Overbilling and Killing? Evidence from Skilled Nursing Facilities

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Background

- **Medicare costs have steadily increased at 1.8 times rate of inflation over the last 25 years**
  - Represent $15,727 per beneficiary each year
  - Significant disagreement about whether Medicare payments are sufficient to provide quality care
- **Inherent Conflict of Interest: Profit-maximizing and patient-optimal care may not coincide**
  - Examine billing practices around a major change in reimbursement intended to reduce waste and improve overall care

Skilled Nursing

- **Skilled nursing facilities (SNFs) are designed to provide skilled care, including nursing and rehab following an inpatient hospital stay**
  - Typically, an intermediary setting between hospital and returning home
- **SNFs face a conflict of interest in the provision of care**
  - Should focus on patient outcomes but patient-optimal care may not be revenue-maximizing for health care providers
- **Payment is determined by a patient's "case-mix" which is a combination of patient conditions and services provided**
  - January 2016-September 2019: Resource Utilization Group (**RUG-IV**)
  - October 2019-December 2022: Patient Driven Payment Model (**PDPM**)

Preview of Findings—Billing

- **Certain SNF systems consistently provided care in an opportunistic manner from 2016-2019**
  - Rehab provided at very high levels just above billing thresholds suggesting a focus on profit extraction rather than patient need
  - These same SNF systems generate highest revenues under new PDPM
    - Cost differences are significant at up to $6,000 more per patient
- **Higher billing revenue during PDPM appears to be driven by strategic upcoding**
  - Diagnoses are not documented at immediately preceding hospital stays
  - Use of high-reimbursement codes spreads following acquisition by opportunistic systems

Preview of Findings—Quality of Care

- **Additional revenue not used to provide better care**
  - More likely to experience preventable and severe health conditions such as bed sores, UTIs, rehospitalization and mortality
  - Patient Reviews– 2.5 times more neglect and abuse for upcoding, lower stars
  - Fewer nurses (20%), especially registered nurses
- **SNF systems do not seem to experience market or regulatory discipline**
  - No, opportunistic systems are expanding at 2.5 times the rate of other systems and have similar levels of patient retention
  - Systematic underreporting of preventable health conditions contaminates CMS Quality Ratings

Outline

- **Methodology and Data**
- **Billing Practices**
  - RUG-IV
  - PDPM
- **Quality of Care**

Data

- **Skilled Nursing**
  - 14,318,809 skilled nursing stays from 7,287,257 unique patients from January 1, 2016 to December 31, 2022
  - Patient characteristics, diagnoses, and billing categories
- **Inpatient Limited Data Set**
  - Universe of Inpatient Hospital Medicare Claims
  - Shares anonymized beneficiary ID with SNF limited data set
- **Public Use Files**
  - Facility-level information from Center for Medicare and Medicaid Services (CMS)
- **Caring.com Patient Reviews**
  - 73,237 nursing home reviews

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Medicare Payments in RUG-IV and "Excess Rehab"

- **Under RUG-IV, Medicare reimbursement based primarily on the number of therapy minutes provided weekly**
  - Distinct categories: Low (45-149 Minutes), Medium (150-324 Minutes), High (325-499 Minutes), Very High (500-719 Minutes) and Ultra-High (720+ Minutes)
- **Higher reimbursement rates for more therapy creates an incentive to increase therapy even if not beneficial**
- **Use of Ultra-High therapy increased from less than 10% in 2003 to 54% by 2019**
- **Question:** Is this driven by certain SNF systems providing "excessive" care?

Main Measure of Opportunism

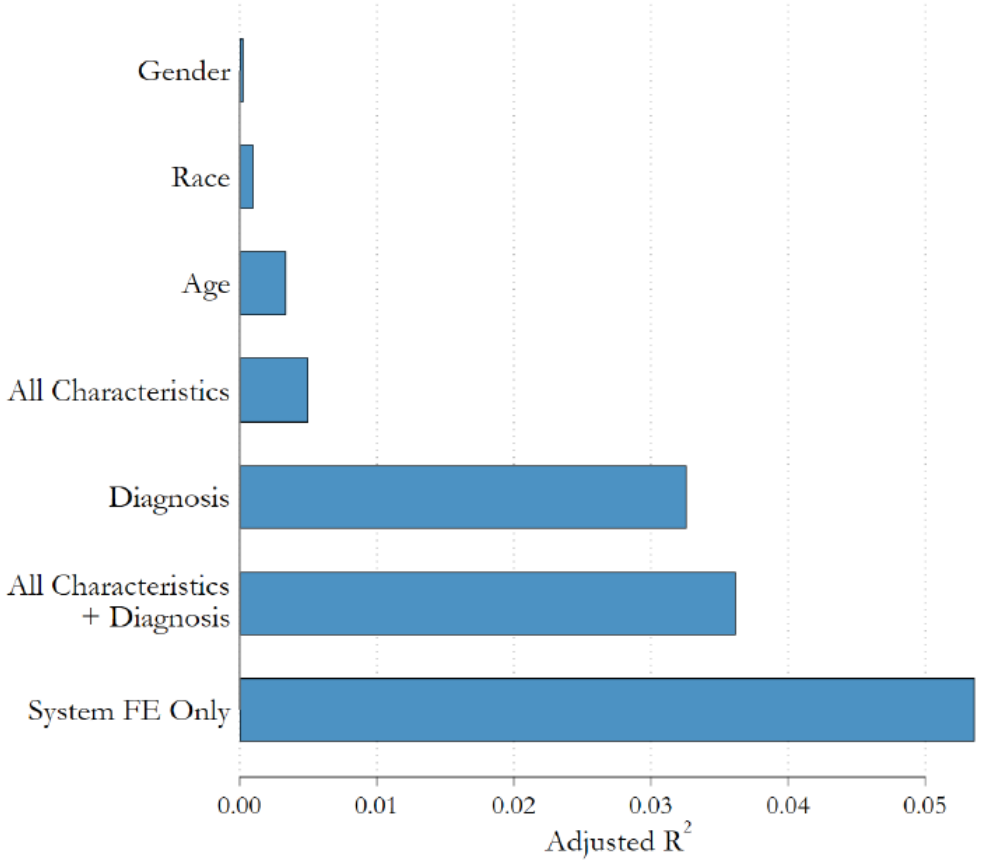
- **Key Challenge:** We observe only the level of treatment a patient received and not what level a patient needs
  - ➢Can we be sure that higher levels of therapy are "Excessive"?
- **Idea:** Utilize variation in patient characteristics and diagnoses to construct an *expected* level of therapy utilization
  - *ExcessRehab* is the System-wide level of *Unexplained* therapy provision
  - Patients at facilities belonging to SNF systems in the highest one-third of *ExcessRehab* ("Opportunistic systems") received 71% more Ultra-High Rehab days than at other facilities
  - Differences are not explained by observable patient characteristics
- Furthermore, differences in rehab provision across systems concentrated in 10-minute windows around payment cutoffs

