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Ownership Type and Quality of Care in Facilities Serving the Intellectually Disabled

Alison Morantz

Tom A. Rutter

Leslie Ross

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ABSTRACT

Since the closure of large state institutions, many individuals with intellectual and developmental disabilities (I/DD) have resided in Intermediate Care Facilities for Individuals with Intellectual Disabilities (ICF-IIDs) operated by nonprofit and for-profit companies. Given mounting evidence that for-profit nursing homes provide lower quality care than nonprofits, we explore whether for-profit ownership is negatively related to care quality among ICF-IIDs. Taken at face value, measures based primarily on facility self-reports, such as staffing ratios, indicate that for-profit facilities match or exceed government-owned and nonprofit facilities in care quality. Yet our analysis of two quality measures that do *not* rely on facility self-reports, regulatory deficiencies and stakeholder complaints, imply that for-profit facilities significantly underperform government and nonprofit entities in important respects. Our results lend credence to concerns regarding care deficiencies in for-profit ICF-IIDs, and suggest that the Centers for Medicare and Medicaid Services should collect detailed, longitudinal data on the characteristics and welfare of individual ICF-IID residents as it does for nursing home residents. Our findings also underscore the importance of making data on Medicaid-funded long-term care facilities less prone to self-reporting bias.

INTRODUCTION

In industries that provide health services or personal care to the sick, disabled and elderly, government-owned facilities frequently operate alongside for-profit and nonprofit providers. In recent years, empirical literature on the effect of ownership type on the quality of healthcare services has proliferated. Some scholars have sought to quantify differences between public and private providers, while others have compared the performance of for-profit and nonprofit companies. In some sectors of the healthcare service industry, such as nursing homes and hospitals, the literature has become extensive enough to support multiple literature surveys and meta-analyses.[1]

Yet an important segment of the healthcare services industry has received virtually no scholarly attention: that which provides long-term residential support to individuals with intellectual and developmental disabilities (I/DD). Given the dramatic rise in autism diagnoses,[2] the increasing longevity of individuals with I/DD,[3] and the fact that nearly all individuals with

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[1] *See* Mark A. Davis, *On Nursing Home Quality: A Review and Analysis*, 48 MED. CARE REV. 627 (1991) (review of literature surrounding quality of nursing home care for those persons with mental illness); *see also* Michael P. Hillmer et al., *Nursing Home Profit Status and Quality of Care: Is There Any Evidence of an Association?*, 62 MED. CARE REV. 139 (2005); *see also* P.J. Devereaux et al., *A Systematic Review and Meta-Analysis of Studies Comparing Mortality Rates of Private For-Profit and Nonprofit Hospitals*, 166 CAN. MED. ASS'N J. 1399 (2002); *see also* Vikram R. Comondore et al., *Quality of Care in For-Profit and Not-For-Profit Nursing Homes: Systematic Review and Meta-Analysis*, 339 THE BMJ 1 (2009), https://www.bmj.com/content/bmj/339/bmj.b2732.full.pdf (last visited July 1, 2019); *see also* Karen Eggleston et al., *Hospital Ownership and Quality of Care: What Explains the Different Results in the Literature?*, 17 HEALTH ECON. 1345 (2008).

[2] *Data & Statistics on Autism Spectrum Disorders*, CTRS. FOR DISEASE CONTROL & PREVENTION (April 5, 2019) https://www.cdc.gov/ncbddd/autism/data.html (last visited July 1, 2019).

[3] MAC TAYLOR, CAL. LEGISLATIVE ANALYST'S OFFICE, A LONG-TERM OUTLOOK: DISABILITY AMONG CALIFORNIA'S SENIOR'S 3 (2006) https://lao.ca.gov/reports/2016/3509/disability-long-term-outlook-112816.pdf (last visited July 1, 2019).

Down Syndrome will develop Alzheimer's Disease or dementia if they survive into old age,[4] an

increasing number of adults with I/DD are likely to require long-term residential care.[5]

Moreover, in a historic shift of state and federal policy, many individuals with I/DD who

require around-the-clock support live in licensed community care facilities or other community-

based settings rather than large, state-run institutions. Between 1977 and 2012, for example, the

proportion of individuals with I/DD residing in large institutions serving at least 16 clients

declined by 82%.[6] Meanwhile, by 2015, 82% of individuals with I/DD living outside the home

resided in settings with six or fewer people.[7]

Ensuring that residential and long-term care facilities supporting those with I/DD provide

high-quality care is an important public policy goal. Concerns about the prevalence of abuse and

neglect in state institutions helped galvanize the deinstitutionalization movement in the mid to

late twentieth century.[8] Yet theoretical accounts of the economic incentives facing for-profit

entities, as well as empirical literature from other healthcare service sectors (such as the nursing

home industry), justify the concern that smaller, for-profit entities have weak incentives to invest

in high-quality care.[9] Consequently, determining whether care quality is negatively correlated

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[4] *Alzheimer's Disease in People with Down Syndrome*, NAT'L INST. OF AGING, U.S. DEP'T OF HEALTH & HUMAN SERVS. (May 19, 2017), https://www.nia.nih.gov/health/alzheimers-disease-people-down-syndrome (last visited July 1, 2019).

[5] *About AFAA*, ADVANCING FUTURES FOR ADULTS WITH AUTISM, http://www.afaa-us.org/about (last visited Mar. 4, 2019).

[6] SHERYL LARSON ET AL., RESIDENTIAL INFO. SYS. PROJECT, IN-HOME AND RESIDENTIAL LONG-TERM SUPPORTS AND SERVICES FOR PERSONS WITH INTELLECTUAL OR DEVELOPMENTAL DISABILITIES: STATUS AND TRENDS THROUGH 2012 6 (2014) HTTPS://ICI-S.UMN.EDU/FILES/NI4N6-KKEQ/RISP_FINAL_2012.PDF (last visited July 1, 2019).

[7] DAVID L. BRADDOCK ET AL., THE STATE OF THE STATES IN INTELLECTUAL AND DEVELOPMENTAL DISABILITIES: 2017 5 (11th ed. 2017).

[8] *See* STUDY COMM'N ON MENTAL RETARDATION, THE UNDEVELOPED RESOURCE: A PLAN FOR THE MENTALLY RETARDED IN CALIFORNIA (1965).

[9] *See* Comondore et al., *supra* note 1; *see also* Henry B. Hansmann, *The Role of Nonprofit Enterprise*, 89 YALE L.J. 835, 864 (1980); *see also* Richard Steinberg, *Economic Theories of Nonprofit Organization*, *in* THE STUDY OF THE NONPROFIT ENTERPRISE 277 (Helmut K. Anheier & Avner Ben-Ner eds., 2003).

with for-profit ownership—and if so, whether legal or regulatory reforms could help mitigate

such disparities—is vital to ensuring that individuals with I/DD successfully integrate into their

local communities, a goal that has been enshrined in federal law for over two decades.[10]

This study examines the relationship between ownership type and care quality in one type

of long-term care facility designed to support individuals with I/DD: Intermediate Care Facilities

for Individuals with Intellectual Disabilities (ICF-IIDs). Through this program, the Center for

Medicare and Medicaid Services (CMS) funds the provision of comprehensive, long-term health

care and rehabilitation services at licensed residential facilities.[11] ICF-IIDs may be owned by state

or local governments, for-profit companies, or not-for-profit (nonprofit) entities. They generally

encompass two different types of establishments: large state facilities that may house scores or

even hundreds of residents; and smaller, more community-based facilities that can support as few

as four individuals in a more home-like setting. Nationwide, about 60,000 individuals—or 11% of

all individuals with I/DD not living in their own homes—reside in ICF-IIDs.[12]

Our examination of the relationship between ownership type and quality of care in the ICF-

IID sector is particularly timely in light of recent market trends. As is shown in Exhibit 1, the

proportion of ICF-IID residents living in government-owned facilities fell from 37% to 28% from

2009 to 2016, with corresponding increases in the respective shares of consumers living in for-

profit and nonprofit facilities. Meanwhile, concerns regarding the quality of care provided by ICF-

IIDs garnered considerable attention in late 2018, when a female resident of a Phoenix-based ICF-

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[10] *See* Developmentally Disabled Assistance and Bill of Rights Act, Pub. L. No. 94-103, 89 Stat. 486 (1975) (codified at 42 U.S.C. § 1010(2) (2019)); *see also* The Americans with Disabilities Act, Pub. L. No. 101-335, 104 Stat. 327 (1990) (codified as amended in scattered sections of 42 and 47 U.S.C.).; *see also* Olmstead v. L.C. *ex rel.* Zimring, 527 U.S. 581, 593-94 (1999).

[11] *Intermediate Care Facilities for Individuals with Intellectual Disabilities*, MEDICAID.GOV., https://www.medicaid.gov/medicaid/ltss/institutional/icfid/index.html (last visited July 1, 2019).

[12] BRADDOCK ET AL., *supra* note 7.

IID who had spent most of her 29 years in a persistent vegetative state was impregnated by a staff

member—a fact that went unnoticed until she went into labor and gave birth to a boy.[13]

EXHIBIT 1: Trends in proportion of ICF-IID residents in each facility type using cleaned sample (2009–2016)
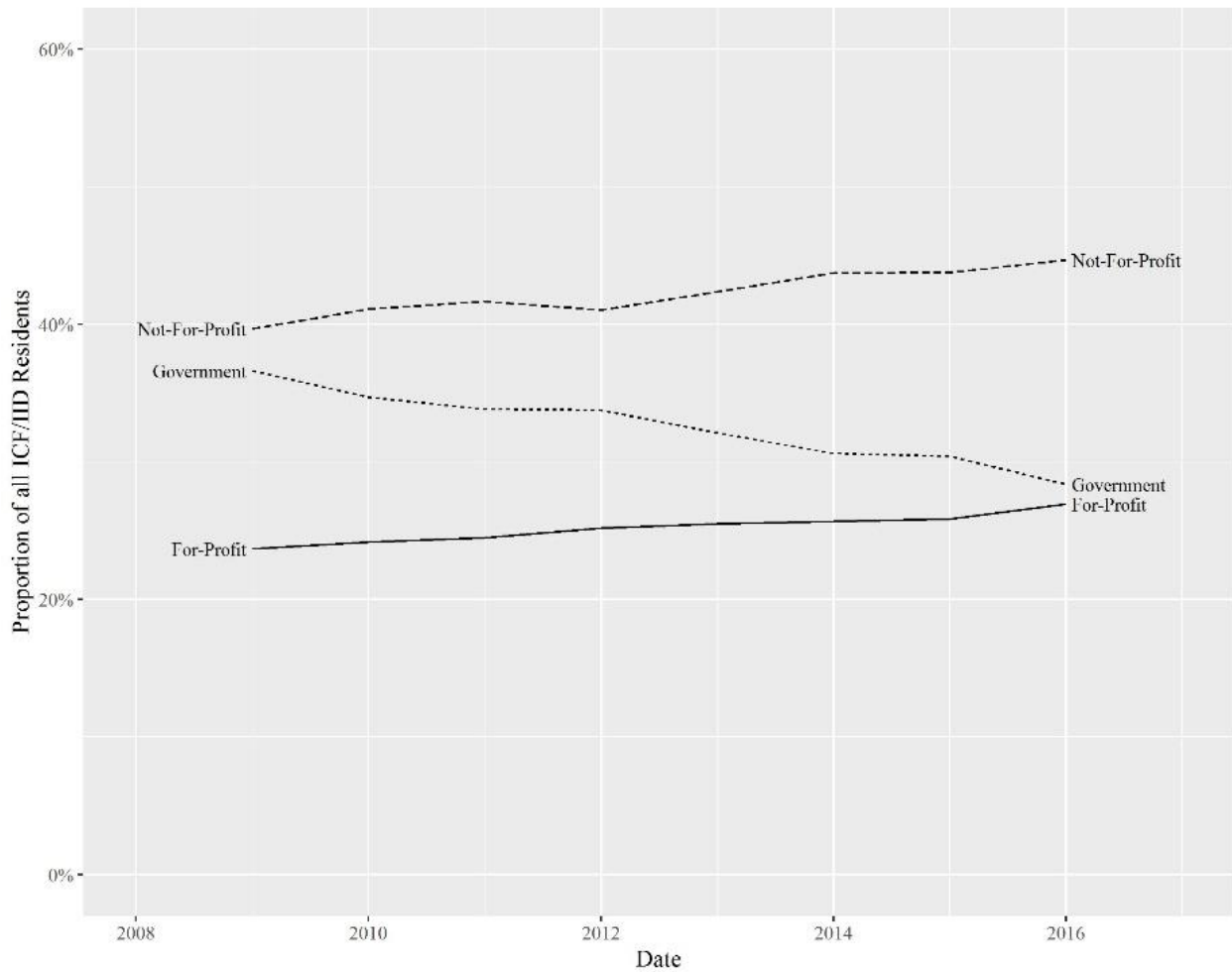
[13] Liam Stack, et al., *Police Collect DNA from Nursing Home Works After Rape of Patient in Coma*, N.Y. TIMES, Jan. 9, 2019, https://www.nytimes.com/2019/01/09/us/vegetative-state-birth-woman.html (last visited July 1, 2019).

Finally, the only prior study to examine the relationship between ICF-IID ownership type and care quality is nearly two decades old, analyzes data from only a small subset of the providers then in existence, excludes government-owned facilities, and examines a narrow set of quality indicators that are defined inconsistently or not at all.[14]

DESCRIPTION OF DATA

The information analyzed in this study consists of three datasets collected by the Centers for Medicare and Medicaid Services (CMS) through its OSCAR reporting system. The datasets encompass the years 2008–2017 and comprise a census of all ICF-IIDs in the U.S.

The first dataset consists of information from the Intermediate Care Facilities for Individuals with Intellectual Disabilities Survey Report Form CMS-3070G ("Annual Survey"), which is collected by state authorities approximately once per calendar year based on data supplied by ICF-IID staff.[15] The team that completes the Annual Survey is required to consult with a

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[14] *See* Samuel L. Brown, *Nonprofit Ownership and Quality in Medicaid's Longterm Care Program for Persons with Developmental Disabilities,* 25 J. OF HEALTH & HUM. SERVS. ADMIN. 315, 315-341 (2002). Brown's study sample reportedly consisted of 600 non-government-owned facilities that were selected through a stratified randomized sampling procedure from among all ICF-IIDs surveyed annually by CMS. The study reportedly compares three outcomes in a multiple regression framework: (1) medication error rates; (2) a "normalized index" of (reported) professional and direct care staffing ratios (staff-to-resident ratios of direct service staff, registered nurses, and licensed practical nurses), and (3) a "normalized index" of the (self-reported) frequency of behavioral interventions. Yet many aspects of the sample analyzed and methodology employed could not be ascertained from a careful review of the article. For example, the author does not clearly specify which or how many year(s) of data were analyzed; how the stratified random sampling procedure was performed; or how the "normalized indices" reportedly used as dependent variables were constructed. Attempts to reach the author by e-mail and voicemail were unsuccessful. Since the article was published in 2002, however, we assume that the data analyzed were from the 1990s.

[15] *See* CTRS. FOR MEDICARE & MEDICAID SERVS., INTERMEDIATE CARE FACILITIES FOR INDIVIDUALS WITH INTELLECTUAL DISABILITIES SURVEY REPORT (2013) [hereinafter ICF SURVEY REPORT], https://www.cms.gov/Medicare/CMS-Forms/CMS-Forms/Downloads/CMS3070G.pdf (last visited July 1, 2019); *see also* CTRS. FOR MEDICARE & MEDICAID SERVS., STATE OPERATIONS MANUAL Appendix J 5-16 (2018) [hereinafter SOM APPENDIX J], https://www.cms.gov/Regulations-and-Guidance/Guidance/Manuals/downloads/som107ap_j_intermcare.pdf (last visited July 1, 2019).

member of the ICF-IID's professional staff, such as an administrator, nurse, or social worker, to complete the survey.[16]

The other two datasets used in our analysis—a citations dataset and a complaints dataset—do not rely on self-reported information from ICF-IID managers, but on information from other informed stakeholders. Regulatory citations are assessed during unannounced inspections conducted by state agency officials or CMS regional office representatives in conjunction with the Annual Survey. Inspectors' primary method of information gathering is direct observation, augmented if necessary with interviews or record reviews.[17] Complaints against ICF-IIDs are submitted by concerned stakeholders—such as consumers, family members, advocates, or health care providers—to state agencies or CMS regional offices.[18]

Dependent Variables

The OSCAR database includes several different measures that could shed light on the quality of care: (1) the number of deficiency citations assessed by state inspectors; (2) the number of complaints filed against a facility (both total complaints and the subset of complaints that are officially substantiated); (3) the respective ratios of direct-care staff and registered nursing staff reported on the Annual Survey; (4) the number of abuse and neglect investigations by state authorities reported on the Annual Survey; and (5) whether drugs, physical restraint, and/or time-out rooms reportedly are used to control behavior. We separately estimate the effects of direct-

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[16] ICF SURVEY REPORT, *supra* note 15, at 1.

