INFUSE

Type: **Interviewer-led** | Difficulty: **Low** | Function: **Operations** | Sector: **Healthcare** | Stretch area: **Math** | Author: **ex-Bain**

A leading biotech company is developing an Alzheimer's treatment unlike anything on the market, as it slows disease progression rather than only treating symptoms.

The executive team is concerned by a feasibility study that flagged a potential risk: a rumored shortage of infusion capacity in the US. Because the treatment must be delivered via infusion, such a shortage could limit adoption and reduce financial returns.

Ahead of launch, the company has hired you to assess the expected shortfall and recommend a response.

ADDITIONAL INFORMATION

- Infusion is the delivery of medicine directly into a patient's bloodstream through an intravenous (IV) line, typically in the arm.
- The treatment will be launched in the US only.
- The client has not yet estimated how big the infusion shortfall will be.
- The client does not have any strategies to mitigate the shortfall.
- Most other Alzheimer's medications are delivered as oral pills.
- If approved by the FDA, the treatment would reach the market in about two years.

INFUSE – QUESTION 1

Dimension: **Structuring**

How would you approach solving this problem?

PROPOSED SOLUTION

1. What is the expected shortfall in infusion capacity?
   - What is the infusion capacity required to deliver the Alzheimer's treatment?
     - How many people in the US have Alzheimer's?
     - How many Alzheimer's patients will seek this treatment?
     - How frequently and for how long does this infusion need to be administered?
   - How much free infusion capacity is expected in the US at the time of product launch?
   - What is the expected shortfall/gap in infusion capacity?
2. Why is there a shortfall in infusion capacity?
   - Infrastructure gap? (e.g., not enough providers or equipment to administer infusions)
   - Skills gap? (e.g., providers don't know how to administer infusions)
   - Incentive misalignment? (e.g., providers don't want to offer infusions)
   - Logistics issue? (e.g., capacity overwhelmed in certain geographies but sitting idle in others)
3. How can the shortfall in infusion capacity be mitigated?
   - Reduce the demand for infusion capacity
   - Increase the supply of infusion capacity

INFUSE – QUESTION 2

Dimension: **Math**

How much do you estimate the shortfall of infusion capacity will be in the US for this treatment when it enters the market?

ADDITIONAL INFORMATION

- 10% of people aged 60 - 80 have Alzheimer's.
- We expect 50% of people with Alzheimer's to use our new treatment.
- The US is expected to have free capacity for 12M infusion hours per year at the time of launch of the treatment.
- As current Alzheimer's medications are oral pills, no infusion capacity is available from Alzheimer's patients switching from their previous medication.
- The infusion must be administered once every 3 months and takes 2 hours to administer each time.

INTERVIEWER GUIDANCE

A strong candidate will identify that not everyone with Alzheimer's will try to get the treatment. They can be encouraged to make their own assumption. The proposed solution assumes that 50% of patients will get the treatment.

INFUSE – QUESTION 2

Dimension: **Math**

PROPOSED SOLUTION

- I will estimate the **number of patients** who will use this treatment and multiply this by the **number of infusion hours** needed per patient. I will compare this to the current free capacity to calculate the shortfall.
- Potential patient population = US population x % with Alzheimer's
  - Total US population = 320M
  - 10% of 60 – 80 year olds have Alzheimer's. Assuming equal distribution across ages means we'll have 80M people in the 60 – 80 years of age bucket.
  - 80M * 10% = 8M people.
- Actual patient population
  - We know that not every person with Alzheimer's will try to get the treatment due to factors including:
    - Not getting an appropriate diagnosis
    - Not being prescribed the treatment / Not being deemed a good fit for the treatment
    - Not having insurance that covers the treatment or not being able to afford the treatment
  - 50% of people with Alzheimer's will take this treatment
  - 8M * 50% = 4M patients will take the treatment
- Infusion hours
  - We need to know how long the infusion takes to translate patient numbers into infusion capacity.
  - The infusion must be administered once every 3 months and takes 2 hours to administer each time.
  - Every 3 months -> 4 times per year.
  - 4M users * 4 times per year = 16M infusions per year
  - 16M infusions per year * 2 hours per infusion = 32M infusion hours per year
  - We should allow a buffer time on top of the 2-hour infusion time to allow for the realities of operations in healthcare clinics. If we assume 30 extra minutes, then we get 16M infusions per year * 2.5 hours per infusion = 40M infusion hours per year
- Infusion capacity required and expected shortfall
  - The infusion capacity required will be between 32M – 40M infusion hours per year.
  - Given that the US currently has free capacity for only 12M infusion hours per year, the shortfall for our Alzheimer's treatment is 20M – 28M infusion hours per year.