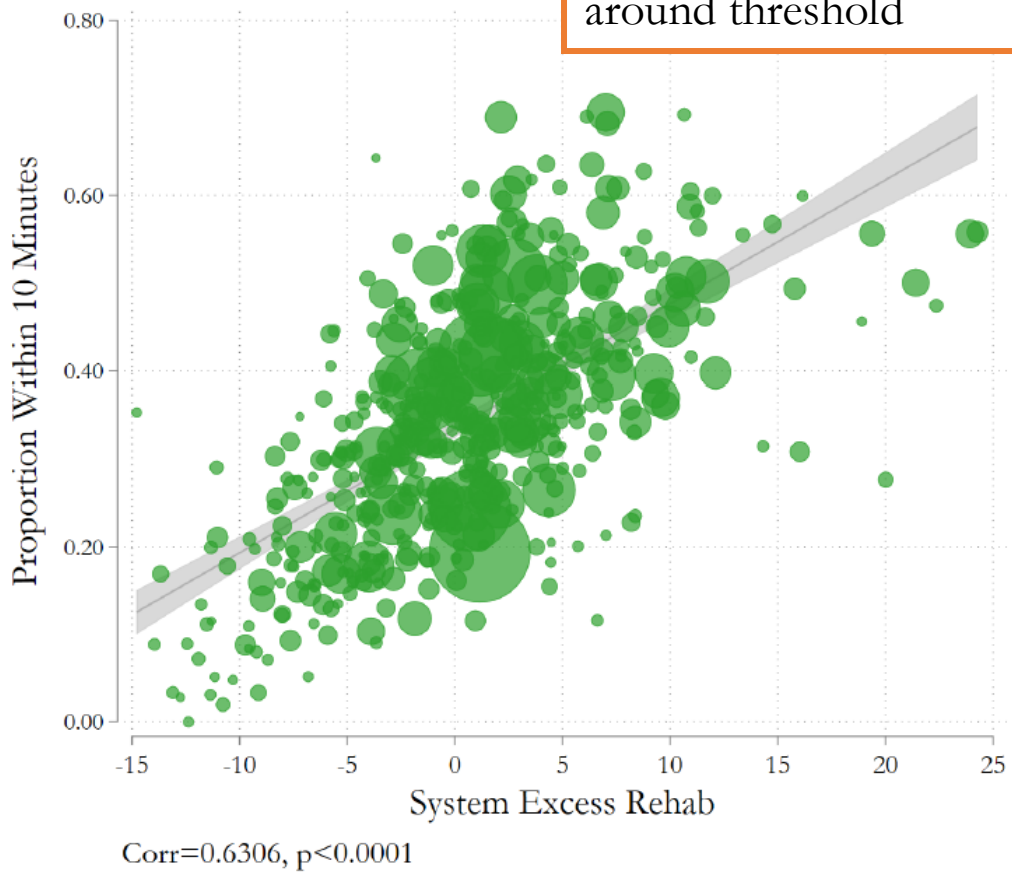
Threshold Billing

Identity of System Explains More than Patient Characteristics

Differences across systems concentrated in 10-minute window around threshold

Figure 2. Importance of SNF System in Rehab

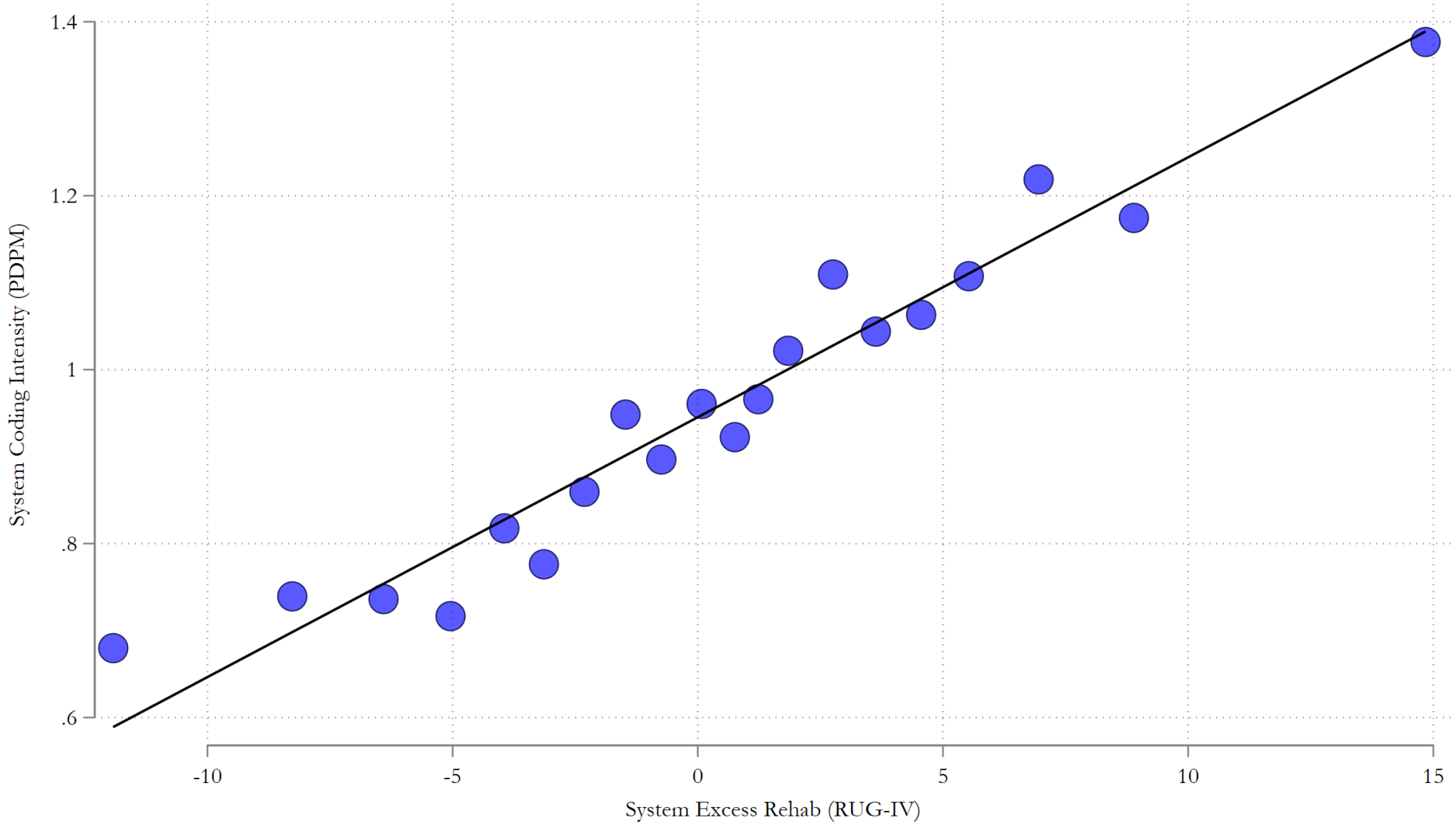




PDPM Billing

- **CMS enacted the Patient Driven Payment Model (PDPM) beginning October 1, 2019**
  - Different model of incentives: Away from therapy utilization and towards individualized patient characteristics and needs
- **Medicare case-mix and reimbursement relies on patient conditions, which are assessed and reported by employees of the Skilled Nursing Facility**
- **Five patient categories determine per diem reimbursement**
  - Nursing, Physical Therapy ("PT"), Occupational Therapy ("OT"), Speech-Language Pathology ("SLP"), and Non-Therapy Ancillary Services ("NTA")
  - Additional details provided in paper
