Omissions of Care in Nursing Homes

Final Environmental Scan Report

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Executive Summary

Omissions of care (OOCs) in nursing homes contribute to nearly 60 percent of all adverse events experienced by residents,[1] yet researchers and practitioners are challenged to assess and prevent OOCs without a concise definition. The primary goal of this report is to describe the definitions found in the peer-reviewed and gray literature. The secondary goal is to update the Agency for Healthcare Research and Quality's (AHRQ) technical report, *Resident Safety Practices in Nursing Home Settings*, which reviewed nursing home safety research from 2005 to 2015.

To guide the environmental scan, we used the person-environment fit (PEF) framework, which assesses the degree of congruence between a person's needs and his or her environmental conditions. It has been applied in health services research to highlight the adverse outcomes of disparities between care that is required and care that is received by nursing home residents. We used the PEF framework to answer the following questions:

1. What research is available to describe OOCs, including adverse outcomes that may be attributable to omissions, and how does this research inform a definition of OOCs?
2. What secondary data sources are used or could be used to identify and report care omissions in nursing homes?

The environmental scan included a review of peer-reviewed literature, AHRQ resources, and gray literature. We conducted searches in PubMed, Web of Science, EBSCO Academic Search Premier, and the Cumulative Index to Nursing and Allied Health Literature (CINAHL) using keywords and controlled vocabulary terms selected with input from our technical expert panel. We searched AHRQ's website for research reports, AHRQ-funded grants and contracts, tools, and other resources using the gray literature search process, which includes keyword searching and browsing. For gray literature, we focused on resources from AARP, LeadingAge, the Gerontological Society of America, the American Geriatrics Society, and AMDA – the Society for Post-Acute and Long-Term Care Medicine.

We used two methods of abstraction. First, for literature that explicitly focused on OOCs, we used an abstraction template to record data from articles (appendix B). Articles included were in English, published in peer-reviewed journals or research reports, and applicable to nursing home settings. For each article, we abstracted details such as authorship and publication information, relevance of the article to the project, definitions of OOCs, adverse events, and interventions to reduce OOCs.

Next, we evaluated research focused on adverse events in nursing homes regardless of whether the articles provided a definition of OOCs. We inspected each article to determine if the study included evidence of an omission; identified key risk factors that might prevent an omission or

adverse event; provided practice interventions to reduce adverse events or omissions; or used secondary data sources to detect, monitor, or prevent omissions. These articles were also in English, published in peer-reviewed journals, and applicable to nursing home settings. We evaluated these resources by reviewing the article abstract to determine whether it provided data relevant to our review; when it did not, we reviewed the full text of the article.

For peer-reviewed literature, we included 34 items that explicitly defined OOCs (publication dates ranged from 1976 to 2018) and 327 items that focused on adverse events (publication dates ranged from 2015 to 2019). AHRQ's website provided 14 resources for review and 6 comparative effectiveness reviews. Our gray literature and web-based literature search yielded six resources for review.

Our review of literature defining OOCs in healthcare settings found four main themes:

1. Any delay in care or failure to provide care is an omission.
2. Omissions can lead to adverse events.
3. Omissions can occur in both clinical and psychosocial care.
4. Causes of omissions include a broad variety of factors.

All articles in our review defined OOCs as unfinished, undone, or inadequate care that should have been delivered, whereas 13 articles also defined OOCs as including delayed care. Twelve articles included adverse events in some way within the definition. Most articles focused on omissions in clinical care, such as tasks related to providing nursing care, planning care, or helping residents with tasks such as ambulation and toileting. Psychosocial care omissions, such as patient comforting or social care, were found in 11 articles. Of the 34 articles in our review, 20 identified a cause of the omission, including time constraints, rationed nursing care due to high rates of nurse burden, complex or complicated resident needs, and urgent or unanticipated situations that interfered with regular care.

Consistent with the PEF framework, our literature review examined adverse events that could result from a discrepancy between a resident's needs and the care or resources provided within the home environment—in this case, nursing homes. Our review of the literature identified nine adverse events associated with OOCs that were also discussed in AHRQ's 2016 report: falls, pressure ulcers, infections, medication errors, nutrition problems, disability/functional decline, incontinence, depression, and pain. We identified an additional seven adverse events that were not discussed in AHRQ's 2016 report, including avoidable hospitalizations, cardiovascular events, cognitive decline, death (all cause and suicide), delirium, loneliness, and poor resident-centered care.

This report is intended to support further work by the project team, technical expert panel, and stakeholders to develop a definition of OOCs and guidance for the field. Several key issues emerged from the review that suggested initial questions for consideration in that process:

- Is failure to monitor known risk factors an OOC?
- How can the definition of OOCs best distinguish between the omission and the causes of the omission?
- Is the absence of recommended interventions to reduce the risk of an adverse event an OOC?
- How should the definition distinguish between omissions that result in immediate harm and omissions that cause harm only if they occur systematically over time?

Introduction

Omissions of care (OOCs) in nursing homes contribute to nearly 60 percent of all adverse events experienced by residents.[1] However, researchers and clinicians have yet to develop a concise definition of OOCs with a particular focus on their causes and consequences. Without such a definition, assessing and preventing OOCs in nursing homes to improve resident outcomes is challenging. The Agency for Healthcare Research and Quality (AHRQ), as part of its mission to produce evidence that improves healthcare quality, is interested in developing a standard definition of OOCs in the nursing home setting. As such, AHRQ has commissioned this study to develop a comprehensive understanding of research on OOCs in nursing home settings.

The primary goal of this report is to present the results of an environmental scan, which includes a review of published literature and gray literature related to OOCs. This environmental scan, together with input from AHRQ, a technical expert panel, and key stakeholders, will be used to inform a definition of OOCs within the nursing home setting. Therefore, this report includes limited discussion of interpretations or implications, as those will emerge in future reports. A secondary goal of this report is to provide an update to AHRQ's *Resident Safety Practices in Nursing Home Settings*,[2] which reviewed nursing home safety research from 2005 to 2015.

Because the environmental scan focused on a relatively understudied and ill-defined topic area, we cast a wide net to (1) gather explicit definitions of OOCs relevant to adult populations and (2) identify evidence for when adverse events may be attributable to OOCs. We searched peer-reviewed and gray literature for empirical studies, research reports, position papers, and issue briefs. These materials were reviewed and synthesized for the findings presented here. Throughout the search process, we also identified and evaluated resources such as intervention programs and data sources that address OOCs in nursing homes.

Framework for the Environmental Scan

As a framework for understanding OOCs in nursing homes, the person-environment fit (PEF) identifies sensitizing concepts and corresponding relationships that may help us understand the causes and consequences of care omissions in nursing homes. PEF refers to the degree of congruence between a person's needs and his or her environmental conditions or personal competencies.

PEF has been widely applied to research on older adults' home environments and focuses on the consequences, or harms, of inadequate fit between a person and his or her care residence. In studies of unmet needs among older adults, for example, PEF highlights the health consequences of disparities between the care required and the care received by an older

person.[3] Further, considerations of facility design or the accommodation of residents' social needs are different in nursing homes than in hospitals and may differentially affect OOCs.

Research Questions

In addition to the conceptual framework described previously, we used the following research questions to guide the environmental scan. These questions were used to develop search strategies, identify appropriate information sources, and structure the review and analysis of the literature and resources.

1. What research is available to describe omissions of care, including adverse outcomes that may be attributable to omissions? How does this research help inform a definition of omissions of care?
2. What secondary data sources are used to assess care omissions or could be used to support accurate identification and timely reporting of care omissions in nursing homes?

Methods

The environmental scan included several categories of information, each requiring different methods for search, retrieval, and review. Here we summarize the methods used to search for and review material for each of the following literature categories:

- Peer-reviewed literature
- AHRQ resources, such as AHRQ reports, grants, and contracts, as well as other materials available on AHRQ's website
- Gray literature, such as research reports, issue briefs, and papers not published in academic journals; tools; and materials describing data sources, interventions, or resources that could be used to identify and address OOCs in nursing homes

Peer-Reviewed Literature

We conducted searches in PubMed, Web of Science, EBSCO Academic Search Premier, and the Cumulative Index to Nursing and Allied Health Literature (CINAHL) using keywords and controlled vocabulary terms (table 1) selected with input from our technical expert panel (TEP). First, we combined terms for nursing homes with terms for omissions. Then, we combined terms for nursing homes with terms for adverse events. A summary of search strategies and their results is provided in appendix A. In all, 1,451 retrieved records were downloaded into EndNote, which removed most duplicate citations automatically.

Table 1. Search terms used in the literature review

Search Concept	Terms	
Nursing homes	Nursing home Long-term care	Skilled nursing facility Old-age home
Omissions of care	Missed care Abbreviated care Delayed care Unmet need Care rationing Interrupted care Partially omitted care Omitted care Omission Error of omission	Omission errors Unfinished care Commissions of care Errors in care Inadequate care Insufficient care Wrong care Barriers to care Avoidable hospitalization
Outcomes of interest/adverse events/harms	Adverse event Disability Functional limitations Pressure sores Pressure ulcers Morbidity/multimorbidity Mortality/death Falls Weight loss Depression Delirium Wound care	Harm Chronic illness Chronic disease Pain Patient harm Resident harm Infections Care transition Discharge planning Infection control Medication safety

We compared article abstracts to inclusion and exclusion criteria (table 2) and assessed overall relevance to the research questions and topics. Relevance was judged based on the following:

- Applicability to the research questions
- Whether the article appeared to include an explicit definition of OOCs (e.g., “omission of care” or “care omission” or “error of omission” or “omission errors” or “omission”)
- Whether the article appeared to address any error in care that could constitute an OOC or an adverse event that resulted from an omission (see table 1 for a full list of error terms)
- Whether the article appeared to report on adverse events in nursing home/long-term care (LTC) settings, including potential sources of adverse events

- Whether the article appeared to explore ways to reduce errors in care settings for adult populations

We included articles with explicit definitions of OOCs for full-text review, regardless of date of publication. For adverse events/harms in nursing home or LTC settings, we structured our review as an update and supplement to the prior AHRQ report, *Resident Safety Practices in Nursing Home Settings*, which reviewed nursing home safety research from 2005 to 2015. Thus, we excluded articles published before 2015.

We also excluded articles published by the same author that used the same definition. For example, our search yielded 13 articles by Kalisch but we only included three in full-text abstraction to avoid redundancy. Figures 1 and 2 provide flowcharts showing the results at each stage of review and exclusion.

Table 2. Inclusion and exclusion criteria for peer-reviewed literature

Inclusion Criteria	Exclusion Criteria
• Items published in the past 10 years, unless conceptual or definitional in nature • Items published in the past 5 years (for adverse events in nursing homes) • Items written in English • Peer-reviewed articles reporting descriptive, quantitative, and qualitative studies • Professional or "trade" articles on preventing or responding to omissions • Issue briefs or white papers • Research reports (e.g., government, foundation) • Webinars/videos on omissions in nursing homes	• Editorials and commentary/opinion pieces that do not reflect an expert opinion • Articles specific to other care settings, such as intensive care or home care • PowerPoint presentations and other incomplete resources • News or media reports

Figure 1. PRISMA flow diagram for peer reviewed literature on defining omissions of care

