Press Ganey Analytics Exercise

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Overview

- Description of tables

- Data Merging
    - Overview of tables
    - Merged tables

- Survey Results Summary
    - Survey results by age and patient sex
    - Survey results by mode of delivery
    - Quality of care measures
    - Performance benchmarking

- Measuring Quality of Care
    - How can Quality of Care be measured?
    - What are the drivers of Quality of Care?

- Application Example: Benchmarking

- Future Considerations

Data Merging

Combining Data Sources

Description of tables

- **Survey**: Table that identifies, for each completed survey (identified by `SurveyKey` – one for each survey returned), the `Mode` the survey was conducted in.

- **SurveyItem**: Table with fields relevant to content of survey:
  - `SurveyItemVariable`: Question/rating that respondent is answering
  - `Survey`
  - `ResponseCode`: Rating scale of item. Many of our survey items ask ordinal response questions (e.g. on a scale to 1 to 5: completely disagree to completely agree), with a higher value being better.
  - `TopBoxCode`: This is the value for the `ResponseCode` that we consider "TopBox" – the highest rating.
  - `SurveyItemReportName`: Brief description of question corresponding to `SurveyItemVariable`

- **Patient**: Demographics table with `PatientSex` and `PatientBirthDateKey` (all birth-dates changed to January 1). Birthdate is in format YYYYMMDD.

- **Response**: Table with survey response value (`SurveyResponse`), in a key-value structure; e.g. one row per item, per respondent. Also includes fields used to merge with **Survey**, **Patient** and **SurveyItem** fields.

Merged tables

- See the attached R notebook for the data manipulations

- The two outputs `SurveyMatrix` and `MergedSurvey` are attached

Survey Results Summary

Visualizations & Drill Down

Survey results by age and patient sex

- Most survey respondents are older

- Less than 5% of male patients between the ages of 18-39 respond, whereas about 10% of female patients from this group do respond

- Looking at the number of respondents instead of the percentage shows a very similar pattern
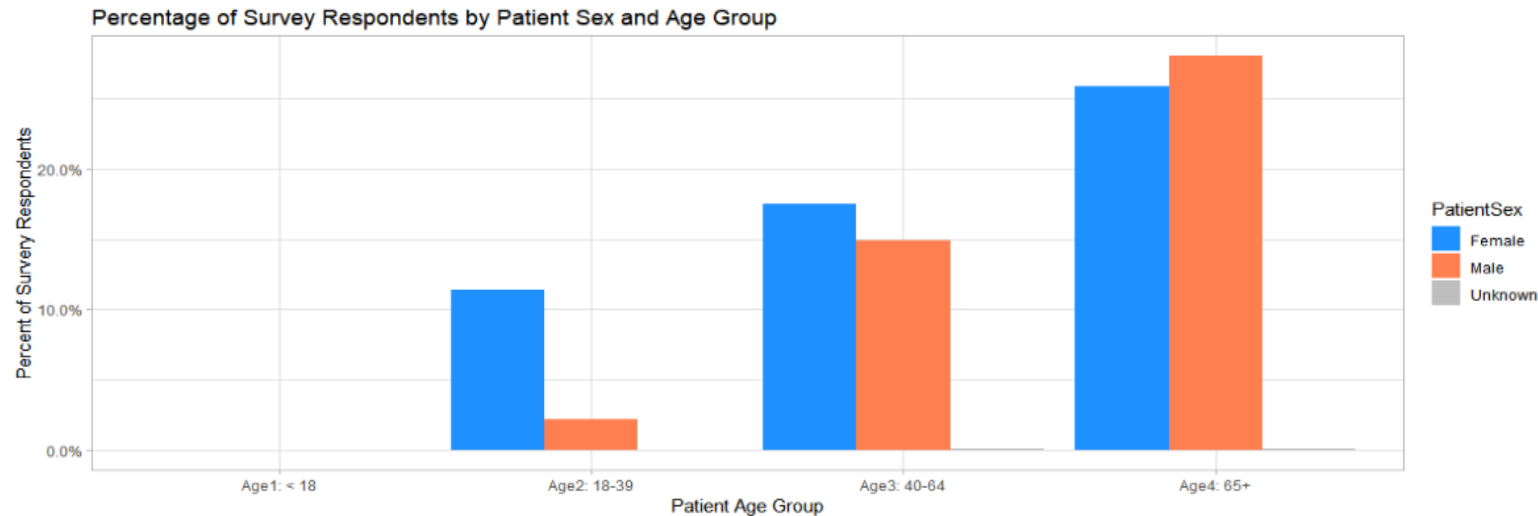
Percentage of Survey Respondents by Patient Sex and Age Group

