Pfizer Case Study

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Introduction/Executive Summary

Motivation: Due to healthcare providers understocking their vaccine fridges, there is unfilled demand and uncaptured business value that Pfizer would like resolve. Pfizer hopes to better understand which healthcare providers are understocking their fridges and use eCommerce marketing to optimize their distribution of vaccines and increase profits.

Introduction/Executive Summary

Problems I Solved:

- Customer orders with 0 doses
- Lack of data on fridge capacity

Findings and Recommendations:

- Arilatapide and Furmantadmine are the most understocked brands
- Found no significant difference in seasons
- Plan to pilot application in Central Southern USA

Executive Ask

I am asking for **$1 million** to fund the PfizerPro3000 application, the virtual fridge program, and pilot Internet of Things (IoT) fridge chip sensors that connect to the virtual fridge feature .
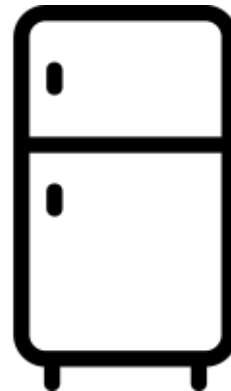
Business Questions and Hypotheses

Q1: What qualifies as health-care providers understocking their vaccine fridges?

- Assumption: I assume that not maximizing their fridge capacity determines understocking.

Q2: Which factors for predicting understocking are the most pronounced?

- Hypothesis: I hypothesize that that the winter season will be the most pronounced in predicting understocking since people catch colds and demand flu vaccines.

Q3: How can we decrease the amount of vaccine understocking and unfilled demand?

- Assumption: I assume that I can leverage our eCommerce channel to better communicate inventory needs and stocking timelines to healthcare providers.

Data Overview

Customer Types (2)	Physician or Large Group
# of Distinct Transactions	522,394
# of Distinct Brands	16
Date Range	January 2016 to February 2020

	brand	dose_price
	<chr>	<int>
1	NALIMORELIN	400
2	DILIAXOIIMOD	200
3	SULFAARELIN	100
4	PERFLUSULFAN	200
5	NIFURIARILATADINE	100
6	GADOINABIMELINE	150
7	CEFASIBAN	300
8	PREDACRINAT	500
9	ARILATAPIDE	200
10	BOLCOICAMSULE	150
11	PREDSTATATRIPTAN	300
12	GADOAZOLINE	300
13	VINIGESTDUTANT	500
14	NIFURMANTADINE	500
15	SOMATOXMONAM	300
16	DILBOLIPARCIL	700
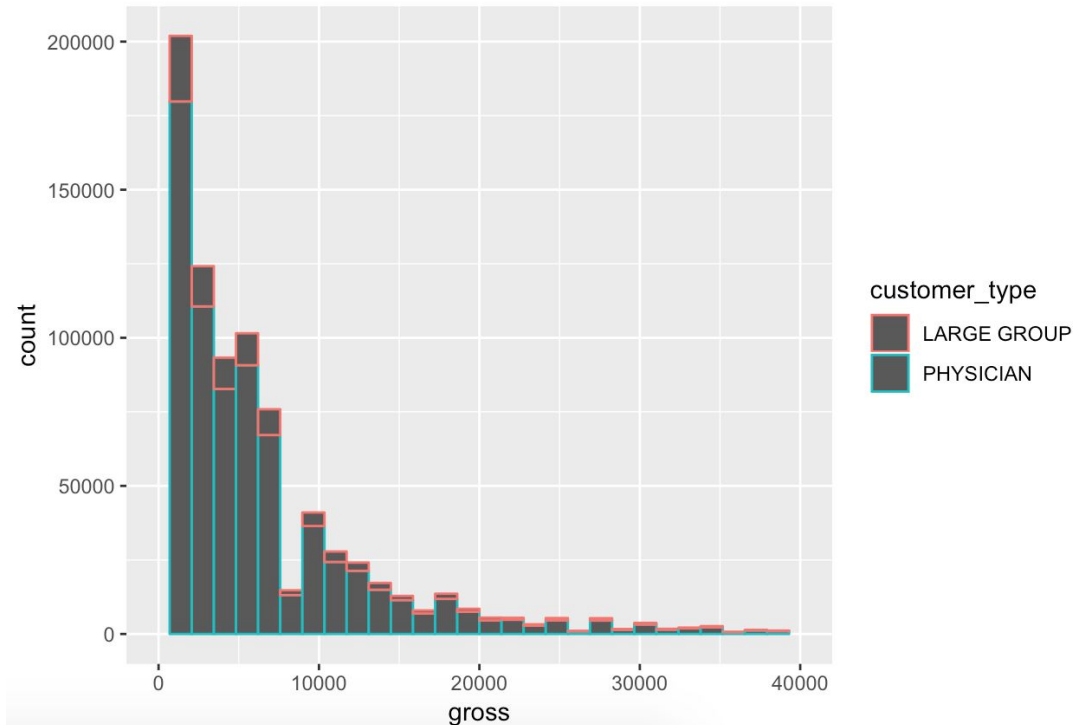
Data and Methods

