Technical Report: Nursing Home Value-Based Reimbursement and Quality Literature Review

Study of the Minnesota Nursing Home Nursing Home Value-Based Reimbursement System

Prepared for
Minnesota Department of Human Services

Prepared by:
Kathleen Abrahamson, PhD RN
School of Nursing
Purdue University

June 30, 2020

Abstract

A search of the academic literature was completed to capture recent evidence surrounding factors that influence quality measurement and the dimensions in the relationship between value base purchasing (VBP) and quality. Thirty-six research articles were identified and described in this report. Evidence fell into 3 broad categories: nursing home quality, reimbursement and costs; influence of VBP on care quality and outcomes; and the nursing home report card and MDS quality measures. Search results are presented in the form of synthesized key findings, a summary of study findings organized by theme, and a table to provide an overview of individual studies.

Introduction

This report describes a search and review of academic literature that was completed to identify and summarize recent research regarding the relationships between value based purchasing (VBP) reimbursement policy, quality measurement, facility spending decisions, and care quality outcomes within nursing homes. The search addressed the following questions:

1) What factors influence quality measurement in nursing homes (NHs)?
2) What is the influence of VBP programs on care quality outcomes?

Search Methods

A search of the PubMed database was completed using the search terms “nursing home” (MeSH for Skilled Nursing Facility (SNF)) AND quality AND measurement, resulting in 753 research articles. The search was limited to research published within the past 5 years in order to highlight recent additions to the literature, and included only publications from within peer-reviewed journals. Research was excluded from this summary if it addressed quality measurement in a setting apart from nursing homes/ SNFs; did not directly address factors that influence quality outcomes; or did not address the relationship between resources and quality. Abstracts were reviewed and 21 applicable papers were obtained. An additional 15 articles were identified through an ancestry search of the reference list of identified articles. Articles identified through the ancestry search were allowed to go beyond the 5 year date limit in an effort to capture frequently cited and pivotal works in this area. A total of 36 primary research articles from peer reviewed journals contributed to this summary. Unsurprisingly, there was wide variation in identified studies given the broad nature of the search and minimal exclusion criteria.

Search Results

Identified studies ranged in publication date from 1998-2019, and came from a wide variety of high quality nursing, gerontology, medical, economics and health services journals. Studies were most commonly retrospective analyses of large government databases such as the MDS, OSCAR, Medicare Claims Data, and the Area Resource File, with the exception of 4 surveys, 3 commentaries, 3 interview based studies, 1 systematic review and 1 mixed methods study combining secondary data analysis with observations of care.

Key takeaways from the synthesized findings:

1. NH quality, reimbursement, and costs

- Increased reimbursement does not necessarily correlate with improvements in quality.
- Financial constraints are not clearly predictive of the inability to deliver quality care, and processes unmeasured by quality indicators (QI) such as leadership stability and team approaches to care may play a larger role in quality than spending.
- The relationship between costs and quality is variable and often inverse. High cost were sometimes correlated with high quality, but often low costs were correlated with high quality. High costs were often correlated with low quality, highlighting the costs of managing the outcomes of poor quality care such as falls and pressure ulcers.
- The relationship between costs and quality varies by facility characteristics such as size and staffing, and the strategies which allow some facilities to provide quality care at a low cost are understudied given the prevalence of secondary data analyses in this literature.
- RN staffing and nursing case mix that favors licensed nurses is expensive and increases costs, but may be essential to improve quality.
- The relationship between structure, processes and outcome measures is likely not as strong as the current quality measurement system assumes, and various QI's are impacted differently by reimbursement changes. Generally studies supported spending on staffing and process measures.

2. Influence of Value Based Purchasing programs on care quality outcomes

- Providers respond variably to VBP incentives, and transparency/clarity regarding quality measurement is necessary to improve provider decision making.

- Perverse incentives exist in the system that may de-incentivize top facilities from improving quality.
- A single VBP threshold and weighting system for a state is possibly less effective than a more individualized, consultant style system that rewards facilities for addressing particular areas of quality concern.
- Overall, VBP systems improve quality in a less dramatic fashion than was anticipated when the programs began.

3. NH report card and MDS quality measures

- Clarity, simplicity and transparency regarding quality measurement is needed to increase resident and family engagement with the report card for decision making.
- There is evidence that consumer driven weighting and individualized composite measures are feasible and valid approaches to measuring quality.
- Public reporting of quality may result in disparities of nursing home self-selection. Those with high resources tend to cluster in facilities with high quality.
- Despite some concerns about accuracy of self-report measures, current MDS measures are generally well correlated with outcomes, stable and sensitive. However, some measures are considerably better at differentiating between high and low quality facilities than others, and QIs can perhaps be grouped into composite measures for simplification.

Summary of study findings:

1. NH quality, reimbursement, and costs (5 secondary analyses of state data; 2 secondary analyses of Veterans' Administration (VA) data; 1 secondary analysis of Swiss data; 5 secondary data analyses of national MDS data; 1 mixed methods study)

Burgess et al. (2018) found the relationship between quality and costs within VA nursing homes varied by size and structure of the facility. Small facilities that improved clinical quality indicators had higher costs, while large facilities that improved had lower costs. No relationship was noted between costs and measures of resident centered care. Carey et al (2018) found that within VA nursing homes higher quality predicted higher costs, and lower quality predicted lower costs. The study contradicts others that found poor care outcomes such as falls, pressure ulcers and other inefficiencies led to higher costs. A study from within Swiss nursing homes found poor QI performance, specifically on pain and wt. loss, was related to higher costs, contributing to the evidence for an inverse relationship between

costs and quality (DiGeorgio et al., 2016). Examining data from Missouri nursing homes, Hicks et al. (2004) found resident days accounted for the most variation in cost, indicating that provision of basic care, regardless of quality, impacts cost. Declining ADL's and pressure ulcers accelerated costs, demonstrating an inverse relationship similar to other studies. Mukamel and Spector (2000), examining trends in New York state data, noted a U-shaped relationship between quality and costs, with some high quality facilities having very low costs. Using Missouri data, Rantz et al. (2004) noted higher costs in low quality facilities. Weech-Maldonado et al. (2006) found the relationship between cost and quality was not linear and differed based upon the quality outcome examined.