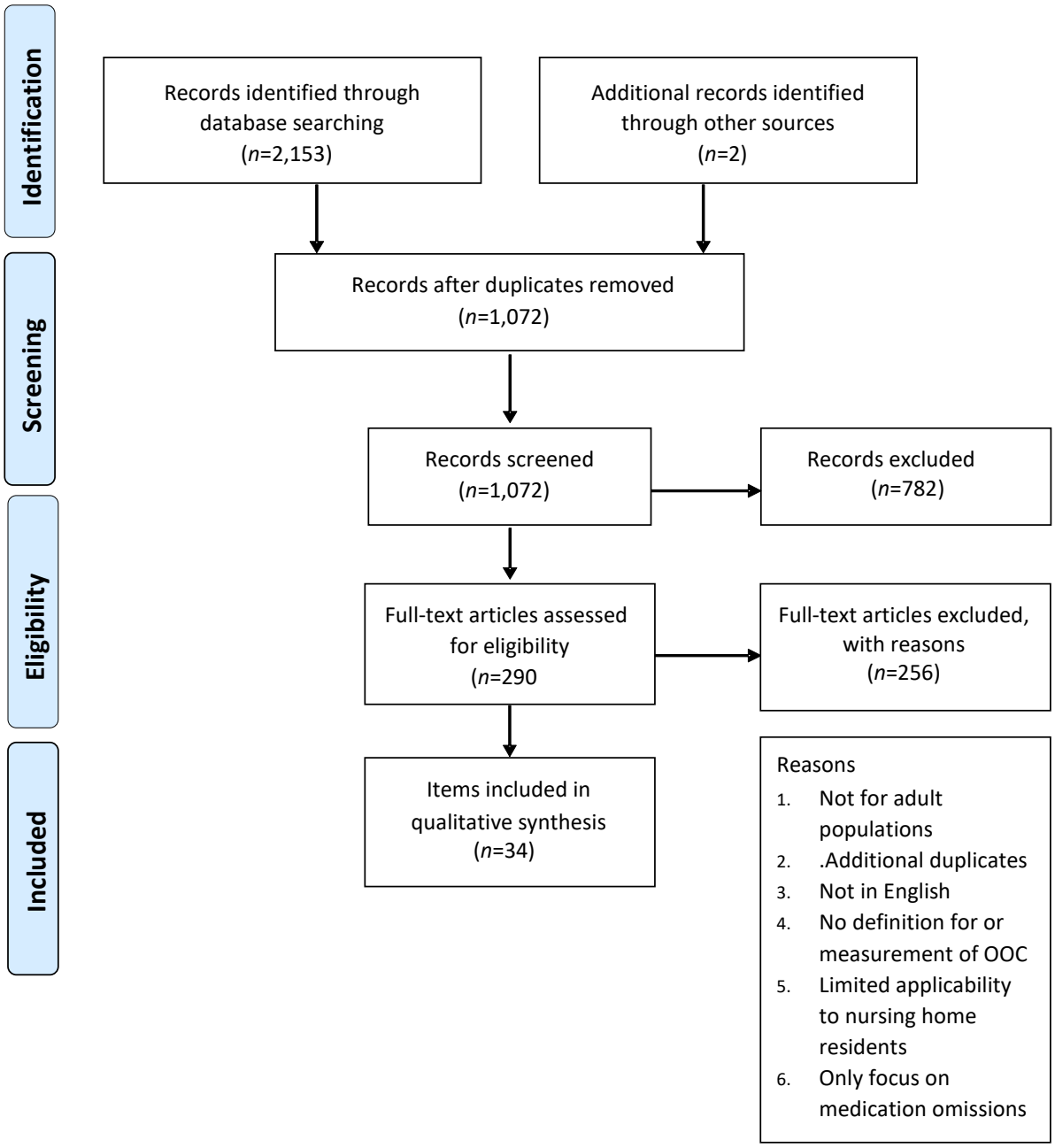
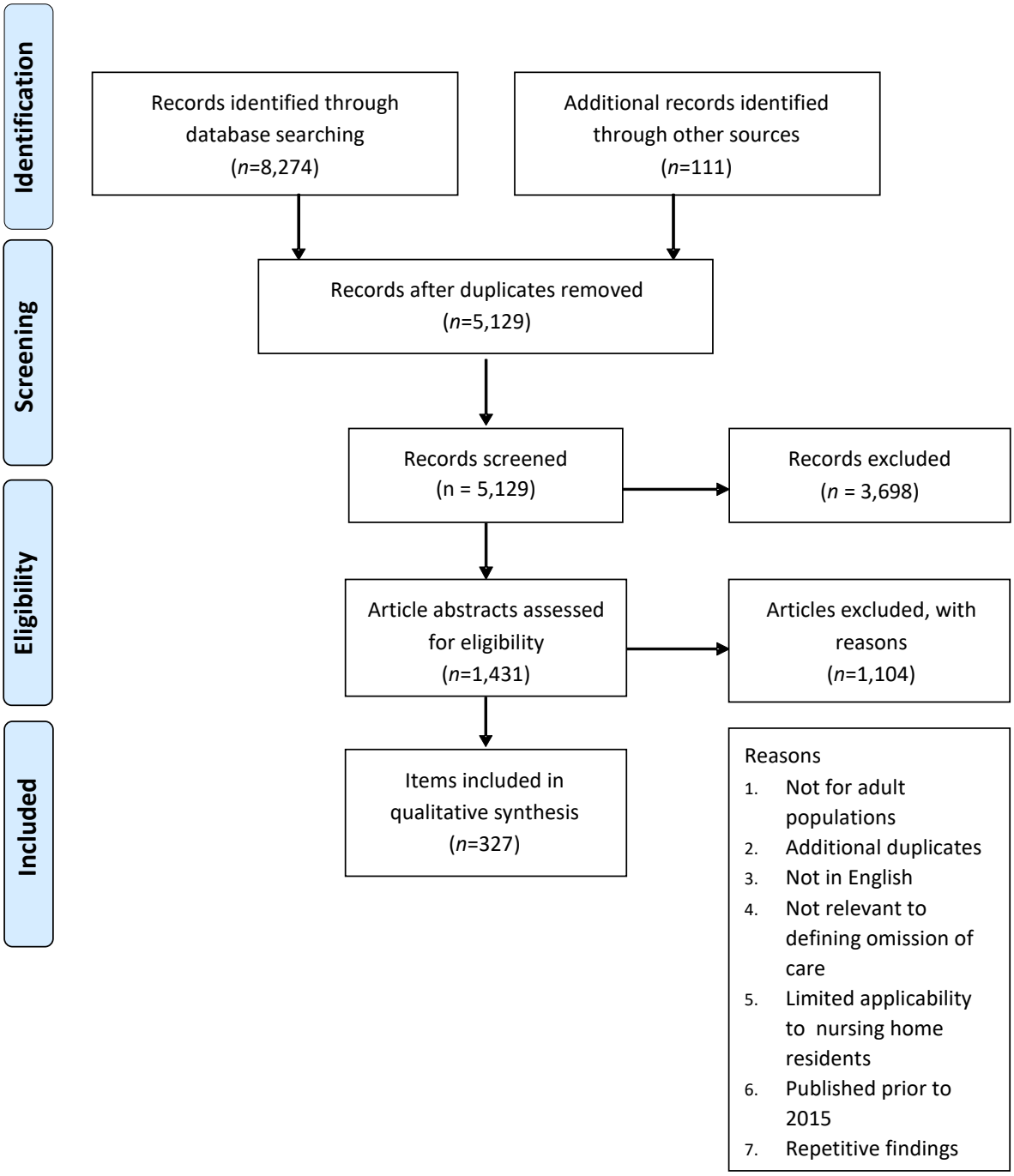


Figure 2. PRISMA flow diagram for peer-reviewed literature on adverse events



We retained articles that focused on OOCs and adverse events in care settings other than nursing homes if they were relevant to nursing home settings, such as including a focus on older adults. For example, Lehnbom, et al.,[4] provided a review of medication reconciliation practices and clinical outcomes that focused on hospital, community, and residential aged care facility settings. Although the studies in this review did not exclusively focus on nursing home residents, medication reconciliation errors across care transitions are relevant to nursing home settings, where residents may be at higher risk for hospital transfers than are community-dwelling older adults.

Gray Literature: AHRQ Resources

We searched AHRQ's website for research reports, AHRQ-funded grants and contracts, tools, and other resources using the gray literature search process, which included keyword searching and browsing. We retrieved 14 resources, reports, and tools, and an additional 6 comparative effectiveness reviews relevant to LTC settings. We reviewed and excluded all references to published peer-reviewed articles because they duplicated references already retrieved in the peer-reviewed literature search.

Gray Literature: Stakeholder Websites and the Wider Internet

We searched the wider internet for gray literature related to omissions of care, with a specific, but not exclusive, focus on the web pages of five stakeholder organizations: AARP, LeadingAge, Gerontological Society of America, American Geriatrics Society, and AMDA – Society for Post-Acute and Long-Term Care Medicine. Keyword searching and browsing retrieved six relevant resources for review.

Gap Analysis

We conducted a gap analysis to assess the degree to which the literature addressed topics related to OOCs and made similar assessments for interventions and data sources. Our gap analysis included identifying understudied areas of research within the nursing home literature on OOCs and adverse events. We also looked at trends in the literature to identify areas for growth in the conceptualization of OOCs.

Methods for Abstraction

We used two methods for abstraction. For literature specifically focused on OOCs, we developed an abstraction template (see appendix C). An expert in conducting systematic reviews and environmental scans oversaw the training of two junior abstractors. Training included orientation to the abstraction template for OOCs, followed by independent dual abstraction of the five articles and adjudication of differences between investigators. In a second step, the two junior reviewers identified five additional articles, conducted independent dual abstraction, and conducted adjudication of differences.

Finally, one junior reviewer abstracted the remaining articles and the other reviewer conducted quality checks and synthesized the results. We focused on abstracting data from articles related to authorship and publication information, relevance of the article to the project (e.g., participant characteristics and setting), definitions of OOCs, adverse events, and interventions to reduce OOCs.

For literature focused on adverse events, we inspected each item to determine if the study included evidence of (1) omitted care as a factor contributing to incidence, (2) key risk factors appropriate for surveillance that might prevent occurrence, (3) information about practice interventions directed at reducing either incidence or care omission, and (4) information about data sources used to determine either incidence or omission. We conducted our review by first examining the journal abstract to see whether it included the data required for our review; when it did not, we examined the full text.

Results

Characteristics of Literature Included in This Report

For peer-reviewed literature, we included 34 items that explicitly defined OOCs and 327 items that focused on adverse events. AHRQ's website provided 14 resources for review and an additional 6 comparative effectiveness reviews. Our gray literature and web-based literature search yielded six resources for review. A bibliography for all items included in the review is provided in appendix D.

Definitions of Omissions of Care

We found 34 items focused on topics that could be explicitly classified as OOCs, including missed care, care left undone, rationed care, unfinished care, inadequate care, and errors of omission and care omissions. One item was a technical brief from AHRQ that provided a definition of OOCs in nursing home settings, and 33 were peer-reviewed articles.

Of the 33 peer-reviewed items, 11 included nursing home or LTC settings, and the rest addressed other healthcare settings. There were:

- 16 quantitative articles,
- 5 qualitative articles,
- 4 literature reviews,
- 3 mixed-methods articles,
- 2 editorials or commentaries that reflected expert opinion, and
- 3 systematic reviews.

Publication dates ranged from 1976 to 2018 (1976–2008: *n*=4; 2009–2015: *n*=15; 2016–2018: *n*=14).

Adverse Events in Nursing Homes

We found 327 items that focused on adverse events in nursing homes that may be attributable to OOCs and were published between 2015 and 2019: 59 from 2015, 75 from 2016, 88 from 2017, 96 from 2018, and 6 from 2019. We included three articles that were published before 2015 because they also included additional information relevant to identifying adverse events related to OOCs.

Findings From the Literature Relevant to Defining Omissions of Care

This summary of findings is organized into three broad topic areas: definitions of OOCs, adverse events in nursing homes and interventions intended to prevent them, and data sources used. We found several common concepts used in defining OOCs: (1) causes of the omission; (2) types of omitted care, including clinical and psychosocial care; (3) whether omitted care results in a definite or potential adverse outcome; and (4) types of omissions, such as delayed care or unfinished, undone, or inadequate care. An overview of common concepts that authors included when defining OOCs is provided in table 3. Detailed findings for each publication that specifically defined and examined OOCs are provided in appendix A.

Definitions of Omissions of Care

For the purposes of developing a working definition of OOCs—Research Question 1 (RQ1)—we began with a review of all literature that explicitly defined care omissions. Across these publications, authors defined OOCs as delayed, unfinished, undone, or inadequate clinical or psychosocial care, or administrative care tasks that should have been done, could have been done, or needed to be done in a timely manner.

Kalisch, et al.'s,[5] definition of missed care was the most widely cited in defining OOCs (cited by 17 other authors in this review) and is described as "any aspect of required patient care that is omitted, in part or in whole, or delayed."

Any delay or failure is an omission. All articles in our review defined OOCs as unfinished, undone, or inadequate care that should have been delivered, whereas 13 articles also defined OOCs as including delayed care. However, authors varied in how they defined the need for or the appropriateness of care. For example, Dabney, et al.,[6] describe omissions as the "failure to do the right thing," while Dhaini, et al.,[7] define them as "any reduction of standard clinical practice."

Omissions can lead to adverse events. Seven articles either included adverse events as part of their definition of OOCs or studied adverse events as definitive outcomes related to OOCs. Conversely, five articles noted that OOCs were related to only the potential for adverse patient or resident outcomes but did not specify that an omission necessitated a definite adverse event. Five additional articles defined OOCs as both leading to adverse events or the potential for such events.