- We define sum of five high-reimbursement diagnoses as *CodingIntensity*
- According to CMS, PDPM was expected to shift revenue *away* from residents receiving high levels of therapy *towards* patients with complex clinical needs

Motivating Evidence

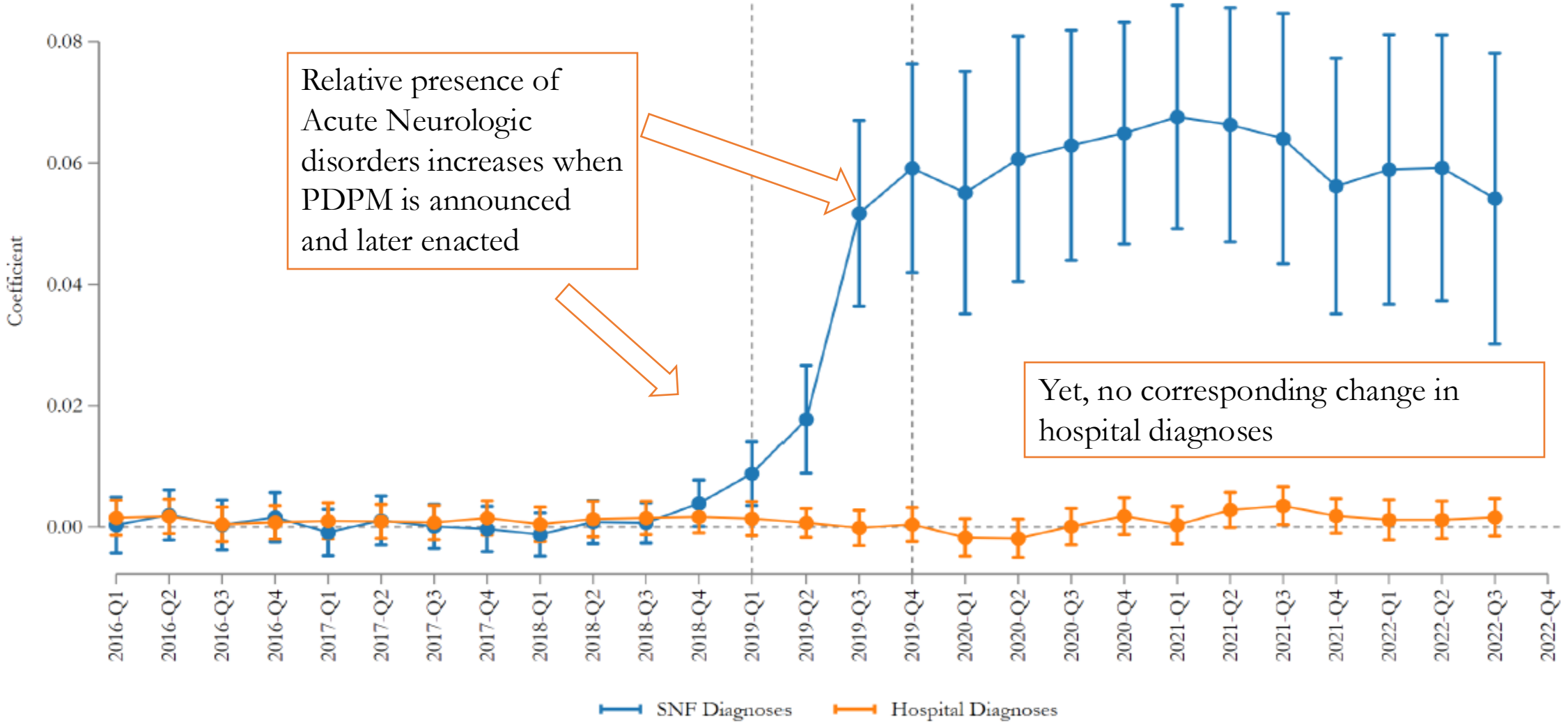


SNF systems which previously had higher levels of excess rehab subsequently bill for more comorbidities

Event Study around PDPM

- **Question:** Is higher level of coding intensity explained by upcoding?
- **Challenge:** Changes in reimbursement might alter the type of patients a facility targets
- **Idea:** Examine prevalence of patient diagnoses before and after PDPM as recorded by BOTH the qualifying hospital and skilled nursing facility
  - Comparing frequency of compensating comorbidities (such as Acute Neurologic or SLP-related comorbidities) at opportunistic SNF systems versus other SNF systems during the same time