In many identified studies staffing appeared to be a relevant factor in the relationships between quality, reimbursement and costs. In an examination of 494 Texas nursing homes, Anderson et al. (1998) found no significant differences in spending allocation patterns between facilities with the best/ worst average outcomes. However, facilities with the highest improvement in resident outcomes had the highest costs and highest level of RN staffing. A more recent study in Ohio (Bowblis & Applebaum, 2017) found changes in state Medicaid reimbursement resulted in corresponding staffing changes, although quality indicators were not significantly affected. Authors proposed that something unmeasured at the micro level was perhaps occurring that drove the decision to spend on staffing despite the challenge of moving quantitative measures. A retrospective panel study of California nursing homes demonstrated mixed results in regards to costs, quality and staffing. Dulal (2017) found costs were inversely related to quality (lower costs, higher QI's), unrelated to inspection data, and higher staffing was related to cost inefficiency as defined by the study. Higher quality nursing homes had low costs, primarily due to fewer poor outcomes. Staffing was related to higher costs but not necessarily higher quality. Similarly, Grabowski (2001) found that among a national sample of nursing homes higher Medicaid reimbursement was related to increased nurse staffing but not an increase in quality. In a subsequent study, Grabowski et al. (2004) found higher reimbursement to be related to higher quality, although authors noted that the mechanism for the relationship was unclear. Weech-Maldonado et al. (2019), examining a national sample, found that higher RN staffing was related to high quality but lower financial performance, concluding that RN staffing may be needed, but at a cost.

2. Influence of Value Based Purchasing programs on care quality outcomes (1 survey of administrators; 1 retrospective analysis of CMS data; 2 retrospective analysis of multiple government sources)

In a multi-state of evaluation of the impact of VBP implementation on quality and costs, Grabowski et al. (2017) concluded that VBP had little impact on quality or costs, and that payments should be large enough to influence change and not simply reward already strong facilities. Adequate reimbursement to incentivize change emerged from a survey of 2,426 nursing home administrators from within 8 states with VBP policies and 8 states with no VBP policy. The survey found that administrators felt that quality is costly, and that VBP does not cover the cost. Respondents also questioned transparency of program administration and relevancy of measures to actual quality of care (Castle et al., 2014).

Werner et al. (2013) compared nursing home quality before and after VBP implementation in VBP and non-VBP states. Compared to non-VBP states, clinical quality measures improved, staffing was unchanged, and deficiencies increased, concluding that the impact of VBP was variable and inconsistent. Werner et al. (2016) investigated the impact of performance thresholds in pay for performance programs on nursing home response/ behavior. They measured nursing home performance in 6 states before and after threshold based VBP programs and found that most improvement was seen in the worst nursing homes, while the best nursing homes declined in quality. One study of hospitals (Das et al., 2016) was included in this summary because of its direct examination of VBP outcomes when the program emphasizes costs related to quality. Das et al. (2016) found adding an emphasis on costs/ spending in VBP for hospitals resulted in payments for efficiency that maintained quality, but also in payments to low quality hospitals that did not invest in improving care. Authors concluded that minimum quality thresholds are needed as not to reward providers for cost efficiency that does not maintain or improve quality.

3. NH report card and MDS quality measures (1 interviews with state program administrators; 3 commentary; 3 retrospective MDS analyses; 2 correlation between interview and MDS assessments; 3 secondary analyses of multiple government sources; 1 evaluation study; 2 survey; 1 secondary analysis of state data; 1 mixed method; 1 interviews with families)

Castle & Ferguson (2010), postulate that measurement of nursing home quality is highly intertwined with government regulation, and has evolved from minimum quality standards to a definition of quality aimed at reaching highest level of care. Current measures focus upon structure, process and outcomes which has both positive and negative influences on quality measurement. Risk adjustment, while necessary, also brings in limitations. The current search identified evidence which correlated the current quality ratings system to better

actual resident outcomes. Cornell et al. (2019) found discharge to a higher star rated facility led to significantly lower mortality, fewer days in the nursing home, fewer hospital readmissions, and more days at home or with home health care during the first six months post facility admission. Results also indicated that within facility improvement results in improvement in resident outcomes. Rantz et al. (2004) investigated the ability of MDS-derived quality indicators to differentiate between high and low quality facilities in Missouri. They found that 10 of the QI's appeared to be sensitive to differentiating between facilities with poor and good quality outcomes and in general the MDS measures appeared stable. In a subsequent study Rantz et al. (2004) coupled observations of care with secondary data and found that consistency in basic care such as ambulation and nutrition were noted in facilities with good quality. Also, smaller facilities had better outcomes, and quality facilities had stable leadership and a team approach. Despite the evidence in support of MDS measures, Shanghavi et al (2019) found that 57% of resident falls with an acute care visit were reported on MDS, and facilities were less likely to report for non-white residents and in facilities with high proportion of non-white residents, as well as higher reporting rate for long stay than for short stay residents.

Several studies examined the influence of quality rating systems on nursing home selection. Konetzka (2014) found a correlation between financial ability and residence in a 5-star rated facility, with Medicaid eligible residents more likely to live in a 5-star home if they already lived there and the facility improved, as opposed to moving there, concluding that the 5-star policy inadvertently drove those with more choice to higher quality homes. Shapira (2016) conducted interviews with family members of newly admitted residents and found that when made aware of the report card people liked it, but more clarity is needed for the public to understand the methodology surrounding selection, measurement and weighting of quality scores. Similarly, Weimer et al. (2019) surveyed a sample of 4,310 residents to test the feasibility of using a consumer driven weighting approach instead of an expert determined weighting approach for the quality report card. They found staffing and inspection results to be the most consistent priorities of residents, with wide variation in the other QIs.

Drummond et al. (2015) matched interviewer assessments with MDS assessments and found strong correlation between the two assessments that remained stable even with MDS data collected 41 days from the interview assessment, providing additional evidence regarding the validity of MDS based quality measures. Mukamel et al. 2016 also examined

use of MDS-derived measures for end of life care and found quantitatively valid measures, with the limitation that key aspects of patient choice are missing from the measure. Xu et al. (2016) conducted a factor analysis and concluded that summary measures could be created to adequately capture 4 dimensions of care quality. Kutschar et al. (2019) found item response to be stable in assessment among residents with mild cognitive impairment, but moderate cognitive impairment was negatively related to resident response in assessment. Pamalee et al. (2009) conducted an online survey of nursing home leaders and found that ratings of the utility of MDS data were generally high, however qualitative findings suggested concerns around data accuracy, team functioning, timeliness of assessments, and validity of the MDS tool itself.