- Used a random 10% sample of the population. (n = 82,861)
- I demeaned the data based on the mean of the doses ordered for each customer.
- I used a linear regression model to predict factors of stocking:

$$\Delta = \beta_0 + customer\_type\beta_1 + customer\_state\beta_2 + brand\beta_3 + num\_trans\beta_4 + doses3mo\beta_5 + gross3\beta_6$$

Data and Methods

| Understocked Brands | Understocked States | Understocked Seasons |

Identify the lowest stocked brands per doses over 3 months.

Identify the specific states that are the most understocked. Is there a regional cluster?

Identify the months that see the most understocked. Is there a seasonal significance?
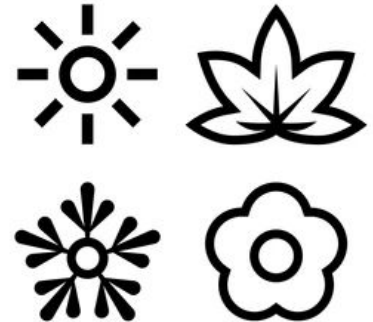
Findings

- Average fridge capacity per customer type
  - Individual (physician)
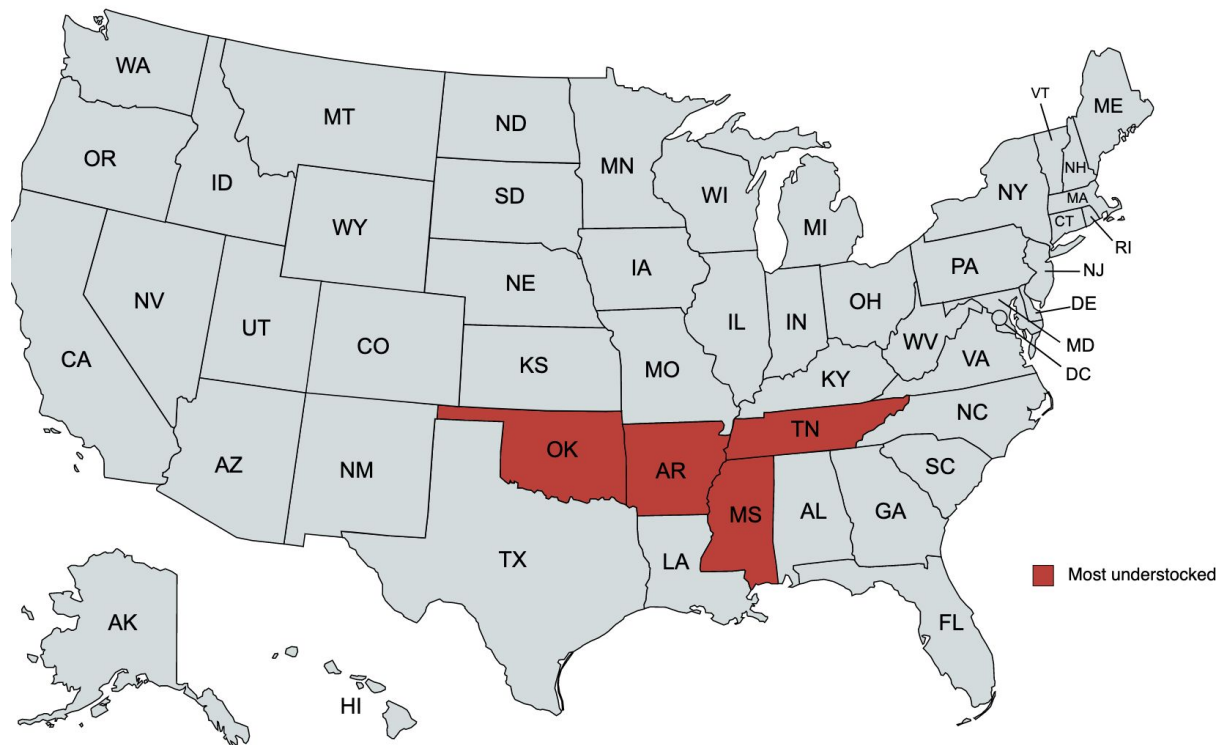   - 99.7 doses
  - Physician group
    - 115 doses