Acute Neurologic Conditions



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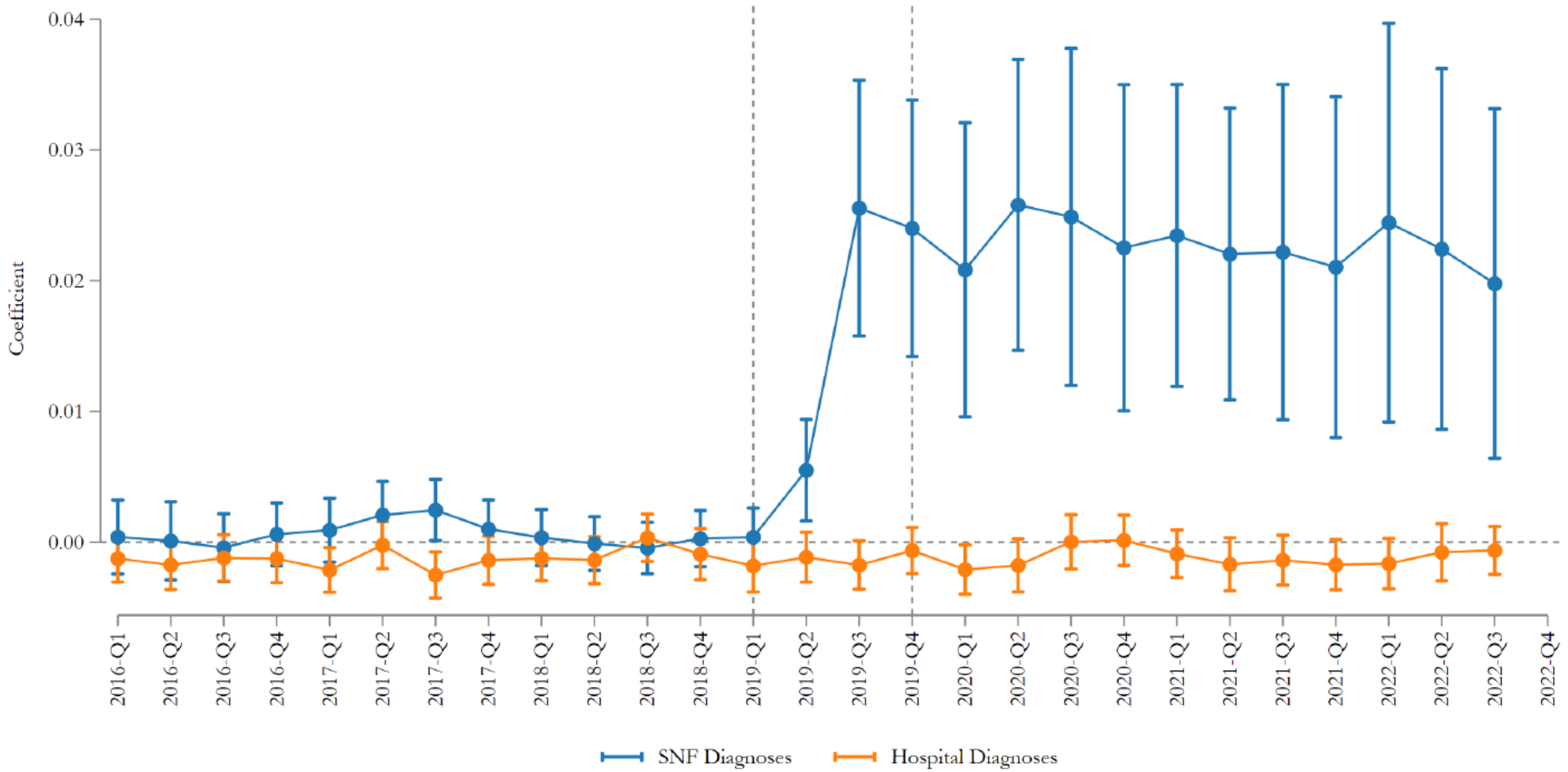
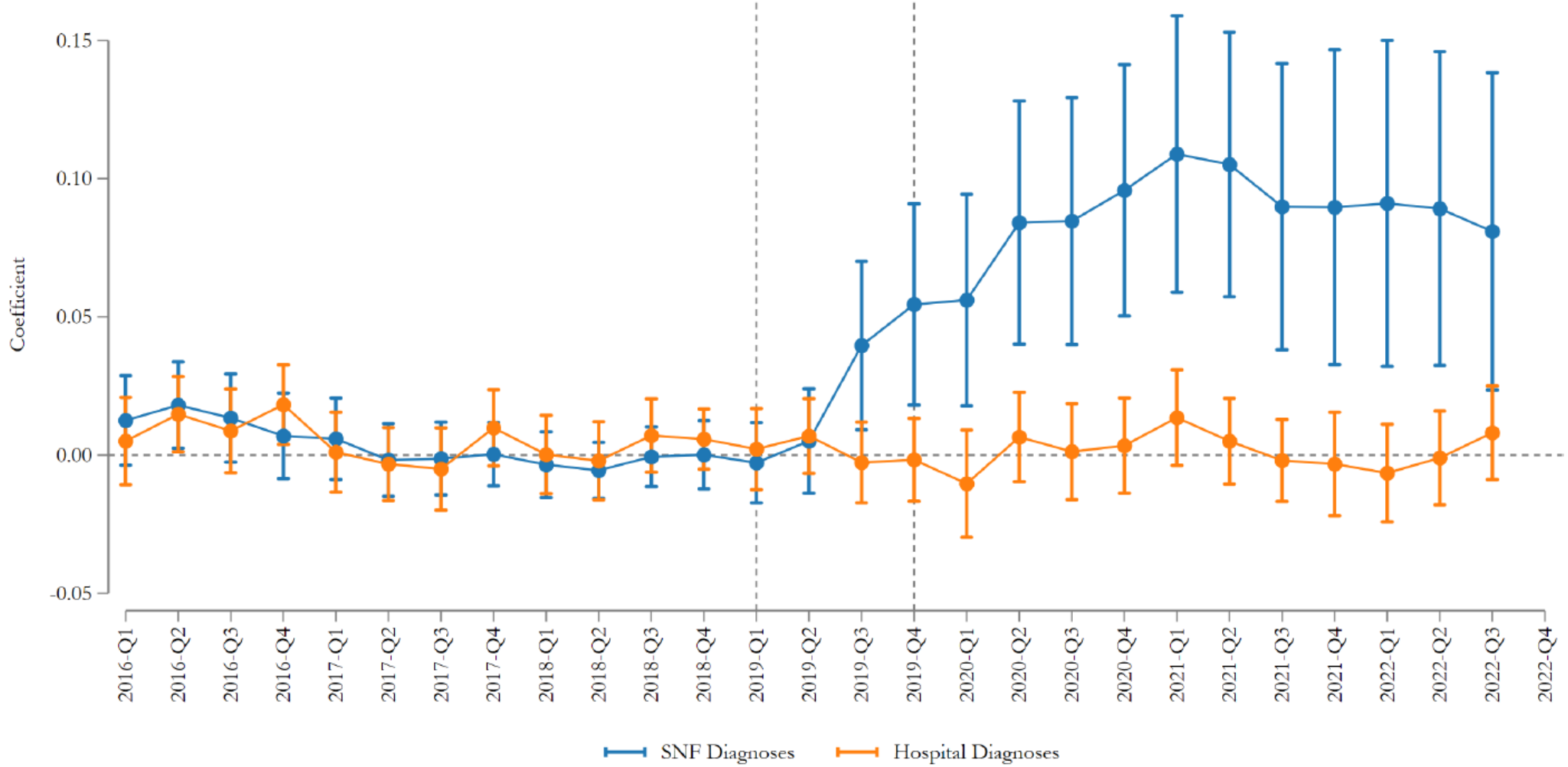
SLP-Related Comorbidities