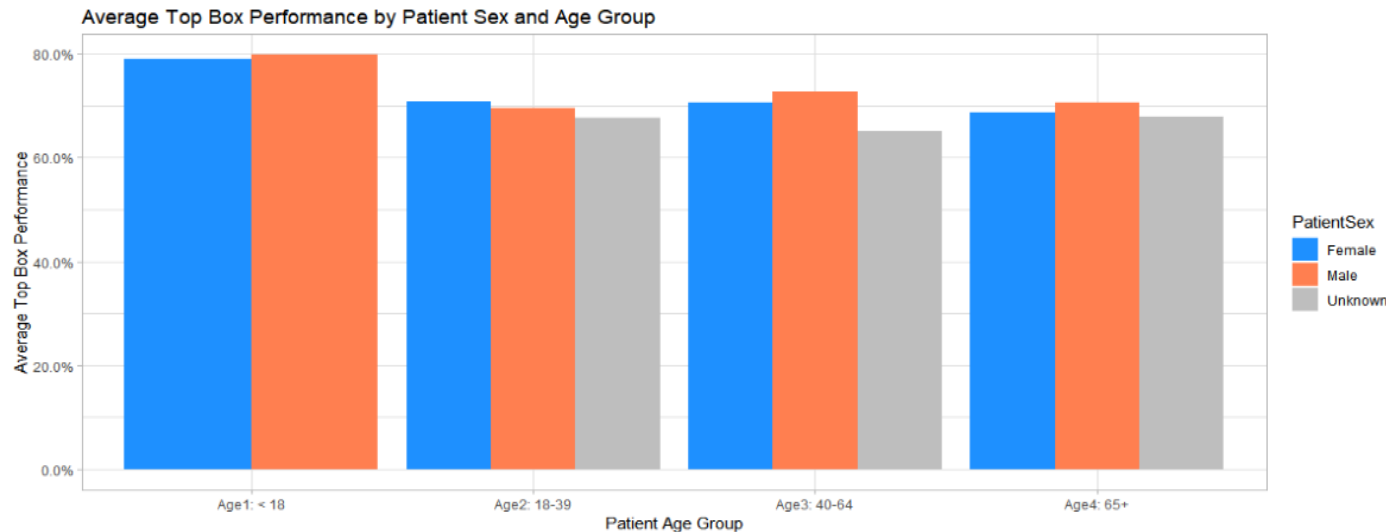| Patient Sex	Age1: < 18	Age2: 18-39	Age3: 40-64	Age4: 65+	Total
Female	76	34,418	52,974	78,535	166,003
Male	124	6,587	45,072	85,046	136,829
Unknown		167	312	326	805
Total	**200**	**41,172**	**98,358**	**163,907**	**303,637**

Creating a performance measure

- "Top Box" performance shows the if a patient indicated that their quality or care was the highest possible value, a 4-out-of-4 rating

- This performance measure can be split by any member characteristics such as the patient's sex, age group, the mode of the survey, or other information

Top box performance by age and patient sex

- Men have higher top box percentages for ages 40+, and women have higher responses on average between the ages of 18-39

- Patients younger than 18 have higher responses on average. Is this because the quality of care is better or because they are spending less time completing the survey?

Average Top Box Performance by Patient Sex and Age Group

| Patient Sex	Age1: < 18	Age2: 18-39	Age3: 40-64	Age4: 65+	Total
Female	76	34,418	52,974	78,535	166,003
Male	124	6,587	45,072	85,046	136,829
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Top box performance by mode of survey

- Surveys can be completed either online or in paper form

- 98% of patients completed the surveys in paper; 2% completed the surveys online

	Number of Respondents
Clarity of treatment plan	**39,327**
Paper	38,666
Internet	661
Environment	**39,403**
Paper	38,736
Internet	667
Medicine instructions	**26,574**
Paper	26,177
Internet	397
Nurse spent time with you	**39,745**
Paper	39,079
Internet	666
Nurse was friendly	**39,759**
Paper	39,091
Internet	668
Physician spent time with you	**39,625**
Paper	38,960
Internet	665
Physician was friendly	**39,688**
Paper	39,023
Internet	665
Quality of care	**39,516**
Paper	38,849
Internet	667
Grand Total	**303,637**

Quality of care by mode of survey

- The biggest difference in performance from paper to online is in the overall "Quality of Care" and "Clarity of Treatment Plan"

- It is not clear whether or not patients have a choice between online or paper form. If this is a choice, then there could be selection bias in the results. For instance, patients who are too sick to write out on a paper form may have a third party fill it out online for them

- Patients indicate that the nursing staff was friendly about 80% of the time, which has very little difference between the mode of the survey

- Patients consistently have questions about the medicine instructions as the Top Box percentage is about 50%