INFUSE – QUESTION 3

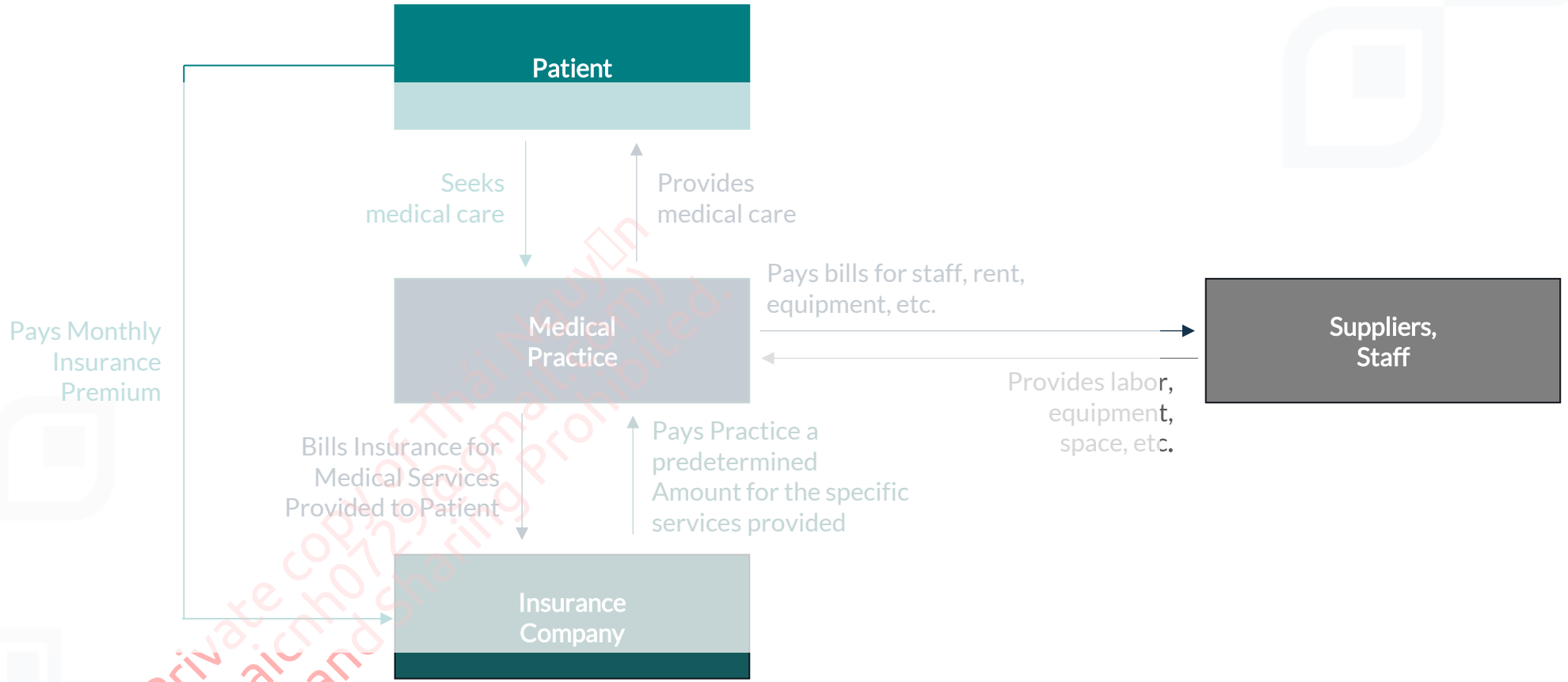
Dimension: **Judgment and insights**

Based on Exhibit 1, what might the main constraints on infusion capacity be?

ADDITIONAL INFORMATION	• Of all the players in the healthcare system, the medical practices have the most control over available infusion capacity. • Medical practices haven't been keen to increase their infusion capacity.
INTERVIEWER GUIDANCE	The candidate can then propose hypotheses as to why this might be the case. Ensure that the candidate does not start investigating the solution space at this stage.

INFUSE– EXHIBIT 1

PAYMENT IN THE US HEALTHCARE SYSTEM



INFUSE– QUESTION 3

Dimension: **Judgment and insights**

PROPOSED SOLUTION

- My main takeaway from this diagram is that medical practices need their revenue to be greater than their costs for them to stay in business.
- Infusion capacity will be limited if the profits on infusion are lower than the profits on other services a medical practice can offer. The practice has limited resources - only so many medical providers, so much physical space, so many hours - and so if the profit is low on infusions, they are not incentivized to offer infusions.
- We also know that infusions take a long time - 2 hours in the case of this treatment (compared with oral pill administration). That might make it especially difficult for infusions to be profitable for medical practices.

INFUSE– QUESTION 4

Dimension: **Creativity**

The client intends to introduce the new treatment to the market in 2 years.

How can the biotech firm mitigate the infusion capacity shortfall, and what immediate actions can they take?

ADDITIONAL INFORMATION

- Demand reduction methods e.g., adjusting our product to require fewer infusion hours and/or changing the mode of delivery is currently not feasible as any alterations to product delivery will delay the launch by 3 years.
- While the government will not hinder our efforts to increase supply, they will also not actively help with policy or financing as well.

INFUSE– QUESTION 4

Dimension: **Creativity**

PROPOSED SOLUTION

- **Infrastructure** gap
  - Create new treatment centers
  - Improve infrastructure in existing medical/treatment centers
    - Provide/upgrade infusion infrastructure
    - Facilitate discounts for infusion infrastructure (through partnerships and other means)
    - Incentivize medical/treatment centers to hire specialized treatment staff
- **Skills** gap
  - Provide active/live training for medical staff to efficiently administer the new treatment
  - Provide training material (Online/Offline) to enable medical staff to self-learn effective administration of the new treatment
- **Incentive misalignment**
  - Partner with insurance companies to reimburse a higher amount for this treatment
  - Provide some profit kickback to partners across the value chain
- **Logistics** issues: maximize utilization of existing capacity by providing a capacity tracking services for patients (e.g., appointment portal)

INFUSE– QUESTION 5

Dimension: **Synthesis**

What would you recommend to the client?

PROPOSED SOLUTION

You have asked us the investigate how you can mitigate the anticipated infusion capacity shortfall when your new Alzheimer's treatment launches.

We estimated that the infusion capacity shortfall will be around 20M –28M infusion hours per year.

Some of the strategies we developed to mitigate the shortfall include:

- Addressing the current infrastructure gap through partnerships with existing medical centers or by creating new centers;
- Providing in-person or online training;
- Incentivizing infusion capacity provision with kickbacks across the value chain and;
- Enabling patients to locate free capacity.

As the next steps, we recommend that you start acting now on these strategies, given your 2-year time to launch, as activities like partnerships and possibly creating new treatment centers would take considerable time.