[17] SOM APPENDIX J, *supra* note 15, at 19-32.

[18] CTRS. FOR MEDICARE & MEDICAID SERVS., STATE OPERATIONS MANUAL § 5010 (2016), https://www.cms.gov/Regulations-and-Guidance/Guidance/Manuals/Downloads/som107c05.pdf (last visited July 1, 2019).

care and registered nursing staff in recognition of the fact that registered nurses have been shown to have a particularly large effect on care quality in nursing homes.[19]

Our comparison of care quality relies primarily on the first two of these fields, citations and complaints, because unlike the other fields analyzed, they do not rely on self-reported information from ICF-IID personnel.

Independent Variables

In all of our models, the unit of observation is the facility/year, and the independent variable of interest is ownership type, which encompasses for-profit, nonprofit, and government-owned facilities.

Before estimating any models, we assessed the quality of the ownership type field. Our analysis suggested that it is susceptible to some coding error. It is not surprising to see some facilities changing ownership type during the sample period; for example, a for-profit facility may convert to a nonprofit, or vice versa. In rare cases, this occurs more than once. Yet given the significant legal and administrative costs associated with changing ownership type, one would not expect a facility to change ownership type for a single year before changing status again. There were 640 facilities (roughly 12% of all facilities) in our dataset that displayed this seemingly implausible pattern at some point during the study period.

To minimize coding errors in the final dataset, we implemented a data cleaning procedure to improve the quality of the ownership type field. Depending on the specific pattern observed, we adjusted or dropped facility-years for which ownership type was very likely miscoded, trying to

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[19] Hongsoo Kim, Charlene Harrington & William H. Greene, *Registered Nurse Staffing Mix and Quality of Care in Nursing Homes: A Longitudinal Analysis,* 49 THE GERONTOLOGIST 81, 85-89 (2009).

strike a balance between retaining as much data as possible and eliminating probable coding errors. The Appendix provides a detailed description of the cleaning procedure used.

Additional model covariates, all of which are aggregated to the facility level, include controls for facility size (defined slightly differently depending on the model specification), basic resident demographics (the respective percentages that are male, under age 22, and over age 65), health status information (the respective percentages of residents with medical care plans, and who have been diagnosed with autism, cerebral palsy, epilepsy, language impairments, hearing impairments, visual impairments, ambulatory impairments, and varying degrees of intellectual disability), state dummies, and year dummies. The Appendix describes in detail the provenance and construction of each independent variable used in our models.

METHODOLOGY

At each stage of the analysis, we adjusted our estimation strategy to suit the distribution of the dependent variable(s) being analyzed. Since the respective numbers of citations, complaints, and reported investigations are count variables that frequently take on zero values, we estimated their respective frequencies using negative binomial models. To estimate the number of (full-time equivalent) staff per resident, a continuous variable, we used linear regression models. Finally, to model whether a facility reported using drugs, physical restraint, or time-out rooms (respectively) to control behavior, we used probit models to account for the binary nature of the dependent variables. In all models, standard errors were clustered at the facility level.

It is well known that regression models can produce misleading results when there is poor covariate balance among the groups being compared.[20] In our setting, this concern stems from the

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[20] Gary King & Langche Zeng, *The Dangers of Extreme Counterfactuals*, 14 POL. ANALYSIS 131, 131-159 (2006).

fact that government-owned ICF-IIDs typically support many more individuals than for-profit and nonprofit ICF-IIDs, creating imbalance in facility size (number of residents). The results presented in the exhibits were obtained from models estimated on the unadjusted sample, for which we made no effort to improve covariate balance.

To check the robustness of our results, we re-estimated all of our models on several alternative samples in which we kept the original "uncleaned" observations (i.e., without taking any measures to reduce likely coding errors), used methods to improve covariate balance, or implemented both procedures at once.[21] A description of these robustness checks and their results are presented in the Appendix. They are qualitatively similar to those presented in Exhibits 2-4.

LIMITATIONS

Our methodological approach has several important limitations. First, by confining our analysis to cross-sectional differences *between* ICF-IIDs, we cannot control for unobservable factors that could simultaneously affect a given ICF-IID's ownership type *and* the quality of care that it provides. In principle, one could overcome this problem by using a fixed-effects model to measure the effect of changes in ownership type *within* individual ICF-IIDs, instead of examining differences in quality between different types of facilities. In practice, however, this approach was not feasible. So few ICF-IIDs in our dataset underwent changes to or from for-profit ownership type during the study period that models of this type were not statistically well-powered enough

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[21] Our main results, presented in Exhibits 2-4, were obtained from models estimated on the cleaned, unadjusted sample. In the Appendix, we describe each of the alternative samples in detail and demonstrate that the results obtained from them are qualitatively similar to those presented in the main paper, *see* Gary King, Christopher Lucas & Richard Nielson, *The Balance-Sample Size Frontier in Matching Methods for Causal Inference*, 61 AM. J. POL. SCI. 473, 477-482 (2017); *See also* Fredrik Sävje, Michael J Higgins & Jasjeet Sekhon, Generalized Full Matching 4-16 (Mar. 11, 2017) (unpublished working paper) (on file with arXiv.org), https://arxiv.org/abs/1703.03882v1 (last visited July 1, 2019).

to detect even large changes in care quality.[22] The fact that our analysis relies purely on cross-sectional variation is thus an important methodological limitation.

Secondly, as discussed earlier, three of the reported outcome measures examined—the number of nurses/direct staff per resident; the number of abuse and neglect investigations; and the use of drugs, physical restraint, and/or time-out rooms to control behavior—rely heavily on facility self-reports.[23] In the nursing home context, a mounting body of evidence suggests that information on the Annual Survey is frequently inflated or misreported, particularly by operators who have financial incentives to provide erroneous self-reports.[24] Indeed, widespread concerns about data quality partly spurred CMS to undertake a number of reforms in 2015, including imposing a new requirement that nursing home staffing ratios be based on payroll data.[25]

We are unaware of any scholarship assessing the quality of Annual Survey data reported by ICF-IID operators. Yet since several of the fields used in our analysis are the same ones found to be susceptible to self-reporting bias in the nursing home context, and the reforms undertaken in 2015 did not encompass ICF-IIDs, three of the data fields we examine—the reported numbers of direct care and nursing staff per resident; the reported number of state investigations; and the

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[22] Of the ICF/IIDs in our data, 1,132 report changing ownership status at least once during the eight years covered by our data. However, many of these changes appear to be reporting errors, where the ICF/IID appears to switch ownership status for one year before reverting back to the prior ownership status. Once switches like this are excluded, only 287 ICF/IIDs appear to switch ownership status during the period covered by our data. The power of fixed-effects models using only the plausibly genuine conversions was so low that we would have been unable to detect even large changes in quality of care following a change in ownership status.

[23] Comondore et al., *supra* note 1.

[24] *See* Jeff Kelly Loewenstein, CTR. FOR PUB. INTEGRITY, Analysis Shows Widespread Discrepancies in Staffing Levels Reported by Nursing Homes (Nov. 12, 2013), https://publicintegrity.org/health/analysis-shows-widespread-discrepancies-in-staffing-levels-reported-by-nursing-homes/ (last visited July 1, 2019); *see also* Xu Han, Niam Yaraghi & Ram Gopal, *Winning at All Costs: Analysis of Inflation in Nursing Homes' Rating System,* 27 PROD. OPER. MANAG. 215, 223-229 (2018).

[25] CTRS. FOR MEDICARE & MEDICAID SERVS., DESIGN FOR NURSING HOME COMPARE FIVE-STAR QUALITY RATING SYSTEM: TECHNICAL USERS' GUIDE 6-7 (2019), https://www.cms.gov/Medicare/Provider-Enrollment-and-Certification/CertificationandComplianc/Downloads/usersguide.pdf (last visited July 1, 2019).

reported use of drugs, physical restraint, and time-out rooms to control behavior—are likely to be biased.

A third limitation of the OSCAR data used for our analysis is that although it includes basic summary data on the distribution of gender, age, and health status, it includes no information on, or credible proxies for, the respective proportions of residents with mental illness, aggressive behavior, or self-injurious behavior. If certain facilities are more (or less) likely to serve clients with severely disruptive or unsafe behaviors, such differences could help explain facility-level variations in staffing ratios or in use of physical restraint, time-out rooms and/or drugs. Our inability to observe any such differences is thus a potential source of omitted variable bias.

Fourth, the dataset on ICF-IID regulatory citations is far less extensive and granular than that available for nursing homes. Although it indicates the type of each deficiency in care, it does not include any information on its scope or severity.[26] As a result, we cannot construct fine-grained measures of regulatory compliance that account for the scope and gravity of cited deficiencies.

Finally and most importantly, the ICF-IID data contains no individual-level fields, and to our knowledge, cannot be linked to any other dataset containing individual-level data. Here again, the comparison with nursing homes is instructive. The passage of the Nursing Home Reform Act of 1987 took place in the wake of extensive media coverage of an Institute of Medicine study that substantiated concerns about poor quality of care and ineffective regulation.[27] Since the Act's passage, all nursing homes funded by CMS have been required to complete a Resident Assessment

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[26] *Nursing Home Enforcement*, CTRS. FOR MEDICARE & MEDICAID SERVS. (June 3, 2017), https://www.cms.gov/medicare/provider-enrollment-and-certification/surveycertificationenforcement/nursing-home-enforcement.html (last visited July 1, 2019).

[27] Joshua M. Wiener et al., KAISER FAMILY FOUNDATION, NURSING HOME CARE QUALITY: TWENTY YEARS AFTER THE OMNIBUS BUDGET RECONCILIATION ACT OF 1987 3-5, https://www.kff.org/wp-content/uploads/2013/01/7717.pdf (last visited July 1, 2019).

Instrument, including a Minimum Data Set (MDS) containing longitudinal measures of each patient's health status and day-to-day functioning levels.[28] Health scholars have used the MDS to test a number of detailed hypotheses regarding the relationship between nursing home ownership type, patient characteristics, and the quality of care.[29] Yet despite the obvious and close similarities between the types of long-term care provided by nursing homes and ICF-IIDs, CMS does not require ICF-IID operators to complete the Resident Assessment Instrument, from which the MDS is derived.

The absence of any longitudinal data on individual outcomes for ICF-IID residents drastically limits the utility of the OSCAR data. Without the capacity to track individual-level variation and changes over time, it is not possible to draw robust causal inferences regarding the relationship between ownership type and quality of care in the ICF-IID setting.

RESULTS

Regulatory Citations

Exhibit 2 presents results for the two quality measures that are relatively impervious to reporting bias. The table shows, first, that conditional on covariates, nonprofit facilities only receive about 88% as many citations as for-profit facilities, while government owned facilities only receive about 81% as many citations as for-profit facilities. As is shown in the Appendix, the results are similar when estimating this model on the alternative samples.

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[28] Loewenstein, *supra* note 24.

[29] *See* David C. Grabowski et al., *Effect of Nursing Home Ownership on the Quality of Post-Acute Care: An Instrumental Variables Approach*, 32 J. HEALTH ECON. 12, 12-21 (2013).; *see also* Richard A. Hirth et al., *Effect of Nursing Home Ownership on Hospitalization of Long-Stay Residents: An Instrumental Variables Approach*, 14 INT. J. HEALTH CARE FIN. ECON. 1, 1-18 (2014).

Importantly, unlike some other regulatory settings in which citations may involve trivial or technical infractions that may have little bearing on an establishment's adherence to core regulatory objectives, most of the deficiencies cited by ICF-IID inspectors relate in obvious and consequential ways to quality of care. For example, the five most common types of citation are: violations of the individual program plan (the seminal document listing all of the services and supports to which a client is legally entitled); deficiencies in program monitoring and change (i.e., failing to review and update, if necessary, a client's individual program plan); improper drug administration; improper staff treatment of clients; and inadequate protection of clients' rights.

EXHIBIT 2: Differences in regulatory citations and complaints
(presented as incidence rate ratios)

	Total Number of Regulatory Citations	Total Complaints	
		All	Substantiated
Nonprofit Ownership	0.880***	0.897*	0.923
	(-5.17)	(-2.15)	(-1.41)
Government Ownership	0.807***	0.894	0.924
	(-4.45)	(-0.97)	(-0.69)
p-value: For-Profit vs Nonprofit	0.000***	0.032*	0.159
p-value: For-Profit vs Government	0.000***	0.331	0.493
p-value: Nonprofit vs Government	0.057	0.981	0.987
Number of Facility-Years	42,224	42,081	42,081
Number of Facilities	5,160	5,142	5,142

Complaints

Exhibit 2 also reveals that conditional on covariates, nonprofit facilities receive about 10% fewer total complaints than for-profit facilities—a finding that is statistically significant at the 5% level—although the disparity in substantiated complaints is statistically insignificant, as are the disparities between government-owned and for-profit facilities. The same basic pattern holds in all of the alternative samples, although as shown in the Appendix, there are some models for which the difference in total complaints between for-profit and nonprofit facilities is only statistically significant at the 10% level.

Reported Investigations

As shown in Exhibit 3, nonprofit and government-owned facilities report significantly *more* investigations than their for-profit counterparts (15% and 122%, respectively). As shown in the appendix, the nonprofit vs. for-profit disparity is only statistically significant in two of the alternative samples, whereas the government-owned vs. for-profit disparity remains statistically significant (albeit sometimes smaller in magnitude) in all four alternative samples.

EXHIBIT 3: Differences in reported investigations and staffing ratios by ownership type (presented as incidence rate ratios)

	Number of Reported Investigations	Direct Care Staff per Resident	Registered Nurses per Resident
Nonprofit Ownership	1.153**	-0.0161	0.00203
	(3.05)	(-0.22)	(0.50)
Government Ownership	2.221***	0.106	0.0336**
	(6.68)	(0.87)	(3.18)
p-value: For-Profit vs Nonprofit	0.002**	0.825	0.615
p-value: For-Profit vs Government	0.000***	0.387	0.001**
p-value: Nonprofit vs Government	0.000***	0.189	0.001***
Number of Facility-Years	42,216	42,224	42,224
Number of Facilities	5,159	5,160	5,160

Source: Authors' analysis of CMS OSCAR data, 2008—2017. **Notes:** Incidence rate ratio estimates from negative binomial models are presented for reported investigations. OLS coefficient estimates are presented for staffing ratios. Standard errors are clustered at the ICF/IID level. *t*-statistics are given in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. P-values listed as "0.000" are less than 0.001.

Reported Staffing Ratios

Exhibit 3 also presents disparities in reported staffing ratios, including the respective numbers of direct care staff and registered nurses per resident. In contrast to prior scholarship, we find no statistically significant differences between for-profit, nonprofit, and government facilities in the number of direct care staff. Our analysis of nursing staff ratios, however, is more complex. Although nursing staff ratios are statistically indistinguishable in for-profit and nonprofit facilities, they are significantly higher in government facilities than in for-profit facilities. The Appendix reveals that the latter disparity (between government-owned and for-profit facilities) holds in two of the alternative samples.

Reported Use of Drugs, Physical Restraint and Time-Out Rooms

Exhibit 4, below, displays results for three final quality measures that also rely on facility self-reports: the use of drugs, physical restraint, and time-out rooms, respectively, to control behavior.

EXHIBIT 4: Use of drugs, physical restraint, and time-out rooms to control behavior

	Drugs	Physical Restraint	Time-Out Rooms
Nonprofit Ownership	0.0212**	0.0403***	0.0135***
	(2.85)	(4.82)	(3.38)
Government Ownership	-0.0100	0.0968***	0.0101
	(-0.61)	(5.94)	(1.36)
p-value: For-Profit vs Nonprofit	0.004**	0.000***	0.000***
p-value: For-Profit vs Government	0.544	0.000***	0.173
p-value: Nonprofit vs Government	0.050*	0.000***	0.612
Number of Facility-Years	42,094	42,167	39,606
Number of Facilities	5,144	5,153	4,842

Source: Authors' analysis of CMS OSCAR data, 2008—2017. **Notes:** Average marginal effects from probit models are presented; these values are calculated by identifying the marginal effect for each variable and then averaging across all variables. Standard errors are clustered at the ICF/IID level. *t*-statistics are given in parentheses. *p*-values are taken from tests of significance conducted on the underlying probit coefficients.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. P-values listed as "0.000" are less than 0.001.

We find that compared to for-profit facilities, nonprofit facilities are significantly more likely (between 1 and 4 percentage points) to report using one of the three techniques. The results for physical restraint and time-out rooms remain statistically significant in all four alternative samples, although the disparity in the reported use of drugs only retains significance in two of them. Meanwhile, although government facilities are just as likely as for-profits to report using drugs or time-out rooms, they are significantly *more* likely to report using physical restraint, a pattern that persists in all of the alternative samples.

