

# EXPERIMENT DESIGN FOR MERCK AND CO.

## Introduction

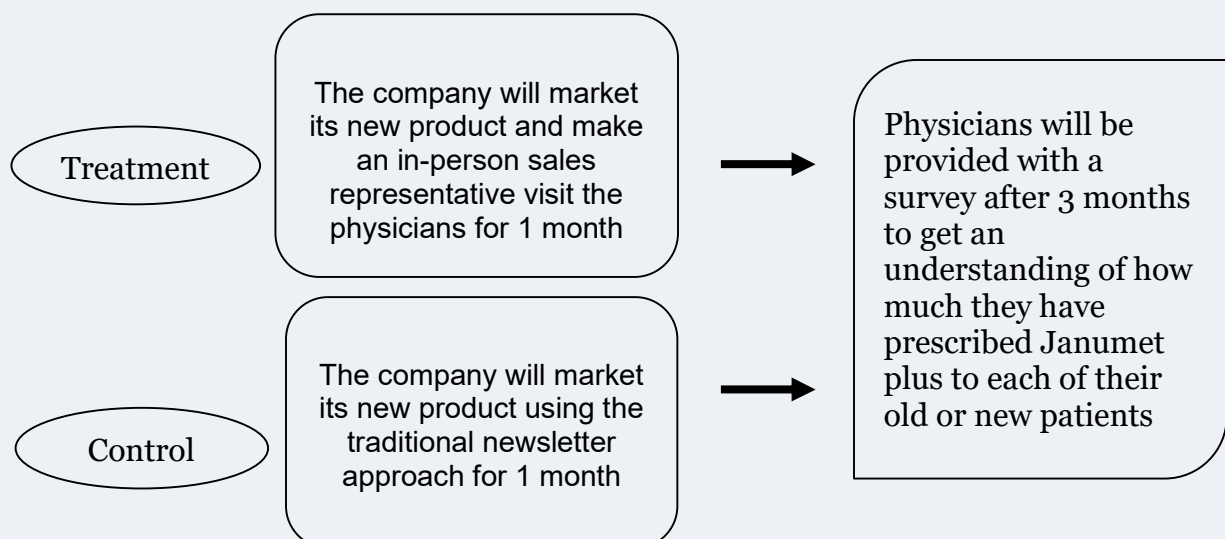
*Merck launched a product Janumet Plus as an improved form (better efficiency in lower doses) of the 2007 product Janumet for treating diabetes and obesity. The updated product has been approved recently, but it is more expensive than its previous version. The company wants to know the market position from an HCP perspective, ways to improve revenue for the newly released product, and the potential impact of launching it over the previous product.*

## Objective

*Our goal as Merck analysts is to conduct an experimental (mechanism test) study among HCPs/Physicians for one month to determine the best approach to increase prescription rates for Janumet Plus. The hypothesis is that HCPs participating in the study will have a higher prescription rate because of the study.*