Average Top Box Performance by Survey Mode and Question Topic
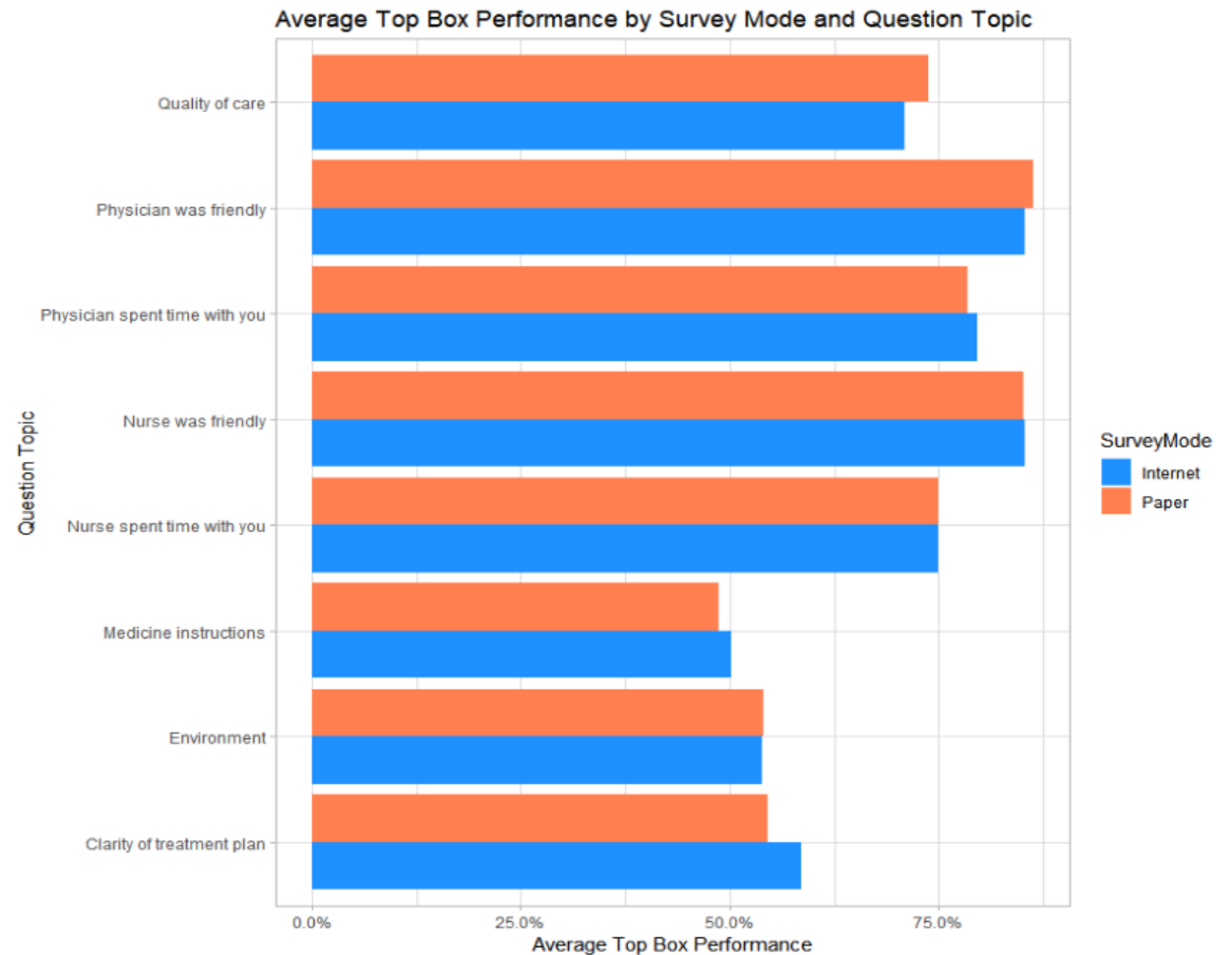
Measuring Quality of Care