Interviews with administrators from 6 state value-based reimbursement programs revealed that measurement of quality varied between the 6 states, with some common measures. The most common approach to financial award based upon quality was a daily add on to the Medicaid rate (Arling et al, 2009). Konetzka et al. (2018) found evidence that facilities improved what was emphasized by the quality rating system, with higher weight placed on clinical measures correlated to improvements in those areas, but low weighting being correlated with decline in those areas, and skilled staffing increasing when weight placed on staffing. Both high and low quality homes were influenced by incentive program weighting of quality measures. Arling et al. (2009) highlighted the need to move beyond 'one size fits all' quality measurement, an idea that was validated by Mukamel et al.'s (2016) evaluation of a demonstration project comparing personalized selection of measures, weighting and subsequent rankings with the 'one size fits all' model. They found that personalized measures differed enough between individuals and from CMS that such a model should be considered for nursing home selection.

An expert commentary (Miller & Mor, 2008) noted the need for better, more specific data and more facility-specific and quality improvement focused regulation that is consistent between states, regions, and districts within states. In an earlier commentary, Mor (2005) noted that a risk of composite measures is that some facilities perform well on one, poorly on another, and when the average is taken the facilities appear equal; important differences are missed. Using data to motivate quality improvement is especially challenging, as even under controlled conditions QI's are hard to move. Mor (2005) suggests that context effects such as leadership may be the true driver of change.

References

Anderson, R. A., Hsieh, P. C., & Su, H. F. (1998). Resource allocation and resident outcomes in nursing homes: Comparisons between the best and worst. Research in Nursing & Health, 21(4), 297-313.

Arling, G., Job, C., & Cooke, V. (2009). Medicaid nursing home pay for performance: where do we stand?. The Gerontologist, 49(5), 587-595.

Bowblis, J. R., & Applebaum, R. (2017). How does Medicaid reimbursement impact nursing home quality? The effects of small anticipatory changes. Health services research, 52(5), 1729-1748.

Burgess Jr, J. F., Shwartz, M., Stolzmann, K., & Sullivan, J. L. (2018). The relationship between costs and quality in veterans health administration community living centers: an analysis using longitudinal data. Health Services Research, 53(5), 3881-3897.

Carey, K., Zhao, S., Snow, A. L., & Hartmann, C. W. (2018). The relationship between nursing home quality and costs: Evidence from the VA. PloS one, 13(9).

Castle, N. G., & Ferguson, J. C. (2010). What is nursing home quality and how is it measured?. The Gerontologist, 50(4), 426-442.

Castle, N. G., Engberg, J., Ferguson-Rome, J. C., & Sonon, K. (2014). Nursing Home Administrators' Opinions of Pay for Performance. Journal of aging & social policy, 26(3), 229-248.

Cornell, P. Y., Grabowski, D. C., Norton, E. C., & Rahman, M. (2019). Do report cards predict future quality? The case of skilled nursing facilities. Journal of health economics, 66, 208-221.

Das, A., Norton, E. C., Miller, D. C., Ryan, A. M., Birkmeyer, J. D., & Chen, L. M. (2016). Adding a spending metric to Medicare's value-based purchasing program rewarded low-quality hospitals. Health Affairs, 35(5), 898-906.

Drummond, L. S., Slaughter, S. E., Jones, C. A., & Wagg, A. S. (2015, September). Affirming the value of the Resident Assessment Instrument: Minimum Data Set Version 2.0 for nursing home decision-making and quality improvement. In Healthcare (Vol. 3, No. 3, pp. 659-665). Multidisciplinary Digital Publishing Institute.

Dulal, R. (2017). Cost efficiency of nursing homes: do five-star quality ratings matter?. Health care management science, 20(3), 316-325.

Di Giorgio, L., Filippini, M., & Masiero, G. (2016). Is higher nursing home quality more costly?. The European Journal of Health Economics, 17(8), 1011-1026.

Grabowski, D. C. (2001). Does an increase in the Medicaid reimbursement rate improve nursing home quality?. The Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 56(2), S84-S93.

Grabowski, D. C., Angelelli, J. J., & Mor, V. (2004). Medicaid payment and risk-adjusted nursing home quality measures. Health Affairs, 23(5), 243-252.

Grabowski, D. C., Stevenson, D. G., Caudry, D. J., O'Malley, A. J., Green, L. H., Doherty, J. A., & Frank, R. G. (2017). The impact of nursing home pay‐for‐performance on quality and medicare spending: results from the nursing home value‐based purchasing demonstration. Health services research, 52(4), 1387-1408.

Hicks, L. L., Rantz, M. J., Petroski, G. F., & Mukamel, D. B. (2004). Nursing home costs and quality of care outcomes. Nursing Economics, 22(4), 178-192.

Tamara Konetzka, R., Grabowski, D. C., Perraillon, M. C., & Werner, R. M. (2015). Nursing home 5-star rating system exacerbates disparities in quality, by payer source. Health affairs, 34(5), 819-827.

Konetzka, R. T., Skira, M. M., & Werner, R. M. (2018). Incentive design and quality improvements: Evidence from state Medicaid nursing home pay-for-performance programs. American journal of health economics, 4(1), 105-130.

Kutschar, P., Weichbold, M., & Osterbrink, J. (2019). Effects of age and cognitive function on data quality of standardized surveys in nursing home populations. BMC geriatrics, 19(1), 244.

Miller, E. A., & Mor, V. (2008). Balancing regulatory controls and incentives: Toward smarter and more transparent oversight in long-term care. Journal of Health Politics, Policy and Law, 33(2), 249-279.

Mor, V. (2005). Improving the quality of long‐term care with better information. The Milbank Quarterly, 83(3), 333-364.

Mukamel, D. B., & Spector, W. D. (2000). Nursing home costs and risk-adjusted outcome measures of quality. Medical Care, 38(1), 78-89.

Mukamel, D. B., Amin, A., Weimer, D. L., Sharit, J., Ladd, H., & Sorkin, D. H. (2016). When patients customize nursing home ratings, choices and rankings differ from the government's version. Health Affairs, 35(4), 714-719.

Mukamel, D. B., Ladd, H., Caprio, T., & Temkin-Greener, H. (2016). Prototype end-of-life quality measures based on MDS 3 data. Medical care, 54(11), 1024-1032.