Omissions occur in clinical and psychosocial care. In defining types of omissions, 21 articles focused only on omissions in clinical care, 2 focused only on omissions in psychosocial care, and 9 focused on both clinical and psychosocial domains of care. Clinical care included tasks related to providing nursing care, planning care, or helping residents with tasks such as ambulation and toileting. Psychosocial care included tasks such as patient comforting, emotional care, and social care.

Fewer articles addressed OOCs in nursing homes than in hospitals (*n*=11 versus *n*=19), but studies focusing on nursing homes were more likely to include socioemotional domains of care or resident dignity and respect. Indeed, 6 of the 11 articles (55%) applying OOCs to nursing homes included psychosocial care, whereas 4 of the 19 (21%) articles that did not apply OOCs to nursing homes included psychosocial care.

Causes of omissions. Of the 34 articles in our review, 19 identified a cause of the omission. Notably, these causes were largely due to time constraints, rationed nursing care due to high rates of nurse burden, complex or complicated resident needs, and urgent or unanticipated situations that interfered with regular care.

Table 3. Common concepts used in defining OOCs

	Lists Cause of Omissions	Includes Clinical Care	Includes Psycho-Social Care	Includes Definite Adverse Outcomes	Includes Potential Adverse Outcomes	Delayed Care	Unfinished, Undone, or Inadequate Care	Applied to Nursing Homes
Simmons, 2016*		✓				✓	✓	✓
Ball, 2014	✓	✓	✓				✓	
Berlin, 2017		✓					✓	
Bittner, 2011	✓	✓	✓			✓	✓	
Carthon, 2015	✓	✓	✓		✓		✓	
Cho, 2015	✓	✓					✓	
Dabney and Kalisch, 2015	✓				✓		✓	
Dhaini, 2017	✓	✓					✓	✓
Gillespie, 2018							✓	
Gilmore-Bykovskyi, 2018		✓		✓			✓	
Gravlin, 2010	✓	✓			✓	✓	✓	
Griffiths, 2018	✓	✓		✓	✓	✓	✓	
Hayward, 2005		✓		✓	✓		✓	
Henderson, 2017	✓	✓				✓	✓	✓
Hirst, 2002		✓	✓	✓			✓	✓
Jones, 2015	✓	✓			✓		✓	
Kalisch, 2013		✓					✓	
Kalisch, 2009a	✓	✓			✓	✓	✓	
Kalisch, 2009b	✓	✓		✓	✓		✓	
Kind, 2011		✓					✓	
Malmedal, 2008			✓				✓	✓
Miller, 1976		✓					✓	✓
Naden, 2013			✓	✓			✓	✓
Nelson, 2015	✓	✓	✓	✓			✓	✓
Papastavrou, 2014	✓	✓		✓		✓	✓	

	Lists Cause of Omissions	Includes Clinical Care	Includes Psycho-Social Care	Includes Definite Adverse Outcomes	Includes Potential Adverse Outcomes	Delayed Care	Unfinished, Undone, or Inadequate Care	Applied to Nursing Homes
Papastavrou, 2016	✓	✓	✓			✓	✓	
Poghoysan, 2017		✓	✓				✓	
Recio-Saucedo, 2017		✓	✓	✓		✓	✓	✓
Schnelle, 2016		✓				✓	✓	✓
Smith, 2018		✓		✓		✓	✓	
Srulovici, 2017	✓	✓				✓	✓	
Suhonen, 2018	✓	✓		✓	✓	✓	✓	
VanFossen, 2016	✓	✓					✓	
Zúñiga, 2015	✓	✓	✓	✓	✓		✓	✓
Total across 34 articles	**19**	**30**	**11**	**12**	**10**	**13**	**34**	**11**
Percent	**56**	**88**	**32**	**35**	**29**	**38**	**100**	**32**

* AHRQ technical brief.

Adverse Events and Interventions in Nursing Homes

Consistent with the guiding PEF framework and in further support of RQ1, our literature review examined adverse events that could result from a discrepancy between a resident's needs and the care or resources provided within his or her home environment—in this case, nursing homes. In our review, we looked at when this discrepancy could be the result of OOCs. Similarly, we looked for interventions aimed at reducing these omissions by seeking to reduce the discrepancy between resident needs and the nursing home environment.

In this section, we summarize the evidence about associations between OOCs and adverse events, key characteristics of interventions reflected in the literature, and information about the data sources that have been used in detecting or evaluating omissions in the reported studies.

We found 19 adverse event domains that have been associated with OOCs in nursing home residents and might inform an operational definition of OOCs. Following, we elaborate on each of these domains and specify their connection to OOCs. Summary findings for each domain are presented in table 4.

Table 4. Evidence from the nursing home literature on adverse events and their connection to omissions of care, interventions, and data sources

Adverse Event (Number of Studies)	Supplies Evidence for These Omissions and/or Risk Factors Appropriate for Monitoring	Interventions Used	Data Sources or Measures Used
Avoidable hospitalizations (*n*=12)	**Omissions That Contribute to Incidence:** • Lack of resources for safely managing a progressive condition • Lack of communication • Lack of early detection of change in resident status • Lack of understanding of resident preferences • Lack of a palliative care plan • Lack of advanced care planning • Poor infection control (UTI and respiratory infections) • Poor teamwork/communication • Inappropriate medication use **Risk Factors Appropriate for Monitoring:** • High risk of falls and depression • Malnutrition	• OPTIMISTIC demonstration project to reduce avoidable hospitalizations • Missouri Quality Initiative (CMS Innovation Center) • INTERACT and INTERACT II • Telemedicine to improve communication and timeliness of care • TripleCare (TC; after-hours physician-covered service) • ARCHUS	• Minimum Data Set (linked with healthcare data and INTERACT data) • Long-term care and national health insurance claims data (Japan) • Missouri Quality Initiative (CMS Innovation Center) • FINE study (medical and nonmedical data) • National Survey of Residential Care Facilities • ARCHUS
Cardiovascular events (*n*=7)	**Omissions That Contribute to Incidence:** • Misdiagnoses in residents with dementia • Lack of monitoring of patients taking atypical psychoactive drugs	• Nonpharmacological interventions to reduce use of atypical antipsychotics, which increase risk for cardiovascular events • COSMOS intervention	• PARTAGE study • SHELTER study

Adverse Event (Number of Studies)	Supplies Evidence for These Omissions and/or Risk Factors Appropriate for Monitoring	Interventions Used	Data Sources or Measures Used
		• Deprescribing preventive cardiovascular medication for frail residents	
Cognitive decline (*n*=9)	**Omissions That Contribute to Incidence:** • Lack of physical activity or ADL-related programs • Greater level of unmet need **Risk Factors Appropriate for Monitoring:** • Malnourishment	• Physical activity interventions (ADL training) for residents with moderate to severe dementia • OASIS trial for residents with cognitive impairment	• Claims data • Minimum Data Set–Cognition Scale
Death—All-cause mortality (*n*=56)	**Omissions That Contribute to Incidence:** • Lack of surveillance (e.g., residents wandering) • Lack of physical and social activities • Lack of vaccinations (influenza and pneumococcal) • Incorrect diagnosis and prognosis • Poor hand hygiene practices • Poor oral hygiene practices (oral care by dental personnel associated with reduced mortality; oral care by nursing home staff associated with increased mortality) • Lack of responsibility for followup resident care • Use of physical restraints • Staffing: nurse turnover in nursing homes • Severe/abnormal weight loss	• Multifaceted hand hygiene intervention • INTERACT and INTERACT II	• Aging@NH study • National Coronial Information System (Australia) • SHELTER Study • Minimum Data Set (linked with data from INTERACT and claims data) • Claims data • INCUR • Minimum Data Set–Changes in Health, End-Stage Disease and Symptoms and Signs Scale (MDS-CHESS; predicts mortality in nursing home residents) • FRAIL-NH (predicts mortality) • Hospice Eligibility Prediction (HELP) Index (6-month mortality)

Adverse Event (Number of Studies)	Supplies Evidence for These Omissions and/or Risk Factors Appropriate for Monitoring	Interventions Used	Data Sources or Measures Used
	• Use of medication with sedatives/tranquilizers • Lack of systematic drug reviews for residents with low systolic blood pressure • Lack of communication about risk factors for death **Risk Factors Appropriate for Monitoring:** • Older age • Comorbidities • More severe dementia • Higher ADL dependency/more ADL limitations • Lower BMI • Minor urology surgery • Delirium • Falls • Urinary incontinence • Anticholinergic drug use		

Adverse Event (Number of Studies)	Supplies Evidence for These Omissions and/or Risk Factors Appropriate for Monitoring	Interventions Used	Data Sources or Measures Used
Death—Suicide (*n*=7)	**Omissions That Contribute to Incidence:** • Lack of treatment or intervention for isolation and loneliness • Lack of programs to enhance adjustment to nursing home life • Lack of communication about risk factors for suicide • Lack of environmental evaluation for suicide hazards • Lack of systematic assessment and treatment procedures for mental health disorders • Lack of staffing (larger facilities associated with higher risk) • Better Nursing Home Compare metrics associated with higher odds **Risk Factors Appropriate for Monitoring:** • Depression • Being male • Residing in nursing home <12 months • Health deterioration • PTSD • Schizophrenia	• SAMHSA's recommendations for global (e.g., providing activities to promote resident socialization and minimizing access to lethal means) and focused (e.g., training staff to recognize and respond to depression) approaches to prevent suicide among residents • PROSPECT intervention • Promoting Emotional Health and Preventing Suicide: A Toolkit for Senior Living Communities	• National Coronial Information System (Australia) • Virginia Violent Death Reporting System • Medical records • Death records • Health database

Adverse Event (Number of Studies)	Supplies Evidence for These Omissions and/or Risk Factors Appropriate for Monitoring	Interventions Used	Data Sources or Measures Used
Delirium (*n*=9)	**Omissions That Contribute to Incidence:** • Insufficient provider knowledge or awareness of medication interactions • Untreated pain **Risk Factors Appropriate for Monitoring:** • Acute infection • Pain • Use of antipsychotics	• Stop Delirium! Intervention • Hospital Elder Life Program (HELP-LTC)	• Minimum Data Set (2009 Medicare Current Beneficiary Survey; Resident Assessment Instrument)
Depression (*n*=28)	**Omissions That Contribute to Incidence:** • Lack of programs to address loneliness and isolation via social support • Lack of understanding, education, and confidence regarding identifying and treating depression • Lack of screening for depression due to insufficient training, high documentation burden, limited reimbursement, and high caseload • Lack of programs to improve family involvement (findings showed low satisfaction with family support were associated with more depression) • Untreated pain and sleep difficulties • Lack of physical activity (unclear if voluntary or due to lack of mobility support) • Lack of enjoyable activities (including exercise/mobility activities)	• BE-ACTIV Intervention (walking and talking) • ACT • PPW quality improvement intervention • Group reminiscence therapies	• Minimum Data Set

Adverse Event (Number of Studies)	Supplies Evidence for These Omissions and/or Risk Factors Appropriate for Monitoring	Interventions Used	Data Sources or Measures Used
	• Lack of relevant therapies, such as cognitive behavioral therapy and reminiscence		
Disability/functional decline (*n*=20)	**Omissions That Contribute to Incidence:** • Lack of vitamin D supplementation **Risk Factors Appropriate for Monitoring:** • Cognitive decline • Has undergone surgery (minor) • Prevalent geriatric syndromes	• Rehabilitation interventions • Multicomponent interventions that include supervised exercises	• National Long-Term Care Survey • Medicare Current Beneficiary Survey (linked to claims data) • Minimum Data Set (ADL Scale) • Precipitating Events Project
Falls (*n*=54)	**Omissions That Contribute to Incidence:** • Lack of supervision for residents at risk for falls (poor vision, multiple medications, use of walking aids, vertigo, balance problems, history of falls) • Unmet medical care needs • Lack of support for walking and mobility (staff and assistive devices) • Falls less common during walking and more common during sit-to-stand procedures • Lack of programs to improve balance and strength • Lack of timely identification of rapid health decline • Lack of screening for, and supplementation of, vitamin D deficiency • Untreated pain	• Multifactorial interventions for residents at greatest risk for falls • The Sunbeam Program (balance and moderate-intensity progressive resistance training)	• Money Follows the Person demonstration program (Connecticut) • Minimum Data Set • Video footage in LTC or nursing homes • Care by Design study (Nova Scotia) • SENIOR study • National Care Indicators Programme (New Zealand) • National Survey of Residential Care Facilities