Visualizations & Drill Down

Drivers of quality of care

There are two components

1. What the patient fills out on the form. This is related to the overall "patient experience"

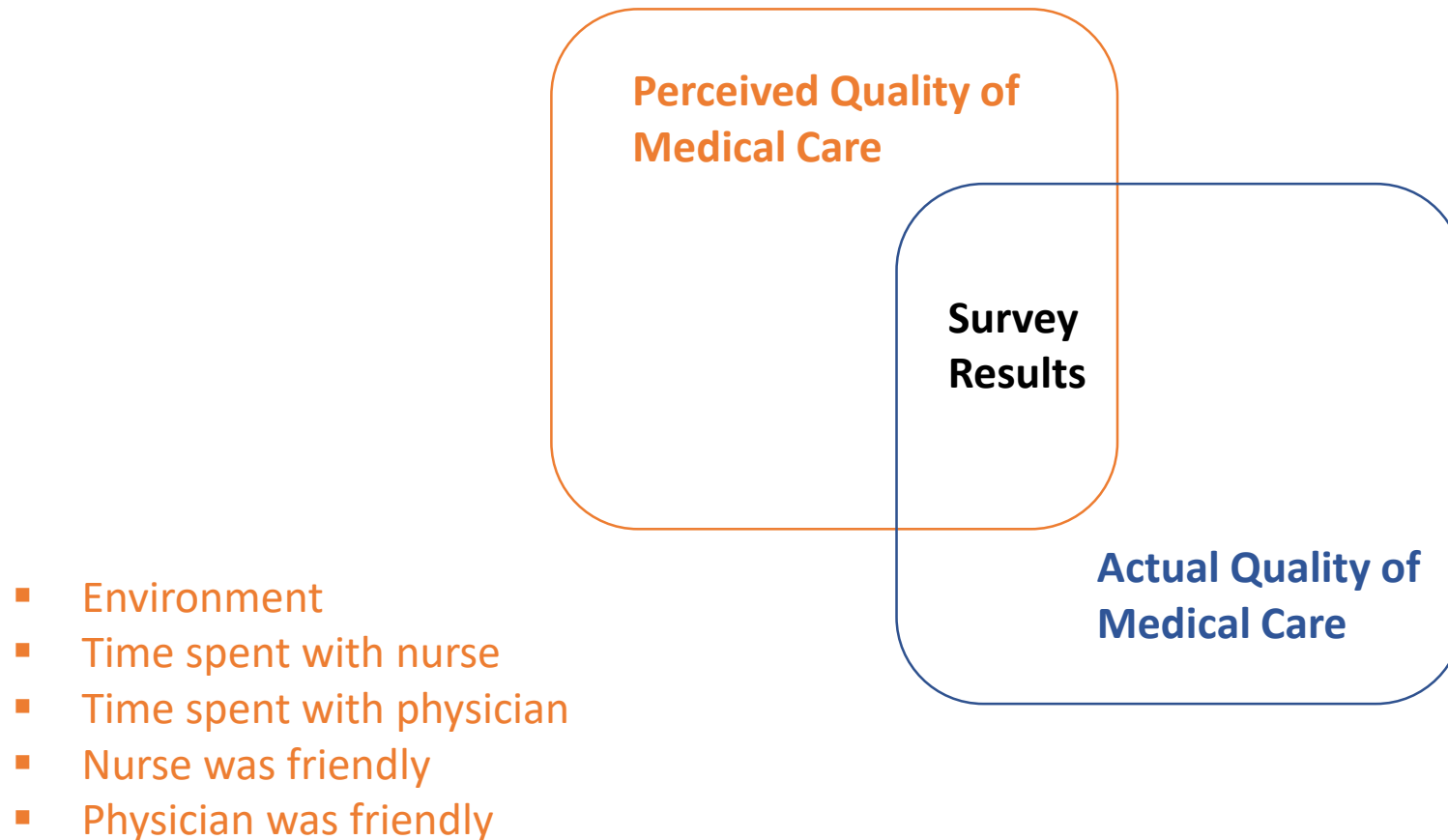2. The efficiency and proper medical treatment which the patient receives