DISCUSSION

The primary question motivating this study is whether there are grounds for concern that for-profit ICF-IIDs provide lower-quality care than their nonprofit and government-owned counterparts. The tentative answer is yes. Most importantly, a comparison of regulatory deficiencies cited by state inspectors reveals that for-profit facilities are substantially less compliant with state regulations than nonprofit and government-owned facilities. The other quality measure that does not rely on facility self-reports, complaint frequency, reveals a similar disparity between for-profit and nonprofit facilities, although the finding is less robust and the measure itself may be susceptible to reporting bias.[30] Given the limitations of the data available for analysis, we cannot make any strong claims regarding causality. Nevertheless, we believe our results create a rebuttable presumption that for-profit ICF-IIDs have weaker incentives than other operators to invest in high-quality care.

Equally important, our findings raise pressing concerns regarding the quality of data on ICF-IIDs reported on the Annual Survey. The metrics examined that rely on information provided by ICF-IID operators—staffing ratios; the frequency of state investigations; and the use of drugs, physical restraint, and time-out rooms to control behavior—tell a very different and far more sanguine story than those derived from third-party reports. If anything, these metrics suggest that the quality of care provided in for-profit facilities *surpasses* that of nonprofit and government-owned facilities.

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[30] As shown in Exhibit 2, the disparity between for-profit and nonprofit facilities is only statistically significant for total complaints, not for complaints that are substantiated by government authorities. Moreover, as a measure of care quality, complaints could be susceptible to some reporting bias. Although family members do not pay ICF-IID operators directly for their services (they are funded with state dollars, and any family share of costs would be paid to the state rather than the facility), the characteristics of residents' family members might correlate with ownership type in ways that affect the frequency of complaints. For example, if relatives of for-profit ICF residents tend to live in closer geographic proximity to the facilities—or if residents of for-profit facilities tend to have larger families—family members might visit the facilities more often, and have more opportunities to witness practices that trigger complaints.

Reporting bias is not the only explanation; it is also possible that some of the disparities we observe in the data are explained by unobservable heterogeneity in the populations being served. For example, if government-owned and nonprofit facilities are more likely to serve clients with aggressive or self-injurious behaviors, staff at such facilities may find it more difficult to forgo the use of drugs, physical restraint or time-out rooms to control their behavior.

Yet taken as a whole, our findings justify the concern that self-reporting bias, which is well known to have compromised measures of nursing home quality derived from the Annual Survey, also afflicts the ICF-IID industry. Enlarging the scope of recent CMS reforms that augment facilities' reporting obligations, and require staffing ratios to be based on payroll data, to encompass ICF-IIDs would be an important step toward mitigating this problem.

Finally, our analysis underscores the urgent need for CMS to collect longitudinal, individual-level data on people with I/DD who reside in long-term care facilities. Researchers' access to the MDS, which contains longitudinal, individual-level data on nursing home residents, has paved the way for detailed empirical scholarship on the relationship between ownership type, quality of care, and key health outcomes among the elderly. Extending the MDS requirement to include ICF-IID residents would stimulate rigorous research on the long-term welfare of individuals with I/DD, thereby facilitating these individuals' safe transition from state institutions to community-based settings.

APPENDIX

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I. Summary Statistics and Description of Variables

Exhibit A1: Units of observation in each sample, by ownership type

	Unadjusted sample			Pruned sample			Weighted sample #1			Weighted sample #2		
	For-Profit	**Nonprofit**	**Government**	**For-Profit**	**Nonprofit**	**Government**	**For-Profit**	**Nonprofit**	**Government**	**For-Profit**	**Nonprofit**	**Government**
Total number of facilities	2,188	2,922	322	2,121	2,762	310	2,188	2,922	322	2,188	2,922	322
Total number of facility-years	17,020	22,712	2,492	13,334	17,428	2,212	17,020	22,712	2,492	17,020	22,712	2,492
Total number of residents	146,220	242,925	189,434	117,477	194,078	116,319	146,220	242,925	189,434	146,220	242,925	189,434

Exhibit A2: Dependent variables table

Variable	Description
Total Citations	The number of deficiency citations recorded in CMS' ASPEN system for an ICF-IID.
Total Complaints	The number of complaints recorded in CMS' ASPEN system for an ICF-IID.
Total Substantiated Complaints	The number of complaints recorded in CMS' ASPEN system which are marked as being "Substantiated" (as opposed to being marked as "Unsubstantiated"). A complaint is marked as being "Substantiated" if a complaint survey responsive to the complaint finds that the ICF-IID in question was deficient with regard to meeting a standard set by CMS for ICF-IIDs that receive Medicaid funds.
Number of Reported Investigations	The number of investigations of allegations of abuse and neglect the ICF-IID reports on Form CMS 30070-G.
Direct Care Staff per Resident	The number of full-time equivalent direct care staff reported by the ICF-IID on Form CMS 3070-G, divided by the number of residents at the ICF-IID, also reported on Form CMS 3070-G.
Registered Nurses per Resident	The number of full-time equivalent registered nurses reported by the ICF-IID on Form CMS 3070-G, divided by the number of residents at the ICF-IID, also reported on Form CMS 3070-G.
Use of Drugs to Control Behavior	A binary variable, equal to one if the ICF-IID reports using drugs to control behavior for at least one resident on Form CMS 3070-G, and equal to zero otherwise.
Use of Physical Restraint to Control Behavior	A binary variable, equal to one if the ICF-IID reports using physical restraints to control behavior for at least one resident on Form CMS 3070-G, and equal to zero otherwise.
Use of Time-Out Rooms to Control Behavior	A binary variable, equal to one if the ICF-IID reports using a time out room to control behavior for at least one resident on Form CMS 3070-G, and equal to zero otherwise.

Exhibit A3: Summary statistics - dependent variables[31]

Variable	Type	Unadjusted sample			Pruned sample			Weighted sample #1			Weighted sample #2		
		For-Profit	Nonprofit	Government	For-Profit	Nonprofit	Government	For-Profit	Nonprofit	Government	For-Profit	Nonprofit	Government
Total citations	Mean	3.9	3.17	5.37	3.88	3.2	4.7	4.16	3.31	3.74	4.13	3.21	3.8
	(SD)	4.88	4.06	6.98	4.81	4.06	6.05	5.07	4.25	4.54	5.11	4.15	4.58
Total complaints	Mean	0.91	0.58	4.48	0.89	0.57	2.54	1.2	0.67	0.74	1.22	0.7	0.75
	(SD)	2.57	2.33	19.22	2.58	2.44	11.05	4.28	2.84	5.62	4.53	3.03	6.07
Substantiated complaints	Mean	0.47	0.27	1.46	0.45	0.26	0.79	0.56	0.31	0.24	0.53	0.33	0.29
	(SD)	1.7	1.24	8.28	1.74	1.28	3.51	2.27	1.44	2.37	2.12	1.54	2.66
Number of reported investigations	Mean	1.13	1.52	28.55	1.15	1.45	16.66	2.67	1.84	4.35	3.1	1.96	4.26
	(SD)	6.63	8.07	96.97	6.01	5.19	55.74	21.07	9.16	27.75	24.31	11.89	27.84
Direct care staff per resident	Mean	2.33	2.13	2.33	2.5	2.06	2.3	3.53	2.13	2.15	3.65	2.22	2.36
	(SD)	35.5	14.28	1.65	40.01	15.85	1.67	53.46	14.01	1.53	46.94	13.43	2.12
Registered nurses per resident	Mean	0.15	0.18	0.31	0.14	0.16	0.31	0.17	0.18	0.36	0.22	0.22	0.42
	(SD)	0.54	0.58	0.45	0.46	0.32	0.46	0.61	0.57	0.5	0.84	0.73	0.66
Use of drugs to control behavior	Mean	0.83	0.89	0.86	0.85	0.89	0.86	0.84	0.88	0.85	0.83	0.87	0.85
	(SD)	0.37	0.32	0.35	0.36	0.31	0.35	0.37	0.33	0.36	0.37	0.34	0.35
Use of physical restraint to control behavior	Mean	0.08	0.21	0.48	0.08	0.2	0.44	0.11	0.2	0.34	0.12	0.2	0.33
	(SD)	0.27	0.41	0.5	0.27	0.4	0.5	0.31	0.4	0.47	0.32	0.4	0.47
Use of time-out rooms to control behavior	Mean	< 0.01	0.02	0.06	< 0.01	0.02	0.04	0.01	0.02	0.01	< 0.01	0.02	0.01
	(SD)	0.06	0.14	0.24	0.06	0.14	0.2	0.08	0.14	0.11	0.06	0.13	0.1

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[31] The *Unadjusted Sample* refers to the sample with no covariate-balancing adjustments. The *Pruned Sample* is constructed using the matching method described by King et al. (2017), in which a matched sample of for-profit and nonprofit ICF-IIDs is constructed, then matched with a set of government-owned ICF-IIDs with a similar distribution of covariates. The two weighted samples are calculated using Generalized Full Matching (Sävje et al. 2017), in which the units of observation for *Weighted Sample #1* and *Weighted Sample #2* are the facility-year and the facility, respectively. In this exhibit, observations have been assigned to ownership type categories based on the *cleaned* ownership type variable.

Exhibit A4: Discussion of independent variables

The goal of each of our models is to control for other factors that could affect each of the outcomes of interest (the dependent variables) besides ownership type. As shown in Exhibit A5, there are four groups of variables that we believe could influence the outcomes of interest, and therefore for which we would like to control: facility size, resident demographics (age and gender), other resident characteristics (average levels of intellectual disability and prevalence of other medical diagnoses), and other independent variables (state and year). We control for these four sets of covariates in slightly different ways depending on the type of model(s) being estimated. For OLS and probit models, we include a covariate set that controls for size using the number of residents and the squared number of residents in the facility ("Covariate Set 1"); for negative binomial models, we include an alternative set of covariates that control for size using the logarithm of the number of residents as well as a series of dummy variables for different facility-size categories ("Covariate Set 2").

Our rationale for including facility size as a model covariate is the well-documented relationship between establishment size and other fields, such as occupational safety (see, e.g., Ruser (1985), Weil (1987), and Fenn and Ashby (2004)), and the possibility of economies of scale in the provision of residential care (see, e.g., Bernet and Singh (2015), Giancotti et al. (2017), Long et al. (1985), Pope and Burge (1996)). As discussed in the previous paragraph, for OLS and probit models, we use Covariate Set 1 to allow for a potentially nonlinear relationship between the size of the facility and the dependent variable. For negative binomial models, we use Covariate Set 2 to allow for a nonlinear relationship between facility size and the dependent variable.

All of our models account for resident demographics, levels of intellectual disability, and other medical diagnoses, since differences in the mix of these characteristics could affect some of the outcomes regardless of the underlying quality of care provided. For example, all things being equal, older patients and/or those with more complex medical needs (such as epilepsy or cerebral palsy) may require more nurses per resident to maintain a given safety level, and patients with more severe levels of ID or autism may require high direct-care staff ratios. Importantly, as shown in Exhibit A5, information on resident demographics and characteristics is not available at the level of the resident, but is only available at the aggregate facility level. Moreover, there is no information available regarding the number of residents with comorbid mental illness or behavioral issues (such as aggression or self-injurious behavior) that could affect the real or perceived necessity of using drugs, physical restraint, or time-out rooms to control behavior. It is possible that other resident characteristics—such as gender, age, or level of intellectual disability—correlate with these omitted variables, which provides further justification for their inclusion. With these considerations in mind, the other resident characteristics for which we control in all models are: the proportion of residents under 22; the proportion of residents over 65; the proportion of residents who are male; the proportion of residents with a severe or profound intellectual disability; the proportion of residents with autism; the proportion of residents with cerebral palsy; the proportion of residents with epilepsy; the proportion of residents with a language impairment; the proportion of residents with a hearing impairment; the proportion of residents with a visual impairment; the proportion of residents who are non-ambulatory; and the proportion of residents with a medical care plan.

Lastly, we also control for the state in which the facility is located and the year in which the facility was surveyed. State is included as a covariate because the stringency of regulatory surveys and the mechanisms by which complaints may be filed are likely determined, at least in part, by state-variant factors. We include year fixed effects (reflecting the year in which the survey was conducted) since the stringency of regulatory surveys or other economic or policy-driven factors can change over time.

Exhibit A5: Independent variables table

Variable	Description	Included in: Covariate Set 1	Included in: Covariate Set 2
Covariates of Interest			
For-Profit Ownership	A binary variable equal to one if Form CMS 3070-G indicated that the ICF-IID was owned by a private proprietary. This is the base case for the models we analyze in the paper, since this dummy is not included in our regression specifications.	✓	✓
Nonprofit Ownership	A binary variable equal to one if Form CMS 3070-G indicated that the ICF-IID was owned by a private nonprofit.	✓	✓
Government Ownership	A binary variable equal to one if Form CMS 3070-G indicated that the ICF-IID was owned by a city/county (0.1% of all ICF-IID-years in our sample), city/town (0.1%), county (1.4%), or state (4.0%).	✓	✓
Controls for Facility Size			
Number of Residents	The number of residents reported by the ICF-IID on Form CMS 3070-G.		✓
Number of Residents Squared	The number of residents reported by the ICF-IID on Form CMS 3070-G, squared.		✓
log(Number of Residents)	The logarithm of the number of residents reported by the ICF-IID on Form CMS 3070-G.	✓	
Small Size Facility Dummy	A binary variable equal to one if the ICF-IID has strictly fewer than 8 residents, and equal to zero otherwise.	✓	
Medium Size Facility Dummy	A binary variable equal to one if the ICF-IID has between 8-12 residents inclusive, and equal to zero otherwise.	✓	
Large Size Facility Dummy	A binary variable equal to one if the ICF-IID has between 13-39 residents inclusive, and equal to zero otherwise.	✓	
Very Large Size Facility Dummy	A binary variable equal to one if the ICF-IID has strictly more than 39 residents, and equal to zero otherwise.	✓	
Resident Demographics			
Proportion of Residents Under 22	The number of residents under age 22 reported by the ICF-IID on Form CMS 3070-G, divided by the total number of residents reported by the ICF-IID on Form CMS 3070-G.	✓	✓
Proportion of Residents Over 65	The number of residents over age 65 reported by the ICF-IID on Form CMS 3070-G, divided by the total number of residents reported by the ICF-IID on Form CMS 3070-G.	✓	✓
Proportion Male	The number of male residents reported by the ICF-IID on Form CMS 3070-G, divided by the total number of residents reported by the ICF-IID on Form CMS 3070-G.	✓	✓

Exhibit A5: Independent variables (continued)

Variable	Description	Included in:	
		Covariate Set 1	Covariate Set 2
Other Resident Characteristics			
Proportion Severe/Profound ID	The number of residents with either "severe" or "profound" intellectual disability reported by the ICF-IID on Form CMS 3070-G, divided by the total number of residents reported by the ICF-IID on Form CMS 3070-G.	✓	✓
Proportion Autistic	The number of residents with autism reported by the ICF-IID on Form CMS 3070-G, divided by the total number of residents reported by the ICF-IID on Form CMS 3070-G.	✓	✓
Proportion Cerebral Palsy	The number of residents with cerebral palsy reported by the ICF-IID on Form CMS 3070-G, divided by the total number of residents reported by the ICF-IID on Form CMS 3070-G.	✓	✓
Proportion Epilepsy	The number of residents with either "controlled" or "uncontrolled" epilepsy reported by the ICF-IID on Form CMS 3070-G, divided by the total number of residents reported by the ICF-IID on Form CMS 3070-G.	✓	✓
Proportion Language Impairment	The number of residents with a speech or language impairment reported by the ICF-IID on Form CMS 3070-G, divided by the total number of residents reported by the ICF-IID on Form CMS 3070-G.	✓	✓
Proportion Hearing Impairment	The number of residents with a hearing impairment reported by the ICF-IID on Form CMS 3070-G, divided by the total number of residents reported by the ICF-IID on Form CMS 3070-G.	✓	✓
Proportion Visual Impairment	The number of residents with a visual impairment reported by the ICF-IID on Form CMS 3070-G, divided by the total number of residents reported by the ICF-IID on Form CMS 3070-G. *(Included in both covariate sets.)*	✓	✓
Proportion Nonambulatory	The number of residents with a nonambulatory disability reported by the ICF-IID on Form CMS 3070-G, divided by the total number of residents reported by the ICF-IID on Form CMS 3070-G.	✓	✓
Proportion Medical Care Plan	The number of residents with a medical care plan (requiring licensed nursing care on a 24 hour basis) reported by the ICF-IID on Form CMS 3070-G, divided by the total number of residents reported by the ICF-IID on Form CMS 3070-G.	✓	✓
Other Independent Variables			
State	A factor variable denoting the state listed for the facility's address on CMS Form 3070-G. (Three states—Alaska, Michigan, and Oregon—are excluded from the analysis because they have no ICF-IDDs.)	✓	✓
Year	A factor variable indicating the year of the survey, listed in the CMS OSCAR dataset.	✓	✓