Adverse Event (Number of Studies)	Supplies Evidence for These Omissions and/or Risk Factors Appropriate for Monitoring	Interventions Used	Data Sources or Measures Used
	• Lack of understanding and education among nurses regarding causal reasons for falls **Risk Factors Appropriate for Monitoring:** • Cardiovascular disorders • Depression • Lower BMI • Use of diuretics • More ADL-dependent • Use of an SSRI • Use of psychotropic drugs		
Incontinence (*n*=10) Urinary incontinence Fecal incontinence	**Omissions That Contribute to Incidence:** • Lack of interventions to maintain continence **Risk Factors Appropriate for Monitoring:** • White race • Physical inactivity • Greater ADL limitations • Stroke • Cognitive decline • Comorbidities	• Educational intervention for incorporating knowledge of best practices through use of workshops, assessment guidelines, and educational outreach visits	• National Care Indicators Programme (New Zealand) • Minimum Data Set
Infections—General (*n*=46)	**Omissions That Contribute to Incidence:** • Lack of infection preventionist on staff • Lack of vaccination among staff and residents • Lack of routine assessment	• AHRQ's Safety Program for Long-Term Care: Healthcare-Associated Infections/Catheter-Associated Urinary Tract Infections	• Certification and Survey Provider Enhanced Reporting data • MegaSurvey of Infection Preventionists (2015 APIC MegaSurvey)

Adverse Event (Number of Studies)	Supplies Evidence for These Omissions and/or Risk Factors Appropriate for Monitoring	Interventions Used	Data Sources or Measures Used
	• Lack of implementation of infection control practices due to boundaries related to daily workflow, collaboration, and technological infrastructure • Lack of supplementation to address low levels of zinc and vitamins E and D • Poor hygiene practices • Lack of environmental infection control practices (surface cleaning)	• Pulsed-xenon ultraviolet disinfection device to remove microbes on environmental surfaces	• National Survey of Nursing Homes • Minimum Data Set
Infections—Respiratory (*n*=10)	**Omissions That Contribute to Incidence:** • Lack of environmental infection control practices (surface cleaning) • Poor hygiene practices **Risk Factors Appropriate for Monitoring:** • Dysphagia • Vitamin D deficiency	• Pulsed-xenon ultraviolet disinfection device to remove microbes on environmental surfaces	• Minimum Data Set
Infections—UTI (*n*=14)	**Omissions That Contribute to Incidence:** • Lack of knowledge and education about risk factors and indicators • Poor safety as measured by the Nursing Home Survey on Patient Safety Culture • Lack of management support for resident safety • Lack of communication openness among staff • Poor hygiene practices	• Cooper Urinary Tract Infection Program • AHRQ's Safety Program for Long-Term Care: Healthcare-Associated Infections/Catheter-Associated Urinary Tract Infection • Pulsed-xenon ultraviolet disinfection device to remove microbes on environmental surfaces	• Nursing Home Survey on Patient Safety Culture (linked with catheter-associated UTI rates from national collaborative) • Medical chart review • Minimum Data Set

Adverse Event (Number of Studies)	Supplies Evidence for These Omissions and/or Risk Factors Appropriate for Monitoring	Interventions Used	Data Sources or Measures Used
	• Lack of environmental infection control practices (surface cleaning) **Risk Factors Appropriate for Monitoring:** • Indwelling catheter use		
Loneliness (*n*=6)	**Omissions That Contribute to Incidence:** • Lack of social support or poor social contact among residents • Lack of dignity and self-determination; deficiencies in resident input regarding care • Unaddressed grief	• Peer-led program to reduce pain management led to decreases in loneliness • REAP program for increasing social identity, reciprocal relationships, and social productivity	• Not specified
Medication errors and omissions (*n*=25)	**Omissions That Contribute to Incidence:** • Inadequate staff medication knowledge and training • Lack of interprofessional collaboration • Lack of physician and pharmacist accessibility • Poor staff/resident ratio (greater workload and time pressure cause more errors) • Most common medication omissions: vitamins D and B12 and antidepressants • Lack of medication reconciliation practices **Risk Factors Appropriate for Monitoring:** • Greater number of transfers between care settings • Number and types of medications and comorbidities • Dysphagia	• 3MR, consisting of an assessment of the patient perspective, medical history, critical appraisal of medications, a meeting between the treating elder-care physician and the pharmacist, and implementation of medication changes • ViP study intervention • Electronic Medication Administration systems • Videoconference for care transitions and medication reconciliation	• Aging@NH Study • COME-ON study (Belgium) • Electronic Medication Administrative records

Adverse Event (Number of Studies)	Supplies Evidence for These Omissions and/or Risk Factors Appropriate for Monitoring	Interventions Used	Data Sources or Measures Used
Nutrition (*n*=19) Dehydration Weight loss Malnourishment	**Omissions That Contribute to Incidence:** • Poor oral health practices • Lack of support for eating dependency • Lack of care to support dysphagia, including diet modification **Risk Factors Appropriate for Monitoring:** • Dysphagia • Eating dependency • Leaving 25% or more food uneaten • Chewing problems • Voluntary stopping of eating and drinking	• Oral liquid nutrition supplement to increase caloric intake • nutritionDay Project	• National Care Indicators Programme (New Zealand) • TURN study data (Braden nutrition subscale) • nutritionDay Project data
Pain (*n*=28)	**Omissions That Contribute to Incidence:** • Inconsistent end-of-life care (care that does not match a resident's wishes) • More unmet needs related to pain management • Poor communication between providers and an inability to communicate pain from the resident • Underuse of pain medication in cognitively impaired residents • Lack of assessment and understanding regarding pain management • Use of physical restraints	• INTERACT intervention • Meta-analysis reports that analgesics are most effective in reducing pain	• Minimum Data Set (linked with INTERACT data) • Medical chart review

Adverse Event (Number of Studies)	Supplies Evidence for These Omissions and/or Risk Factors Appropriate for Monitoring	Interventions Used	Data Sources or Measures Used
Pressure ulcers (*n*=19)	**Omissions That Contribute to Incidence:** • Lack of knowledge and physical skills • Lack of education about preventive measures • Lack of taking preventive measures (repositioning, special mattresses and chair cushions, offloading heels) • Lack of communication regarding resident responsibility • Lack of visible prioritization of preventing pressure ulcers from nursing home leadership **Risk Factors Appropriate for Monitoring:** • Deficits in ADLs • Physical impairment • Cognitive impairment	• Use of Munsell color charts to measure changes in skin tone	• National Care Indicators Programme (New Zealand) • Minimum Data Set • Dutch National Prevalence Measurement of Care Problems • National Inpatient Sample (data of Health Insurance Review and Assessment Service; Korea) • Medicare Nursing Home Compare Quality Measures report
Poor resident-centered care (*n*=3)	**Omissions That Contribute to Incidence:** • Lack of choice in wake and bed times • Not listening to residents • Inconsistent staff assignment • Poor response time • Lack of access to nature • Lack of transparency about illness and death in the resident community	• Not specified	• Not specified

Abbreviations and Acronyms

- 3MR = Multidisciplinary Multistep Medication Review
- ACT = acceptance and commitment therapy; ADLs = activities of daily living; APIC = Association for Professionals in Infection Control and Epidemiology; ARCHUS = Aged Residential Care Healthcare Utilization Study
- BE-ACTIV = Behavioral Activities Intervention; BMI = body mass index
- CMS = Centers for Medicare & Medicaid Services; COME-ON = Collaborative approach to Optimise MEdication use for Older people in Nursing homes; COSMOS = Communication, Systematic pain assessment and treatment, Medication review, Organization of activities, and Safety
- FINE = Finland Italy Netherlands Elderly study ; FRAIL-NH = Fatigue, Resistance, Ambulation, Incontinence, Loss of weight, Nutritional approach, and Help with dressing
- HELP = Hospital Eligibility Prediction Index; HELP-LTC = Hospital Elder Life Program
- INCUR = Incidence of pNeumonia and related ConseqUences in nursing home Residents; INTERACT and INTERACT II = INTErventions to Reduce Acute Care Transfers
- LTC = long-term care
- OASIS = Outcome and ASessment Information Set; OPTIMISTIC = Optimizing Patient Transfers, Impacting Medical quality, and Improving Symptoms: Transforming Institutional Care
- PARTAGE = predictive values of blood Pressure and ARterial stiffness in institutionalized very AGEd population; PPW = promoting positive well-being; PROSPECT = PRevention of Suicide in Primary care Elderly: Collaborative Trial; PTSD = post-traumatic stress disorder
- REAP = Resident Engagement and Peer Support
- SAMHSA = Substance Abuse and Mental Health Services Administration; SENIOR = Sample of Elderly Nursing home Individuals: Observational Research; SHELTER = Services and Health for Elderly in Long TERm care ; SSRI = selective serotonin reuptake inhibitor
- TC = TripleCare; TURN = Turn for Ulcer Reduction
- UTI = urinary tract infection
- ViP = Visiting Pharmacist study.

Summary of Findings on Adverse Events

The findings from this review demonstrate alignment between the adverse events specifically associated with OOCs and the adverse events highlighted in definitions of OOCs. However, the literature on adverse events does not emphasize person-centered aspects of care to the same degree as the literature defining OOCs. Person-centeredness includes residential and psychosocial aspects of nursing home care, such as social support, dignity, enjoyable activities, autonomy, and respect. OOCs that undermine the patient-centeredness of resident care may result in depression, loneliness, and increased risk for death (suicide and all-cause mortality).

The novelty and the challenge of defining and reducing OOCs in nursing homes appears to lie in the twofold purpose of nursing homes to address medical and psychosocial needs. Within the PEF framework, we can construe the following: those nursing homes that minimize OOCs and thereby reduce medical and psychosocial harms are reducing the discrepancy between residents' needs and the appropriateness of resources in their home environments.

When examining the relationships between OOCs and adverse events, authors tended to focus on causes rather than on type of omissions. The articles reviewed in this analysis demonstrate that it may be difficult to distinguish between causes of OOCs and the OOCs themselves. The results also indicate that adverse events are often not related to a single OOC. Rather, a sequence of omissions leads to the adverse event. For example, a staff person at change of shift fails to communicate a change in a resident's status, which leads to the next staff person not performing a monitoring assessment, which leaves the physician unaware of the resident's symptoms when ordering a diagnostic test, resulting in the resident suffering an acute illness exacerbation.

Some common causes in the literature for OOCs leading to adverse events include resource restrictions (e.g., staffing, time, and money), poor teamwork and communication within and between care settings, ineffective delegation of tasks, lack of education in care staff, complex resident care needs, and urgent or unexpected situations that interfere with regular care. That is, whereas some omissions are event related or at the patient level (e.g., use of restraints, medication error, poor communication), many others are programmatic or systemic in nature (e.g., lack of education/awareness, unavailability of programs, insufficient surveillance and supports). This observation has important consequences for developing an operational definition of OOCs, as current definitions tend to reflect event-level conceptualization and may not sufficiently take into account risk that is cumulative when care is omitted repeatedly over time or omitted throughout a nursing home.

Detailed Findings on Adverse Events

Avoidable hospitalizations of nursing home patients. The literature defines avoidable hospitalizations as transfers from a nursing home to a hospital that were potentially avoidable if a different or earlier action had been taken by nursing home care staff. We reviewed 12 articles about common omissions that led to avoidable hospitalizations. These omissions included communication and teamwork breakdowns (typically among care team members, but some include patient and family), poor infection control practices, inappropriate medication use, lack of detected changes in resident status, and lack of understanding of resident preferences.

Characteristics of successful interventions for reducing avoidable hospitalizations include assessment support, communication facilitation, education strategies, and documentation of resident preferences. One such program is the Interventions to Reduce Acute Care Transfers (INTERACT) program.[8] INTERACT comprises three core components: (1) early screening and management of health conditions; (2) communication, documentation, and decision support for health condition management; and (3) use of advance care planning for hospice and palliative care in nursing homes. The INTERACT intervention has been shown to decrease all-cause hospitalizations in nursing home residents by improving those factors that contribute to and constitute OOCs. Other techniques for avoiding hospitalizations include increasing access to physicians via programs such as TripleCare, which provides after-hours physician consultation, and use of telemedicine.