Parmelee, P. A., Bowen, S. E., Ross, A., Brown, H., & Huff, J. (2009). "Sometimes people don't fit in boxes": attitudes toward the minimum data set among clinical leadership in VA nursing homes. Journal of the American Medical Directors Association, 10(2), 98-106.

Rantz, M. J., Hicks, L., Petroski, G. F., Madsen, R. W., Mehr, D. R., Conn, V., ... & Maas, M. (2004). Stability and sensitivity of nursing home quality indicators. The Journals of Gerontology Series A: Biological Sciences and Medical Sciences, 59(1), M79-M82.

Rantz, M. J., Hicks, L., Grando, V., Petroski, G. F., Madsen, R. W., Mehr, D. R., ... & Bostick, J. (2004). Nursing home quality, cost, staffing, and staff mix. The Gerontologist, 44(1), 24-38.

Sanghavi, P., Pan, S., & Caudry, D. (2019). Assessment of nursing home reporting of major injury falls for quality measurement on nursing home compare. Health Services Research.

Schapira, M. M., Shea, J. A., Duey, K. A., Kleiman, C., & Werner, R. M. (2016). The nursing home compare report card: perceptions of residents and caregivers regarding quality ratings and nursing home choice. Health services research, 51, 1212-1228.

Weech-Maldonado, R., Shea, D., & Mor, V. (2006). The relationship between quality of care and costs in nursing homes. American Journal of Medical Quality, 21(1), 40-48.

Weech-Maldonado, R., Pradhan, R., Dayama, N., Lord, J., & Gupta, S. (2019). Nursing home quality and financial performance: is there a business case for quality?. INQUIRY: The Journal of Health Care Organization, Provision, and Financing, 56, 0046958018825191.

Weech-Maldonado, R., Lord, J., Pradhan, R., Davlyatov, G., Dayama, N., Gupta, S., & Hearld, L. (2019). High Medicaid Nursing Homes: Organizational and Market Factors Associated

With Financial Performance. INQUIRY: The Journal of Health Care Organization, Provision, and Financing, 56, 0046958018825061.

Weimer, D. L., Saliba, D., Ladd, H., Shi, Y., & Mukamel, D. B. (2019). Using contingent valuation to develop consumer‐based weights for health quality report cards. Health services research, 54(4), 947-956.

Werner, R. M., Skira, M., & Konetzka, R. T. (2016). An evaluation of performance thresholds in nursing home pay‐for‐performance. Health services research, 51(6), 2282-2304.

Werner, R. M., Konetzka, R. T., & Polsky, D. (2013). The effect of pay‐for‐performance in nursing homes: evidence from state Medicaid programs. Health services research, 48(4), 1393-1414.

Xu, D., Kane, R. L., Shippee, T., & Lewis, T. M. (2016). Identifying consistent and coherent dimensions of nursing home quality: Exploratory factor analysis of quality indicators. Journal of the American Geriatrics Society, 64(12), e259-e264.

Table 1: Summary of Studies

Citation	Study Objective	Study Design	Sample and Data	Outcome of Interest	Findings	Limitations	Implications
Anderson, R. A., Hsieh, P. C., & Su, H. F. (1998). Resource allocation and resident outcomes in nursing homes: Comparisons between the best and worst. *Research in Nursing & Health*, *21*(4), 297-313.	To examine and compare resource allocation patterns within the best and worst performing nursing homes in Texas; Do high quality nursing homes allocate financial resources differently than low quality nursing homes?	Secondary data analysis from State database	494 nursing homes divided into 5 comparison groups based upon resident outcome measures	Resource allocation differences between nursing homes with high and low quality resident outcomes	There was no significant differences in spending allocation patterns between facilities with the best/ worst average outcomes. If RN spending is controlled for, quality outcomes did not vary by high/ low cost facilities. Facilities with the highest improvement in resident outcomes had the highest costs and highest level of RN staffing.	Single state, all measures not available	RN's contribute to improving care, and are a high cost investment in improving quality outcomes. When RN staffing is controlled for in the analysis, the relationship between cost and quality improvement decreases. If investing and increasing costs, nursing staff is likely to most impact quality. Impact of spending/ allocation on static measures such as averages is more difficult to determine.
Arling, G., Job, C., & Cooke, V. (2009). Medicaid nursing home pay for performance: where do we stand?. *The Gerontologist*, *49*(5), 587-595.	To provide a snapshot of current pay for performance programs in nursing homes and provide recommendations based upon the experiences of 6 states	Structured interviews with administrators of the 6 state nursing home pay for performance programs operating in 2007	See study design	Structure and administration of current (2007) nursing home pay for performance	Measurement of quality varied between the 6 states, with some common measures. The most common approach to financial award is a daily add	Findings were highly interpretive	Evidence-based measurement, clear predictable paths to achieve reward, stakeholder input, and state support for an overall quality plan that goes beyond financial

					on to the Medicaid rate.		incentives were among the recommendations
Bowblis, J. R., & Applebaum, R. (2017). How does Medicaid reimbursement impact nursing home quality? The effects of small anticipatory changes. *Health services research*, *52*(5), 1729-1748.	To examine how anticipated changes in Medicaid rates impacts nursing home spending and resident outcomes; how changes in state reimbursement impact quality	Retrospective secondary analysis of government databases	All Ohio nursing homes	Spending allocation, costs, and resident outcomes	Changes to reimbursement as a result of state policy varied among Ohio nursing homes, allowing for comparison based upon reimbursement change. Changes in reimbursement led to corresponding changes (up or down) in staffing. However, no significant changes in resident outcomes were noted.	Retrospective and reliant on existing measures; cannot account for the lag in quality changes	Reimbursement changes resulted in corresponding staffing changes. However, quality indicators were not significantly affected. Something unmeasured at the micro level is perhaps occurring that drives the decision to spend on staffing despite challenge of moving quantitative measures
Burgess Jr, J. F., Shwartz, M., Stolzmann, K., & Sullivan, J. L. (2018). The relationship between costs and quality in veterans health administration community living centers: an analysis using longitudinal data. *Health Services*	To determine the relationship between costs and quality	Retrospective secondary data analysis	130 VA nursing homes over a 3 year period	Clinical quality indicators from the MDS, measures of resident centered care	Small facilities that improved clinical quality indicators had higher costs, large facilities that improved had lower costs. No relationship was noted between costs	No information regarding allocation decisions	The relationship between costs and quality varies by size and structure. High quality may require high costs, or in other settings high quality is the result of efficient lower cost