- Confirms my intuitive expectation that large system providers have greater fridge capacities than the individuals

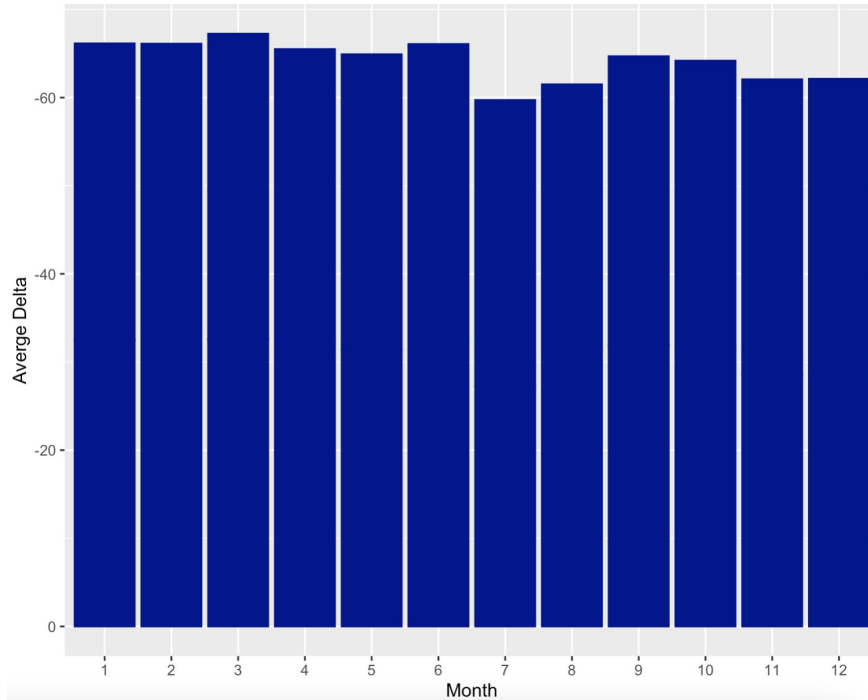# Findings

- Find brands that are most understocked:

Difference in 3 Month Dose from Mean
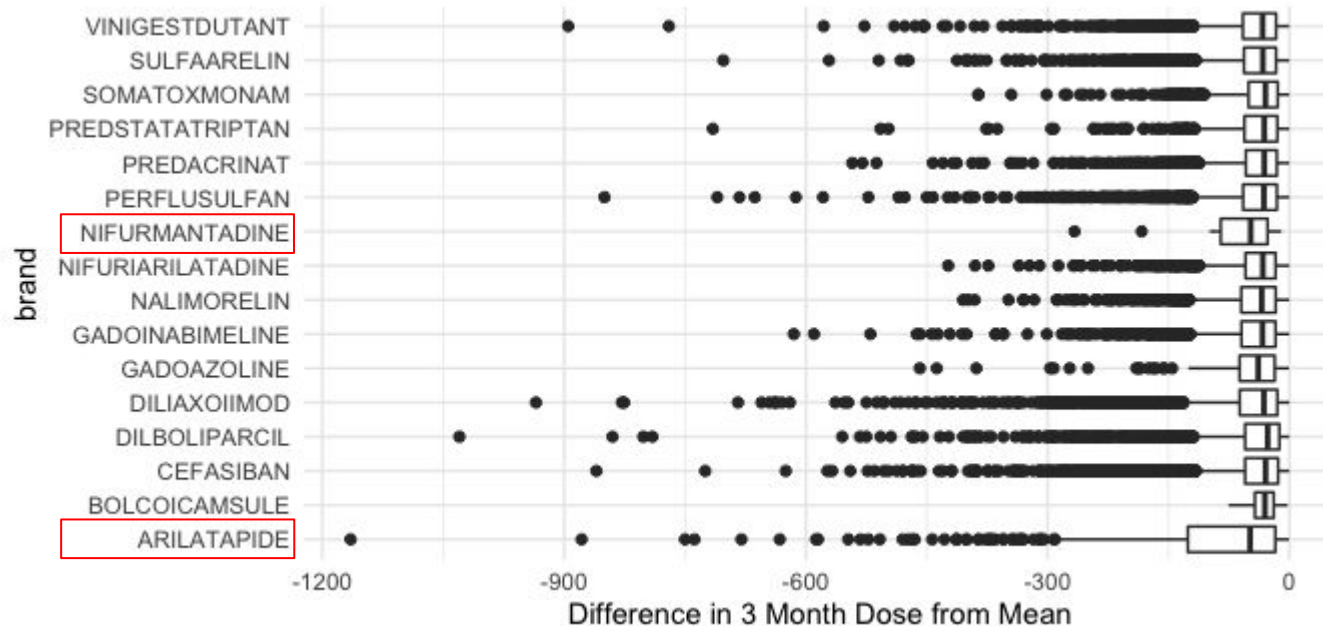
Findings

ARILATAPIDE:
−44.05

NIFURMANTADINE:
−43.05

Findings

Barplot of the Average Delta per Month

Discussion

63.7% of total customers are understocking

⌐→ Most Understocked **Brands**:

- Arilatapide
- Nifurmantadine

⌐→ Most understocked **Region**:
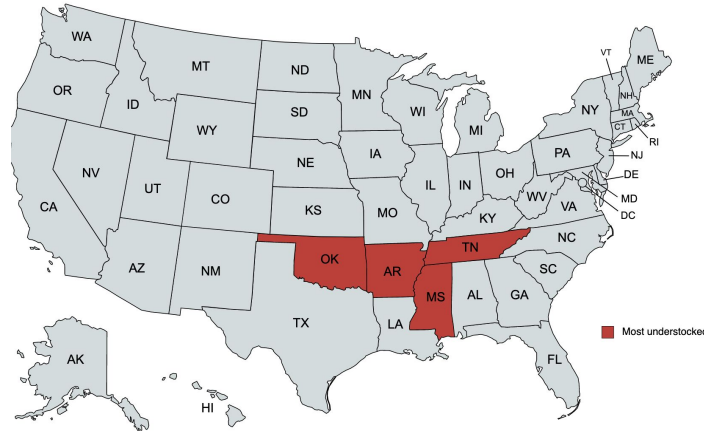
- Central Southern in U.S

Interesting Find:

❄ No significance in seasonal understocking

Recommendation

▶ Integrate inventory functionality into website—a virtual fridge
▶ Begin implementing this virtual fridge program in the central southern states that we are seeing the most understocked fridges

Application Recommendation

- PfizerPro – current order website for healthcare professionals
- My application is the **PfizerPro3000** : a new & improved application
  - Provides monthly text / email reminders and a personalized virtual fridge that provides updates on vaccine inventory
- Develop pilot with discounted fridge sensors
  - Connects to **virtual fridge dashboard** to report and monitor inventory