Exhibit A6: Summary statistics - independent variables[32]

Variable	Type	Unadjusted Sample			Pruned Sample			Weighted Sample #1			Weighted Sample #2		
		For-Profit	Nonprofit	Government	For-Profit	Nonprofit	Government	For-Profit	Nonprofit	Government	For-Profit	Nonprofit	Government
Number of residents	Mean	8.59	10.7	76.02	8.81	11.14	52.59	12.59	12.65	14.68	12.56	12.66	14.42
	(SD)	14.5	16.1	113.47	14.81	16.57	82.24	27.64	25.76	36.09	28.67	27.19	35.28
Proportion under 22	Mean	0.07	0.09	0.04	0.04	0.04	0.04	0.08	0.08	0.04	0.08	0.08	0.04
	(SD)	0.18	0.24	0.1	0.1	0.12	0.1	0.2	0.22	0.13	0.21	0.22	0.12
Proportion over 65	Mean	0.09	0.09	0.12	0.08	0.08	0.12	0.09	0.09	0.09	0.09	0.09	0.1
	(SD)	0.14	0.15	0.15	0.12	0.12	0.15	0.14	0.14	0.13	0.14	0.15	0.15
Proportion male	Mean	0.57	0.57	0.64	0.58	0.58	0.64	0.57	0.57	0.61	0.58	0.56	0.63
	(SD)	0.37	0.34	0.25	0.37	0.33	0.26	0.35	0.35	0.34	0.36	0.35	0.35
Proportion severe/profound ID	Mean	0.5	0.56	0.71	0.5	0.58	0.7	0.54	0.55	0.6	0.54	0.54	0.6
	(SD)	0.34	0.33	0.27	0.34	0.32	0.27	0.33	0.33	0.33	0.34	0.34	0.34
Proportion autistic	Mean	0.1	0.15	0.14	0.09	0.12	0.14	0.12	0.14	0.13	0.13	0.14	0.13
	(SD)	0.17	0.23	0.17	0.14	0.19	0.16	0.19	0.21	0.18	0.2	0.21	0.17
Proportion cerebral palsy	Mean	0.2	0.21	0.2	0.18	0.2	0.19	0.21	0.21	0.18	0.21	0.21	0.18
	(SD)	0.25	0.24	0.21	0.22	0.22	0.21	0.24	0.24	0.22	0.24	0.24	0.22
Proportion epilepsy	Mean	0.35	0.35	0.45	0.34	0.35	0.44	0.36	0.35	0.37	0.36	0.35	0.39
	(SD)	0.26	0.25	0.23	0.25	0.24	0.23	0.26	0.26	0.25	0.26	0.26	0.26
Proportion language impairment	Mean	0.43	0.49	0.64	0.43	0.49	0.63	0.47	0.48	0.5	0.47	0.48	0.56
	(SD)	0.38	0.39	0.35	0.38	0.38	0.36	0.38	0.39	0.39	0.39	0.39	0.39
Proportion hearing impairment	Mean	0.13	0.14	0.16	0.11	0.12	0.15	0.13	0.14	0.12	0.13	0.14	0.12
	(SD)	0.18	0.17	0.15	0.13	0.13	0.14	0.18	0.18	0.14	0.18	0.18	0.15
Proportion visual impairment	Mean	0.45	0.43	0.41	0.44	0.42	0.4	0.44	0.43	0.42	0.43	0.44	0.42
	(SD)	0.3	0.29	0.25	0.28	0.28	0.25	0.29	0.29	0.27	0.29	0.3	0.28
Proportion nonambulatory	Mean	0.54	0.55	0.58	0.52	0.53	0.59	0.55	0.55	0.56	0.56	0.55	0.58
	(SD)	0.46	0.44	0.4	0.46	0.44	0.41	0.44	0.44	0.44	0.45	0.44	0.43
Proportion withs medical care plan	Mean	0.19	0.18	0.27	0.16	0.15	0.25	0.19	0.19	0.19	0.19	0.19	0.21
	(SD)	0.39	0.37	0.42	0.36	0.34	0.41	0.38	0.38	0.38	0.39	0.38	0.39

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[32] The *"Unadjusted Sample"* refers to the sample without any covariate-balancing adjustments employed. The "*Pruned Sample*" is constructed using the matching method of King et al. (2017) to first construct a matched sample of for-profit and nonprofit ICF-IIDs, then to match this sample with a set of government-owned ICF-IIDs with a similar distribution of covariates. The two weighted samples are calculated using Generalized Full Matching (Sävje et al. 2017), in which the units of observation for *Weighted Sample #1* and *Weighted Sample #2* are the facility-year and the facility, respectively. Observations are broken down into ownership types based on the *cleaned* ownership type variable.

II. Discussion of Alternative Samples Used for Robustness Checks

1) Overview
- To test the robustness of our findings, we estimate the models on four alternative samples. These alternative samples vary along two dimensions: whether or not they have been "cleaned" to improve the quality of the ownership type variable, and whether or not they have been "adjusted" to improve covariate balance.
- The results presented in the main paper were obtained from models estimated on the cleaned, unadjusted sample. In this appendix, we demonstrate that the results obtained from four alternative samples (*Uncleaned Sample*, *Pruned Sample*, *Weighted Sample #1*, and *Weighted Sample #2*) are qualitatively similar.

2) Details on Uncleaned Sample
- The *uncleaned* sample does <u>not</u> incorporate any of the cleaning steps detailed in Section II of this appendix ("Observation Decision Rules"), and thus <u>includes</u> observations in which ownership type has (very like) been miscoded.
- The *cleaned* sample has been altered to incorporate the steps listed in Section II of this appendix ("Observation Decision Rules"), and therefore includes very few, if any, probable miscodings of the ownership type variable.

3) Details on Unadjusted Sample versus Pruned Sample, Weighted Sample #1, and Weighted Sample #2
- The "unadjusted" sample exhibits significant covariate imbalance because on average, government-owned facilities are considerably larger than for-profit and nonprofit facilities.
- The *weighted* and *pruned* samples are adjusted to improve the covariate balance between the three different ownership groups in the sample.
- The *pruned* sample uses a balancing procedure that drops outlying observations to improve covariate balance, as outlined in King et al. (2017).
- Both *weighted* samples assign different weights to different observations to improve covariate balance, as outlined by Sävje et al. (2017).
  - The two weighted samples differ in only one regard: whether covariate balance is maximized across facility-years or across facilities.
  - In *Weighted Sample #1*, covariate balance is maximized across all facility-years.
  - In *Weighted Sample #2*, covariate balance is maximized across facilities. (For each facility, median values of all fields are calculated across all years.)

4) Summary of robustness of findings to use of alternative samples
- The results presented in the main paper are derived from the *cleaned, unadjusted* sample.
- Pages 11-21 of this appendix show that the results are similar when estimated using the *Uncleaned Sample*.
- Pages 21-33 show that the results from the unadjusted sample are similar to those from *Pruned Sample*, *Weighted sample #1*, and *Weighted Sample #2*.

III. Creation of "Cleaned" Sample

We applied the following decision rules to decide which observations to re-code or drop from the dataset because of the probable miscoding of ownership type (N=nonprofit, F=for-profit, and G=government-owned):

1) Only facilities with data from at least two consecutive years were retained.

2) If a facility displayed a uniform ownership pattern for all years in the sample, it was retained in its entirety.

3) If a facility displayed a uniform ownership pattern for all years in the sample except for one (internal) year in the sequence – such as F/F/F/N/F/F/F/F or G/G/G/G/F/G/G/G – we assumed that the single aberrant year was a coding error, and recoded it to match the other (adjacent) years.

4) If a facility displayed an (apparent) one-year change in ownership type at either the very beginning or very end of a sequence (but not both) – such as N/F/F/F/F/F/F/F or F/F/F/F/F/F/F/N – we could not determine whether the aberrant year reflected a longer trend (beyond the study period) or was simply a coding error. Therefore, we discarded the observation for the aberrant year, but retained all other years in the sequence. (This rule implied that any ICF-IIDs that appeared in our sample for only two years, and had conflicting ownership types in each year, were discarded entirely.)

5) If a facility displayed one (and only one) apparently consistent change in ownership that lasted for more than one year – such as N/N/N/N/F/F/F – we assumed the data were correctly coded and made no changes.

6) If a facility reported an ownership type of "other" for more than one year – such O/O/O/O/O/O/O/O/O/O or O/O/N/N/N/N/N – it was dropped from the sample, due to concerns that facilities coded as "other" for multiple years were not comparable to other facilities, because the "other" category is not clearly defined by CMS.[33]

7) If a facility displayed a mixed or erratic pattern—apparently changing ownership type more than once—such as N/N/N/N/N/F/N/F/F/N, F/F/F/F/G/N/G/G/G, or F/F/F/F/G/F/F/F/N – the entire facility was dropped from our sample due to concerns about the reliability of reporting at the facility in question.

8) We applied the above rules regardless of how many years a given facility appeared in the sample. For example, a facility with an ownership sequence of F/N was dropped from the sample (because it failed rule #5); a facility with a sequence of F/F/N was retained in part (only the last year was discarded); and a facility with a sequence of F/F/N/N was retained in its entirety.

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[33] Despite conducting a series of internet and database searches, we were unable to find any detailed description of exactly which type of facilities are coded as "other." An official from the California Dept. of Public Health however, expressed the belief that most of the facilities falling under the "other" ownership category are sole proprietorships (Corey Egel, California Department of Public Health, email communication, March 14th 2018).

IV. Results of Uncleaned Sample Robustness Checks

Note: The highlighted column in each of the following exhibits displays the results from the models presented in the main paper, which were estimated on the unadjusted and *cleaned* sample, which incorporates measures to eliminate probable miscodings of the covariate of interest (ownership type) using the protocol described in Section II of this appendix ("Observation Decision Rules"). The other (un-highlighted) column in each exhibit contains alternative results from a model estimated on the unadjusted and *uncleaned* data, which includes likely miscodings of the ownership type variable.

Exhibit A7: Total citations – uncleaned sample robustness checks

	Cleaned Sample	Uncleaned Sample
Private Nonprofit Ownership	0.880***	0.888***
	(-5.17)	(-5.34)
Government Ownership	0.807***	0.843***
	(-4.45)	(-3.89)
log(Number of Residents)	1.582***	1.544***
	(12.86)	(12.61)
Medium Size Dummy	0.907**	0.930*
	(-3.10)	(-2.41)
Large Size Dummy	0.887*	0.909
	(-2.14)	(-1.76)
Very Large Size Dummy	0.742**	0.786*
	(-2.75)	(-2.29)
Proportion Under Age 22	1.067	1.090
	(1.27)	(1.77)
Proportion Over Age 65	1.115	1.106
	(1.74)	(1.66)
Proportion Male	1.057	1.063*
	(1.78)	(2.06)
Proportion Severe or Profound ID	1.248***	1.236***
	(6.07)	(6.07)
Proportion Autistic	1.035	1.008
	(0.68)	(0.17)
Proportion Cerebral Palsy	0.939	0.950
	(-1.44)	(-1.21)
Proportion Epileptic	0.926*	0.921*
	(-2.05)	(-2.31)
Proportion Speech Impairment	0.891***	0.894***
	(-4.90)	(-4.97)
Proportion Hearing Impairment	0.908*	0.931
	(-2.03)	(-1.55)
Proportion Visual Impairment	0.806***	0.801***
	(-6.76)	(-7.23)
Proportion Nonambulatory	1.170***	1.158***
	(7.63)	(7.46)
Proportion Medical Care Plan	1.029	1.043*
	(1.33)	(2.03)
p-value: For-Profit vs Nonprofit	0.000000234	9.07e-08
p-value: For-Profit vs Government	0.00000853	0.000100
p-value: Nonprofit vs Government	0.0574	0.214
Number of Facility Years	42224	45314
Number of Facilities	5160	5666

Model: Negative Binomial. Standard errors are clustered at the ICF-IID level. State fixed-effects and year fixed-effects are included in the model. *t*-statistics are given in parentheses. Some states are dropped to achieve model convergence, since state fixed effects are not identified for states with no positive values of the dependent variables in a negative binomial model. The sample used is the *unadjusted* sample.
Significance Levels: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Exhibit A8: Total complaints – uncleaned sample robustness checks

	Cleaned Sample	Uncleaned Sample
Private Nonprofit Ownership	0.897[*]	0.913[*]
	(-2.15)	(-1.99)
Government Ownership	0.894	0.848
	(-0.97)	(-1.58)
log(Number of Residents)	2.060[***]	2.120[***]
	(9.32)	(10.03)
Medium Size Dummy	0.960	0.941
	(-0.54)	(-0.86)
Large Size Dummy	1.328[*]	1.265[*]
	(2.36)	(2.04)
Very Large Size Dummy	1.635[*]	1.502
	(2.10)	(1.81)
Proportion Under Age 22	1.648[***]	1.636[***]
	(5.57)	(5.77)
Proportion Over Age 65	1.318	1.303[*]
	(1.94)	(1.96)
Proportion Male	0.977	0.981
	(-0.39)	(-0.33)
Proportion Severe or Profound ID	0.921	0.924
	(-1.14)	(-1.15)
Proportion Autistic	1.283[*]	1.266[*]
	(2.18)	(2.20)
Proportion Cerebral Palsy	0.804[*]	0.837
	(-2.20)	(-1.90)
Proportion Epileptic	1.040	1.022
	(0.49)	(0.29)
Proportion Speech Impairment	0.935	0.939
	(-1.26)	(-1.23)
Proportion Hearing Impairment	0.888	0.963
	(-1.24)	(-0.42)
Proportion Visual Impairment	0.718[***]	0.718[***]
	(-5.17)	(-5.44)
Proportion Nonambulatory	1.161[***]	1.163[***]
	(3.50)	(3.70)
Proportion Medical Care Plan	1.123[*]	1.137[**]
	(2.52)	(2.95)
p-value: For-Profit vs Nonprofit	0.0316	0.0471
p-value: For-Profit vs Government	0.331	0.115
p-value: Nonprofit vs Government	0.981	0.468
Number of Facility Years	42081	45171
Number of Facilities	5142	5648

Model: Negative Binomial. Standard errors are clustered at the ICF-IID level. State fixed-effects and year fixed-effects are included in the model. *t*-statistics are given in parentheses. Some states are dropped to achieve model convergence, since state fixed effects are not identified for states with no positive values of the dependent variables in a negative binomial model. The sample used is the *unadjusted* sample.
Significance Levels: [*] $p < 0.05$, [**] $p < 0.01$, [***] $p < 0.001$.