NTA-Related Comorbidities



Event Study Summary

- **Around the enactment of PDPM, facilities which previously had higher Excess Rehab experience sharp increases in the prevalence of patients with Acute Neurologic disorders, SLP-related and NTA-related comorbidities versus other facilities**
  - Same facilities did not have pre-existing specialization in treating relevant comorbidities
- **Reimbursement based on conditions as identified by the SNF**

  →Use the diagnoses at hospital for a given patient as an external measure of patient condition
  - Higher levels of comorbidities not supported in hospital claims

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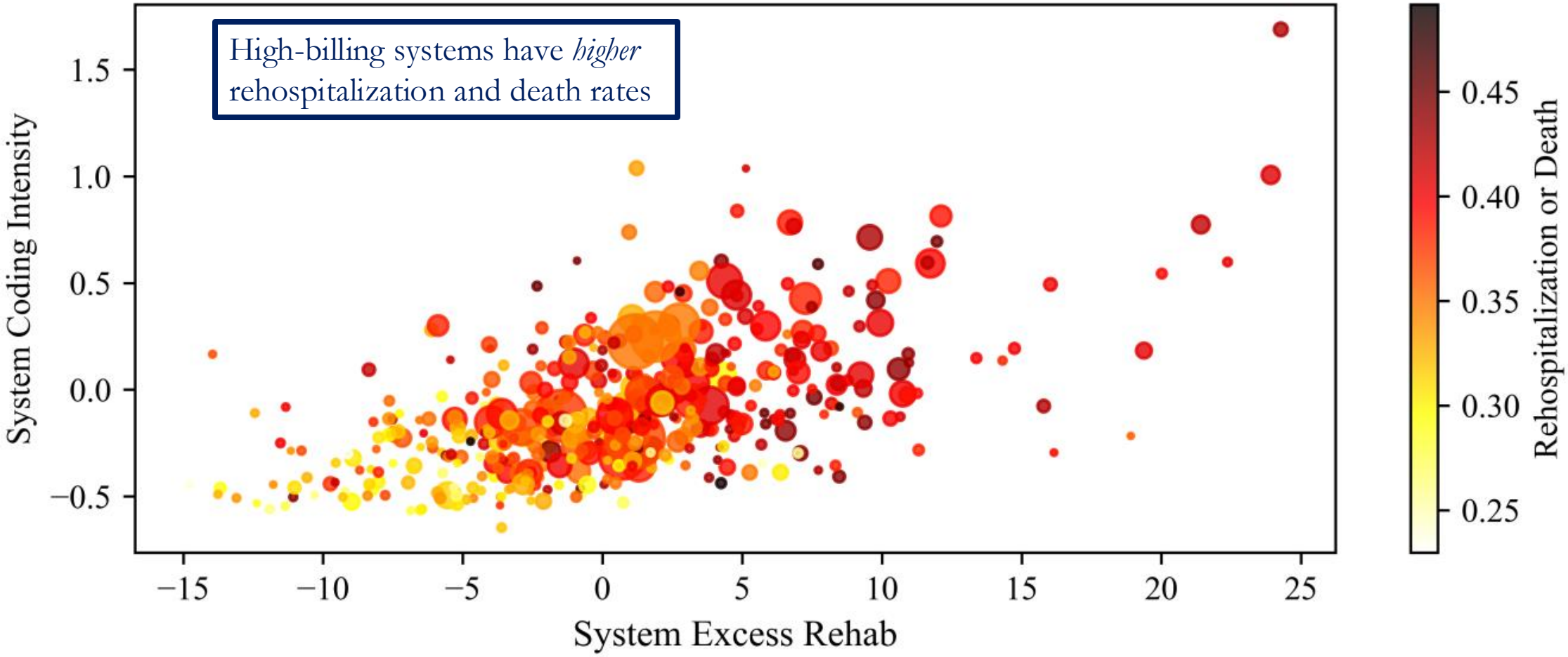
Quality of Care

- **Cost of care per patient is far more expensive at opportunistic facilities**
  - **Per-patient cost can vary by more than $6,000**
- **Are system billing practices related to quality of care?**
- To focus on quality of care, consider three separate sources
  - Incidence of patient health outcomes including pressure ulcers, UTIs, rehospitalization and mortality within 90 days
  - Patient reviews
  - Staffing levels and unannounced health inspections

Billing Practices and Health Outcomes



Patient Health Outcomes

- Consider various measures of patient health outcomes which measure quality of care
  - Pressure ulcers (bed sores)
  - UTI's
  - Rehospitalization within 30 days
  - Death within 90 days
- To compute these measures, we merge the SNF data with the Inpatient and Hospice datasets
  - Consider a patient to have facility-acquired pressure ulcer or bed sore if admitted to hospital within 1 day and recorded as having a new bed sore (P.O.A.)
  - This is a conservative lower bound since it assumes that **only** patients admitted within 1 day could have developed a bed sore

Patient Health Outcomes

	(1) Pressure Ulcer	(2) UTI	(3) Rehospitalized	(4) Mortality
Excess Rehab	0.000200***	0.000545***	0.00259***	0.00227***
	(3.35)	(7.34)	(7.03)	(7.80)
Patient Gender	Yes	Yes	Yes	Yes
Age Bucket	Yes	Yes	Yes	Yes
Patient Race	Yes	Yes	Yes	Yes
County x Quarter FE	Yes	Yes	Yes	Yes
Diagnosis x Hospitalization Length	Yes	Yes	Yes	Yes
HSA FE	Yes	Yes	Yes	Yes
Kleibergen-Paap F Statistic	111.8	111.8	111.8	111.8
Observations	1,609,904	1,609,904	1,609,904	1,609,904

t statistics in parentheses

* p<0.10, ** p<0.05, *** p<0.010

Shifting from first to third tercile of Excess Rehab predicts increase in rehospitalization (mortality) of 2.72% (2.38%)