Cardiovascular events. Cardiovascular events, discussed in seven articles, were largely due to omissions in diagnoses and lack of monitoring of at-risk residents. Research shows that taking psychoactive medication increases residents' risk for adverse cardiovascular events. To address this increased risk, care providers may increase their monitoring of a resident's health; failure to monitor residents at increased risk for cardiovascular events may be an omission.

One option to avoid this increased cardiovascular risk would be the use of nonpharmacological interventions to reduce the use of antipsychotics. For example, the COSMOS intervention showed a reduction in the use of cardiovascular drugs for 32 percent of residents in the COSMOS person-centered care intervention; blood pressure increased for these residents between baseline and the fourth month but returned to baseline levels by the ninth month. The investigators argue that monitoring blood pressure decreases critical harms when deprescribing medicines that increase risk for cardiovascular events. Regardless, using medications that increase cardiovascular events without appropriate followup can be considered an OOC.

Cognitive decline. Cognitive decline encompassed a varying severity of cognitive impairment and was discussed in nine articles. The literature suggests that higher rates of cognitive decline may be due to omissions such as lack of physical activity or activities of daily living (ADL)-related programs, greater levels of unmet need, and malnourishment. Successful interventions used to slow or reduce cognitive decline appear to consist of physical activity interventions (e.g., ADL training) and the reframing of challenging behaviors for residents with cognitive impairment. These studies suggest that cognitive decline may serve as an indicator of an unmet need, which could constitute an OOC, rather than as behavioral problems needing antipsychotic treatment. Indeed, it is possible that not providing standard care leads to adverse events at the same time that failing to provide care that improves outcomes (beyond standard care) may also be an OOC.

Death. Death included all-cause mortality in 56 articles and suicide in 7 articles. A large portion of the literature focuses on death as a result of care omissions, likely due to its ease of measurement and the availability of assessment in secondary data sources. OOCs that may result in resident death include a lack of resident monitoring and surveillance, low vaccination rates, incorrect diagnoses and prognoses, limited physical and social activities, poor hygiene practices, lack of followup care, high nurse turnover rates, and use of physical restraints. In addition, a number of risk factors predispose residents to increased chance of death; thus, a lack of screening for these risk factors may also constitute an omission. These risk factors include older age, severe morbidity, severe dementia, ADL dependency, lower body mass index (BMI), surgeries, delirium, falls, and anticholinergic drug use.

Interventions in care practice relevant to reducing all-cause mortality (excluding suicide) include hygiene interventions to reduce the number of deaths attributable to poor hygiene practices, poor oral health, and infection. Similarly, several tools have been developed to screen residents for mortality risk, including the MDS-CHESS, the FRAIL-NH, and the HELP index. Screening for residents at risk for mortality may indicate a need to initiate hospice or palliative care, thereby reducing resident pain and encouraging communication of resident status to family.

With regard to suicide, the literature points to several areas where OOCs may contribute to incidence. The literature indicates that isolation, loneliness, and poor adjustment to nursing homes are major risk factors for suicide and may be attenuated through targeted programs. An absence of targeted programs for those at risk for suicide, therefore, may be an omission. Similarly, suicide is associated with several risk factors that are subject to systematic screening among nursing home residents, including depression, health deterioration, post-traumatic stress disorder (PTSD), and schizophrenia. Thus, failure to conduct screening or to act on results may be considered an OOC.

Few interventions in the reviewed literature suggest formal programs for reducing resident suicide or suicidal ideation. Typical treatment to reduce risk for suicide might include treatment for depression, PTSD, and schizophrenia. Similarly, the Substance Abuse and Mental Health Services Administration recommends both global (e.g., provision of activities to promote resident socialization) and targeted (e.g., training staff to recognize and respond to depression) approaches to prevent suicide in residents.

Delirium. Delirium is often defined as mental confusion and emotional disruption in the absence of diagnosed cognitive decline. It was the focus of nine articles and may be caused by OOCs related to medication interactions (or lack of knowledge thereof), untreated pain, acute infection, and use of antipsychotics. Successful interventions—such as Stop Delirium!—included consultation with a specialist in delirium via educational sessions with and additional resources for nursing home staff. Another program, HELP-LTC, included delirium risk-reducing activities and incorporated a dedicated certified nursing assistant (CNA) to deliver the HELP-LTC intervention. The intervention included activities such as reminiscence therapy, physical exercise, snacks and drinks, relaxation visits, music, and hand or foot massages. The CNA also communicated with the unit staff to tailor activities and promote resident safety. Although the results of the HELP-LTC intervention indicated a reduction in delirium severity, it is unclear whether improvements were due to increased communication between a dedicated CNA and the rest of the nursing staff or the actual delirium risk-reducing activities.

Depression. Twenty-eight articles discussed resident-centered medical and social omissions that contribute to increased rates of depression. These include failures to recognize and treat depression but also OOCs that might prevent depression. For example, failure to screen for depression, insufficient training among staff, high documentation burden, and high staff member caseload have all been defined as omissions that may contribute to depression rates. Similarly, a lack of understanding, education, and confidence among staff regarding the treatment of depression can lead to unaddressed depressed mood. Thus, a lack of programs and trainings aimed at increasing staff awareness of and knowledge about depression treatment may constitute an omission. Finally, the lack of physical activity programs, relevant therapies, and enjoyable activities for residents is associated with higher rates of depression, as are untreated pain and unaddressed sleep difficulties.

Disability/functional decline. Functional decline encompasses ADL disability and reductions in physical mobility and performance and was the focus of 20 articles. The lack of screening for risk factors that predict disability and functional decline may constitute an OOC; risk factors include cognitive decline, surgeries, geriatric syndromes, and vitamin D deficiency. Of the evidence reviewed, rehabilitation and multicomponent interventions that include supervised exercises have been shown to slow or alter functional decline.

Falls. Falls were the second most commonly discussed adverse event (with death being the first) and were the focus of 54 articles. Our findings are consistent with the findings of AHRQ's 2016 report on resident safety. Risk factors for falls include poor vision, use of multiple medications, relianceying on walking aids, vertigo, balance problems, low BMI, a history of falls, depression, and cardiovascular disorders. Residents with these risk factors may need additional supervision and surveillance, especially during sit-to-stand procedures, when falls are more common (as compared with falls during walking). Thus, a failure to provide adequate supervision and surveillance of residents who have these risk factors may be an omission. A lack of programs for improving strength and balance may also be an omission, especially in settings such as nursing homes, where the population is already at higher risk for general frailty. Successful interventions, such as the Sunbeam Program, incorporated supervised balance exercises with progressive resistance training with long-term (7–12 months) maintenance and functional group exercise sessions.

Incontinence. We found 10 articles that addressed the link between OOCs and incontinence. Although these articles identify risk factors for incontinence—including physical inactivity, greater ADL limitation, cognitive decline, and comorbidities—they do not describe how care staff might act to reduce incontinence. Nonetheless, they suggest that incontinence can be reduced through interventions to maintain continence, so failure to deliver such incontinence treatment could qualify as an omission. Educational programs incorporating best practices through workshops and systematic assessment guidelines to improve providers' knowledge and skills have successfully reduced the prevalence of incontinence.

Infections. A large body of literature is devoted to reducing infections in nursing homes in general. Forty-six articles focused on OOCs related to general infection risk, 11 focused on OOCs and respiratory infections, and 14 focused on OOCs and urinary tract infections (UTIs). The omissions discussed consisted of poor infection prevention and hygiene practices, which were often influenced by lack of knowledge and education about infection prevention and hygiene among staff. These findings are consistent with AHRQ's 2016 resident safety report.

Loneliness. Loneliness was addressed in six articles in our review. OOCs related to loneliness included a lack of social contact and social support, lack of dignity and self-determination, and unaddressed grief. Programs that successfully reduced loneliness increased peer interactions, engagement, and social support.

Medication omissions. Medication errors are prevalent in the OOC literature and constitute 25 articles in this review. AHRQ's 2016 report on resident safety includes medication omissions under the larger category of medication errors. Avoidable causes of medication omissions include inadequate medication knowledge and training among staff, lack of collaboration

between staff and settings, lack of access to a physician or pharmacist, and poor staff-to-resident ratio. Similarly, the lack of medication reconciliation practices is of particular importance because it entails systematically reviewing (in)consistencies between care settings and necessitates communication between providers. Residents at greatest risk for medication omissions include those with a greater numbers of care transfers, those with a greater number and type of medications and comorbidities, and those with dysphagia.

Several interventions that successfully reduced medication errors and omissions were found in the literature including the Multidisciplinary Multistep Medication Review (3MR). This program consists of assessing resident perspective, reviewing patients' medical history, reviewing and appraising medications, holding a meeting between the physician and pharmacist, and implementing changes. This medication reconciliation program increased communication between care providers and identified problematic or missing medications. Alternatives to this intervention include the Visiting Pharmacist (ViP) intervention and the use of videoconference resources for care transitions and medication reconciliation.

Nutrition. Our review of nutrition-related adverse outcomes included dehydration, weight loss, and malnourishment in 19 articles. Risk factors for nutrition-related problems included dysphagia, eating dependency, leaving 25 percent or more food on one's plate, and voluntary stopping of eating and drinking (VSED). Thus, a lack of screening for and support to ameliorate these risk factors may qualify as an omission. Examples of risk-oriented care omissions that might contribute to poor nutrition include lack of support for eating dependency and lack of diet modification for residents with dysphagia. Poor oral health practices are also associated with nutrition outcomes, indicating that improving resident oral health may improve these outcomes. Although extreme weight loss and malnourishment are linked to OOCs in nursing home settings, little evidence linked dehydration to OOCs. The nutritionDay Project is one example of an intervention aimed at reducing malnutrition and increasing knowledge and awareness of nutrition performance in nursing homes.

Pain. Pain was evaluated in 27 articles in our review. Causes of pain that may be related to OOCs include end-of-life or palliative care that does not align with resident wishes, poor communication between providers, underuse of pain medicine in residents with cognitive decline, lack of assessment regarding pain, and use of physical restraints. A meta-analysis included in our report found that analgesics are the most effective medication for reducing pain, and underuse of analgesics may constitute an omission.

Pressure ulcers. AHRQ's 2016 resident safety report noted that the literature on pressure ulcers focused on treatment of existing wounds rather than preventive guidelines. Our analysis of 19 articles points to several preventive measures, the absence of which is an omission. Preventive

measures to reduce the development of pressure ulcers include repositioning, special mattresses and chair cushions, offloading residents' heels, and communicating responsibility of resident care to designated staff. Our review also found that lack of knowledge and physical skills to complete preventive measures were factors contributing to pressure ulcers.

Poor resident-centered care. Poor resident-centered care was highlighted in three articles and focuses on aspects of dignity and autonomy among nursing home residents. Omissions of high-quality resident-centered care may entail a lack of resident choice in wake and sleep times, not being heard, poor response time from staff, lack of access to nature, and lack of transparency about death in the resident community. Poor resident-centered care may also be related to depression and loneliness due to a lack of engaging and meaningful activities that support social identity, productivity, and reciprocal relationships.

We also noted that few articles emerged that focused on psychosocial or quality-of-life adverse events apart from those pertaining to resident-centered care. Part of this may be due to our search terms, which did not include nonclinical domains. The use of broad search terms such as "adverse events" likely yielded literature representative of resident quality of life, psychosocial omissions, and adverse events but may well underrepresent the number of studies in the period covered by our review. Given that our search provided so few studies, it is possible that this gap in the literature warrants either supplemental literature review or additional research studies.

Data Sources Used in the Reviewed Literature

In support of RQ2, we also documented secondary data sources used in the literature. Studies focused on OOCs relied heavily on questionnaires, many of which focused on nursing practices, staffing practices, or safety culture. In addition, studies often used medical and administrative records, including staffing records, which looked at data such as absenteeism. A few studies used other data sources, such as claims, discharge summaries, and interviews.

Looking across articles for all adverse events, the most commonly used data source was the Minimum Data Set (MDS), which was used in 14 of the 19 domains. Other commonly used data sources included claims data, medical charts, INTERACT data, and national survey data sources, such as the National Survey of Residential Care Facilities and the Medicare Current Beneficiary Survey. Many other data sources were particular to a single adverse event. For example, sources of mortality data or hospitalization data were used only in studies assessing omissions for those specific events. Finally, data sources for foreign countries are listed because our review included non-U.S. studies; similar data sources may not be available in the United States.