Exhibit A9: Substantiated complaints – uncleaned sample robustness checks

	Cleaned Sample	Uncleaned Sample
Private Nonprofit Ownership	0.923	0.932
	(-1.41)	(-1.34)
Government Ownership	0.924	0.857
	(-0.69)	(-1.47)
log(Number of Residents)	1.914***	2.016***
	(8.08)	(8.99)
Medium Size Dummy	0.881	0.864
	(-1.61)	(-1.94)
Large Size Dummy	1.282*	1.173
	(1.96)	(1.31)
Very Large Size Dummy	1.587	1.366
	(1.91)	(1.33)
Proportion Under Age 22	1.531***	1.530***
	(3.85)	(4.08)
Proportion Over Age 65	1.512*	1.521**
	(2.46)	(2.61)
Proportion Male	1.036	1.044
	(0.48)	(0.61)
Proportion Severe or Profound ID	1.012	1.007
	(0.14)	(0.09)
Proportion Autistic	1.334*	1.308*
	(2.12)	(2.09)
Proportion Cerebral Palsy	0.709**	0.760*
	(-2.89)	(-2.45)
Proportion Epileptic	1.008	1.005
	(0.08)	(0.05)
Proportion Speech Impairment	0.934	0.939
	(-1.14)	(-1.11)
Proportion Hearing Impairment	0.970	1.049
	(-0.26)	(0.43)
Proportion Visual Impairment	0.669***	0.671***
	(-5.33)	(-5.58)
Proportion Nonambulatory	1.274***	1.274***
	(4.69)	(4.87)
Proportion Medical Care Plan	1.163**	1.178***
	(2.88)	(3.31)
p-value: For-Profit vs Nonprofit	0.159	0.182
p-value: For-Profit vs Government	0.493	0.142
p-value: Nonprofit vs Government	0.987	0.408
Number of Facility Years	42081	45171
Number of Facilities	5142	5648

Model: Negative Binomial. Standard errors are clustered at the ICF-IID level. State fixed-effects and year fixed-effects are included in the model. *t*-statistics are given in parentheses. Some states are dropped to achieve model convergence, since state fixed effects are not identified for states with no positive values of the dependent variables in a negative binomial model. The sample used is the *unadjusted* sample.
Significance Levels: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Exhibit A10: Number of reported investigations – uncleaned sample robustness checks

	Cleaned Sample	Uncleaned Sample
Private Nonprofit Ownership	1.153**	1.143**
	(3.05)	(3.13)
Government Ownership	2.221***	2.044***
	(6.68)	(6.51)
log(Number of Residents)	3.081***	3.166***
	(11.96)	(12.09)
Medium Size Dummy	0.863*	0.859*
	(-2.19)	(-2.28)
Large Size Dummy	0.952	0.935
	(-0.36)	(-0.49)
Very Large Size Dummy	1.087	1.058
	(0.27)	(0.18)
Proportion Under Age 22	1.469***	1.458***
	(4.45)	(4.56)
Proportion Over Age 65	0.674**	0.663***
	(-3.28)	(-3.54)
Proportion Male	0.956	0.957
	(-0.90)	(-0.92)
Proportion Severe or Profound ID	0.626***	0.640***
	(-7.11)	(-7.04)
Proportion Autistic	0.987	1.011
	(-0.15)	(0.14)
Proportion Cerebral Palsy	0.806*	0.814*
	(-2.19)	(-2.16)
Proportion Epileptic	1.236**	1.232**
	(3.08)	(3.14)
Proportion Speech Impairment	0.958	0.959
	(-0.95)	(-0.93)
Proportion Hearing Impairment	0.716***	0.742***
	(-3.78)	(-3.47)
Proportion Visual Impairment	0.846**	0.842**
	(-2.75)	(-2.92)
Proportion Nonambulatory	1.022	0.997
	(0.59)	(-0.08)
Proportion Medical Care Plan	1.136**	1.135**
	(2.70)	(2.78)
p-value: For-Profit vs Nonprofit	0.00230	0.00175
p-value: For-Profit vs Government	2.35e-11	7.65e-11
p-value: Nonprofit vs Government	1.42e-09	5.17e-09
Number of Facility Years	42216	45306
Number of Facilities	5159	5665

Model: Negative Binomial. Standard errors are clustered at the ICF-IID level. State fixed-effects and year fixed-effects are included in the model. *t*-statistics are given in parentheses. Some states are dropped to achieve model convergence, since state fixed effects are not identified for states with no positive values of the dependent variables in a negative binomial model. The sample used is the *unadjusted* sample.
Significance Levels: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Exhibit A11: Direct care staff per resident – uncleaned sample robustness checks

	Cleaned Sample	Uncleaned Sample
Private Nonprofit Ownership	-0.0161	0.0224
	(-0.22)	(0.31)
Government Ownership	0.106	0.104
	(0.87)	(0.95)
Number of Residents	-0.00661***	-0.00666***
	(-4.83)	(-5.01)
(Residents)^2	0.0000170***	0.0000172***
	(5.03)	(5.18)
Proportion Under Age 22	0.491*	0.463*
	(2.20)	(2.20)
Proportion Over Age 65	-0.155	0.00961
	(-1.11)	(0.06)
Proportion Male	0.0230	0.0605
	(0.29)	(0.79)
Proportion Severe or Profound ID	0.143	0.117
	(1.44)	(1.07)
Proportion Autistic	0.0604	0.0339
	(0.38)	(0.19)
Proportion Cerebral Palsy	0.187	0.157
	(1.09)	(0.79)
Proportion Epileptic	-0.197	-0.0840
	(-1.31)	(-0.55)
Proportion Speech Impairment	0.0199	0.0450
	(0.26)	(0.53)
Proportion Hearing Impairment	-0.0209	-0.0809
	(-0.17)	(-0.63)
Proportion Visual Impairment	-0.127	-0.181
	(-1.40)	(-1.74)
Proportion Nonambulatory	0.180**	0.160**
	(2.81)	(2.60)
Proportion Medical Care Plan	0.0874	0.0856
	(1.25)	(1.31)
p-value: For-Profit vs Nonprofit	0.825	0.755
p-value: For-Profit vs Government	0.387	0.340
p-value: Nonprofit vs Government	0.189	0.379
Number of Facility Years	42224	45314
Number of Facilities	5160	5666

Model*:* OLS. Standard errors are clustered at the ICF-IID level. State fixed-effects and year fixed-effects are included in the model. *t*-statistics are given in parentheses. The sample used is the *unadjusted* sample.
Significance Levels: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Exhibit A12: Registered nurses per resident – uncleaned sample robustness checks

	Cleaned Sample	Uncleaned Sample
Private Nonprofit Ownership	0.00203	0.00551
	(0.50)	(1.35)
Government Ownership	0.0336**	0.0307***
	(3.18)	(3.34)
Number of Residents	-0.000288**	-0.000272**
	(-3.05)	(-3.01)
(Residents)^2	0.000000604**	0.000000584**
	(2.71)	(2.67)
Proportion Under Age 22	0.0480***	0.0495***
	(3.67)	(3.99)
Proportion Over Age 65	-0.00889	-0.00180
	(-0.85)	(-0.16)
Proportion Male	0.00403	0.00594
	(1.01)	(1.51)
Proportion Severe or Profound ID	0.00820	0.0108
	(1.30)	(1.71)
Proportion Autistic	-0.0206*	-0.0244*
	(-1.99)	(-2.21)
Proportion Cerebral Palsy	0.00681	-0.00114
	(0.87)	(-0.12)
Proportion Epileptic	0.00529	0.0115
	(0.73)	(1.47)
Proportion Speech Impairment	-0.00158	0.000819
	(-0.35)	(0.16)
Proportion Hearing Impairment	-0.00506	-0.00681
	(-0.64)	(-0.81)
Proportion Visual Impairment	0.0157*	0.00923
	(2.22)	(1.19)
Proportion Nonambulatory	0.0161***	0.0143***
	(3.78)	(3.52)
Proportion Medical Care Plan	0.0309***	0.0302***
	(5.60)	(5.84)
p-value: For-Profit vs Nonprofit	0.615	0.179
p-value: For-Profit vs Government	0.00149	0.000847
p-value: Nonprofit vs Government	0.000989	0.00404
Number of Facility Years	42224	45314
Number of Facilities	5160	5666

Model*:* OLS. Standard errors are clustered at the ICF-IID level. State fixed-effects and year fixed-effects are included in the model. *t*-statistics are given in parentheses. The sample used is the *unadjusted* sample.
Significance Levels: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Exhibit A13: Drugs to control behavior – uncleaned sample robustness checks

	Cleaned Sample (Average Marginal Effects)	Uncleaned Sample (Average Marginal Effects)	Cleaned Sample (Probit Coefficients)	Uncleaned Sample (Probit Coefficients)
Private Nonprofit Ownership	0.0212** (2.85)	0.0157* (2.38)	0.105** (2.86)	0.0772* (2.38)
Government Ownership	-0.0100 (-0.61)	-0.0130 (-0.89)	-0.0500 (-0.61)	-0.0642 (-0.89)
Number of Residents	0.00120*** (3.63)	0.00115*** (3.62)	0.00595*** (3.61)	0.00568*** (3.61)
(Residents)^2	-0.00000126 (-1.48)	-0.00000120 (-1.42)	-0.00000627 (-1.48)	-0.00000592 (-1.42)
Proportion Under Age 22	-0.111*** (-7.20)	-0.110*** (-7.41)	-0.554*** (-7.19)	-0.541*** (-7.40)
Proportion Over Age 65	0.0278 (1.42)	0.0264 (1.41)	0.138 (1.42)	0.130 (1.41)
Proportion Male	-0.00345 (-0.43)	-0.00365 (-0.48)	-0.0172 (-0.43)	-0.0180 (-0.48)
Proportion Severe or Profound ID	-0.0440*** (-4.24)	-0.0429*** (-4.25)	-0.219*** (-4.25)	-0.211*** (-4.27)
Proportion Autistic	0.113*** (6.45)	0.113*** (6.71)	0.565*** (6.48)	0.555*** (6.75)
Proportion Cerebral Palsy	-0.111*** (-8.17)	-0.115*** (-8.79)	-0.552*** (-8.23)	-0.566*** (-8.85)
Proportion Epileptic	0.0243* (2.08)	0.0200 (1.79)	0.121* (2.08)	0.0984 (1.79)
Proportion Speech Impairment	-0.00841 (-1.17)	-0.00234 (-0.33)	-0.0419 (-1.17)	-0.0115 (-0.33)
Proportion Hearing Impairment	0.0156 (1.04)	0.0184 (1.26)	0.0778 (1.04)	0.0907 (1.26)
Proportion Visual Impairment	0.0255** (2.68)	0.0269** (2.93)	0.127** (2.67)	0.133** (2.92)
Proportion Nonambulatory	-0.0588*** (-9.39)	-0.0604*** (-9.98)	-0.293*** (-9.40)	-0.297*** (-10.00)
Proportion Medical Care Plan	0.0334*** (4.65)	0.0353*** (5.12)	0.167*** (4.65)	0.174*** (5.13)
p-value: For-Profit vs Nonprofit			0.00429	0.0171
p-value: For-Profit vs Government			0.544	0.374
p-value: Nonprofit vs Government			0.0496	0.0437
Number of Facility Years	42094	45184	42094	45184
Number of Facilities	5144	5650	5144	5650

Model: Coefficient estimates from Probit models are displayed in columns "Cleaned Sample (Probit Coefficients)" and "Uncleaned Sample (Probit Coefficients)". Standard errors are clustered at the ICF-IID level. State fixed-effects and year fixed-effects are included in the model. *t*-statistics are given in parentheses. Some states are dropped to achieve model convergence, since state fixed effects are not identified for states with no positive values of the dependent variables in a probit model. The sample used is the *unadjusted* sample. The corresponding average marginal effects from probit models are presented in columns "Cleaned Sample (Average Marginal Effects)" and "Uncleaned Sample (Average Marginal Effects)"; these values are calculated by identifying the marginal effect of each variable for every observation and then averaging across all observations.
Significance Levels: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Exhibit A14: Physical restraint – uncleaned sample robustness checks

	Cleaned Sample (Average Marginal Effects)	Uncleaned Sample (Average Marginal Effects)	Cleaned Sample (Probit Coefficients)	Uncleaned Sample (Probit Coefficients)
Private Nonprofit Ownership	0.0403*** (4.82)	0.0315*** (4.20)	0.206*** (4.83)	0.164*** (4.20)
Government Ownership	0.0968*** (5.94)	0.0815*** (5.62)	0.494*** (5.90)	0.423*** (5.59)
Number of Residents	0.00288*** (10.94)	0.00284*** (11.35)	0.0147*** (10.72)	0.0147*** (11.12)
(Residents)^2	-0.00000421*** (-6.93)	-0.00000417*** (-7.15)	-0.0000215*** (-6.88)	-0.0000217*** (-7.10)
Proportion Under Age 22	0.0310* (2.06)	0.0354* (2.47)	0.158* (2.07)	0.184* (2.47)
Proportion Over Age 65	-0.0983*** (-4.61)	-0.0923*** (-4.51)	-0.502*** (-4.61)	-0.479*** (-4.51)
Proportion Male	0.0243* (2.47)	0.0238* (2.56)	0.124* (2.48)	0.124* (2.56)
Proportion Severe or Profound ID	-0.0173 (-1.48)	-0.0138 (-1.25)	-0.0883 (-1.48)	-0.0717 (-1.25)
Proportion Autistic	0.0983*** (6.01)	0.108*** (6.74)	0.502*** (5.99)	0.558*** (6.73)
Proportion Cerebral Palsy	0.00749 (0.50)	0.00984 (0.69)	0.0382 (0.50)	0.0511 (0.70)
Proportion Epileptic	0.0384** (3.01)	0.0340** (2.81)	0.196** (3.01)	0.176** (2.81)
Proportion Speech Impairment	-0.00952 (-1.22)	-0.00733 (-0.98)	-0.0486 (-1.22)	-0.0380 (-0.98)
Proportion Hearing Impairment	0.0299 (1.91)	0.0311* (2.09)	0.153 (1.91)	0.161* (2.09)
Proportion Visual Impairment	-0.00109 (-0.10)	0.00395 (0.39)	-0.00559 (-0.10)	0.0205 (0.39)
Proportion Nonambulatory	-0.0178** (-2.73)	-0.0184** (-2.97)	-0.0911** (-2.74)	-0.0956** (-2.98)
Proportion Medical Care Plan	0.0485*** (6.63)	0.0509*** (7.43)	0.247*** (6.64)	0.264*** (7.43)
p-value: For-Profit vs Nonprofit			0.00000135	0.0000262
p-value: For-Profit vs Government			3.54e-09	2.32e-08
p-value: Nonprofit vs Government			0.000287	0.000332
Number of Facility Years	42167	45257	42167	45257
Number of Facilities	5153	5659	5153	5659

Model: Coefficient estimates from Probit models are displayed in columns "Cleaned Sample (Probit Coefficients)" and "Uncleaned Sample (Probit Coefficients)". Standard errors are clustered at the ICF-IID level. State fixed-effects and year fixed-effects are included in the model. *t*-statistics are given in parentheses. Some states are dropped to achieve model convergence, since state fixed effects are not identified for states with no positive values of the dependent variables in a probit model. The sample used is the *unadjusted* sample. The corresponding average marginal effects from probit models are presented in columns "Cleaned Sample (Average Marginal Effects)" and "Uncleaned Sample (Average Marginal Effects)"; these values are calculated by identifying the marginal effect of each variable for every observation and then averaging across all observations.
Significance Levels: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Exhibit A15: Time-out rooms – uncleaned sample robustness checks

	Cleaned Sample (Average Marginal Effects)	Uncleaned Sample (Average Marginal Effects)	Cleaned Sample (Probit Coefficients)	Uncleaned Sample (Probit Coefficients)
Private Nonprofit Ownership	0.0135***	0.0125***	0.416***	0.394***
	(3.38)	(3.36)	(3.56)	(3.50)
Government Ownership	0.0101	0.00932	0.312	0.294
	(1.36)	(1.40)	(1.36)	(1.40)
Number of Residents	0.000448***	0.000421***	0.0138***	0.0133***
	(5.95)	(5.98)	(6.69)	(6.71)
(Residents)^2	-0.000000650***	-0.000000602***	-0.0000201***	-0.0000190***
	(-3.99)	(-3.87)	(-4.27)	(-4.13)
Proportion Under Age 22	-0.00121	-0.00190	-0.0375	-0.0599
	(-0.23)	(-0.37)	(-0.23)	(-0.37)
Proportion Over Age 65	-0.0244**	-0.0225**	-0.753**	-0.711**
	(-2.77)	(-2.75)	(-2.84)	(-2.82)
Proportion Male	0.00352	0.00328	0.109	0.103
	(0.97)	(0.99)	(0.98)	(0.99)
Proportion Severe or Profound ID	-0.00723	-0.00584	-0.223	-0.184
	(-1.50)	(-1.29)	(-1.51)	(-1.29)
Proportion Autistic	0.0168**	0.0168**	0.519**	0.529**
	(2.91)	(3.04)	(3.04)	(3.19)
Proportion Cerebral Palsy	-0.00744	-0.00732	-0.230	-0.231
	(-1.31)	(-1.36)	(-1.30)	(-1.36)
Proportion Epileptic	-0.00684	-0.00653	-0.211	-0.206
	(-1.46)	(-1.48)	(-1.47)	(-1.49)
Proportion Speech Impairment	-0.00605*	-0.00601*	-0.187*	-0.190*
	(-2.18)	(-2.25)	(-2.17)	(-2.24)
Proportion Hearing Impairment	0.00190	0.00106	0.0586	0.0334
	(0.28)	(0.17)	(0.28)	(0.17)
Proportion Visual Impairment	-0.00244	-0.00226	-0.0755	-0.0712
	(-0.52)	(-0.51)	(-0.52)	(-0.50)
Proportion Nonambulatory	-0.000241	0.000194	-0.00744	0.00613
	(-0.10)	(0.08)	(-0.10)	(0.08)
Proportion Medical Care Plan	0.00148	0.00163	0.0458	0.0516
	(0.54)	(0.64)	(0.54)	(0.63)
p-value: For-Profit vs Nonprofit			0.000370	0.000458
p-value: For-Profit vs Government			0.173	0.160
p-value: Nonprofit vs Government			0.612	0.590
Number of Facility Years	39606	42446	39606	42446
Number of Facilities	4842	5297	4842	5297

Model: Coefficient estimates from Probit models are displayed in columns "Cleaned Sample (Probit Coefficients)" and "Uncleaned Sample (Probit Coefficients)". Standard errors are clustered at the ICF-IID level. State fixed-effects and year fixed-effects are included in the model. *t*-statistics are given in parentheses. Some states are dropped to achieve model convergence, since state fixed effects are not identified for states with no positive values of the dependent variables in a probit model. The sample used is the *unadjusted* sample. The corresponding average marginal effects from probit models are presented in columns "Cleaned Sample (Average Marginal Effects)" and "Uncleaned Sample (Average Marginal Effects)"; these values are calculated by identifying the marginal effect of each variable for every observation and then averaging across all observations.
Significance Levels: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

V.   Results of Covariate Balance Robustness Checks

Note: The highlighted column in each of the following exhibits displays the results from the models presented in the main paper, which were estimated on the cleaned and *unadjusted* sample. The other (i.e., un-highlighted) columns contain alternative results from models estimated on three cleaned and *adjusted* samples. As described in Section IV of this Appendix, these three adjusted samples include *Pruned Sample*, *Weighted Sample #1*, and *Weighted Sample #2*.

