

Summer Undergraduate Research Fellowship (SURF) USA

Effects of Ownership Type on Quality of Care in Nursing Homes Post Covid-19:

A Regression Analysis

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Research Location: Due to the accessibility of public data, this study will be done remotely.

***The following example SURF proposal has been adapted from a longer original proposal written by MJ Condon/Analytical Economics and Statistics (Faculty Mentor: Esmail Bahalkeh). The example has been modified and edited to fit the current, more concise SURF proposal guidelines.**

Proposal prompts in blue are included for instructional purposes only, based on the SURF proposal guidelines. Applicants should not include these prompts when submitting a final application.

Project Summary (one page maximum, single-spaced)

1. Abstract (200 words maximum): concisely summarize your project and its goals

While quality of care within nursing homes has been analyzed for decades, increasing strains on nursing homes following Covid-19 have demonstrated an increase in lowered quality of care. Coverage type, resident characteristic, accreditation, and skill level all impact quality of care, yet limited research has analyzed nursing home quality of care post Covid-19, and there is a gap in knowledge regarding how ownership type (non-profit or for-profit) impacts quality of care in nursing homes following Covid-19. This study will use publicly available data from multiple sources to determine underlying relationships between ownership type and quality of care. I will clean and process data for both singular variable and multi-variable analysis, providing descriptive statistics and modeling as well as a correlational analysis. Next, I will employ regression analysis to create predictive models and analyze the relationships between ownership type and quality of care, and I will utilize Tableau to model and visualize these relationships. Expected results are that non-profit owned facilities will primarily have lowered quality of care compared to pre-Covid-19 and for-profit ownership. The results will identify areas and potential policies for quality and access improvement.

2. Outcomes (list 2-5, one bullet point each): tangible products of your project (e.g. report, database, results of quantitative/qualitative/textual analysis, paper, thesis, presentation, production, exhibition, film, article submitted for conference or publication, etc.); also include at least one outcome stating how this project contributes to your personal, educational, and/or professional goals

- Analysis of cleaned data set on nursing home type and health outcome quality to provide recommendations for nursing home consumer choice
- Production of a video summarizing findings for public dissemination
- Publication in the Hamel Center's *Inquiry* journal and/or Undergraduate Research Blog
- Lay a foundation for my senior Statistics Capstone, where I plan to create my own research study analyzing access to Reproductive Healthcare
- Gain experience and skills for data and health economics for my future professional life where I hope to analyze problems within the U.S. healthcare delivery systems to help shape public policy toward improving health outcomes

3. Timetable (one line or row per week maximum): using bullet points or a table, list your planned research activities and specific goals for each week of the project

Week	Stage	Steps
1	Data pre-processing	Select and clean data sets
2-3	Descriptive	Univariate analysis
4-5	Descriptive	Multivariate analysis
6-8	Predictive modeling	Regression analysis
9	Interpreting	Interpreting results
10	Interpreting	Write final report
Post SURF	Summarizing	Video creation

Project Background (two pages maximum, single-spaced)

1. Project History, Definition, and Significance

- general problem, theme, or issue to be addressed
- historical context: i.e., most relevant previous research, scholarship, or artistry on this topic by other researchers, scholars, or artists (cite sources)
- project's specific question, hypothesis, or objective
- contribution of your project to the problem and your field
- broader significance or importance of your research (e.g., social, cultural, intellectual, creative, practical, theoretical)

Nursing home facilities care for the most vulnerable population within our communities, yet from 2013 to 2017, the Government Accountability Office reported 82% of nursing home facilities inspected had infection control and prevention deficiencies (The White House, 2022). While quality of care is frequently measured, limited research has analyzed the relationship between quality of care and the nursing home ownership types of non-profit versus for-profit. Further, analysis of quality of care within nursing homes lacks data for post Covid-19 times. In 2022, the Centers for Medicare & Medicaid Services (CMS) publicly released ownership data of all skilled nursing facilities that are enrolled in Medicaid, however only descriptive research on this data has been completed at this time (Welch et al., 2022). Research existing on the relationship between ownership type and quality of care lacks modern interpretation and nationwide scale, as existing research comparing ownership type and quality of care focuses too narrow of a scope (Stevenson et al., 2016). This research will provide current analysis regarding quality of care in nursing homes following Covid-19, and also provide insight into the relationship between quality of care and ownership type. This information will enable transparency for consumers of nursing home care, allowing for better informed decision making to improve consumer health outcomes.