Research, *53*(5), 3881-3897.					and measures of resident centered care.		processes. Mixed methods work is needed.
Carey, K., Zhao, S., Snow, A. L., & Hartmann, C. W. (2018). The relationship between nursing home quality and costs: Evidence from the VA. *PloS one*, *13*(9).	To examine the relationship between costs and resident outcomes in VA nursing homes	Retrospective secondary data analysis, MDS outcomes	135 VA nursing homes over a 2 year period	Costs	Higher quality predicted higher costs, lower quality predicted lower cost	Aggregate only facility level VA specific data	The study contradicts others that found poor care outcomes such as falls, pressure ulcers and other inefficiencies leads to higher costs and supports a basic economic argument that good care is expensive. It did not however find that high costs were being allocated to nurse staffing.
Castle, N. G., & Ferguson, J. C. (2010). What is nursing home quality and how is it measured?. *The Gerontologist*, *50*(4), 426-442.	Overview and commentary of nursing home quality measurement	Framed the discussion using Donabedian's structure, process and outcome framework	See study design	none	Measurement of nursing home quality is highly intertwined with government regulation, and has evolved from minimum quality standards to a definition of quality aimed at reaching highest level of care. Current	Findings are highly interpretive	The relationship between structure, process and outcomes is likely not as strong as the current quality measurement structure assumes. Risk adjustment accounts for uneven 'playing fields' between facilities but may obfuscate some real quality

					measures focus upon structure, process and outcomes which is both positive and negative. Risk adjustment, while necessary, also brings in limitations.		differences. Linearity is also assumed and likely not reflective of true quality differences. The link between measuring quality and improving quality remains uncertain.
Castle, N. G., Engberg, J., Ferguson-Rome, J. C., & Sonon, K. (2014). Nursing Home Administrators' Opinions of Pay for Performance. *Journal of aging & social policy*, *26*(3), 229-248.	To examine nursing home administrators perceptions of pay for performance incentive structures, program administration, and quality measurement/ impact	Mail survey of nursing home administrators in 8 states that had implemented VBR and 8 randomly selected states that had not	Surveys from 2,426 respondents almost evenly divided between VBR states and non VBR states	Respondent opinions of pay for performance	Overall perceptions were very low. Respondents felt payments should be higher, more frequent, and more reflective of the costs to improve quality. Measurement was viewed as not transparent and not related to actual quality. Opinions within states with VBR were significantly lower than in states without VBR. Paper provides table of perceptions	Likert scale survey that left the rating scale up to the interpretation of respondents.	Administrators felt that quality is costly, and that VBR does not cover the cost. Also questioned transparency of program administration and relevancy of measures to actual quality of care.

					regarding which indicators should be included or excluded from quality composites.		
Cornell, P. Y., Grabowski, D. C., Norton, E. C., & Rahman, M. (2019). Do report cards predict future quality? The case of skilled nursing facilities. *Journal of health economics*, *66*, 208-221.	To determine the relationship between quality star ratings and resident outcomes, and to contribute to the quality literature an analysis that accounts for the contribution of resident selection bias of high/ low quality facilities to the relationship between quality and outcomes	Retrospective analysis of MDS and Medicare claims data, community data, other secondary data	Claims, geographic and MDS data from 1,278,456 Medicare beneficiaries discharged from 4,332 acute care hospitals to 15,166 SNFs.	Resident outcome disposition: rehospitalization, death, hospice, home with home health	Discharge to a higher star SNF led to significantly lower mortality, fewer days in the nursing home, fewer hospital readmissions, and more days at home or with home health care during the first six months post SNF admission. Results also show that within facility improvement results in improvement in resident outcomes	Big data analysis makes a number of assumptions and does not account for factors that are unmeasured, such as discharge planner influence on choice	Star quality ratings are reflective of quality in terms of resident trajectory/ disposition, and should be a part of resident's decision making processes.
Das, A., Norton, E. C., Miller, D. C., Ryan, A. M., Birkmeyer, J. D., & Chen, L. M. (2016). Adding a spending metric to Medicare's value-based purchasing	To determine that impact of VBR policy that emphases costs/ low spending over quality measures on the	Retrospective analysis of CMS databases and American Hospital	CMS data on 2,679 hospitals eligible in 2014-2015	Financial incentive received by hospital	Adding an emphasis on costs/ spending in VBR for hospitals resulted in	Secondary data analysis that cannot capture unmeasured variance	Minimum quality thresholds are needed as not to reward providers for cost efficiency that does not results in quality.

program rewarded low-quality hospitals. *Health Affairs*, *35*(5), 898-906.	distribution of rewards	Association data			payments for efficiency, but also payments to low quality hospitals that did not invest in care		
Drummond, L. S., Slaughter, S. E., Jones, C. A., & Wagg, A. S. (2015, September). Affirming the value of the Resident Assessment Instrument: Minimum Data Set Version 2.0 for nursing home decision-making and quality improvement. In *Healthcare* (Vol. 3, No. 3, pp. 659-665). Multidisciplinary Digital Publishing Institute.	To compare interview completed functional assessments with the functional assessment recorded on the MDS for consistency	Correlational analysis	362 paired interviewer assessments and MDS assessments from 130 nursing home residents	Stability of MDS measure when compared to more comprehensive interviewer assessment	MDS assessment was correlated to interviewer assessment and remains stable even with MDS collected 41 days from interview	Data collection for both measures subject to interviewer bias	Adds confidence to MDS function measures and QI's
Dulal, R. (2017). Cost efficiency of nursing homes: do five-star quality ratings matter?. *Health care management science*, *20*(3), 316-325.	To investigate what factors influence nursing home costs, and how quality influences costs	Retrospective quantitative analysis	Panel survey of California nursing homes from 2009-13 with n ranging from 761-919. Data included quality measures, inspection data and staffing levels	Nursing home costs	Costs were inversely related to quality (lower costs, higher QI's), unrelated to inspection data, and higher staffing was related to cost inefficiency as defined by the study. Higher quality nursing homes had low costs, primarily	Single state data, secular influences on cost unmeasured	High costs do not necessarily mean high quality, and investment in process change instead of simply higher staff can improve cost efficiency.