Several measures of nursing home quality are available (e.g., deficiency citations in the Online Survey, Certification, and Reporting [OSCAR] data; quality measures from the Centers for Medicare & Medicaid Services [CMS]; and Nursing Home Compare), but these do not directly measure care staff-reported assessments of care omissions, as are available through surveys such as the MISSCARE survey. Clinical intervention programs, such as INTERACT, are useful in that they capture OOCs and can be linked to claims data to evaluate adverse events, but data from INTERACT are not widely available.

AHRQ Resources Related to Omissions of Care

We found seven resources published on AHRQ's website that were relevant to OOCs in nursing home settings. They are:

1. **Nursing Home Survey on Patient Safety Culture**, which evaluates staff- and resident-reported perceptions and incidents related to patient safety. These surveys may be useful in identifying areas of omission and related adverse events and could also be used concurrently to evaluate discrepancies between staff and resident evaluations.
2. **AHRQ Quality Indicators** include patient safety measures that focus on avoidable errors. These measures identify adverse events or the potential for adverse events that may need further evaluation.
3. The **CUSP toolkit** is an intervention meant to encourage clinical practices that reflect best practices in patient safety; it engages frontline staff but focuses mostly on infection prevention.
4. **AHRQ's Safety Program for Nursing Homes: On-Time Prevention** focuses on pressure ulcer prevention, healing, avoidable hospitalizations, and fall prevention. This resource uses medical records to identify residents at risk for adverse events and allows staff to intervene early, thus avoiding a potential OOC. This intervention also uses a facilitator, who is someone who helps nursing homes integrate reports of adverse events into care planning and encourages communication among staff.
5. The **Falls Management Program** is aimed at reducing OOCs related to lack of person-centered care through resident engagement and staff education regarding fall care processes.
6. The **Team STEPPS** resource is meant to increase communication and teamwork among healthcare providers, which are known to be integral to reducing OOCs and patient harm.
7. The **Common Formats for Event Reporting in Nursing Homes** resource allows care providers to report patient safety events as soon after an incident as possible. Types of

events include: (1) incidents, which are errors or events that adversely affect the resident; (2) near-misses, which are errors or events that had the potential to affect the resident; and (3) unsafe conditions, which are events that increase risk for adverse events. Care providers can report incidents, near-misses, or unsafe conditions for problems related to devices or medical supplies, falls, infections, medications, and pressure ulcers. This resource has the potential to link adverse events (incidents and near-misses) with their possible causes (unsafe conditions and OOCs).

Consistent with the findings from the peer-reviewed literature, these resources support the need for targeting and reducing OOCs related to adverse events in nursing homes. More research is needed to evaluate the extent to which these resources have been used in the field, particularly the Nursing Home Surveys on Patient Safety Culture and electronic resources such as AHRQ Quality Indicators and On-Time Prevention.

Gray Literature, Web-Based Literature, and Tools

Our search of gray literature and web-based resources yielded limited results, as did our request for suggestions from our experts and stakeholders. Our search of AARP's website yielded three results, as did our search of LeadingAge's website.

Resources from AARP focused on disaster preparedness and unreported abuse, which may constitute OOCs. Both dimensions could inform our definition of OOCs and might point to additional quality measures needed to ensure comprehensive resident care. Similarly, low nursing home staff hours were also highlighted, which is consistent with results from our review of the peer-reviewed literature.

Resources from LeadingAge were related to the INTERACT website, which we discuss in the results of the peer-reviewed literature, and quality measures for nursing homes. These quality measures include LeadingAge's 5-star analysis report for nursing homes, which includes domains related to the quality of the nursing home environment, mistreatment, nutrition, quality of care, resident rights, and complaints, as well as information about staffing hours.

The second quality measure highlighted on LeadingAge's website is the National Voluntary Consensus Standards for Nursing Home Care, which have been used to inform the development of Nursing Home Compare. The following domains are considered when determining quality from the Consensus Standards: (1) clinical care; (2) functional status (cognitive and physical); (3) structural characteristics; (4) quality of life; (5) satisfaction of residents, family, and staff; (6) participation in care management; and (7) external assessments of quality, including accreditation survey results, deficiencies, and complaints. Thus, any event that might compromise these standards of care and the lack of support for these standards of care may constitute an omission.

We will need more input from our experts and stakeholders regarding these resources and whether they offer novel contributions to our conceptualization of OOCs in nursing home settings.

Gap Analysis

The results of our review suggest that a large body of literature exists concerning consequences surrounding OOCs. However, most of these findings report long lists of potential omissions and risk factors and mainly focus on medical/clinical domains of OOCs. Therefore, clear evidence is lacking that would permit researchers and clinicians to understand *which* omissions or risk factors (that should be monitored) to prioritize based on their relative impact on a resident or their degree of contribution toward an adverse event.

OOCs are often similar across multiple adverse events. But a gap in the evidence exists about whether these omissions collectively contribute to adverse outcomes in general or whether specific features of omissions are relevant to each adverse outcome. For example, does poor communication generally contribute to poor outcomes, and are there *specific* communication failures relevant to death versus depression? In turn, this question reflects the underlying gap that this project seeks to address, namely, the lack of a widely accepted, readily accessible way of consistently determining when OOCs are occurring.

Potential research questions for the field include:

- Which omissions are most important? And under what conditions?
- Which risk factors are most important? And under what conditions?
- How might resident-centered insights influence the prioritization of these risk factors to maximize resident satisfaction and ensure care that aligns with resident wishes?
- What are effective decision-making tools that might help prioritize efforts to target OOCs?

The ubiquitous focus of the literature on medical/clinical domains of OOCs echoes the major differentiation between OOC definitions applied to nursing homes and OOC definitions applied to hospital settings: limited consideration given to patient-centered care in a way that reflects residential, rather than short-term, acute status.

Our literature review revealed a need for more research that explores omissions of psychosocial care and related adverse events. Little attention has been directed toward psychosocial outcomes, adverse events, and resident well-being, despite some research suggesting their association with depression, loneliness, and suicide risk.

Addressing this gap in the literature requires more research that establishes causality between omissions related to poor resident-centered care and adverse events apart from the influence of clinical omissions that may also increase the likelihood of such events. For example, depression is known to co-occur with a number of chronic conditions, indicating that care providers in nursing homes may attribute depressed mood to multimorbidity. Such attribution errors may overlook other factors that cause depression, such as a lack of social support and meaningful activities in the nursing home setting.

Future intervention studies might explore changes in mood disorders following improvements in patient-centered psychosocial care while controlling for other factors that affect adverse events. In general, and consistent with AHRQ's 2016 resident safety report, more work is needed that rigorously evaluates person-centered care.

Potential research questions for the field include:

- What costs could result from switching from a focus on medical outcomes and associatied omissions to a focus on psychosocial care and reducing omissions of psychosocial care?
- Are there additional health-related adverse events that may be caused by omissions of psychosocial care among nursing home residents?
- Are there additional psychosocial adverse events that may be caused by omissions of clinical care among nursing home residents?
- How does the nursing home environment relate to adverse events?
- Under what circumstances are omissions of psychosocial care consequential, and under what circumstances are they inconsequential?
- What are ways to measure engagement in psychosocial activities, and how do care providers ensure that engagement meets residents' preferences?

Apart from the Minimum Data Set and medical record analyses, we found relative inconsistency in data sources used to determine adverse events related to OOCs in nursing homes. Interventions such as INTERACT seem to have rich data regarding nursing home and resident characteristics, but these data may not be widely available. Similarly, a number of studies used measures such as the MISSCARE survey, which captures self-reported activities of missed care but does not evaluate the consequences of OOCs. Efforts to streamline the assessment of OOCs and adverse events are needed to better understand their relationship. For example, nurses who are assigned to specific residents in a nursing home ward might be surveyed to assess missed care tasks, which could then be used to explore adverse outcomes in residents under their

direct care. A challenge here is the apparent diffusion of responsibility for resident care in nursing homes, which makes it difficult to determine which OOCs influence which adverse events.

Potential research questions for the field include:

- What methods of linking OOC assessment with adverse events are most widely available and can be widely adopted and implemented?
- What is the burden of regularly reporting on OOCs by nurses, who are already challenged with time constraints and high numbers of residents?

Discussion

This report is intended to support further work by the project team, technical expert panel, and stakeholders to develop a definition of OOCs and guidance for the field. Several key issues emerged from the review that suggested initial questions for consideration in that process:

- Is a lack of monitoring of known risk factors an OOC?
- How can the definition best distinguish between OOCs and the causes of omissions?
- Is a lack of providing interventions that reduce risks for adverse events an omission?
- How should the definition or its guidance take into account differences between omissions that could result in immediate or direct harm and omissions that cumulatively or systemically contribute to harm?

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Appendix A. Definitions of Omissions of Care, Types of Article, Care Settings, and Major Findings for Empirical Works

Source (first author, date: title)	Type of Article	Care Setting	Definition of Omissions of Care and Major Study Findings (if applicable)	Data Sources
Simmons, 2016: Resident safety practices in nursing home settings	Review; AHRQ Technical Brief	Nursing homes	"Care omissions can be defined as (1) care documented in a resident's medical record but not actually provided by staff; and, (2) the presence of a clinical condition not identified by staff and thus not reflected in the care plan and/or treatment decisions. Finally, (3) prolonged delays in care delivery wherein care is provided but not in a timely manner may occur (e.g., delayed incontinence care or repositioning)."	Review – NA
Ball, 2014: "Care left undone" during nursing shifts: Associations with workload and perceived quality of care	Empirical: Quantitative	Hospital	"Care left undone, including (1) comforting or talking with patients, (2) educating patients, and (3) developing/updating nursing care plans." Results showed that a greater number of patients per nurse was associated with more tasks left undone.	Cross-sectional analysis of primary survey data from 2,917 RNs in 46 hospitals in England Measures included: • Survey on work environment and job satisfaction • AHRQ's survey on patient safety culture • Survey of care left undone

Source (first author, date: title)	Type of Article	Care Setting	Definition of Omissions of Care and Major Study Findings (if applicable)	Data Sources
Berlin, 2017: Medical errors, malpractice, and defensive medicine: An ill-fated triad	Review	NA	"The physician failed to do something right."	Review – NA
Bittner, 2011: Unraveling care omissions	Review	NA	"Missed nursing care [is care] that is omitted in part or whole or delayed. Nine areas of care omission in nursing include ambulation, turning, delayed or missed feedings, patient teaching, discharge planning, emotional support, hygiene, intake and output documentation, and surveillance." Results showed that "Reasons for omitted care include too few staff, poor use of existing staff resources, increased time required for nursing interventions, poor teamwork, ineffective delegation, habits of cutting corners, and denial of the issue and impact."	Review – NA

Source (first author, date: title)	Type of Article	Care Setting	Definition of Omissions of Care and Major Study Findings (if applicable)	Data Sources
Carthon, 2015: The quality of hospital work environments and missed nursing care is linked to heart failure readmissions: A cross-sectional study of U.S. hospitals	Empirical: Quantitative	Hospital	"Care that nurses regard as necessary but was left undone on their last shift due to a lack of time, and which places patients in harm's way." Results showed that common missed care tasks included talking to and comforting patients, developing and updating care plans, and educating patients and families.	Cross-sectional analysis of three linked secondary data sources: 1. University of Pennsylvania Multi-State Nursing Care and Patient Survey of registered nurses 2. Administrative patient discharge records 3. The American Hospital Association Annual Survey
Cho, 2015: Effects of increasing nurse staffing on missed nursing care	Empirical: Quantitative	Hospital	"Missed nursing care is the omission of any aspect of required nursing care." Results showed that nurses in hospital units with high levels of staff reported fewer missed care activities than nurses in units with low levels of staff. Missed care in units with high levels of staff was less common in patient turning, oral care, bathing and skin care, patient assessments at each shift, toileting, and feeding and setting up meals.	Cross-sectional analysis of primary survey data from 232 nurses in 13 general nursing units in Korea. Measures included: MISSCARE survey (perception of missed care and reasons for missed care)