Exhibit A16: Total number of citations – covariate balance robustness checks

	Unadjusted Sample	Weighted Sample #1 (Facility-Years)	Weighted Sample #2 (Facilities)	Pruned Sample
Private Nonprofit Ownership	0.880*** (-5.17)	0.872*** (-4.52)	0.869*** (-4.19)	0.866*** (-5.30)

Government Ownership	0.807***	0.779***	0.871	0.789***
	(-4.45)	(-3.32)	(-1.85)	(-4.67)
log(Number of Residents)	1.582***	1.612***	1.683***	1.510***
	(12.86)	(9.25)	(9.08)	(9.81)
Medium Size Dummy	0.907**	0.913	0.901	0.907**
	(-3.10)	(-1.78)	(-1.90)	(-2.80)
Large Size Dummy	0.887*	0.778**	0.774**	0.910
	(-2.14)	(-2.99)	(-3.08)	(-1.52)
Very Large Size Dummy	0.742**	0.702*	0.596**	0.798
	(-2.75)	(-2.24)	(-3.07)	(-1.80)
Proportion Under Age 22	1.067	1.126	1.164*	1.378***
	(1.27)	(1.63)	(2.02)	(3.56)
Proportion Over Age 65	1.115	0.956	0.997	1.023
	(1.74)	(-0.34)	(-0.03)	(0.30)
Proportion Male	1.057	0.954	1.060	1.034
	(1.78)	(-0.75)	(1.28)	(0.97)
Proportion Severe or Profound ID	1.248***	1.224***	1.085	1.322***
	(6.07)	(3.31)	(1.02)	(6.62)
Proportion Autistic	1.035	0.950	0.954	0.970
	(0.68)	(-0.61)	(-0.64)	(-0.47)
Proportion Cerebral Palsy	0.939	0.882	0.957	0.952
	(-1.44)	(-1.82)	(-0.70)	(-0.98)
Proportion Epileptic	0.926*	0.959	0.940	0.930
	(-2.05)	(-0.64)	(-0.93)	(-1.63)
Proportion Speech Impairment	0.891***	0.885**	0.962	0.879***
	(-4.90)	(-2.77)	(-0.48)	(-4.57)
Proportion Hearing Impairment	0.908*	0.940	0.908	0.955
	(-2.03)	(-0.86)	(-1.10)	(-0.63)
Proportion Visual Impairment	0.806***	0.817**	0.830***	0.782***
	(-6.76)	(-3.23)	(-3.41)	(-6.62)
Proportion Nonambulatory	1.170***	1.100*	1.112**	1.158***
	(7.63)	(2.40)	(2.98)	(6.40)
Proportion Medical Care Plan	1.029	1.057	1.037	1.012
	(1.33)	(1.39)	(1.07)	(0.47)
p-value: For-Profit vs Nonprofit	0.000000234	0.00000633	0.0000284	0.000000119
p-value: For-Profit vs Government	0.00000853	0.000897	0.0638	0.00000303
p-value: Nonprofit vs Government	0.0574	0.0902	0.961	0.0492
Number of Facility Years	42224	42224	42224	32974
Number of Facilities	5160	5160	5160	4945

Model: Negative Binomial. Standard errors are clustered at the ICF-IID level. *t*-statistics are given in parentheses. State fixed-effects and year fixed-effects are included in the model. Significance Levels: $^* p < 0.05$, $^{**} p < 0.01$, $^{***} p < 0.001$

Samples Used: The "*Pruned Sample*" is constructed using the matching method of King et al. (2017) to first construct a matched sample of for-profit and nonprofit ICF-IIDs, then to match this sample with a set of Public ICF-IIDs with a similar distribution of covariates. "*Weighted Sample #1*" uses the matching method of Sävje et al. (2017) to weight observations in the Unadjusted Sample such that the weighted distribution of covariates for ICF-IIDs is similar across all three ownership groups. "*Weighted Sample #2*" is created by running the matching method of Sävje et al. (2017) on the data after it has been aggregated to the facility level. Some states are dropped to achieve model convergence, since state fixed effects are not identified for states with no positive values of the dependent variables in a probit model. The *cleaned* ownership type variable is used.

Exhibit A17: Total number of complaints – covariate balance robustness checks

	Unadjusted Sample	Weighted Sample #1 (Facility-Years)	Weighted Sample #2 (Facilities)	Pruned Sample
Private Nonprofit Ownership	0.897*	0.870*	0.903	0.866*
	(-2.15)	(-2.25)	(-1.80)	(-2.55)

	Unadjusted Sample	Weighted Sample #1 (Facility-Years)	Weighted Sample #2 (Facilities)	Pruned Sample
Government Ownership	0.894 (-0.97)	0.581*** (-3.56)	0.668** (-2.61)	0.807 (-1.84)
log(Number of Residents)	2.060*** (9.32)	2.072*** (6.54)	2.086*** (5.66)	2.032*** (7.98)
Medium Size Dummy	0.960 (-0.54)	0.950 (-0.42)	0.800* (-2.03)	0.951 (-0.61)
Large Size Dummy	1.328* (2.36)	1.506* (2.10)	1.569* (2.02)	1.335* (2.16)
Very Large Size Dummy	1.635* (2.10)	2.078* (1.98)	2.239 (1.86)	1.614 (1.82)
Proportion Under Age 22	1.648*** (5.57)	1.776*** (3.94)	1.960*** (4.98)	2.384*** (5.30)
Proportion Over Age 65	1.318 (1.94)	0.982 (-0.09)	0.971 (-0.14)	1.282 (1.45)
Proportion Male	0.977 (-0.39)	0.879 (-1.27)	0.937 (-0.71)	0.954 (-0.70)
Proportion Severe or Profound ID	0.921 (-1.14)	0.929 (-0.72)	0.943 (-0.59)	0.948 (-0.61)
Proportion Autistic	1.283* (2.18)	1.204 (1.09)	1.343 (1.76)	1.218 (1.38)
Proportion Cerebral Palsy	0.804* (-2.20)	0.783 (-1.63)	0.669** (-2.70)	0.851 (-1.28)
Proportion Epileptic	1.040 (0.49)	1.130 (1.04)	1.225 (1.65)	1.045 (0.45)
Proportion Speech Impairment	0.935 (-1.26)	0.936 (-0.79)	0.888 (-1.55)	0.949 (-0.80)
Proportion Hearing Impairment	0.888 (-1.24)	0.875 (-1.10)	0.884 (-0.93)	0.836 (-1.16)
Proportion Visual Impairment	0.718*** (-5.17)	0.620*** (-5.16)	0.709*** (-3.68)	0.701*** (-4.78)
Proportion Nonambulatory	1.161*** (3.50)	1.226** (2.91)	1.167* (2.19)	1.141** (2.77)
Proportion Medical Care Plan	1.123* (2.52)	0.963 (-0.54)	1.083 (1.09)	1.135* (2.22)
p-value: For-Profit vs Nonprofit	0.0316	0.0247	0.0719	0.0107
p-value: For-Profit vs Government	0.331	0.000365	0.00917	0.0654
p-value: Nonprofit vs Government	0.981	0.00282	0.0320	0.533
Number of Facility Years	42081	42081	42081	32883
Number of Facilities	5142	5142	5142	4930

Model: Negative Binomial. Standard errors are clustered at the ICF-IID level. *t*-statistics are given in parentheses. State fixed-effects and year fixed-effects are included in the model.

Samples Used: The "*Pruned Sample*" is constructed using the matching method of King et al. (2017) to first construct a matched sample of for-profit and nonprofit ICF-IIDs, then to match this sample with a set of Public ICF-IIDs with a similar distribution of covariates. "*Weighted Sample #1*" uses the matching method of Sävje et al. (2017) to weight observations in the Unadjusted Sample such that the weighted distribution of covariates for ICF-IIDs is similar across all three ownership groups. "*Weighted Sample #2*" is created by running the matching method of Sävje et al. (2017) on the data after it has been aggregated to the facility level. Some states are dropped to achieve model convergence, since state fixed effects are not identified for states with no positive values of the dependent variables in a probit model. The *cleaned* ownership type variable is used.

Significance Levels: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Exhibit A18: Number of substantiated complaints – covariate balance robustness checks

	Unadjusted Sample	Weighted Sample #1 (Facility-Years)	Weighted Sample #2 (Facilities)	Pruned Sample
Private Nonprofit Ownership	0.923 (-1.41)	0.857* (-2.23)	0.929 (-1.20)	0.885 (-1.95)
Government Ownership	0.924 (-0.69)	0.623** (-3.18)	0.783 (-1.65)	0.793* (-1.99)

	Unadjusted Sample	Weighted Sample #1 (Facility-Years)	Weighted Sample #2 (Facilities)	Pruned Sample
log(Number of Residents)	1.914*** (8.08)	2.035*** (6.26)	1.888*** (5.40)	1.904*** (7.11)
Medium Size Dummy	0.881 (-1.61)	0.949 (-0.41)	0.744** (-2.70)	0.838* (-2.07)
Large Size Dummy	1.282* (1.96)	1.249 (1.07)	1.639 (1.76)	1.267 (1.71)
Very Large Size Dummy	1.587 (1.91)	1.552 (1.16)	2.252 (1.96)	1.488 (1.50)
Proportion Under Age 22	1.531*** (3.85)	1.593** (2.65)	1.615*** (3.41)	2.058*** (3.64)
Proportion Over Age 65	1.512* (2.46)	1.110 (0.49)	1.135 (0.62)	1.419 (1.73)
Proportion Male	1.036 (0.48)	0.844 (-1.53)	0.883 (-1.20)	0.997 (-0.04)
Proportion Severe or Profound ID	1.012 (0.14)	0.926 (-0.57)	0.965 (-0.32)	1.030 (0.29)
Proportion Autistic	1.334* (2.12)	1.261 (1.23)	1.333 (1.41)	1.384 (1.92)
Proportion Cerebral Palsy	0.709** (-2.89)	0.676* (-2.48)	0.624** (-2.94)	0.783 (-1.64)
Proportion Epileptic	1.008 (0.08)	1.096 (0.83)	1.054 (0.43)	0.982 (-0.16)
Proportion Speech Impairment	0.934 (-1.14)	0.914 (-0.82)	0.888 (-1.29)	0.976 (-0.33)
Proportion Hearing Impairment	0.970 (-0.26)	0.887 (-0.79)	0.869 (-0.97)	1.028 (0.15)
Proportion Visual Impairment	0.669*** (-5.33)	0.557*** (-5.22)	0.671*** (-3.83)	0.651*** (-5.06)
Proportion Nonambulatory	1.274*** (4.69)	1.353*** (3.61)	1.225** (2.79)	1.260*** (4.04)
Proportion Medical Care Plan	1.163** (2.88)	1.011 (0.16)	1.073 (1.03)	1.155* (2.28)
p-value: For-Profit vs Nonprofit	0.159	0.0260	0.230	0.0517
p-value: For-Profit vs Government	0.493	0.00148	0.0988	0.0466
p-value: Nonprofit vs Government	0.987	0.0186	0.216	0.332
Number of Facility Years	42081	42081	42081	32883
Number of Facilities	5142	5142	5142	4930

Model: Negative Binomial. Standard errors are clustered at the ICF-IID level. *t*-statistics are given in parentheses. State fixed-effects and year fixed-effects are included in the model.

Samples Used: The "*Pruned Sample*" is constructed using the matching method of King et al. (2017) to first construct a matched sample of for-profit and nonprofit ICF-IIDs, then to match this sample with a set of Public ICF-IIDs with a similar distribution of covariates. "*Weighted Sample #1*" uses the matching method of Sävje et al. (2017) to weight observations in the Unadjusted Sample such that the weighted distribution of covariates for ICF-IIDs is similar across all three ownership groups. "*Weighted Sample #2*" is created by running the matching method of Sävje et al. (2017) on the data after it has been aggregated to the facility level. Some states are dropped to achieve model convergence, since state fixed effects are not identified for states with no positive values of the dependent variables in a probit model. The *cleaned* ownership type variable is used.

Significance Levels: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Exhibit A19: Number of reported investigations – covariate balance robustness checks

	Unadjusted Sample	Weighted Sample #1 (Facility-Years)	Weighted Sample #2 (Facilities)	Pruned Sample
Private Nonprofit Ownership	1.153** (3.05)	1.030 (0.50)	1.038 (0.69)	1.108* (2.01)
Government Ownership	2.221***	1.325*	1.398***	2.034***

	Unadjusted Sample	Weighted Sample #1	Weighted Sample #2	Pruned Sample
	(6.68)	(2.41)	(3.39)	(5.75)
log(Number of Residents)	3.081***	3.781***	3.808***	2.795***
	(11.96)	(10.28)	(10.02)	(10.12)
Medium Size Dummy	0.863*	0.815*	0.852	0.900
	(-2.19)	(-2.20)	(-1.70)	(-1.46)
Large Size Dummy	0.952	0.761	0.782	1.068
	(-0.36)	(-1.48)	(-1.29)	(0.45)
Very Large Size Dummy	1.087	0.824	0.836	1.360
	(0.27)	(-0.46)	(-0.39)	(0.91)
Proportion Under Age 22	1.469***	1.402**	1.450**	1.785***
	(4.45)	(3.19)	(3.10)	(4.08)
Proportion Over Age 65	0.674**	0.544***	0.474***	0.617***
	(-3.28)	(-3.61)	(-4.62)	(-3.40)
Proportion Male	0.956	0.964	0.962	0.892*
	(-0.90)	(-0.44)	(-0.50)	(-2.09)
Proportion Severe or Profound ID	0.626***	0.549***	0.521***	0.606***
	(-7.11)	(-5.60)	(-6.95)	(-6.73)
Proportion Autistic	0.987	1.243	1.311*	1.037
	(-0.15)	(1.65)	(2.02)	(0.32)
Proportion Cerebral Palsy	0.806*	0.822	0.800	0.856
	(-2.19)	(-1.54)	(-1.68)	(-1.26)
Proportion Epileptic	1.236**	1.202	1.220*	1.277**
	(3.08)	(1.81)	(2.10)	(3.13)
Proportion Speech Impairment	0.958	0.946	0.941	0.974
	(-0.95)	(-0.79)	(-0.86)	(-0.52)
Proportion Hearing Impairment	0.716***	0.766*	0.753*	0.688**
	(-3.78)	(-2.17)	(-2.10)	(-3.10)
Proportion Visual Impairment	0.846**	0.779**	0.831*	0.819**
	(-2.75)	(-2.98)	(-2.03)	(-2.97)
Proportion Nonambulatory	1.022	0.881*	0.898	1.032
	(0.59)	(-2.13)	(-1.68)	(0.74)
Proportion Medical Care Plan	1.136**	1.131	1.280***	1.183**
	(2.70)	(1.73)	(3.68)	(2.90)
p-value: For-Profit vs Nonprofit	0.00230	0.618	0.487	0.0446
p-value: For-Profit vs Government	2.35e-11	0.0159	0.000686	8.93e-09
p-value: Nonprofit vs Government	1.42e-09	0.0190	0.000225	2.58e-08
Number of Facility Years	42216	42216	42216	32968
Number of Facilities	5159	5159	5159	4944

Model: Negative Binomial. Standard errors are clustered at the ICF-IID level. *t*-statistics are given in parentheses. State fixed-effects and year fixed-effects are included in the model.

Samples Used: The "*Pruned Sample*" is constructed using the matching method of King et al. (2017) to first construct a matched sample of for-profit and nonprofit ICF-IIDs, then to match this sample with a set of Public ICF-IIDs with a similar distribution of covariates. "*Weighted Sample #1*" uses the matching method of Sävje et al. (2017) to weight observations in the Unadjusted Sample such that the weighted distribution of covariates for ICF-IIDs is similar across all three ownership groups. "*Weighted Sample #2*" is created by running the matching method of Sävje et al. (2017) on the data after it has been aggregated to the facility level. Some states are dropped to achieve model convergence, since state fixed effects are not identified for states with no positive values of the dependent variables in a probit model. The *cleaned* ownership type variable is used.