					due to fewer poor outcomes. Staffing was related to higher costs but not necessarily higher quality		
Di Giorgio, L., Filippini, M., & Masiero, G. (2016). Is higher nursing home quality more costly?. *The European Journal of Health Economics*, *17*(8), 1011-1026.	To determine the relationship between quality and costs in Swiss nursing homes	Retrospective quantitative analysis	Data from 45 Swiss nursing homes between 2006-10, including QI's (the IV) and costs	Nursing home costs	Poor QI performance, specifically on pain and wt. loss, was related to higher costs; process measure performance was not related to costs	Results may not be transferable to US healthcare system	Reimbursement systems should account for a relationship between quality and costs that varies based upon quality measure, and that high costs do not mean high quality
Grabowski, D. C. (2001). Does an increase in the Medicaid reimbursement rate improve nursing home quality?. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, *56*(2), S84-S93.	To examine the relationship between changes in Medicaid reimbursement and nursing home quality	Retrospective data analysis of linked government data sets	Facility level data from a national sample of >15K facilities	Nursing home quality measures	Increased Medicaid rate improved the level of professional staffing, but not other quality measures; increased rates decreased deficiencies in tight economic markets but not overall	Secondary analysis of facility data leaves much unmeasured	Higher reimbursement may encourage better staffing but not necessarily better care.
Grabowski, D. C., Angelelli, J. J., & Mor, V. (2004). Medicaid payment and risk-adjusted nursing home	To examine the relationship between Medicaid	Retrospective analysis of linked government data sets	Facility level data from a national sample of >15K facilities	Nursing home quality measures	Higher payment was related to lower pressure ulcer and restraint	Many unmeasured variables, limited quality measure	Higher reimbursement may result in higher quality, though the

quality measures. *Health Affairs*, *23*(5), 243-252.	reimbursement rate and quality				rates. Authors note that the 2 measures are not well correlated so it may indicate better quality across the spectrum	assessment to 3	mechanism is unclear
Grabowski, D. C., Stevenson, D. G., Caudry, D. J., O'Malley, A. J., Green, L. H., Doherty, J. A., & Frank, R. G. (2017). The impact of nursing home pay-for-performance on quality and Medicare spending: results from the nursing home value-based purchasing demonstration. *Health services research*, *52*(4), 1387-1408.	To evaluate the impact of VBR on quality and Medicare spending	Retrospective analysis of quantitative data from baseline measures to measures from within a 3 year VBR demonstration project; qualitative staff interviews	Facility data from New York facilities randomized into the demonstration and matched demonstration facilities in WI and AZ	Nursing home quality measures; Medicare spending rates	No changes in Medicare spending or quality were noted within the NY facilities; facilities in WI and AZ had Medicare savings for part of the time period. Interviews noted few changes were made within facilities due to demonstration, and respondents perceived that already existing quality was simply being rewarded, instead of encouraging new quality efforts	Differences between state contexts may not have been fully controlled for in the analysis	VBR demonstration had little impact on quality or costs. Payments should be large enough to influence change an not just reward already strong facilities.

Hicks, L. L., Rantz, M. J., Petroski, G. F., & Mukamel, D. B. (2004). Nursing home costs and quality of care outcomes. *Nursing Economics*, *22*(4), 178-192.	To examine the relationship between variable costs and 4 QI's: ADL decline, pressure ulcers, psychotropic drug use, weight loss	Secondary analysis of linked MDS and Medicaid cost reports	474 Missouri nursing homes	Variable nursing home costs	Resident days accounted for the most variation in cost, indicating that provision of basic care, regardless of quality, impacts cost. Declining ADL's and pressure ulcers accelerated costs.	Single state, not indepth enough to know what factors are increasing costs	Poorer care quality defined by resident decline results in higher variable cost of providing adequate care. However, most cost contributes to providing basic adequate care, regardless of variation in quality.
Tamara Konetzka, R., Grabowski, D. C., Perraillon, M. C., & Werner, R. M. (2015). Nursing home 5-star rating system exacerbates disparities in quality, by payer source. *Health affairs*, *34*(5), 819-827.	To determine if public reporting of quality measures resulted in more non-dual eligibles selecting high quality homes and more dual eligibles residing in low quality homes	Retrospective quantitative design of linked government data sets	Linked MDS, Nursing home compare, Medicare claims for US nursing homes	Dual eligibles residing in high and low quality nursing homes	The gap between duals and non duals in high quality homes grew over time since reporting began, and duals were more likely to live in a high quality home because the 5 star rating improved, as opposed to moving there	Multiple assumptions are made about nursing home selection in the interpretation of findings	Supply of homes and location of high quality homes matters, 5 star policy inadvertently drove those with more choice to higher quality homes, raising Medicaid rates to be more equitable with private rates is a possible solution
Konetzka, R. T., Skira, M. M., & Werner, R. M. (2018). Incentive design and quality improvements: Evidence from state Medicaid nursing home pay-for-performance	To examine how design of state pay for performance incentive programs influences nursing home	Retrospective analysis of government data sets	Linked MDS, state quality reporting data, and data program data for all US nursing homes,	Facility level quality, health inspection and staffing levels over time	Higher weight placed on clinical measures causes improvements in those areas, but low weight	Analysis did not provide information on the processes that may be influencing these	Weights influence quality behavior of facilities, and programs should perhaps weight most heavily what is needed by a particular facility

programs. *American journal of health economics*, *4*(1), 105-130.	quality improvements		including 3,472 (20%) in VBR states		actually causes decline in those areas; minimum deficiency thresholds are more effective than weighting deficiencies on the incentive structure; skilled staffing increases when weight placed on staffing; both high and low quality homes were influenced by incentive programs	relationships, though reasons were hypothesized	as opposed to applying the same incentive structure to all
Kutschar, P., Weichbold, M., & Osterbrink, J. (2019). Effects of age and cognitive function on data quality of standardized surveys in nursing home populations. *BMC geriatrics*, *19*(1), 244.	To determine if resident characteristics, particularly cognitive impairment, influence the quality of survey data among nursing home residents	Analyzed survey data collected from pre/post intervention to determine influences on non-response	659 residents within 13 German nursing homes	Item non-response	Interview duration and gender had no effect, age had a mild effect, and level of cognitive impairment had a significant effect with a significant difference between mild and moderate impairment	Only non-response, not validity of response, was measured	Even with face to face survey/ interview methods, moderate cognitive impairment can negatively influence survey data quality