Patient Reviews and Abusive Classification

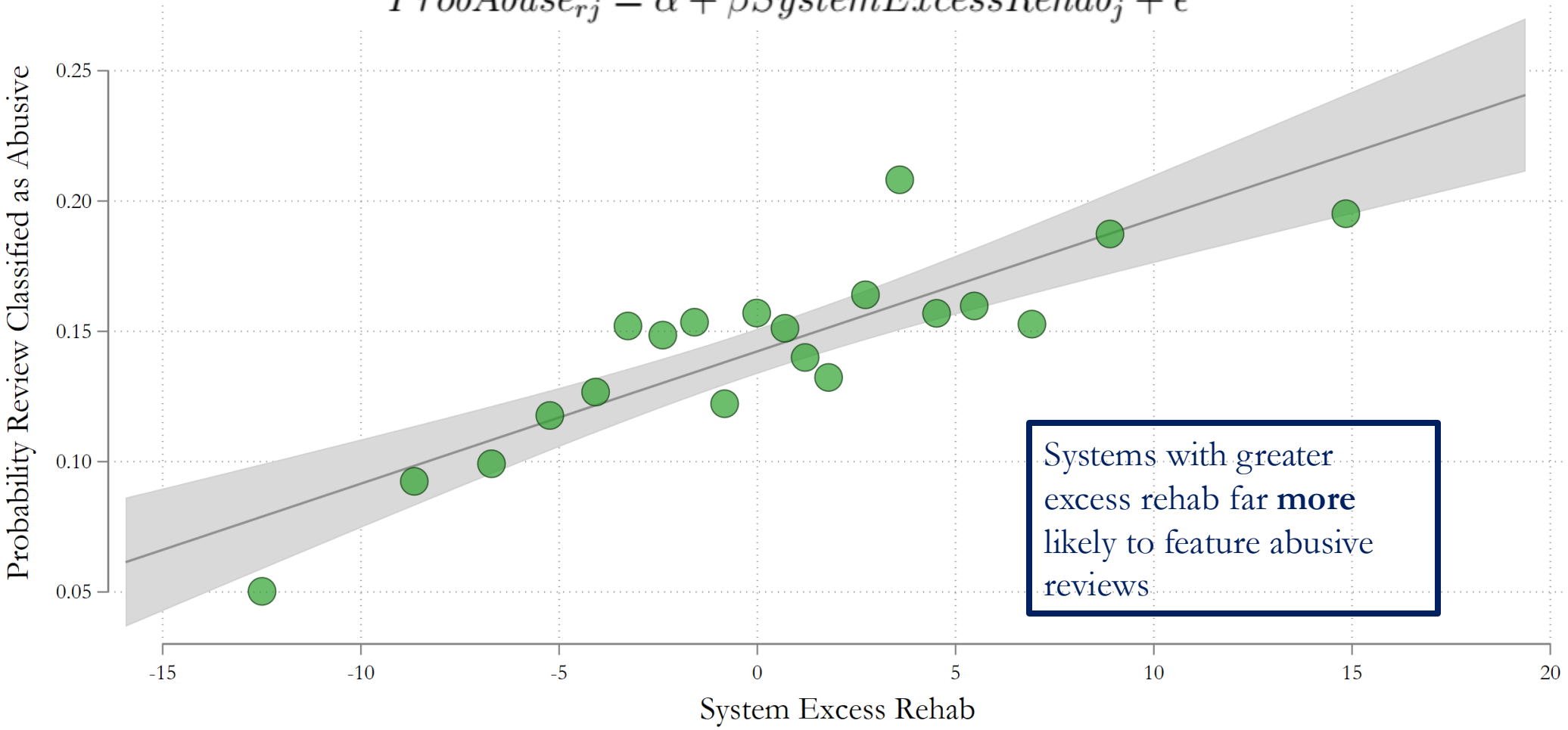
- Patients and family members likely to have considerable information about facility quality that would be difficult to externally quantify

This place is horrible. Don't leave your loved ones here. Nurse call button not answered for several hours. My Dad had a broken hip wasn't able to use the bathroom alone. It took several times to get a nurse and that was me asking for help. He had numerous bed sores and was never moved for several days. When we questioned the nurse she said "I am the only one here for over 30 patients"

- We train a Support Vector Machine (SVM), a supervised algorithm, to identify reviews that could indicate abuse
- Begin with a manual classification of 100 reviews as abusive or not
- Reviews indicating abuse are pervasive: 14.9% of reviews are classified as indicating abuse
- **Does a SNF System's billing practices predict more abusive reviews?**