Significance Levels: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Exhibit A20: Direct care staff per resident – covariate balance robustness checks

	Unadjusted Sample	Weighted Sample #1 (Facility-Years)	Weighted Sample #2 (Facilities)	Pruned Sample
Private Nonprofit Ownership	-0.0161	-0.0590	-0.609	-0.0388
	(-0.22)	(-0.58)	(-1.86)	(-0.51)

	Unadjusted Sample	Weighted Sample #1	Weighted Sample #2	Pruned Sample
Government Ownership	0.106 (0.87)	-0.202 (-0.94)	-1.464[*] (-2.33)	0.129 (1.09)
Number of Residents	-0.00661[***] (-4.83)	-0.00700[***] (-3.57)	-0.0167[**] (-2.75)	-0.00604[***] (-4.43)
(Residents)^2	0.0000170[***] (5.03)	0.0000211[***] (3.70)	0.0000543[**] (2.81)	0.0000173[***] (4.38)
Proportion Under Age 22	0.491[*] (2.20)	0.488 (1.90)	1.184 (1.20)	0.245 (1.78)
Proportion Over Age 65	-0.155 (-1.11)	-0.436[*] (-2.02)	-1.328 (-1.94)	-0.368[*] (-2.03)
Proportion Male	0.0230 (0.29)	0.0915 (0.75)	0.182 (0.53)	0.0455 (0.59)
Proportion Severe or Profound ID	0.143 (1.44)	0.216 (1.41)	0.465 (1.00)	0.0786 (1.00)
Proportion Autistic	0.0604 (0.38)	0.0810 (0.24)	-0.624 (-0.74)	-0.132 (-0.75)
Proportion Cerebral Palsy	0.187 (1.09)	0.0307 (0.12)	-0.263 (-0.30)	-0.0672 (-0.42)
Proportion Epileptic	-0.197 (-1.31)	-0.246 (-0.99)	-0.653 (-0.86)	-0.173 (-1.02)
Proportion Speech Impairment	0.0199 (0.26)	-0.0529 (-0.43)	-0.144 (-0.43)	0.161[**] (2.67)
Proportion Hearing Impairment	-0.0209 (-0.17)	0.0162 (0.12)	-0.346 (-0.72)	-0.210 (-1.54)
Proportion Visual Impairment	-0.127 (-1.40)	-0.411[**] (-2.83)	-0.359 (-0.74)	-0.175 (-1.85)
Proportion Nonambulatory	0.180[**] (2.81)	0.250[**] (2.65)	0.802[*] (2.19)	0.219[***] (3.39)
Proportion Medical Care Plan	0.0874 (1.25)	0.0472 (0.63)	-0.0953 (-0.45)	0.0338 (0.41)
p-value: For-Profit vs Nonprofit	0.825	0.564	0.0625	0.607
p-value: For-Profit vs Government	0.387	0.350	0.0200	0.276
p-value: Nonprofit vs Government	0.189	0.338	0.0103	0.0403
Number of Facility Years	42224	42224	42224	32974
Number of Facilities	5160	5160	5160	4945

Model: OLS. Standard errors are clustered at the ICF-IID level. *t*-statistics are given in parentheses. State fixed-effects and year fixed-effects are included in the model.
Samples Used: The "*Pruned Sample*" is constructed using the matching method of King et al. (2017) to first construct a matched sample of for-profit and nonprofit ICF-IIDs, then to match this sample with a set of Public ICF-IIDs with a similar distribution of covariates. "*Weighted Sample #1*" uses the matching method of Sävje et al. (2017) to weight observations in the Unadjusted Sample such that the weighted distribution of covariates for ICF-IIDs is similar across all three ownership groups. "*Weighted Sample #2*" is created by running the matching method of Sävje et al. (2017) on the data after it has been aggregated to the facility level. Some states are dropped to achieve model convergence, since state fixed effects are not identified for states with no positive values of the dependent variables in a probit model. The *cleaned* ownership type variable is used.
Significance Levels: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Exhibit A21: Registered nurses per resident - − covariate balance robustness checks

	Unadjusted Sample	Weighted Sample #1 (Facility-Years)	Weighted Sample #2 (Facilities)	Pruned Sample
Private Nonprofit Ownership	0.00203	0.00219	0.0141	0.00325

	Unadjusted Sample	Weighted Sample #1	Weighted Sample #2	Pruned Sample
	(0.50)	(0.39)	(1.24)	(0.91)
Government Ownership	0.0336**	0.0237	0.0453	0.0421***
	(3.18)	(1.58)	(1.10)	(4.27)
Number of Residents	-0.000288**	-0.000238	-0.000560***	-0.000328***
	(-3.05)	(-1.95)	(-3.47)	(-3.34)
(Residents)^2	0.000000604**	0.000000649*	0.00000140**	0.000000897***
	(2.71)	(1.99)	(3.04)	(3.71)
Proportion Under Age 22	0.0480***	0.0448	0.0136	0.0101
	(3.67)	(1.94)	(0.66)	(1.30)
Proportion Over Age 65	-0.00889	-0.0231	-0.0250	-0.0238*
	(-0.85)	(-1.16)	(-0.93)	(-2.38)
Proportion Male	0.00403	0.0300*	0.0294	0.000893
	(1.01)	(2.17)	(1.44)	(0.23)
Proportion Severe or Profound ID	0.00820	-0.0161	0.0374	0.00142
	(1.30)	(-0.97)	(1.46)	(0.28)
Proportion Autistic	-0.0206*	-0.0369	-0.0130	-0.0187*
	(-1.99)	(-1.51)	(-0.32)	(-2.23)
Proportion Cerebral Palsy	0.00681	0.00894	-0.0147	0.0116
	(0.87)	(0.70)	(-0.45)	(1.47)
Proportion Epileptic	0.00529	-0.000774	-0.00661	0.0129
	(0.73)	(-0.05)	(-0.28)	(1.83)
Proportion Speech Impairment	-0.00158	-0.00195	-0.0160	0.00149
	(-0.35)	(-0.17)	(-1.37)	(0.42)
Proportion Hearing Impairment	-0.00506	-0.0314	-0.0337	-0.0230*
	(-0.64)	(-1.57)	(-1.04)	(-2.57)
Proportion Visual Impairment	0.0157*	0.00125	-0.0107	0.00288
	(2.22)	(0.08)	(-0.64)	(0.61)
Proportion Nonambulatory	0.0161***	0.00903	0.0404*	0.0133***
	(3.78)	(0.95)	(2.56)	(3.54)
Proportion Medical Care Plan	0.0309***	0.0218*	0.0184	0.0235***
	(5.60)	(2.31)	(1.42)	(4.68)
p-value: For-Profit vs Nonprofit	0.615	0.697	0.217	0.362
p-value: For-Profit vs Government	0.00149	0.115	0.271	0.0000201
p-value: Nonprofit vs Government	0.000989	0.0914	0.326	0.0000288
Number of Facility Years	42224	42224	42224	32974
Number of Facilities	5160	5160	5160	4945

Model: OLS. Standard errors are clustered at the ICF-IID level. *t*-statistics are given in parentheses. State fixed-effects and year fixed-effects are included in the model.
Samples Used: The "*Pruned Sample*" is constructed using the matching method of King et al. (2017) to first construct a matched sample of for-profit and nonprofit ICF-IIDs, then to match this sample with a set of Public ICF-IIDs with a similar distribution of covariates. "*Weighted Sample #1*" uses the matching method of Sävje et al. (2017) to weight observations in the Unadjusted Sample such that the weighted distribution of covariates for ICF-IIDs is similar across all three ownership groups. "*Weighted Sample #2*" is created by running the matching method of Sävje et al. (2017) on the data after it has been aggregated to the facility level. Some states are dropped to achieve model convergence, since state fixed effects are not identified for states with no positive values of the dependent variables in a probit model. The *cleaned* ownership type variable is used.
Significance Levels: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Exhibit A22: Drugs to control behavior – covariate balance robustness checks

	Unadjusted Sample	Weighted Sample #1 (Facility-Years)	Weighted Sample #2 (Facilities)	Pruned Sample

	Unadjusted Sample	Weighted Sample #1 (Facility-Years)	Weighted Sample #2 (Facilities)	Pruned Sample
Private Nonprofit Ownership	0.105** (2.86)	0.0596 (1.24)	0.0370 (0.79)	0.101* (2.48)
Government Ownership	-0.0500 (-0.61)	-0.0777 (-0.67)	0.0265 (0.21)	0.00386 (0.04)
Number of Residents	0.00595*** (3.61)	0.00429* (2.29)	0.00613*** (3.59)	0.00486** (2.59)
(Residents)^2	-0.00000627 (-1.48)	-0.00000419 (-0.89)	-0.0000128** (-3.20)	-0.00000259 (-0.42)
Proportion Under Age 22	-0.554*** (-7.19)	-0.513*** (-4.59)	-0.411*** (-3.60)	-0.104 (-0.76)
Proportion Over Age 65	0.138 (1.42)	0.203 (1.12)	0.127 (0.54)	0.280* (2.20)
Proportion Male	-0.0172 (-0.43)	-0.0626 (-0.90)	-0.0306 (-0.42)	-0.0481 (-1.08)
Proportion Severe or Profound ID	-0.219*** (-4.25)	-0.0852 (-0.94)	-0.114 (-1.20)	-0.187** (-3.10)
Proportion Autistic	0.565*** (6.48)	0.526** (2.90)	0.273 (1.44)	0.497*** (4.30)
Proportion Cerebral Palsy	-0.552*** (-8.23)	-0.547*** (-5.00)	-0.633*** (-6.15)	-0.529*** (-6.59)
Proportion Epileptic	0.121* (2.08)	-0.0576 (-0.54)	-0.0834 (-0.84)	0.102 (1.44)
Proportion Speech Impairment	-0.0419 (-1.17)	-0.0689 (-1.10)	-0.0338 (-0.45)	-0.0476 (-1.12)
Proportion Hearing Impairment	0.0778 (1.04)	0.174 (1.51)	-0.0214 (-0.16)	0.348** (3.14)
Proportion Visual Impairment	0.127** (2.67)	0.378*** (4.21)	0.332*** (3.86)	0.119* (2.12)
Proportion Nonambulatory	-0.293*** (-9.40)	-0.325*** (-4.90)	-0.346*** (-4.23)	-0.274*** (-7.65)
Proportion Medical Care Plan	0.167*** (4.65)	0.165* (2.33)	0.216*** (4.04)	0.173*** (4.03)
p-value: For-Profit vs Nonprofit	0.00429	0.214	0.429	0.0131
p-value: For-Profit vs Government	0.544	0.502	0.833	0.965
p-value: Nonprofit vs Government	0.0496	0.176	0.928	0.244
Number of Facility Years	42094	42094	42094	32853
Number of Facilities	5144	5144	5144	4929

Model: Coefficient estimates from Probit model. Standard errors are clustered at the ICF-IID level. *t*-statistics are given in parentheses. State fixed-effects and year fixed-effects are included in the model.
Samples Used: The "*Pruned Sample*" is constructed using the matching method of King et al. (2017) to first construct a matched sample of for-profit and nonprofit ICF-IIDs, then to match this sample with a set of Public ICF-IIDs with a similar distribution of covariates. "*Weighted Sample #1*" uses the matching method of Sävje et al. (2017) to weight observations in the Unadjusted Sample such that the weighted distribution of covariates for ICF-IIDs is similar across all three ownership groups. "*Weighted Sample #2*" is created by running the matching method of Sävje et al. (2017) on the data after it has been aggregated to the facility level. Some states are dropped to achieve model convergence, since state fixed effects are not identified for states with no positive values of the dependent variables in a probit model. The *cleaned* ownership type variable is used.
Significance Levels: $^{*} p < 0.05$, $^{**} p < 0.01$, $^{***} p < 0.001$.

Exhibit A23: Average marginal effects - drugs to control behavior – covariate balance robustness checks

	Unadjusted Sample	Weighted Sample #1 (Facility-Years)	Weighted Sample #2 (Facilities)	Pruned Sample

	Unadjusted Sample	Weighted Sample #1 (Facility-Years)	Weighted Sample #2 (Facilities)	Pruned Sample
Private Nonprofit Ownership	0.0212** (2.85)	0.0120 (1.25)	0.00758 (0.79)	0.0195* (2.48)
Government Ownership	-0.0100 (-0.61)	-0.0156 (-0.66)	0.00544 (0.21)	0.000747 (0.04)
Number of Residents	0.00120*** (3.63)	0.000864* (2.29)	0.00126*** (3.56)	0.000940** (2.60)
(Residents)^2	-0.00000126 (-1.48)	-0.000000843 (-0.89)	-0.00000263** (-3.18)	-0.000000500 (-0.42)
Proportion Under Age 22	-0.111*** (-7.20)	-0.103*** (-4.70)	-0.0841*** (-3.68)	-0.0200 (-0.76)
Proportion Over Age 65	0.0278 (1.42)	0.0409 (1.12)	0.0259 (0.54)	0.0541* (2.20)
Proportion Male	-0.00345 (-0.43)	-0.0126 (-0.90)	-0.00628 (-0.42)	-0.00929 (-1.08)
Proportion Severe or Profound ID	-0.0440*** (-4.24)	-0.0171 (-0.94)	-0.0234 (-1.22)	-0.0361** (-3.09)
Proportion Autistic	0.113*** (6.45)	0.106** (2.97)	0.0559 (1.46)	0.0960*** (4.30)
Proportion Cerebral Palsy	-0.111*** (-8.17)	-0.110*** (-4.92)	-0.130*** (-5.92)	-0.102*** (-6.55)
Proportion Epileptic	0.0243* (2.08)	-0.0116 (-0.54)	-0.0171 (-0.84)	0.0197 (1.44)
Proportion Speech Impairment	-0.00841 (-1.17)	-0.0139 (-1.10)	-0.00692 (-0.45)	-0.00919 (-1.11)
Proportion Hearing Impairment	0.0156 (1.04)	0.0349 (1.52)	-0.00438 (-0.16)	0.0673** (3.13)
Proportion Visual Impairment	0.0255** (2.68)	0.0761*** (4.09)	0.0679*** (3.70)	0.0231* (2.12)
Proportion Nonambulatory	-0.0588*** (-9.39)	-0.0654*** (-4.91)	-0.0709*** (-4.42)	-0.0529*** (-7.67)
Proportion Medical Care Plan	0.0334*** (4.65)	0.0331* (2.34)	0.0442*** (4.01)	0.0334*** (4.02)
Number of Facility Years	42094	42094	42094	32853

Model: Average marginal effects from probit models are presented, and these values are calculated by these values are calculated by identifying the marginal effect of each variable for every observation and then averaging across all observations. *t*-statistics are given in parentheses. State fixed-effects and year fixed-effects are included in the model.

Samples Used: The "*Pruned Sample*" is constructed using the matching method of King et al. (2017) to first construct a matched sample of for-profit and nonprofit ICF-IIDs, then to match this sample with a set of Public ICF-IIDs with a similar distribution of covariates. "*Weighted Sample #1*" uses the matching method of Sävje et al. (2017) to weight observations in the Unadjusted Sample such that the weighted distribution of covariates for ICF-IIDs is similar across all three ownership groups. "*Weighted Sample #2*" is created by running the matching method of Sävje et al. (2017) on the data after it has been aggregated to the facility level. Some states are dropped to achieve model convergence, since state fixed effects are not identified for states with no positive values of the dependent variables in a probit model. The *cleaned* ownership type variable is used.

Significance Levels: $^* p < 0.05$, $^{**} p < 0.01$, $^{***} p < 0.001$.

Exhibit A24: Physical restraint – covariate balance robustness checks

	Unadjusted Sample	Weighted Sample #1 (Facility-Years)	Weighted Sample #2 (Facilities)	Pruned Sample
Private Nonprofit Ownership	0.206*** (4.83)	0.142** (2.67)	0.114* (2.10)	0.195*** (4.17)

	Pruned Sample	Weighted Sample #1	Weighted Sample #2	
Government Ownership	0.494***	0.335***	0.437***	0.479***
	(5.90)	(3.34)	(3.96)	(5.64)
Number of Residents	0.0147***	0.0184***	0.0170***	0.0156***
	(10.72)	(10.32)	(9.15)	(9.87)
(Residents)^2	-0.0000215***	-0.0000305***	-0.0000300***	-0.0000262***
	(-6.88)	(-7.09)	(-6.34)	(-6.50)
Proportion Under Age 22	0.158*	0.0857	0.186	0.166
	(2.07)	(0.73)	(1.70)	(1.31)
Proportion Over Age 65	-0.502***	-0.950***	-0.885***	-0.591***
	(-4.61)	(-3.66)	(-3.63)	(-4.25)
Proportion Male	0.124*	-0.122	-0.133	0.123*
	(2.48)	(-0.89)	(-0.97)	(2.19)
Proportion Severe or Profound ID	-0.0883	-0.114	-0.0457	-0.0997
	(-1.48)	(-0.95)	(-0.35)	(-1.40)
Proportion Autistic	0.502***	0.544***	0.595***	0.576***
	(5.99)	(3.75)	(3.99)	(5.25)
Proportion Cerebral Palsy	0.0382	-0.0412	-0.136	0.0627
	(0.50)	(-0.24)	(-0.84)	(0.70)
Proportion Epileptic	0.196**	0.139	0.173	0.248**
	(3.01)	(1.07)	(1.27)	(3.19)
Proportion Speech Impairment	-0.0486	-0.0133	-0.0482	-0.0417
	(-1.22)	(-0.16)	(-0.62)	(-0.89)
Proportion Hearing Impairment	0.153	0.160	0.267	0.278*
	(1.91)	(1.00)	(1.44)	(2.41)
Proportion Visual Impairment	-0.00559	0.299**	0.289**	-0.0111
	(-0.10)	(2.94)	(2.74)	(-0.17)
Proportion Nonambulatory	-0.0911**	-0.122	-0.177**	-0.123**
	(-2.74)	(-1.68)	(-2.65)	(-3.22)
Proportion Medical Care Plan	0.247***	0.172*	0.238**	0.244***
	(6.64)	(2.33)	(3.13)	(5.36)
p-value: For-Profit vs Nonprofit	0.00000135	0.00748	0.0356	0.0000310
p-value: For-Profit vs Government	3.54e-09	0.000839	0.0000753	1.74e-08
p-value: Nonprofit vs Government	0.000287	0.0435	0.00225	0.000381
Number of Facility Years	42167	42167	42167	32933
Number of Facilities	5153	5153	5153	4939

Model: Coefficient estimates from Probit model. Standard errors are clustered at the ICF-IID level. t-statistics are given in parentheses. State fixed-effects and year fixed-effects are included in the model.