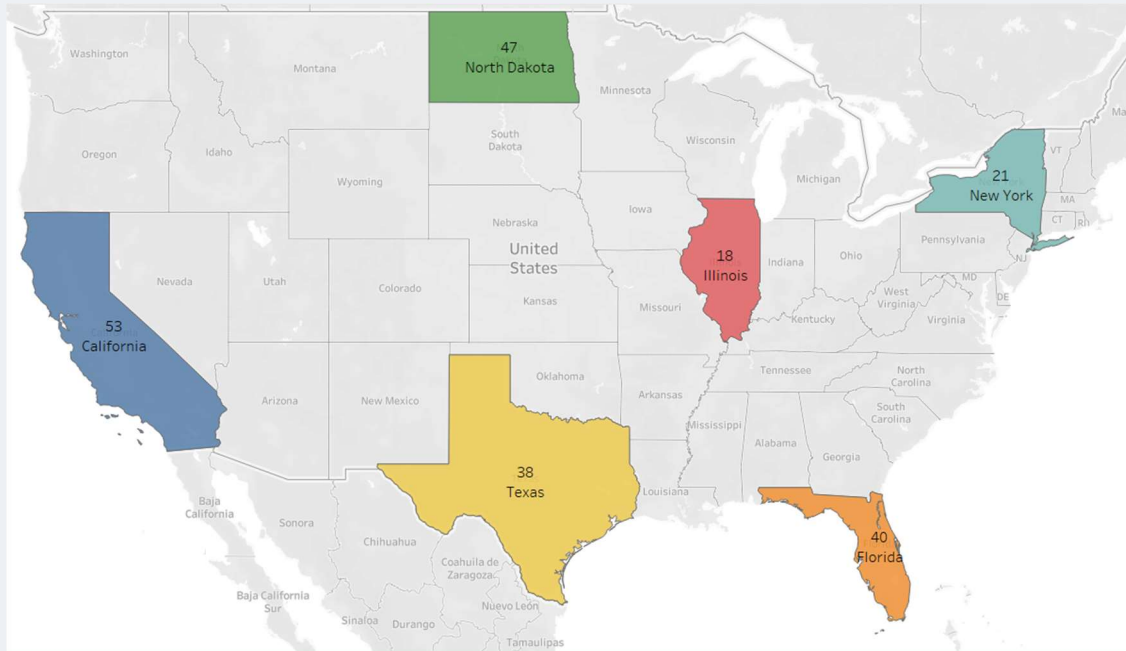
## Experiment

### 1. Treatment Groups and design



## 2. Target Groups

*We will use physicians in California, North Dakota, Texas, Illinois, New York, Florida who prescribed Janumet in the last three years as a target population for our study.*



- *We are considering 6 states representing diverse regions in the USA.*
- *This will give us enough confidence to scale this experiment across the country.*

## 3. Sample size

*Treatment: 216 districts, ~5 clinics per district with 30 physicians*

*Control: 216 districts, ~5 clinics per district with 30 physicians*

## 4. Randomization process

*To ensure true randomization, we plan to have the following pre-experiment variables balanced:*

- *Number of years of experience of physician*
- *Prescription rate for original Janumet*

## 5. Unit of analysis

*We are randomizing the data at the cluster level (one cluster as a district) in all states rather than at the individual level of the doctors, to minimize the interaction between the treatment and control groups.*

## Significance and Power Calculation

*Significance threshold: 0.05*

*Minimum detectable effect: +12%*

*Alternative: greater (treatment > control)*

*Sample size: 216*

***Calculated Power: 0.82***

*With the given sample size, significance threshold and treatment effect we can achieve power of 82%.*

## Challenges, Concerns & Considerations

- *We will use stratified sampling solely based on population of districts, to prevent imbalance between the treatment and control groups.*
- *Non-compliance: Physicians may wish not to entertain the sales team and might refuse to interact with them.*
- *Interference: To minimize the interference, we are conducting our experiment on cluster level.*
- *We might face attrition if physicians do not respond to the survey. In order to minimize this, we would be sending reminder emails to physicians.*
- *Physicians might choose to prescribe Janumet Plus to their new patients but might continually prescribe Janumet to their existing patients as the latter works well on them. The company's return will depend more on the proportion of new patients for that physician and the same cannot be captured using a yes/no survey response.*

# OUTCOME

*Our goal metric for evaluating the experiment is Prescription rate of Janumet Plus in treatment vs control.*

*To conclude the experiment, we will measure following outcome metrics:*

- 1. Prescription Rate for Janumet Plus: It will be measured over a 3-month period using the survey response.*
- 2. Revenue for Janumet Plus: We will measure the increase in revenue for Janumet Plus in treatment districts vs control districts over the same 3-month period.*
- 3. Total Revenue: We will measure increase in revenue for both Janumet Plus and Janumet.*

*We are expecting a variability in increase of prescription rate between 9% and 15%.*

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## Business Outcome

- Forecasting: The results will determine Merck forecast the profits from Janumet Plus in coming financial quarters and how much investment should be made on the marketing campaigns specific for Janumet Plus.*
- Marketing campaigns: The experiment will help us determine the cost involved in sales which will not only help us calculate the ROI for this exercise but will also be useful for future campaigns.*