2. Approach and Methodology

- methods, theories, procedures, or lines of thinking and/or creating you will use to address your research topic and answer the question(s) you pose
- if you plan to conduct interviews or surveys: what assumption/hypothesis/general principle you will test; the number of participants you will seek and how you will recruit/select them; sample interview/survey questions (to be included in Appendices)
- materials and sources needed to pursue your project
- how you will analyze, interpret, and/or evaluate your findings – including how/why this mode of analysis will enable you to accomplish your project objectives and/or answer your research question(s)
- foreseeable challenges, obstacles, or difficulties – and how you are prepared to address them

This study will be divided into several phases: pre-processing data, descriptive analysis, predictive analysis, and interpreting results. Pre-processing data entails collecting and cleaning publicly available datasets. I will use datasets from CMS.gov, then identify missing variables and review the format of each variable, following recommendations of the Health Care Financing Administration (HCFA) (Jencks, 1995). Potential datasets include “Skilled Nursing Facility Quality Reporting Program: National Data,” “MDS Quality Measures,” and “Medicare Claims Quality Measures.” I will then move toward descriptive analysis, which includes both univariate and multivariate analysis. Univariate descriptive analysis utilizes descriptive statistics (e.g., mean, median, skew, kurtosis) in order to analyze each variable's dispersion. Variables such as

zip code, admission volume, resident and staff demographics, and budgets will be analyzed and graphed using Excel and Tableau, and compared to existing research (Welch et al., 2022). Multivariate descriptive analysis builds on univariate analysis to compare variables to one another. Excel will be used to determine correlation, skew of the relationship, and other descriptive statistics, while Tableau will allow variable comparison through graphing. Understanding the dispersion and behavior of a relationship will allow me to determine what variables should be further analyzed.

I will use my descriptive analyses to conduct predictive analysis, which analyzes the effect of characteristics on the specific outcome variable quality of care. Such characteristics may be ownership type, what coverage facilities accept, staffing scores, and zip code. I will use Tableau (which allows for the plotting of linear and non-linear regressions) to conduct a regression analysis analyzing the relationship between ownership type and quality of care, and I will use Excel to further analyze this relationship by calculating regression coefficients, standard error, z-score, and residuals. This will allow me to move onto the final stage of the research process which entails interpreting results and highlighting potential areas to improve the quality and access issues in nursing homes. Through this step, I will account for bias, note failed conditions, and account for any skew in the data, in order to make reliable claims about the relationships between variables. This final step will allow me to determine whether ownership type of nursing homes impacts quality of care, especially following Covid-19.

3. My Role/Preparation/Experience

- your preparation and qualifications to undertake the project (e.g., previous coursework, jobs, extracurricular experiences, other research or training)
- your plans for further preparing yourself before undertaking the project, prior to the start date
- your unique role in the project as compared to the role of your faculty mentor and others (graduate students, technicians, collaborators), including your plan for regular communication with your mentor
- if a group project, the unique role of each student on the project (use an additional paragraph if necessary for this question)

In high school, I received the AP Capstone, which began my hands on research training as I crafted my own research study, utilizing a chi-squared test for independence to analyze the relationship between a High School Senior Male's GPA and their views on feminism. My REAP participation last summer helped me to further develop these analysis skills within Healthcare Economics. At UNH, I am taking ECON620 Health Economics this semester, which has strengthened my ability to conceptualize economic models and elaborate on what these models imply. I am also currently enrolled in CS410 Intro to Scientific Programming and ECON565 Predictive Modeling. I have gained proficiency in Excel and Python, and am currently working with Tableau and R. In Predictive Modeling, I have learned how to utilize descriptive statistics to analyze datasets within Excel, and how to demonstrate relationships graphically within Tableau. By completion of this course, I also will have practiced prediction with regression, classification models, and have been introduced to Machine Learning, all of which I will apply to my datasets in collaboration with Dr. [A]'s specialization in data analytics. My mentor will be crucial to my success in this project. During the summer SURF period, I will meet with Dr. [A] weekly in order to check in on progress, provide answers to lingering questions, and quality check the process. Dr. [A]'s experience will aid me in ensuring I am following correct practices and interpreting results correctly.

Appendices

References

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- “Fact Sheet: Protecting Seniors by Improving Safety and Quality of Care in the Nations Nursing Homes.” The White House, The United States Government, 14 Mar. 2022, <https://www.whitehouse.gov/briefing-room/statements-releases/2022/02/28/fact-sheet-protecting-seniors-and-people-with-disabilities-by-improving-safety-and-quality-of-care-in-the-nations-nursing-homes>
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