Samples Used: The "*Pruned Sample*" is constructed using the matching method of King et al. (2017) to first construct a matched sample of for-profit and nonprofit ICF-IIDs, then to match this sample with a set of Public ICF-IIDs with a similar distribution of covariates. "*Weighted Sample #1*" uses the matching method of Sävje et al. (2017) to weight observations in the Unadjusted Sample such that the weighted distribution of covariates for ICF-IIDs is similar across all three ownership groups. "*Weighted Sample #2*" is created by running the matching method of Sävje et al. (2017) on the data after it has been aggregated to the facility level. Some states are dropped to achieve model convergence, since state fixed effects are not identified for states with no positive values of the dependent variables in a probit model. The *cleaned* ownership type variable is used.

Significance Levels: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Exhibit A25: Average marginal effects – physical restraint – covariate balance robustness checks

	Unadjusted Sample	Weighted Sample #1 (Facility-Years)	Weighted Sample #2 (Facilities)	Pruned Sample
Private Nonprofit Ownership	0.0403*** (4.82)	0.0294** (2.69)	0.0237* (2.12)	0.0372*** (4.16)
Government Ownership	0.0968*** (5.94)	0.0695** (3.27)	0.0907*** (3.87)	0.0915*** (5.67)
Number of Residents	0.00288*** (10.94)	0.00381*** (10.58)	0.00353*** (9.40)	0.00298*** (10.05)
(Residents)^2	-0.00000421*** (-6.93)	-0.00000633*** (-7.16)	-0.00000622*** (-6.41)	-0.00000500*** (-6.54)
Proportion Under Age 22	0.0310* (2.06)	0.0178 (0.73)	0.0386 (1.71)	0.0318 (1.31)
Proportion Over Age 65	-0.0983*** (-4.61)	-0.197*** (-3.63)	-0.184*** (-3.61)	-0.113*** (-4.25)
Proportion Male	0.0243* (2.47)	-0.0253 (-0.89)	-0.0275 (-0.97)	0.0235* (2.18)
Proportion Severe or Profound ID	-0.0173 (-1.48)	-0.0237 (-0.95)	-0.00949 (-0.35)	-0.0191 (-1.40)
Proportion Autistic	0.0983*** (6.01)	0.113*** (3.75)	0.124*** (3.99)	0.110*** (5.29)
Proportion Cerebral Palsy	0.00749 (0.50)	-0.00854 (-0.24)	-0.0282 (-0.84)	0.0120 (0.70)
Proportion Epileptic	0.0384** (3.01)	0.0288 (1.07)	0.0359 (1.27)	0.0473** (3.19)
Proportion Speech Impairment	-0.00952 (-1.22)	-0.00275 (-0.16)	-0.0100 (-0.62)	-0.00797 (-0.89)
Proportion Hearing Impairment	0.0299 (1.91)	0.0333 (1.00)	0.0555 (1.45)	0.0532* (2.42)
Proportion Visual Impairment	-0.00109 (-0.10)	0.0620** (2.91)	0.0601** (2.73)	-0.00213 (-0.17)
Proportion Nonambulatory	-0.0178** (-2.73)	-0.0253 (-1.68)	-0.0368** (-2.65)	-0.0235** (-3.21)
Proportion Medical Care Plan	0.0485*** (6.63)	0.0357* (2.33)	0.0495** (3.14)	0.0465*** (5.36)
Number of Facility Years	42167	42167	42167	32933

Model: Average marginal effects from probit models are presented, and these values are calculated by these values are calculated by identifying the marginal effect of each variable for every observation and then averaging across all observations. Standard errors are clustered at the ICF-IID level. *t*-statistics are given in parentheses. State fixed-effects and year fixed-effects are included in the model.

Samples Used: The "*Pruned Sample*" is constructed using the matching method of King et al. (2017) to first construct a matched sample of for-profit and nonprofit ICF-IIDs, then to match this sample with a set of Public ICF-IIDs with a similar distribution of covariates. "*Weighted Sample #1*" uses the matching method of Sävje et al. (2017) to weight observations in the Unadjusted Sample such that the weighted distribution of covariates for ICF-IIDs is similar across all three ownership groups. "*Weighted Sample #2*" is created by running the matching method of Sävje et al. (2017) on the data after it has been aggregated to the facility level. Some states are dropped to achieve model convergence, since state fixed effects are not identified for states with no positive values of the dependent variables in a probit model. The *cleaned* ownership type variable is used.

Significance Levels: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Exhibit A26: Time-out rooms – covariate balance robustness checks

	Unadjusted Sample	Weighted Sample #1 (Facility-Years)	Weighted Sample #2 (Facilities)	Pruned Sample
Private Nonprofit Ownership	0.416***	0.374*	0.449**	0.385**
	(3.56)	(2.52)	(3.20)	(2.95)
Government Ownership	0.312	0.0181	0.240	0.255
	(1.36)	(0.09)	(1.26)	(1.07)
Number of Residents	0.0138***	0.0165***	0.0162***	0.0135***
	(6.69)	(6.50)	(6.42)	(5.53)
(Residents)^2	-0.0000201***	-0.0000272***	-0.0000269***	-0.0000193**
	(-4.27)	(-3.83)	(-3.93)	(-3.11)
Proportion Under Age 22	-0.0375	0.0221	0.0470	-0.0472
	(-0.23)	(0.12)	(0.27)	(-0.19)
Proportion Over Age 65	-0.753**	-0.780*	-0.238	-0.682
	(-2.84)	(-2.28)	(-0.68)	(-1.93)
Proportion Male	0.109	0.151	0.121	0.0952
	(0.98)	(1.27)	(1.06)	(0.75)
Proportion Severe or Profound ID	-0.223	-0.223	-0.245	-0.162
	(-1.51)	(-1.44)	(-1.61)	(-0.89)
Proportion Autistic	0.519**	0.327	0.382*	0.570*
	(3.04)	(1.75)	(2.12)	(2.50)
Proportion Cerebral Palsy	-0.230	-0.248	-0.223	-0.122
	(-1.30)	(-1.28)	(-1.15)	(-0.59)
Proportion Epileptic	-0.211	-0.324	-0.339	-0.315
	(-1.47)	(-1.55)	(-1.70)	(-1.92)
Proportion Speech Impairment	-0.187*	-0.0570	-0.176	-0.159
	(-2.17)	(-0.56)	(-1.94)	(-1.54)
Proportion Hearing Impairment	0.0586	0.313	0.173	0.352
	(0.28)	(1.29)	(0.74)	(1.27)
Proportion Visual Impairment	-0.0755	-0.362	-0.322	-0.199
	(-0.52)	(-1.85)	(-1.76)	(-1.10)
Proportion Nonambulatory	-0.00744	-0.128	-0.0638	-0.00367
	(-0.10)	(-1.45)	(-0.74)	(-0.04)
Proportion Medical Care Plan	0.0458	0.0962	0.00769	0.0734
	(0.54)	(1.15)	(0.09)	(0.67)
p-value: For-Profit vs Nonprofit	0.000370	0.0118	0.00137	0.00321
p-value: For-Profit vs Government	0.173	0.930	0.209	0.284
p-value: Nonprofit vs Government	0.612	0.0293	0.171	0.541
Number of Facility Years	39606	39606	39606	30531
Number of Facilities	4842	4842	4842	4599

Model: Coefficient estimates from Probit model. Standard errors are clustered at the ICF-IID level. *t*-statistics are given in parentheses. State fixed-effects and year fixed-effects are included in the model.

Samples Used: The "*Pruned Sample*" is constructed using the matching method of King et al. (2017) to first construct a matched sample of for-profit and nonprofit ICF-IIDs, then to match this sample with a set of Public ICF-IIDs with a similar distribution of covariates. "*Weighted Sample #1*" uses the matching method of Sävje et al. (2017) to weight observations in the Unadjusted Sample such that the weighted distribution of covariates for ICF-IIDs is similar across all three ownership groups. "*Weighted Sample #2*" is created by running the matching method of Sävje et al. (2017) on the data after it has been aggregated to the facility level. Some states are dropped to achieve model convergence, since state fixed effects are not identified for states with no positive values of the dependent variables in a probit model. The *cleaned* ownership type variable is used.

Significance Levels: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Exhibit A27: Average marginal effects - time out room – covariate balance robustness checks

|	Unadjusted Sample	Weighted Sample #1 (Facility-Years)	Weighted Sample #2 (Facilities)	Pruned Sample
Private Nonprofit Ownership	0.0135*** (3.38)	0.00958* (2.54)	0.0102** (3.18)	0.0117** (2.82)
Government Ownership	0.0101 (1.36)	0.000463 (0.09)	0.00544 (1.24)	0.00773 (1.07)
Number of Residents	0.000448*** (5.95)	0.000423*** (5.43)	0.000367*** (5.74)	0.000410*** (4.84)
(Residents)^2	-0.000000650*** (-3.99)	-0.000000695*** (-3.46)	-0.000000610*** (-3.69)	-0.000000584** (-2.91)
Proportion Under Age 22	-0.00121 (-0.23)	0.000565 (0.12)	0.00107 (0.27)	-0.00143 (-0.19)
Proportion Over Age 65	-0.0244** (-2.77)	-0.0200* (-2.17)	-0.00539 (-0.68)	-0.0207 (-1.89)
Proportion Male	0.00352 (0.97)	0.00388 (1.24)	0.00274 (1.05)	0.00289 (0.75)
Proportion Severe or Profound ID	-0.00723 (-1.50)	-0.00571 (-1.46)	-0.00557 (-1.60)	-0.00491 (-0.89)
Proportion Autistic	0.0168** (2.91)	0.00838 (1.77)	0.00866* (2.11)	0.0173* (2.43)
Proportion Cerebral Palsy	-0.00744 (-1.31)	-0.00635 (-1.25)	-0.00505 (-1.14)	-0.00371 (-0.59)
Proportion Epileptic	-0.00684 (-1.46)	-0.00829 (-1.58)	-0.00768 (-1.73)	-0.00953 (-1.90)
Proportion Speech Impairment	-0.00605* (-2.18)	-0.00146 (-0.57)	-0.00399* (-1.97)	-0.00482 (-1.55)
Proportion Hearing Impairment	0.00190 (0.28)	0.00801 (1.23)	0.00393 (0.73)	0.0107 (1.27)
Proportion Visual Impairment	-0.00244 (-0.52)	-0.00927 (-1.75)	-0.00730 (-1.69)	-0.00604 (-1.10)
Proportion Nonambulatory	-0.000241 (-0.10)	-0.00328 (-1.43)	-0.00145 (-0.74)	-0.000111 (-0.04)
Proportion Medical Care Plan	0.00148 (0.54)	0.00246 (1.17)	0.000174 (0.09)	0.00222 (0.67)
Number of Facility Years	39606	39606	39606	30531

Model: Average marginal effects from probit models are presented, and these values are calculated by these values are calculated by identifying the marginal effect of each variable for every observation and then averaging across all observations. Standard errors are clustered at the ICF-IID level. *t*-statistics are given in parentheses. State fixed-effects and year fixed-effects are included in the model.
Samples Used: The "*Pruned Sample*" is constructed using the matching method of King et al. (2017) to first construct a matched sample of for-profit and nonprofit ICF-IIDs, then to match this sample with a set of Public ICF-IIDs with a similar distribution of covariates. "*Weighted Sample #1*" uses the matching method of Sävje et al. (2017) to weight observations in the Unadjusted Sample such that the weighted distribution of covariates for ICF-IIDs is similar across all three ownership groups. "*Weighted Sample #2*" is created by running the matching method of Sävje et al. (2017) on the data after it has been aggregated to the facility level. Some states are dropped to achieve model convergence, since state fixed effects are not identified for states with no positive values of the dependent variables in a probit model. The *cleaned* ownership type variable is used.
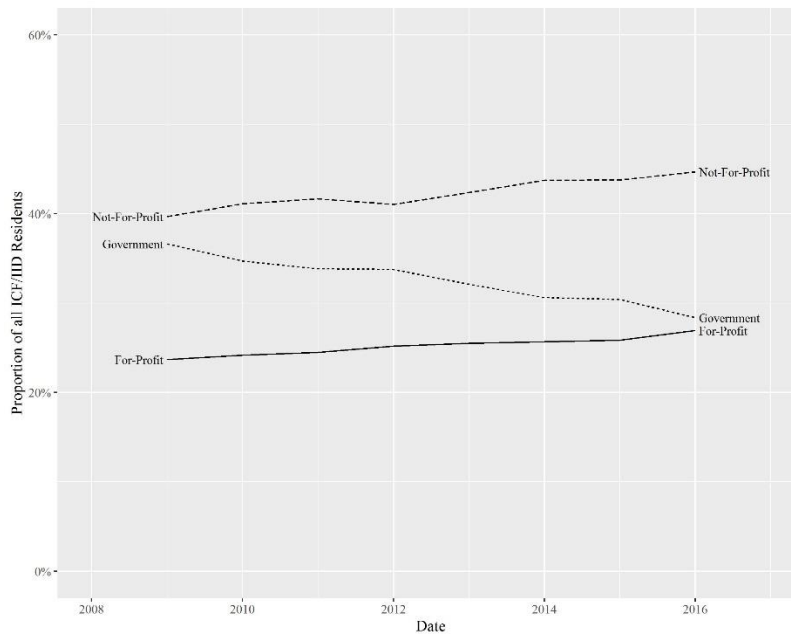**Significance Levels:** * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

VI.   Trends in Proportion of ICF-IID Residents Living in Each Facility Type

Exhibit A28: Trends in proportion of ICF-IID residents by facility type using uncleaned sample (2009–2016)
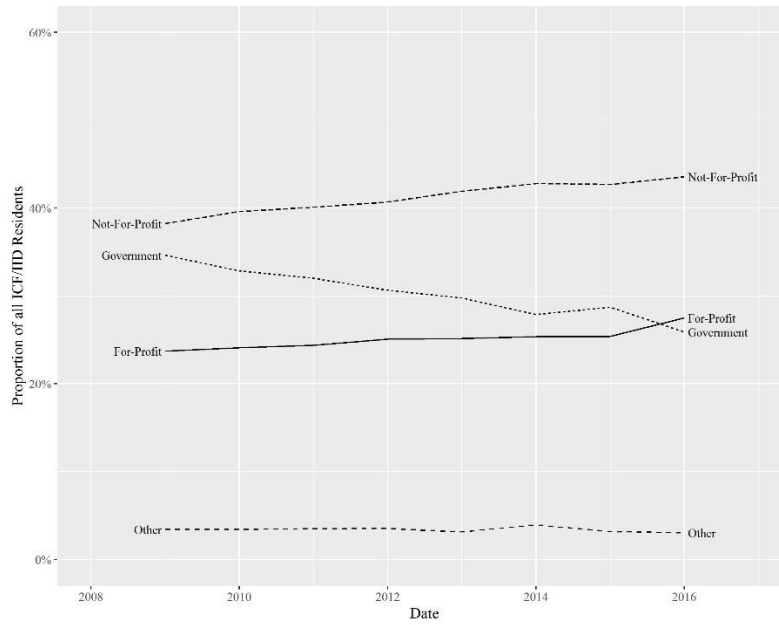
Exhibit A29: Trends in proportion of ICF-IID residents in each facility type using cleaned sample (2009–2016).

Note: Exhibit A29, highlighted above, is identical to Exhibit 1 in the main paper.

VII. Appendix References

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