Source (first author, date: title)	Type of Article	Care Setting	Definition of Omissions of Care and Major Study Findings (if applicable)	Data Sources
Dabney, 2015: Nurse staffing levels and patient-reported missed nursing care	Empirical: Quantitative	Hospital	Errors of omission are defined as "failure to do the right thing" and result in the potential for undesirable outcomes. Results showed that patients reported that it took more time to receive nursing care when there were fewer total nursing staff hours per patient, fewer registered nurses working directly with patients, and fewer registered nurses on staff.	Cross-sectional analysis of secondary data from 729 patients in 20 units of two hospitals linked with administrative records (ARs) Measures included: • MISSCARE survey for patients (communication, timeliness, basic care) • Total nursing staff hours of care per patient-day • RN skill mix
Dhaini, 2017: Are nursing home care workers' health and presenteeism associated with implicit rationing of care? A cross-sectional multi-site study	Empirical: Quantitative	Nursing homes	Task omission is defined as any reduction of standard clinical practice, including nursing tasks directly related to patient care and safety. This study examined the impact of care omissions on staff rather than patients. Results showed that care worker health complaints were positively associated with rationing resident care tasks.	Cross-sectional analysis of secondary data from 3,239 care workers in the SHURP Measures included: • BERNCA survey on nursing care rationing • Self-reported physical and mental health problems • Presenteeism question • PES-NWI survey on work environment

Source (first author, date: title)	Type of Article	Care Setting	Definition of Omissions of Care and Major Study Findings (if applicable)	Data Sources
Gillespie, 2018: Patient-centered insights: Using health care complaints to reveal hotspots and blind spots in quality and safety	Empirical: Mixed Methods	Mixed; does not include nursing homes	"An error of omission is an action that is not performed, whereas an error of commission is an action that is performed incorrectly." "Errors of omission are widespread in health care, and estimates of preventable harm would increase dramatically if errors of omission could be assessed reliably. Detecting errors of omission is difficult, because people rarely observe or take responsibility for what has not happened. Moreover, if the omission was deliberate, it is unlikely to be self-reported. Health care complaints may provide data on omissions because patients usually experience their consequences."	Cross-sectional analysis of secondary data from 1,110 patient complaints from England's National Health Service
Gilmore-Bykovskyi, 2018: Hospital discharge documentation of a designated clinician for followup care and 30-day outcomes in hip fracture and stroke patients discharged to sub-acute care	Empirical: Quantitative	Hospital	Omissions were defined in terms of "inadequate or inaccurate communication between care settings that may lead to significant distress for patients and their caregivers." Results showed that patients whose discharge plans did not include a designated physician for followup care were more likely to be hospitalized or die.	Retrospective cohort study of secondary data for 1,130 patients; Medicare claims data were linked with hospital administrative data.

Source (first author, date: title)	Type of Article	Care Setting	Definition of Omissions of Care and Major Study Findings (if applicable)	Data Sources
Gravlin, 2010: Nurses' and nursing assistants' reports of missed care and delegation	Empirical: Quantitative	Hospital	"Missed nursing care is any aspect of required care that is omitted in part or in whole or delayed and has the potential to lead to adverse patient outcomes." Errors of omission may also include care rationing. Results showed that missed care included turning, ambulating, feeding, oral care, and toileting and was positively associated with patient volume, heavy admission or discharge activity, and inadequate nursing staff.	Cross-sectional analysis of primary data from 241 RNs and 99 nursing assistants Measures included: • MISSCARE survey 2 • Delegation questionnaire • Hospital unit characteristic questionnaire
Griffiths, 2018: The association between nurse staffing and omissions in nursing care: A systematic review	Systematic Review	Mixed; does not include nursing homes	"… missed nursing care [is] defined as any aspect of care that is omitted or delayed, in part or in whole … [and] may be associated with adverse patient outcomes." Studies of potentially avoidable deaths in hospitals demonstrate how omissions by nursing staff can lead to serious adverse outcomes. For example, reports of avoidable deaths in hospitals identify that a failure to measure patients' vital signs, recognize the early signs of deterioration, communicate abnormal observations, and/or provide an adequate response are frequently associated with avoidable deaths. Consequently, omissions in essential care, in particular surveillance to identify and prevent deterioration, have been hypothesized as the mechanism through which mortality rates are influenced by nurse staffing levels.	Systematic review of 18 articles focused on "missed care" or "implicit rationing" or "task left undone" or "unfinished care" Measures in reviewed studies included: • IHOC survey • RN4CAST • MISSCARE • MISSCARE patient • BERNCA • QTDS (delivered)

Source (first author, date: title)	Type of Article	Care Setting	Definition of Omissions of Care and Major Study Findings (if applicable)	Data Sources
Hayward, 2005: Sins of omission: Getting too little medical care may be the greatest threat to patient safety	Empirical: Quantitative	Hospital	"A medical error resulting in an inappropriate increased risk of disease-related adverse event(s) resulting from receiving too little treatment (underuse). Errors of omission include quality problems such as delays in diagnosis, subtherapeutic doses of medications, and failure to provide indicated treatments. Omissions/errors of underuse result in substantive risk of preventable disease-related adverse events. Care omissions can be classified based on attributes, including care function (diagnosis/assessment/monitoring, treatment, prevention/screening, and unclear/not specified) and clinical modality (history and exam, diagnostic testing, medications, immunizations, education/counseling, surgery/procedures/therapy, visit interval/referral/admission, and unclear/not specified."	Retrospective cohort study of 621 patients from 12 VA healthcare systems; data about quality problems came from inpatient and outpatient records

Source (first author, date: title)	Type of Article	Care Setting	Definition of Omissions of Care and Major Study Findings (if applicable)	Data Sources
Henderson, 2017: Missed care in residential aged care in Australia: An exploratory study	Empirical: Mixed Methods	Nursing homes	"The concept of rationed care has been extended to include missed, delayed or omitted care once the patient is in hospital. In these cases, the delay or omission is the direct responsibility of doctors, nurse and allied health professionals. These omissions, at the point of care delivery, are also a result of financial constraints, such as rising labor costs, along with the high cost of medical technologies that allow for shorter patient length of stay, and heightened patient expectations." Results showed that the omission of unplanned care (toileting and answering patient calls) was common among nursing staff. Reasons for missed care were staffing shortages and difficulties meeting complex care needs due to increased resident acuity and fewer skilled nurses.	Cross-sectional analysis of primary data from 922 nurses and other care workers in Australia Measures included: • MISSCARE survey • Open-ended questions about missed care
Hirst, 2002: Defining resident abuse within the culture of long-term care institutions	Empirical: Qualitative	Nursing homes	The results classified resident abuse into omission or commission. Omissions were acts/behaviors not performed, or the decision not to perform act/behavior was not made. These may include failure to meet patient physical and psychosocial needs. Resident abuse that constitutes omissions of care results in a lack of choice on the part of the resident. Examples include failure to take a resident to the restroom, not providing pain medication, forced activity participation, not talking or listening to the resident, not knocking on the resident's door before entering, and not closing the bathroom door.	Qualitative analysis of interview data from 10 RNs to answer the question, "What is the definition of resident abuse used by registered nurses working in long-term care settings?"

Source (first author, date: title)	Type of Article	Care Setting	Definition of Omissions of Care and Major Study Findings (if applicable)	Data Sources
Jones, 2015: Unfinished nursing care, missed care, and implicitly rationed care: State of the science review	Systematic Review	Hospital	"Unfinished care is conceptualized as a three-pronged phenomenon consisting of a problem (resource/time scarcity), a process (clinical decision making to prioritize and ration care), and an outcome (care left undone) … Underuse occurs when health-care services that would have produced favorable patient outcomes are not provided. Each failure to deliver beneficial services represents a missed opportunity to improve health outcomes and is a form of medical error... The first quantitative report of unfinished care came from the International Hospital Outcomes Research Consortium (IHORC) under the term nursing care left undone. This term was subsequently used interchangeably with unfinished care and tasks undone and defined simply as nursing tasks left undone because nurses lack the time to undertake them. Five additional terms with similar definitions were subsequently introduced: care left undone, task incompletion, unmet nursing care needs, implicit rationing of nursing care, and missed nursing care."	Systematic review of 54 articles focused on "implicit rationing" or "missed care" or "tasks undone" or "unfinished care" Measures in reviewed studies included: • TU-13 • TU-7 • TU-9 • TU-5 • BERNCA • PIRNCA • NEWRI • MISSCARE
Kalisch, 2013: Missed nursing care, level of staffing, and job satisfaction	Empirical: Quantitative	Hospital	"Missed nursing care is an act of omission and includes any aspect of standard and required nursing care that is not completed." The study found no associations between staffing levels or job satisfaction and missed care.	Cross-sectional analysis of primary data from 747 RNs in the U.S. and Lebanon Measures included: • MISSCARE survey • Staffing level question • Job satisfaction question

Source (first author, date: title)	Type of Article	Care Setting	Definition of Omissions of Care and Major Study Findings (if applicable)	Data Sources
Kalisch, 2009a: Missed nursing care: A concept analysis	Empirical: Qualitative/ Theoretical	Hospital	"Missed nursing care refers to any aspect of required patient care that is omitted, in part or in whole, or delayed." The paper provides a process framework for understanding antecedents, care process, and care providers' internal processes that cause missed nursing care and affect patient outcomes.	Cross-sectional analysis of primary data from 459 nurses Measures included: • MISSCARE survey
Kalisch, 2009b: Missed nursing care: Errors of omission	Empirical: Quantitative	Hospital	An act of omission is failing to do the right thing, such as ambulating a patient as needed, that leads to an adverse outcome or has significant potential for such outcome. Results showed that major domains of missed care included patient assessment, interventions (individual needs/unplanned care and basic/planned care), and planning. Reasons for omissions included limited labor resources, material resources, and poor communication.	Qualitative concept analysis of published articles focused on "missed nursing care"
Kind, 2011: Omission of dysphagia therapies in hospital discharge communications	Empirical: Quantitative	Hospital	Omitted care is conceptualized as missing care plan recommendations in hospital discharge summaries. Results showed that discharge summaries omitted all categories of provider recommendations at notably high rates for patients with dysphagia-specific accommodations.	Retrospective cohort study of 187 patients; data regarding dysphagia recommendation omissions in discharge summaries came from hospital notes and discharge summaries

Source (first author, date: title)	Type of Article	Care Setting	Definition of Omissions of Care and Major Study Findings (if applicable)	Data Sources
Malmedal, 2008: Inadequate care in Norwegian nursing homes – as reported by nursing staff	Empirical: Quantitative	Nursing homes	Inadequate care includes abuse, violence, neglect, and maltreatment, all of which can be intentional or unintentional. Inadequate care results from the presence of unmet needs for services or assistance that threaten the physical and psychological well-being of the individual. Results showed that 91% of staff had observed at least one act of inadequate care, and 87% had committed one act of inadequate care. Acts of negligence were most frequently reported.	Cross-sectional analysis of primary data from 616 nursing home staff members in Norway Measures included: • Six-part questionnaire: (1) staff background, (2) job satisfaction, (3) resident behavior, (4) staff behavior in forms of inadequate care, (5) perceived reasons for inadequate care, (6) whistle blowing
Miller, 1976: Errors and omission in diagnostic records on admission of patients to a nursing home	Empirical: Quantitative	Mixed; includes nursing homes	Omission errors manifested as diagnostic inconsistencies between referring physicians and medical staff at nursing home admission. The authors pointed to issues with correct diagnoses when the patient's behavioral issues may interfere with the identification of physical disease symptoms.	Cross-sectional analysis of primary and secondary diagnoses for 100 recently admitted nursing home residents

Source (first author, date: title)	Type of Article	Care Setting	Definition of Omissions of Care and Major Study Findings (if applicable)	Data Sources
Naden, 2013: Aspects of indignity in nursing home residences as experienced by family caregivers	Empirical: Qualitative	Nursing homes	"Acts of omission are offences that consist of not doing what one reasonably ought to do. Acts of omission, independent of the causes, describes accidents and behavior that should never happen in elderly care, whether consciously or unconsciously. Abandonment related to indifference concerning the resident's physical health is a kind of act of omission." The results showed that acts of omission can lead to deprivation of resident dignity, such as when residents are not taken to the restroom, food is placed out of reach, and residents are not helped with basic ADLs.	Qualitative analysis of interview data from 28 family caregivers of nursing home residents who answered the question, "How is nursing home residents' dignity maintained, promoted, or deprived from the perspective of family caregivers?"