Abusive Reviews

$$ProbAbuse_{rj} = \alpha + \beta SystemExcessRehab_j + \epsilon$$



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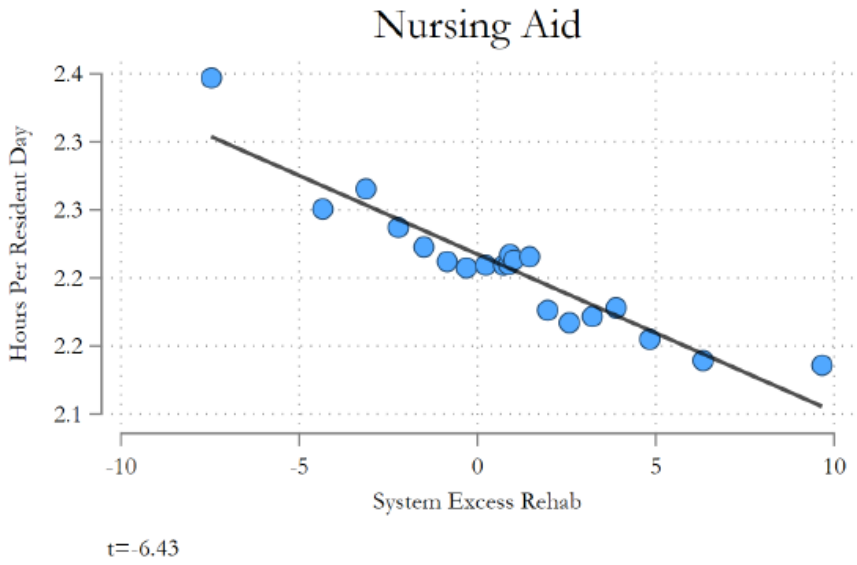
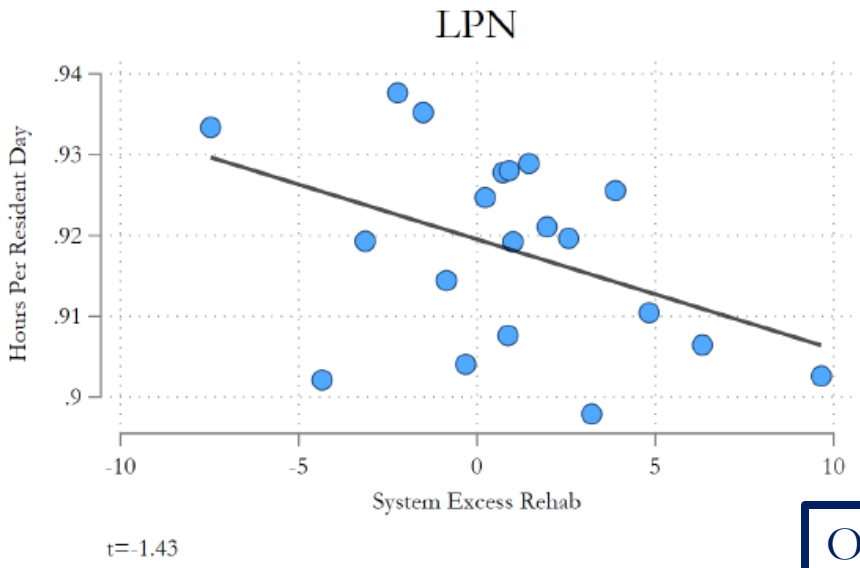
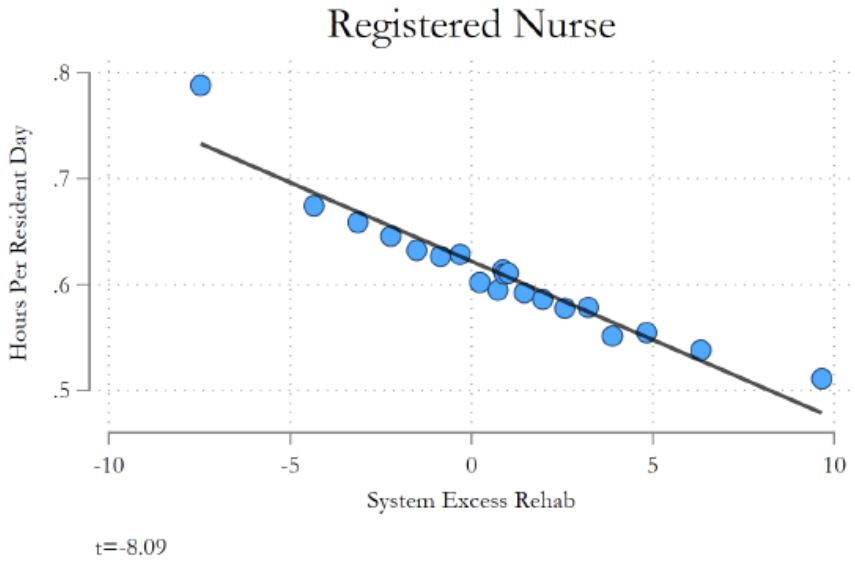
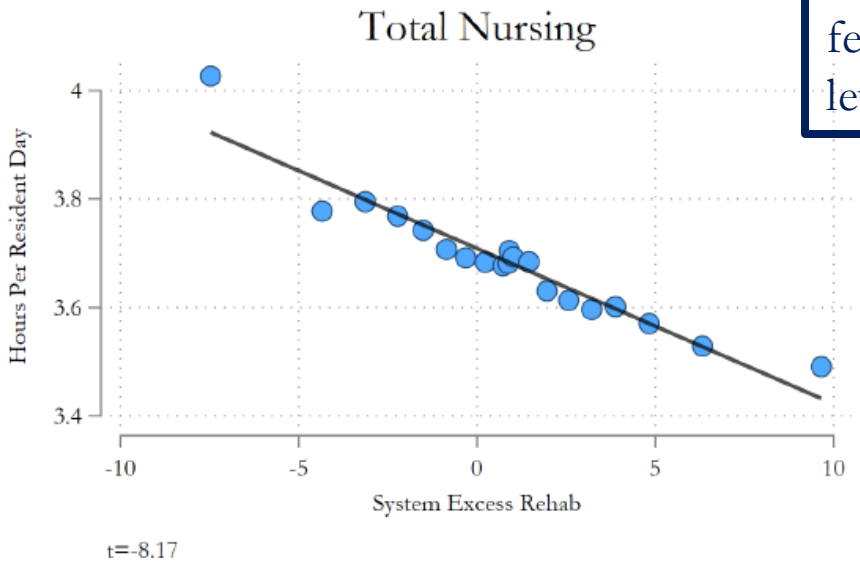
Staffing Ratios