AN INTELLIGENT VACCINE DISPENSER

Display Panel

Freezer Unit   Refrigerator Unit

Updated web application service for physicians and healthcare providers

Pilot fridge sensor program for understocked regions

- As discussed, Oklahoma, Arkansas, Mississippi, and Tennessee are the four most understocked regions.
- I recommend test launching the **fridge chip sensors** and **virtual fridge program** in these four states at a subsidized cost
- The effectiveness of the program will be measured by decreases in understocking and increased business value
- Positive results from the pilot can work to incentivize other physicians and providers to use my program to optimize their vaccine distribution
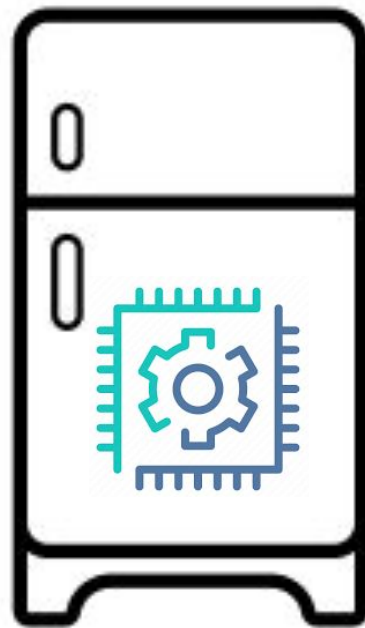
Impact

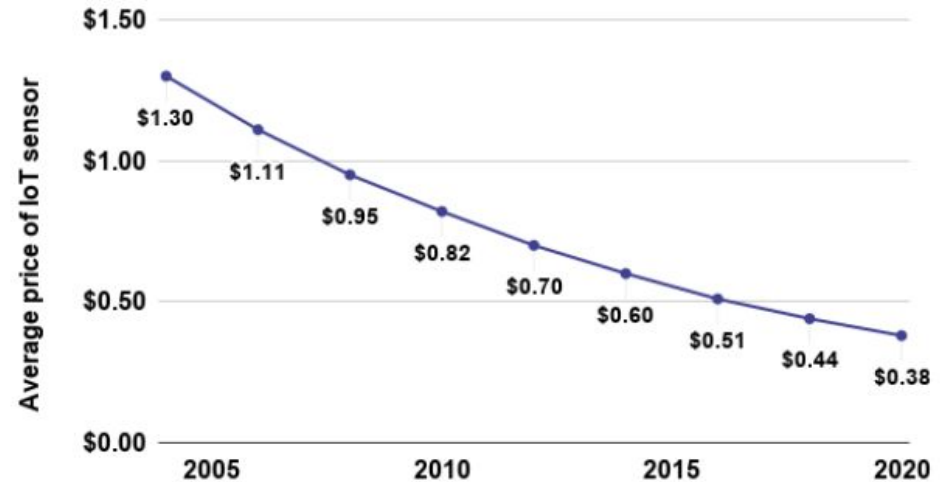On average, OK, AR, MS, and TN understock Arilatapide and Nifurmantadine drugs for every 3 months

If we target the marketing and sensor program to OK, AR, MS, and TN based on my recommendations, we would increase our yearly revenue by
- $1.02 M for the Arilatapide drug
- $1.75 M for the Nifurmantadine drug

Back to the Executive Ask

▶ Why $1 million?

▶ Pfizer's net income: $9.6 billion

▶ Price of IoT sensors have declined

As the price of IoT sensors falls, use is expected to increase

Average price of IoT sensor

- $1.30
- $1.11
- $0.95
- $0.82
- $0.70
- $0.60
- $0.51
- $0.44
- $0.38

$1.50
$1.00
$0.50
$0.00

2005　2010　2015　2020

Matt Leonard / Supply Chain Dive, data from Microsoft

IoT Acquisition Costs

● Outsourcing the IoT
sensor chips
from third-party
companies

What You Will Learn: [hide]

References and Appendices

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https://wiki.seeedstudio.com/ODYSSEY-X86J4105-AzureIOT/

https://www.pharmaceutical-technology.com/news/pfizer-second-quarter-revenue/

Thank you!

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Questions?