Miller, E. A., & Mor, V. (2008). Balancing regulatory controls and incentives: Toward smarter and more transparent oversight in long-term care. *Journal of Health Politics, Policy and Law*, *33*(2), 249-279.	To provide expert commentary on the current regulatory process and potential areas of improvement	Commentary	None, past research	None	Regulatory is crucial, but current practices suffer from limited data, a 'one size fits all' mentality, and a punitive relationship between providers and states. There is also great inconsistency between states, and political influence from the nursing home lobby varies between states to influence the system. An improved model would use facility data to advise facilities how to improve an reward that improvement, much like a consultant	Commentary only (but a really good one)	We need better, more specific data and more facility-specific and quality improvement focused regulation. Regulation should be more consistent between states, regions, and districts within states.
Mor, V. (2005). Improving the quality of long-term care with better information. *The Milbank*	To describe the use of data to measure nursing home quality	Essay/ commentary	None	None	Data/ information can incentivize quality by impacting	Commentary only (but a really good one)	A risk of composite measures is that some facilities perform well on

Quarterly, *83*(3), 333-364.					consumer choices, reward structures, and/or punishment. Essay usefully describes types of quality information such as individual vs. aggregate, process vs. outcome, establishing quality benchmarks, and risk adjustment for comparisons		one, poorly on another, and when the average is taken the facilities appear equal; important differences are missed. Using data to motivate quality improvement is especially challenging, as even under controlled conditions QI's are hard to move. Context effects such as leadership may be the true driver of change.
Mukamel, D. B., & Spector, W. D. (2000). Nursing home costs and risk-adjusted outcome measures of quality. *Medical Care*, *38*(1), 78-89.	To understand the relationship between quality and costs in nursing homes and to test the hypothesis that higher quality is related to lower costs	Secondary data analysis of New York State database	525 nursing homes within NY state	1. risk adjusted pressure ulcers, ADL decline, and mortality 2. variable costs	A non-linear U shaped relationship between quality and costs suggesting some high quality facilities have low costs	Only 3 quality measures and limited definition of costs for analytic purposes	Financial restraints does not always mean (or need to mean) low quality; strategies which result in low cost high quality care need further identification
Mukamel, D. B., Amin, A., Weimer, D. L., Sharit, J., Ladd, H., & Sorkin, D. H. (2016). When patients customize nursing home ratings, choices	To compare data with 146 residents who used the individualized nursing home compare plus	Demonstration project comparing personalized selection of measures, weighting and	146 patients and families (42 were patients) who were discharged from hospital	Difference between measures, weighting, rankings	Almost all users (97%+) selected PT and nurse staffing in their measure; high variability	May not be a feasible approach to VBP	Personalized measures differed enough between individuals and from CMS that such a model

and rankings differ from the government's version. *Health Affairs*, *35*(4), 714-719.	composite measure with the CMS composite measure	subsequent rankings with the 'one size fits all' model	to the nursing home		among other measures; <15% chose restraints or catheters; substantial disagreement between CMS and CMSplus		should be considered for nursing home selection
Mukamel, D. B., Ladd, H., Caprio, T., & Temkin-Greener, H. (2016). Prototype end-of-life quality measures based on MDS 3 data. *Medical care*, *54*(11), 1024-1032.	To develop and test end of life quality measures from MDS data	Secondary data analysis of NY state database	39,590 nursing home decedents in 626 facilities in NY state	Death in the hospital, number of hospitalizations, pain, and depression during the last 90 days before death	End of life QMs had variation across facilities similar to that observed for other QMs The pain and depression QMs were significantly better among nursing homes ranked as 4 and 5 stars compared with those ranked as 1 and 2 stars for most dimensions. The hospitalizations QMs were significantly better among nursing homes with a higher staffing rating.	Misses key measures of patient choice, advanced directives, and emotional care	The MDS could provide some valid data for end of life measures

Parmelee, P. A., Bowen, S. E., Ross, A., Brown, H., & Huff, J. (2009). "Sometimes people don't fit in boxes": attitudes toward the minimum data set among clinical leadership in VA nursing homes. *Journal of the American Medical Directors Association*, *10*(2), 98-106.	To describe attitudes toward the MDS among nursing home unit leadership in the VA	Online survey with some open ended items	289 directors of nursing, medical directors, MDS coordinators, nurse managers	Perception of MDS: accuracy, usefulness for QI, reasons for inaccuracy or non-use	Ratings were generally high, however qualitative findings suggested concerns around data accuracy, team functioning, timeliness of assessments, and validity of the MDS tool itself. MD's were least favorable, as were very large and very small facilities	Only VA system, no objective measures	Respondents appeared to appreciate MDS data but noted multiple weaknesses in its utility
Rantz, M. J., Hicks, L., Petroski, G. F., Madsen, R. W., Mehr, D. R., Conn, V., ... & Maas, M. (2004). Stability and sensitivity of nursing home quality indicators. *The Journals of Gerontology Series A: Biological Sciences and Medical Sciences*, *59*(1), M79-M82.	To determine the ability of nursing home QI's to detect differences in quality between nursing homes and describe the quality of the nursing home	Retrospective analysis of secondary government data sets	92 randomly selected Missouri nursing homes	23 quality indicators; stability of performance over time and sensitivity to quality outcomes/ use in classifying facilities	10 of the QI's appeared to be sensitive to differentiating between facilities with poor and good quality outcomes and in general the MDS measures appear stable	Single state, outcome measurement may not be truly reflective of quality	The 10 identified QI's may be best to use when classifying facilities
Rantz, M. J., Hicks, L., Grando, V., Petroski, G. F., Madsen, R. W., Mehr, D. R., ... & Bostick, J. (2004). Nursing home quality, cost, staffing, and staff	To describe the processes of care, organizational attributes, cost of care, staffing level, and staff	Mixed methods: retrospective analysis of large secondary government	92 randomly selected Missouri nursing homes divided into 3 comparison	Observed care processes; structural attributes of facilities; total cost per resident day	Observed consistency in basic care such as ambulation and nutrition were noted in	Single state study	Quality appears to depend more on leadership and team processes then spending/ costs