Opportunistic systems feature *lower* staffing levels per resident day

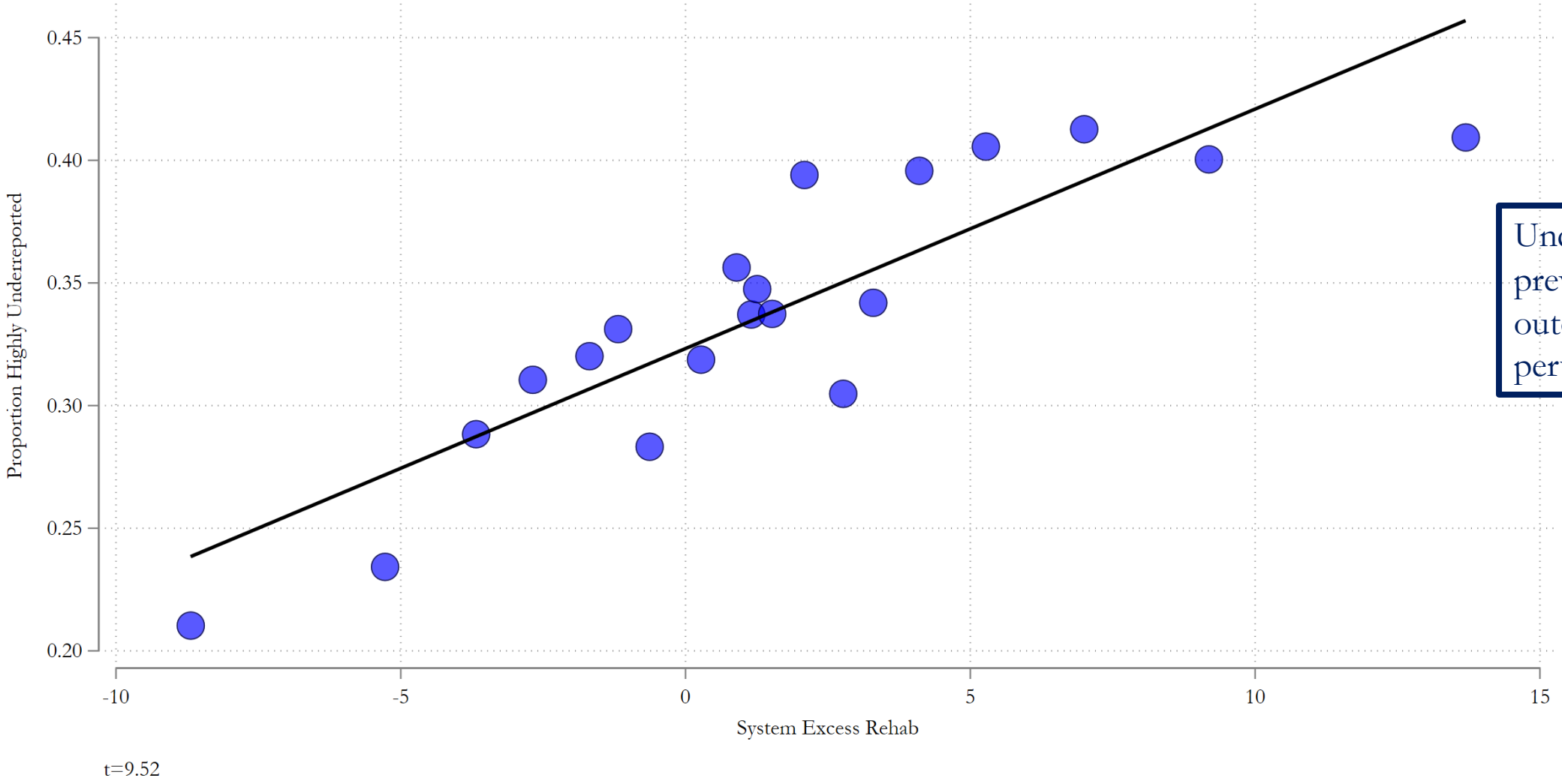
Quality of Care

- Patients at opportunistic facilities more likely to develop bed sores or UTIs and are also more likely to be hospitalized or die within 90 days of discharge
- Patient reviews at opportunistic facilities are 2.5 times more likely to describe abuse or neglect
- Opportunistic facilities provide consistently fewer staffing resources per patient
- Random health inspections reveal higher levels of deficiencies

Public Quality Ratings

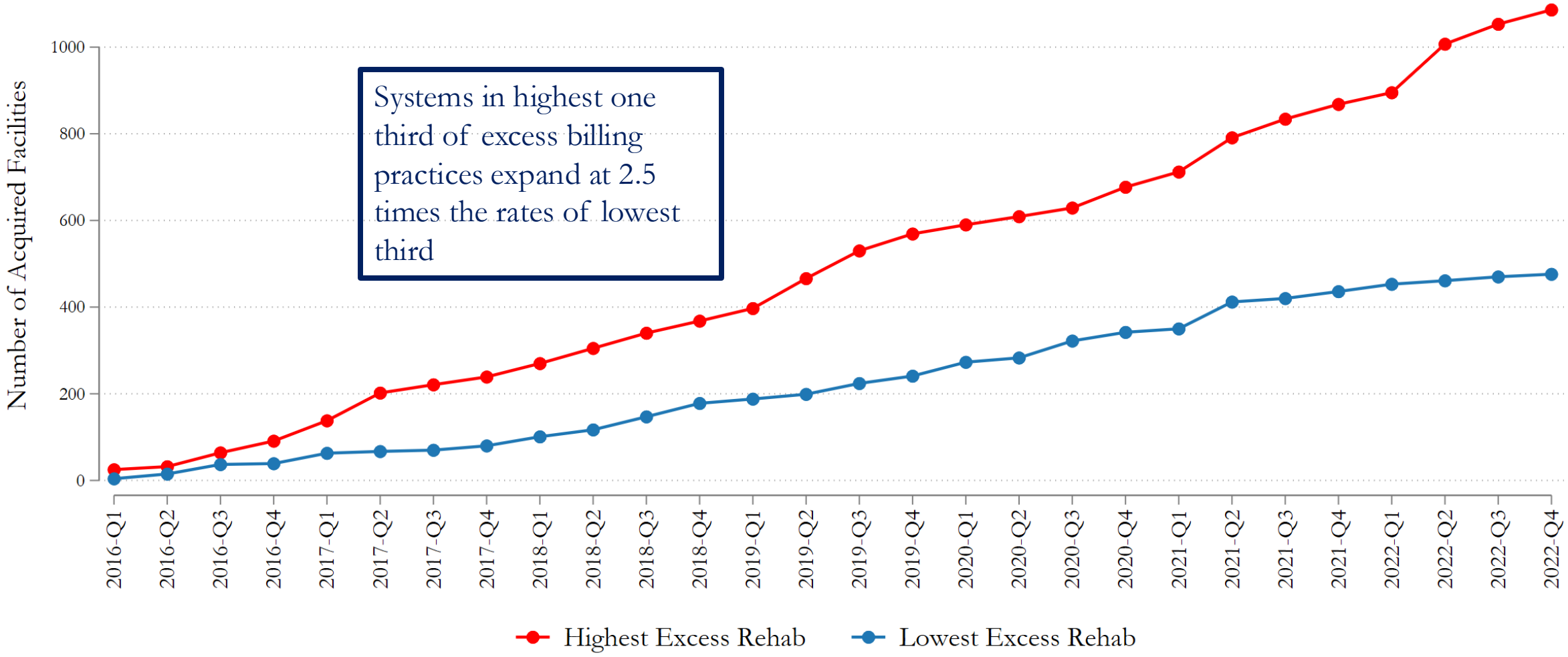
- While Medicare does not directly condition payment on treatment quality, facilities may still face "market discipline" if patients refuse to visit poorly performing facilities
- **Challenge:** Patients may have difficulty accessing or understanding the quality of an underlying facility
- **Potential Solution?** Medicare provides prospective patients with facility-level information and ratings
- **Issue:** Quality ratings rely on data which is self-reported by the Skilled Nursing Facilities
- **Idea:** Construct a lower-bound of facility-acquired health outcomes and compare to those reported in Quality Ratings
  - Classify facility to be "highly underreporting" if lower bound is at least double that reported in Quality Ratings

Result? CMS Quality Rating are Often Gamed



Underreporting of preventable health outcomes is pervasive

External Discipline? Retention and Expansion



Conclusion

- Change in payment scheme did not deter SNF systems from engaging in excessive billing practices
- Discrepancies in billing levels do not seem to be explained by patient heterogeneity, selective admission, or superior diagnostics, but are consistent with upcoding
- Three distinct measures of quality of care suggest that excessive billing practices are associated with lower quality of care
- Underreporting of health outcomes by facilities makes it more challenging for general audience to gauge facility quality
- Facilities with most aggressive billing practices are rewarded under current system and experience much faster growth