Drivers of quality of care

These can be broken down into sub-components

1. What the patient fills out on the form. This is related to the overall "patient experience"

   1. Do they feel cared for? Did the nursing staff and physician spend time with them?

   2. Were they comfortable? Did they have to wait in the ER for 5 hours? Was the environment relaxing?

2. The efficiency and proper medical treatment which the patient receives

   2. Did they receive complete instructions on how to take their medication?

   3. Was the physician able to prescribe treatment or were they just referred on to another medical professional?

   4. Did they recover well or was there a relapse which results in further treatment?
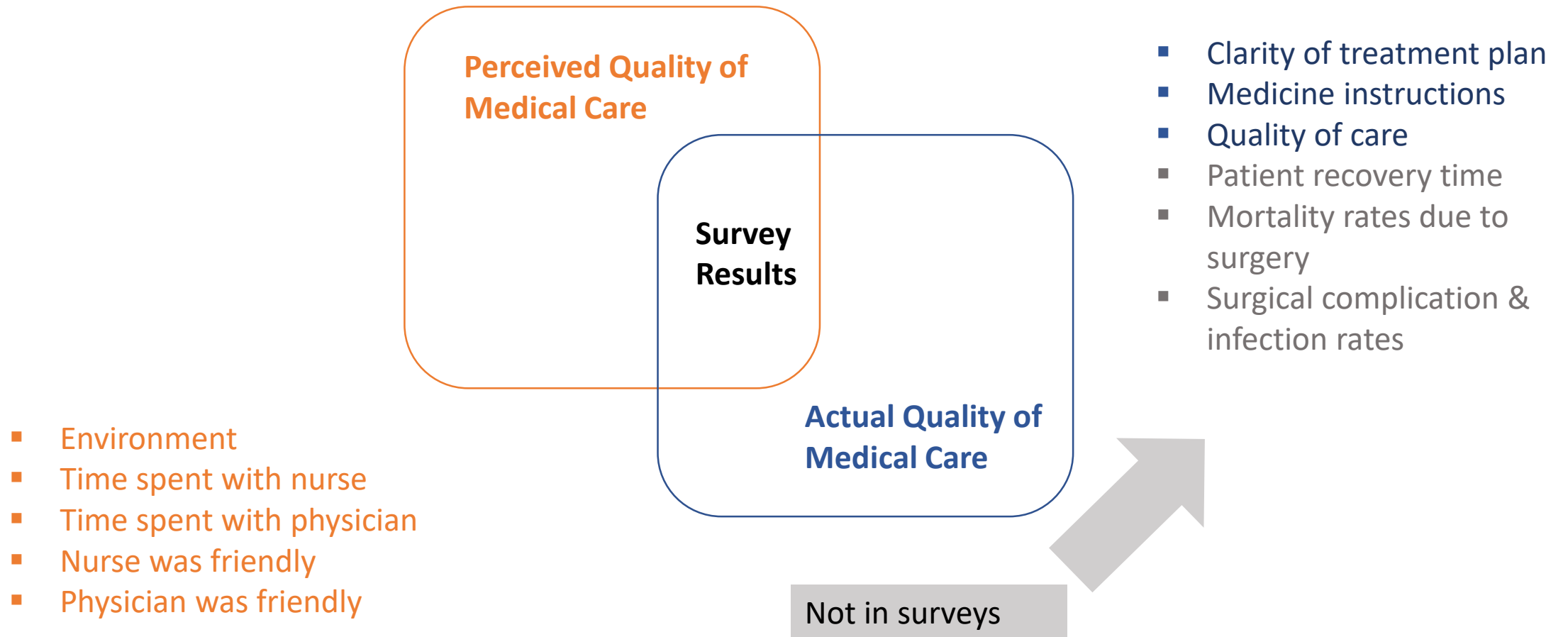
Drivers of quality of care

Perceived Quality of Medical Care

Survey Results

Actual Quality of Medical Care

- Clarity of treatment plan
- Medicine instructions
- Quality of care

- Environment
- Time spent with nurse
- Time spent with physician
- Nurse was friendly
- Physician was friendly

Drivers of quality of care

Quality of Care

Perceived Quality of Medical Care

Survey Results

Actual Quality of Medical Care

- Environment
- Time spent with nurse
- Time spent with physician
- Nurse was friendly
- Physician was friendly

Not in surveys

- Clarity of treatment plan
- Medicine instructions
- Quality of care
- Patient recovery time
- Mortality rates due to surgery
- Surgical complication & infection rates

Drivers of quality of care

What is the distinction between "Top Box" and *Quality of Care*? This this is a highly debated question in health care today. This analysis is assuming that the two are correlated.
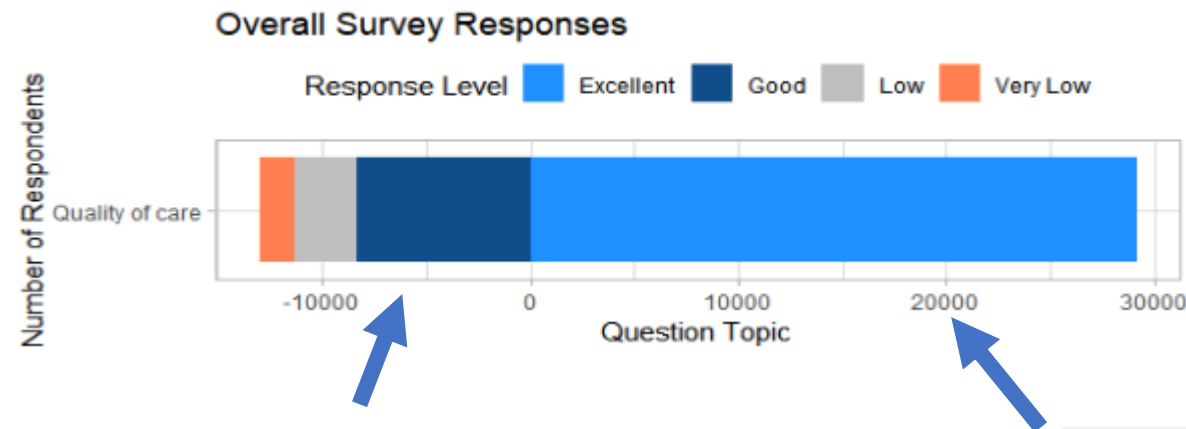
Patient Satisfaction from Survey Results ⟷ **Quality of Medical Care Received**

Measuring quality of care from surveys

- Each question can be answered on a scale of 1-4.