mix. *The Gerontologist*, *44*(1), 24-38.	mix in a sample of Missouri homes with good, average, and poor resident outcomes	data sets; observations of care processes	groups based upon quality rating		facilities with good quality; smaller facilities had better outcomes; quality facilities had stable leadership and a team approach; costs were higher in poor quality facilities and staffing/ staff mix did not vary between groups		
Sanghavi, P., Pan, S., & Caudry, D. (2019). Assessment of nursing home reporting of major injury falls for quality measurement on nursing home compare. *Health Services Research*.	To assess the accuracy of the MDS reports of major injury falls and determine facility characteristics that may be associated with under reporting of falls	Linked claims and MDS data, multi-level modeling	150,828 major fall reports within a national sample (100%) of nursing home residents' with Medicare claims	Correlation between acute care claims and MDS fall report	57% of acute care claim falls were reported on MDS; less likely to report for non-white residents and in facilities with high proportion of non-white residents; reporting higher for long stay than short stay residents	The use of claims data may miss some falls, or may overestimate that number of falls that occurred in the facility	The MDS falls measure may be inaccurate
Schapira, M. M., Shea, J. A., Duey, K. A., Kleiman, C., & Werner, R. M. (2016). The nursing home compare report card: perceptions	To evaluate the perceived usefulness of the report card to residents and families	Primary data collection, structured interviews	Convenience sample of 35 residents (6) or families (29) newly admitted to	Perceptions of star ratings, comparisons, and use of the report card for decision making	Positive perception of quality information overall but confusion over	Convenience sample in a single geographic area	When made aware of the report card people like it, but more clarity is needed for the

of residents and caregivers regarding quality ratings and nursing home choice. *Health services research*, *51*, 1212-1228.			the nursing home in the Philadelphia area		how the quality was actually measured and the relationship between domain specific and overall quality score		public to understand the methodology
Weech-Maldonado, R., Shea, D., & Mor, V. (2006). The relationship between quality of care and costs in nursing homes. *American Journal of Medical Quality*, *21*(1), 40-48.	To evaluate the impact of providing quality care on nursing home costs	Secondary data analysis of government data sets	749 nursing homes in 5 states	Total patient care costs per facility	Neither QI was linear to costs. Pressure ulcers was an inverted U with costs lower for higher quality after a threshold; mood decline was a flat curve for low quality with increasing costs for higher quality	Only 2 QI's were examined, and cost measure was not specific enough to fully explore implications	The relationship between cost and quality is not linear and differs based upon the quality outcome examined
Weech-Maldonado, R., Pradhan, R., Dayama, N., Lord, J., & Gupta, S. (2019). Nursing home quality and financial performance: is there a business case for quality?. *INQUIRY: The Journal of Health Care Organization, Provision, and Financing*, *56*, 0046958018825191.	To determine the relationship between nursing home quality and financial performance	Secondary analysis of government data sets	All free standing non-government nursing homes in the US	Total operating margin per facility	Apart from staffing (structure), nursing homes that have better processes and outcomes have better financial performance	Secondary data sets may miss crucial processes of care	An investment in staffing is expensive but may be necessary; poor quality is costly
Weech-Maldonado, R., Lord, J., Pradhan, R., Davlyatov, G., Dayama,	To examine factors that correlate with	Retrospective data analysis of large	Approximately 1108 high Medicaid	Nursing home operating and total margin	Higher financial performing	Secondary data, unable to determine	Staffing is expensive but may be needed

N., Gupta, S., & Hearld, L. (2019). High Medicaid Nursing Homes: Organizational and Market Factors Associated With Financial Performance. *INQUIRY: The Journal of Health Care Organization, Provision, and Financing*, *56*, 0046958018825061.	better financial performance among high Medicaid nursing homes	secondary data sets	facilities per study year		facilities have more beds, are for profit, in low competition markets, and higher occupancy; RN staffing related to lower financial performance	relationships beyond correlations	for high quality; having slack resources such as occupancy and little competition may allow for low resource innovation
Weimer, D. L., Saliba, D., Ladd, H., Shi, Y., & Mukamel, D. B. (2019). Using contingent valuation to develop consumer-based weights for health quality report cards. *Health services research*, *54*(4), 947-956.	To test the feasibility of using a consumer driven weighting approach instead of an expert determined weighting approach for the quality report card	Web survey asking "willingness to trade" visit/ travel time to facility for quality in specific measures	4310 nursing home residents or recent residents	Calculated "willingness to trade" to weight QI's based upon consumer preferences	Respondent's choices appear economically rationale based but vary considerably between QI and respondent characteristics. The most largest weighting was staffing and inspections.	Unusual method that has a number of assumptions regarding the perceived trade off value of travel time	The trade off method may be useful to inject consumer priorities into QI measures
Werner, R. M., Skira, M., & Konetzka, R. T. (2016). An evaluation of performance thresholds in nursing home pay-for-performance. *Health services research*, *51*(6), 2282-2304.	To investigate the impact of performance thresholds in pay for performance programs on nursing home response/ behavior	Retrospective analysis of secondary government data sets	Nursing homes within 6 states implementing pay for performance, with one set used as subjects and second set of 3 for comparison	Performance before and after implementation of threshold based programs	The most improvement was seen in the worst nursing homes, while the best nursing homes declined in quality	Programs vary by state	There is the potential for perverse incentives in threshold based programs that may discourage high performing facilities from improving, but low performing facilities appear

							motivated by the program
Werner, R. M., Konetzka, R. T., & Polsky, D. (2013). The effect of pay-for-performance in nursing homes: evidence from state Medicaid programs. *Health services research*, *48*(4), 1393-1414.	To test the impact of pay for performance program implementation on nursing home quality	Retrospective MDS and OSCAR analysis	Nursing homes in 8 states implementing pay for performance, with the other 42 states as controls	Change in nursing home quality after policy implementation	Compared to non P4P states, clinical quality measures improved, staffing was unchanged, and deficiencies increased	State programs varied in timing and composition	Impact of P4P on quality was variable and inconsistent
Xu, D., Kane, R. L., Shippee, T., & Lewis, T. M. (2016). Identifying consistent and coherent dimensions of nursing home quality: Exploratory factor analysis of quality indicators. *Journal of the American Geriatrics Society*, *64*(12), e259-e264.	To determine if there are consistent dimensions of QI's that are stable at the resident and facility levels	Retrospective analysis of secondary government data sets	Residents admitted to 382 Minnesota nursing homes in 1 year period	Dimensions of QI's	4 dimensions were identified, and they remained consistent between the resident and facility level	Single state study	Summary measures can be created to capture care quality