,000
    - Total cost savings = ₹15,000,000

Conclusion:

The estimated annual cost savings for the hospital would be approximately **₹15 million** if it reduces 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:

1. **Total Annual Consultations**: 120,000 consultations per year.
2. **Average Revenue per In-Person Consultation**: ₹400.
3. **Average Revenue per Telemedicine Consultation**: ₹250.
4. **Percentage of Consultations Shifted to Telemedicine**: 20%.

Estimation:

1. **Number of Consultations Shifted to Telemedicine**:
    - 120,000 * 20% = 24,000
2. **Revenue from Remaining In-Person Consultations**:
    - Remaining in-person consultations = 120,000 - 24,000 = 96,000.
    - Revenue from in-person consultations = 96,000 * ₹400 = ₹38,400,000.
3. **Revenue from Telemedicine Consultations**:
    - Revenue from telemedicine consultations = 24,000 * ₹250 = ₹6,000,000.
4. **Total Revenue After Shift**:
    - Total revenue after shift = ₹38,400,000 + ₹6,000,000 = ₹44,400,000.
5. **Original Revenue (All In-Person)**:
    - Original revenue (all in-person) = 120,000 * ₹400 = ₹48,000,000.
6. **Change in Revenue**:
    - Revenue change = ₹44,400,000 - ₹48,000,000 = -₹3,600,000.

Conclusion:

The shift to telemedicine results in an estimated annual revenue decrease of **₹3.6 million**. However, potential cost savings from reduced facility use, reduced staff requirements, and increased patient access may offset this decrease and even lead to higher revenue in the long term by improving patient retention, satisfaction, and accessibility.

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

Assumptions:

1. **U.S. Population**: 340 million.
2. **Percentage of Population with Diabetes**: 12%.
3. **Percentage of Diabetics Who Would Use the Device**: 30%.
4. **Annual Cost of the Device**: $450.

Estimation:

1. **Number of People with Diabetes**:
    - 340 million * 12% = 40.8 million people with diabetes.
2. **Number of Potential Device Users**:
    - 40.8 million * 30% = 12.24 million potential users.
3. **Potential Annual Market Size**:
    - 12.24 million * $450 = $5.508 billion.

Conclusion:

The estimated potential annual market size for the new diabetes management device in the United States is approximately **$5.5 billion**.

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

Assumptions:

1. **Clinic Size**: 4,000 patients
2. **Patient Participation in Preventive Care**: 25%
3. **Average Cost per Preventive Service**: Rs 200
4. **Follow-Up Visit Rate**: 60% of patients who participated in preventive care make follow-up visits
5. **Appointment Cost for Follow-Up Visit**: Rs 250

Estimation:

Step 1: Calculate the Number of Patients Using Preventive Care Services

$$4{,}000 \text{ patients} \times 0.25 = 1{,}000 \text{ patients}$$

Step 2: Calculate Revenue from Preventive Care Services

$$1{,}000 \text{ patients} \times \text{Rs}200 = \text{Rs}200{,}000$$

Step 3: Calculate the Number of Follow-Up Visits

$$1{,}000 \text{ patients} \times 0.60 = 600 \text{ follow-up visits}$$

Step 4: Calculate Revenue from Follow-Up Visits

$$600 \text{ visits} \times \text{Rs}250 = \text{Rs}150{,}000$$

Step 5: Calculate Total Additional Annual Revenue

$$\text{Total Revenue} = \text{Revenue from Preventive Care Services} + \text{Revenue from Follow-Up Visit}$$
$$\text{Rs}200{,}000 + \text{Rs}150{,}000 = \text{Rs } 350{,}000$$

Conclusion:

With this new set of assumptions, the estimated potential additional annual revenue for the clinic from implementing preventive care programs is **Rs 350,000**.

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

Assumptions:

1. **Total Annual Purchases of Medical Supplies**: Rs 50,000,000
2. **Current Supply Chain Inefficiency**: 10% of the purchased items are wasted due to overstocking, expiration, or mismanagement.
3. **Potential Reduction in Waste with Optimization**: Optimization can reduce waste by 50%.
4. **Cost of Wasted Supplies**: Wasted supplies result in a loss of 10% of the total annual purchases.

Estimation:

Step 1: Calculate Current Cost of Wasted Supplies

$$\text{Current Waste} = \text{Total Annual Purchases} \times \text{Current Inefficiency}$$

$$\text{Current Waste} = Rs50{,}000{,}000 \times 0.10 = Rs5{,}000{,}000$$

Step 2: Calculate Potential Waste Reduction with Optimization

$$\text{Potential Waste Reduction} = \text{Current Waste} \times 0.50 = Rs5{,}000{,}000 \times 0.50 = Rs2{,}500{,}000$$

Step 3: Calculate Potential Annual Cost Savings

$$\text{Potential Annual Cost Savings} = \text{Current Waste} - \text{Potential Waste Reduction}$$

$$\text{Potential Annual Cost Savings} = Rs5{,}000{,}000 - Rs2{,}500{,}000 = Rs2{,}500{,}000$$

Conclusion:

By optimizing its supply chain management, the hospital could potentially save **Rs 2,500,000** annually by reducing waste due to inefficiencies.

Team -

1. **Sanjana Nasa**
2. **Rohan Mangle**
3. **Shreyas**
4. **Rohit Patil**
5. **Vishal Singh**