- For easier interpretation, let's add labels to indicate a positive response verses a negative response

Overall Survey Responses

Response Level ▪ Excellent ▪ Good ▪ Low ▪ Very Low

Number of Respondents

Quality of care

-10000   0   10000   20000   30000

Question Topic

About 800 patients thought that it their quality of care was "Good"

About 3000 patients indicated that their "Quality of Care" was 4/4, or "Excellent"
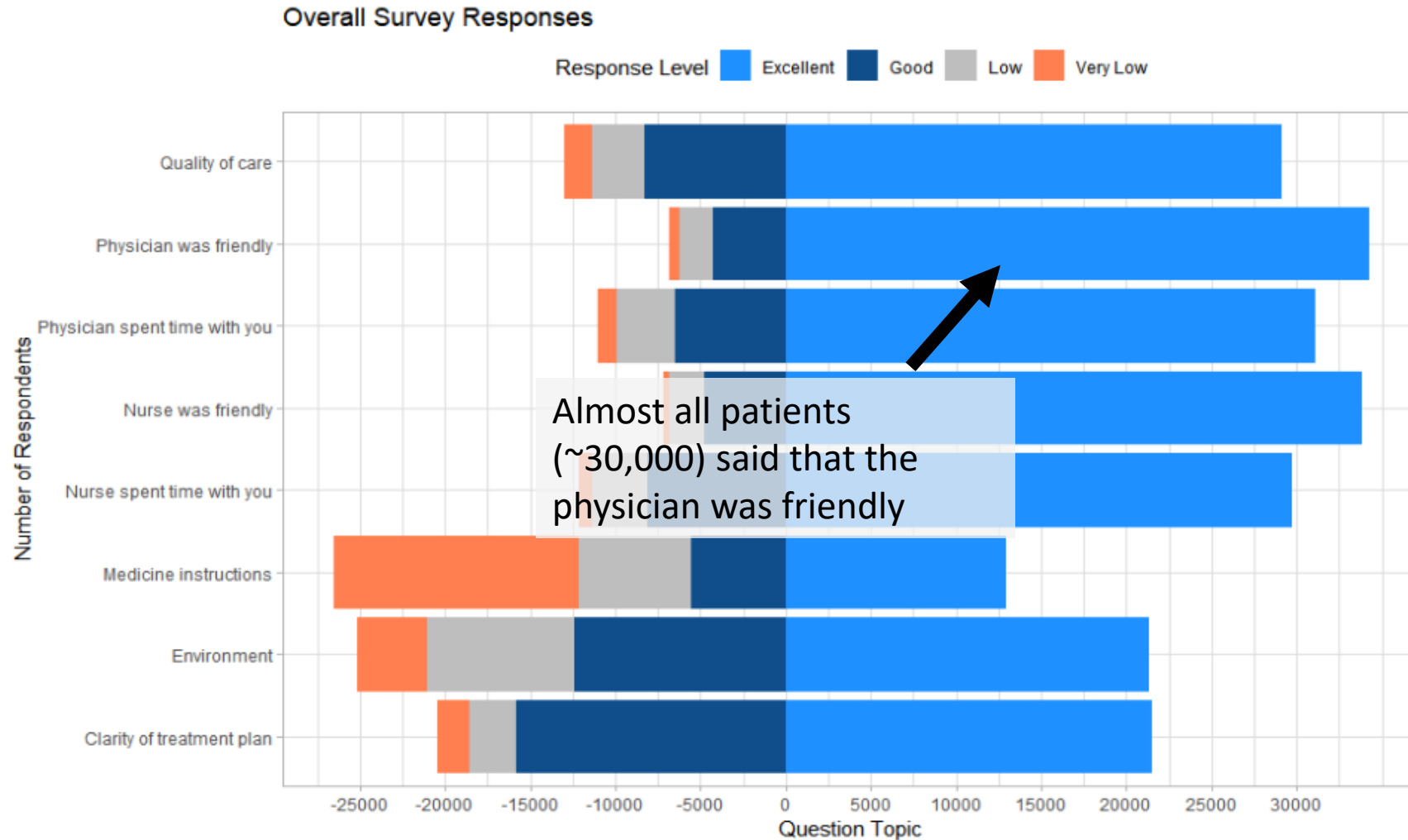
Measuring quality of care from surveys

Overall Survey Responses
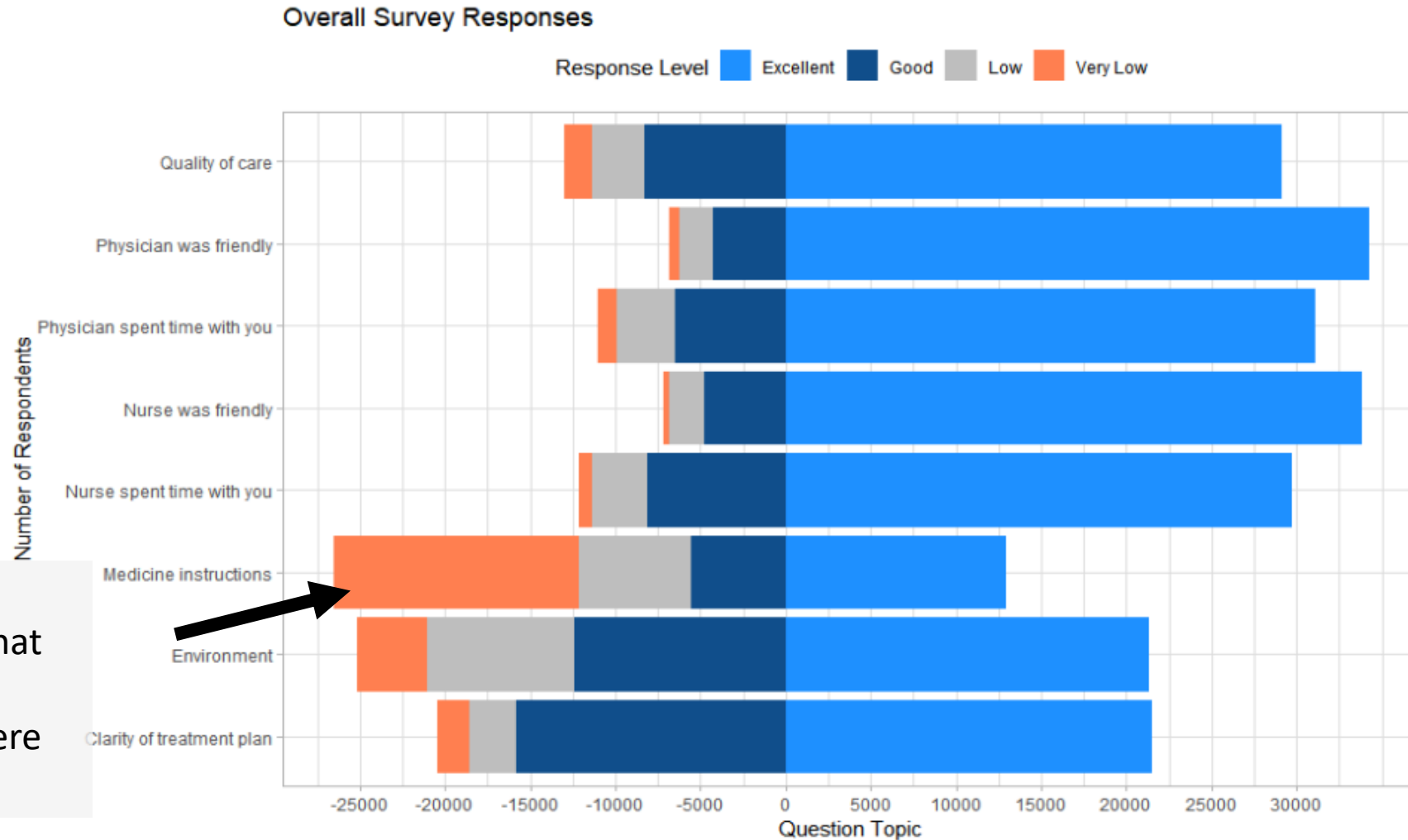
About 10,000 patients said that their medicine instructions were poor

Measuring quality of care from surveys

Overall Survey Responses

Almost all patients (~30,000) said that the physician was friendly

Recap: How should overall quality of care be measured?

Should we just use the "Quality of Care" Top Box rate?

- How can we distinguish between cause and effect?. For instance, was having an unfriendly nurse the reason why a patient rated "Quality of Care" as 2 out of 4, or were they treated the same as other patients but upset due to a bad medical outcome and thus gave a low "friendliness" rating?

- How do patients interpret the overall "Quality of Care" rating? If some patients interpret this to mean strictly the 'comfort' of the experience and other patients the amount of medical attention, number of x-rays given, time spent with the physician, or other arbitrary factors, then how can this be a reliable source?

Client Benchmarking

Findings Opportunities for Improvement of Quality of Care

Compare a given client to a benchmark

Step 1: Create an industry benchmark. This can be as simple as an average of the top 10 clients or as complex as statistical measure including health risk score, the number of patients the sample, and other factors.
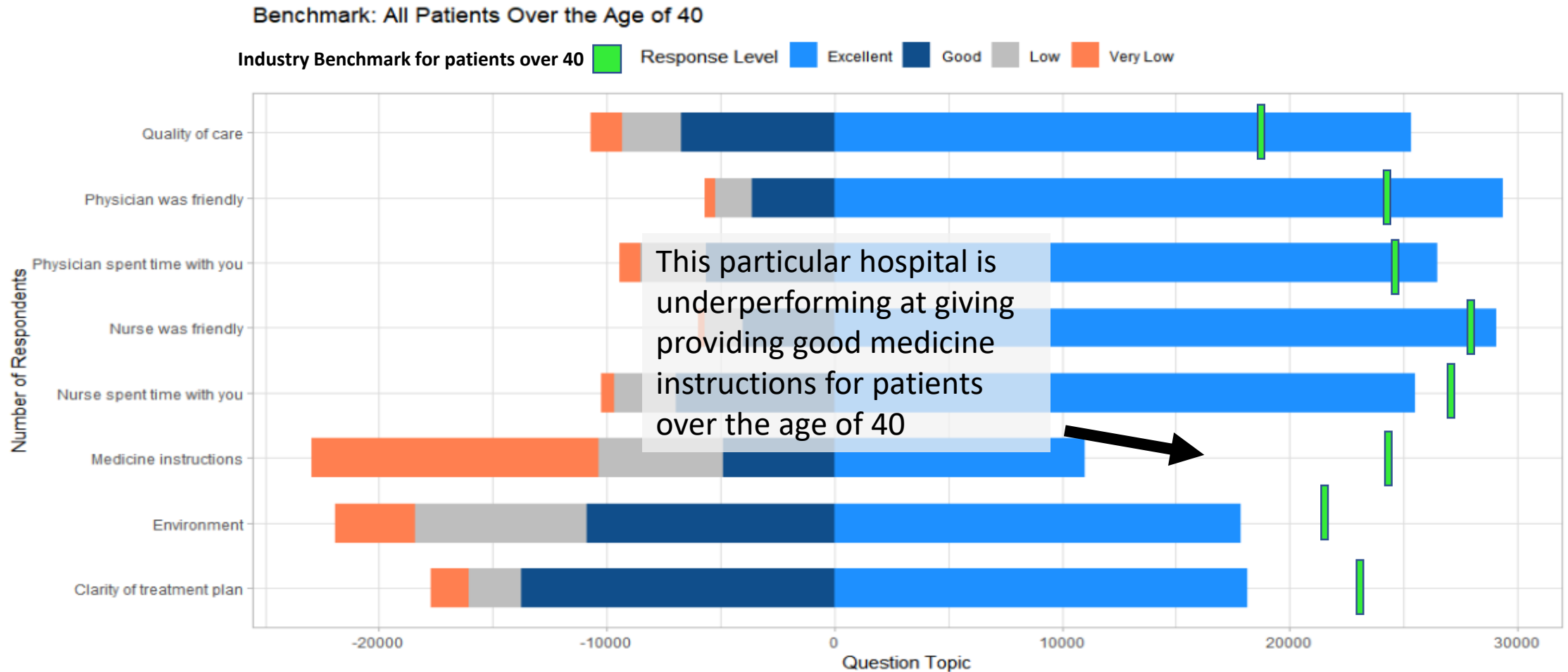
Step 2: For any split of the data, compare a given client to this benchmark

Step 3: If there is significant differences, such as if the client is behind in a certain area, start looking into why this might be the case

Step 4: Take action. Connect the low-performing client with resources from the top performers to answer the question "What is are they doing differently than we are"?

Example: Patients over the age of 40 for Hospital ABC

Benchmark: All Patients Over the Age of 40

Industry Benchmark for patients over 40 Response Level — Excellent — Good — Low — Very Low

This particular hospital is underperforming at giving providing good medicine instructions for patients over the age of 40

Future Considerations

Additional data sources

Future Considerations

What additional data sources would be add to this analysis?

- **Time spent on survey.** This is a way of measuring "survey fatigue" which is the level of interest and authenticity which the patient exhibits when filling out the survey. This can be used a to assign credibility to survey results
- **Past medical history.** A patient who goes to the hospital multiple times per year would have a different standard of "Quality of Care" than a patient who has only been once
- **Time survey was completed.** Was this when they were in the hospital or three weeks later once they were at home?
- **If they had assistance in filling out the survey.**
- **Information of missing data.** Which patients are *not* filling out surveys? Is this MCAR, MAR? What causes a patient to not fill out a survey?