Source (first author, date: title)	Type of Article	Care Setting	Definition of Omissions of Care and Major Study Findings (if applicable)	Data Sources
Nelson, 2015: Relationship between missed care and urinary tract infections in nursing homes	Empirical: Quantitative	Nursing homes	"Necessary but uncompleted nursing care activities, commonly labeled missed care, are indicators of impaired nursing processes and overall poor care quality … Within the emerging literature, there are several labels that are used to embody missed care, including nursing care left undone and implicit rationing of nursing care. Regardless of minor differences, these labels each represent necessary nursing activities that are partially or fully omitted … The concept of missed care has further been described as an error of omission and can include activities such as failure to provide needed patient education, emotional support, timely medication administration, developing and documenting plans of care, and assessment and reassessment as well as many more. Inadequate labor resources, increased workload, and lack of teamwork contribute to missed care within the acute care environment." Results showed that timely administration of medication, adequate patient surveillance, performance of necessary treatments and procedures, comforting/talking with patients, patient and family education, documented nursing care, and coordinated patient care were all associated with a lower prevalence of resident urinary tract infections.	Cross-sectional analysis of secondary data from 340 nurses in 63 nursing homes Measures included: • Nurse reports of missed care from the Multi-State Nursing Care and Patient Survey Study • Nursing Home Compare data

Source (first author, date: title)	Type of Article	Care Setting	Definition of Omissions of Care and Major Study Findings (if applicable)	Data Sources
Papastavrou, 2014: The hidden ethical element of nursing care rationing	Empirical: Qualitative	Hospital	"Rationing has been defined as the withholding of or failure to carry out necessary nursing tasks, or nursing care that has been omitted (either partially or totally) or delayed, or care prioritization due to inadequate resources such as time and staff." Results showed that themes related to nursing care rationing were priorities related to care, professional roles and responsibilities and conflicts, environmental factors influencing care omissions, and patient outcomes related to rationing.	Qualitative analysis of interview data from 23 nurses to explore perceptions about and experiences related to prioritizations, care omissions, and rationing nursing care
Papastavrou, 2016: To what extent are patients' needs met on oncology units? The phenomenon of care rationing	Empirical: Quantitative	Hospital	"Nursing care rationing has been defined as the withholding of or failure to carry out necessary nursing tasks, nursing care that has been omitted (either partially or totally) or delayed, the care needs of a patient not being met, care not being performed or care left undone, the setting of priorities when resources are limited, or the prioritization of care." Results showed that elements of care that were frequently or always missed were regular turning of the patient, ambulation, oral care, patient teaching, emotional support, and nursing education. Causes included inadequate staffing and urgent and unexpected situations that interfered with regular care.	Cross-sectional analysis of primary data from 157 RNs in oncology units Measures included: • MISSCARE survey

Source (first author, date: title)	Type of Article	Care Setting	Definition of Omissions of Care and Major Study Findings (if applicable)	Data Sources
Poghosyan, 2017: Primary care providers' perspectives on errors of omission	Empirical: Qualitative	Mixed; does not include nursing homes	"Most patient safety studies focus on errors of commission—doing something incorrectly such as administering the wrong medication or giving wrong diagnosis as opposed to errors of omission—failure of right action such as missed care and gaps in care." Results showed that the main errors of omission were patient teaching, patient followup, emotional support, and addressing mental health needs.	Qualitative analysis of interview data from 26 PCPs to develop a typology of errors of omission
Recio-Saucedo, 2017: What impact does nursing care left undone have on patient outcomes? Review of the literature	Systematic Review	Mixed; includes nursing homes	"Delayed or unfinished care, more broadly identified as missed care, encompasses all aspects of clinical, emotional or administrative nursing care that have only been partially completed, were delayed or were not completed at all. The terminology used to refer to missed care varies slightly with the instruments used in the studies of the field. In some instances, missed care is viewed as a form of care rationing, or care left undone, while in others, the focus is on unmet patient need … Patient outcomes reported in the missed care literature, which have been associated with quality of care delivered, include hospital-acquired infections, discharge planning, mortality, falls, patient mobilization, feeding, psychological and emotional support." Results showed that missed care resulted in decreased patient satisfaction and adverse outcomes, including medication errors, infections, falls, pressure ulcers, critical incidents, poor quality of care, and patient readmissions.	Systematic review of 14 articles focused on "missed nursing care" or "care rationing" or "care left undone" or "unfinished care" Measures in reviewed studies included: • MISSCARE survey • BERNCA-R • Multi-State Nursing Care and Patient Safety survey • Statewide survey of hospital staff nurses in Pennsylvania • NDNQI RN survey • BERNCA-NH

Source (first author, date: title)	Type of Article	Care Setting	Definition of Omissions of Care and Major Study Findings (if applicable)	Data Sources
Schnelle, 2016: Determining nurse aide staffing requirements to provide care based on resident workload: A discrete event simulation model	Empirical: Quantitative	Nursing homes	Care was measured as omitted if it did not occur within the care window or specified window of time. Care was measured as delayed if it occurred within the care window but later than was scheduled.	Cross-sectional analysis of data from the Minimum Data Set (resident ADL care needs) and self-reported nurse aide staffing levels (CMS Form 671)
Smith, 2018: Does missed nursing care in isolated rural hospitals matter?	Review	Hospitals	"Missed care, or 'any aspect of required patient care that is omitted either in part or in whole or delayed' and has been associated with poor clinical patient outcomes and poor nurse job outcomes."	Review – NA
Srulovici, 2017: Nurses' personal and ward accountability and missed nursing care: A cross sectional study	Empirical: Quantitative	Hospitals	"Missed care is any aspect of required patient care that is omitted or delayed. It is considered an act of omission, or failing to complete necessary care on time, as compared with an act of commission, or providing the wrong care." Findings showed that higher personal accountability of patients' care needs was associated with less missed care.	Cross-sectional analysis of primary data from 172 RNs Measures included: • MISSCARE survey • Survey on personal and organizational accountability • Nurse-reported workload

Source (first author, date: title)	Type of Article	Care Setting	Definition of Omissions of Care and Major Study Findings (if applicable)	Data Sources
Suhonen, 2018: Missed care: A need for careful ethical discussion	Editorial	NA	"Missed care means any aspect of (nursing) care that is omitted or delayed, in part or in whole. Kalisch and Xie regarded missed care as an error, act of omission that leads to an adverse outcome or significant potential of such outcome. Thus, missed care can be seen as an outcome of activities and processes performed (or not performed), consciously or unconsciously, by professional nurses. Several synonyms or related terms for missed care have been used in the literature—terms such as 'unmet care needs' and 'omitted care.' 'Care left undone', 'delayed care', 'rationing of nursing care', 'covert rationing of nursing care' or 'implicit rationing of nursing care' have been used especially in the context of limited resources to describe the activity of professional nurses."	Review – NA
VanFossen, 2016: Unfinished nursing care: An important performance measure for nursing care systems	Review	NA	"The problem of underuse in nursing is reflected in the phenomenon of unfinished nursing care (UNC), also known as implicitly rationed care, tasks left undone, and missed care. UNC is conceptualized as a problem of time scarcity that prompts nurses to engage in a process of clinical prioritization, also called implicit rationing, to determine which elements of necessary care are completed and which are left undone. Necessary care is determined by nursing judgment, provider prescription, and/or professional standards."	Review – NA

Source (first author, date: title)	Type of Article	Care Setting	Definition of Omissions of Care and Major Study Findings (if applicable)	Data Sources
Zúñiga, 2015: The relationship of staffing and work environment with implicit rationing of nursing care in Swiss nursing homes—A cross-sectional study	Empirical: Quantitative	Nursing homes	"The term implicit rationing of nursing care, which will be used in this study, was coined by Schubert et al. (2007) and is based on the general discussion of rationing in healthcare as the allocation of limited resources with the consequence of having to withhold beneficial measures from some individuals. The decision to ration is an implicit, forced in-the-moment choice of an individual healthcare worker to not carry out certain nursing activities in the face of constrained resources." The authors contrasted this definition with Kalisch's definition of missed care, which they cited as follows: "Missed or omitted care—terms mainly used by Kalisch and her team—have their roots in a patient safety framework, where they are considered an error of omission that might lead to adverse outcomes." Results showed that care workers ration care documentation and social care more than ADL care.	Cross-sectional analysis of data from 4,307 nursing home workers from a sub-study of SHURP Measures included: • BERNCA • PES-NWI • Safety Attitudes Questionnaire • Health Professions Stress Inventory

Acronyms and Abbreviations

- ADL = activities of daily living; ARs = administrative records; BERNCA = Basel Extent of Rationing of Nursing Care; BERNCA-NH = BERNCA-Nursing Home; BERNCA-R = BERNCA-Revised; CMS = Centers for Medicare & Medicaid Services
- IHOC = International Hospital Outcomes Consortium; IHORC = International Hospital Outcomes Research Consortium;
- NA = not applicable; NDNQI RN = National Database of Nursing Quality Indicators RN Satisfaction/Engagement Survey; NEWRI = Neonatal Extent of Work Rationing Instrument;
- PCPs = primary care providers; PES-NWI = Practice Environment Scale of the Nursing Work Index; PIRNCA = Perceived Implicit Rationing of Nursing Care instrument; QTDS = Quality of Discharge Teaching Scale; RN = registered nurse; RN4CAST = Registered Nurse Forecasting consortium;
- SHURP = Swiss Nursing Homes Human Resources Project; TU = Tasks Undone (numbers refer to the number of items in the survey); UNC = unfinished nursing care; VA = Department of Veterans Affairs.

Appendix B. Search Terms and Results for Each Data Source in the Peer-Reviewed Literature Search

PubMed search:

("nursing homes"[MeSH Terms] OR ("nursing"[All Fields] AND "homes"[All Fields]) OR "nursing homes"[All Fields] OR ("nursing"[All Fields] AND "home"[All Fields]) OR "nursing home"[All Fields]) AND (omission[All Fields] AND care[All Fields])

Yields 46 results

- 5 removed after applying English-language filter

TEP search + other sources (from proposal literature review, articles recommended by others, et cetera)

- 111 articles

"nursing home"[Title/Abstract]) OR "skilled nursing facility"[Title/Abstract]) OR "long term care"[Title/Abstract]) OR "old age home"[Title/Abstract]) AND "adverse event"[Title/Abstract])

- Add filter for English and past 10 years=30 results
- 9

"nursing home"[Title/Abstract]) OR "skilled nursing facility"[Title/Abstract]) OR "long term care"[Title/Abstract]) OR "old age home"[Title/Abstract]) AND "disability"[Title/Abstract])

- 560 results
- 52

"nursing home"[Title/Abstract]) OR "skilled nursing facility"[Title/Abstract]) OR "long term care"[Title/Abstract]) OR "old age home"[Title/Abstract]) AND "functional limitation"[Title/Abstract])

- 6 results
- 0

"nursing home"[Title/Abstract]) OR "skilled nursing facility"[Title/Abstract]) OR "long term care"[Title/Abstract]) OR "old age home"[Title/Abstract]) AND "pressure sore"[Title/Abstract])

- 11 results
- 4

"nursing home"[Title/Abstract]) OR "skilled nursing facility"[Title/Abstract]) OR "long term care"[Title/Abstract]) OR "old age home"[Title/Abstract]) AND "pressure ulcer"[Title/Abstract])

- 146 results
- 43

"nursing home"[Title/Abstract]) OR "skilled nursing facility"[Title/Abstract]) OR "long term care"[Title/Abstract]) OR "old age home"[Title/Abstract]) AND "bed sore"[Title/Abstract])

- 0 results

"nursing home"[Title/Abstract]) OR "skilled nursing facility"[Title/Abstract]) OR "long term care"[Title/Abstract]) OR "old age home"[Title/Abstract]) AND "morbidity"[Title/Abstract])

- 426 results
- 32

"nursing home"[Title/Abstract]) OR "skilled nursing facility"[Title/Abstract]) OR "long term care"[Title/Abstract]) OR "old age home"[Title/Abstract]) AND "falls"[Title/Abstract])

- 518 results
- 90

"nursing home"[Title/Abstract]) OR "skilled nursing facility"[Title/Abstract]) OR "long term care"[Title/Abstract]) OR "old age home"[Title/Abstract]) AND "weight loss"[Title/Abstract])

- 97 results
- 32

"nursing home"[Title/Abstract]) OR "skilled nursing facility"[Title/Abstract]) OR "long term care"[Title/Abstract]) OR "old age home"[Title/Abstract]) AND "depression"[Title/Abstract])

- 715 results
- 58

"nursing home"[Title/Abstract]) OR "skilled nursing facility"[Title/Abstract]) OR "long term care"[Title/Abstract]) OR "old age home"[Title/Abstract]) AND "delirium"[Title/Abstract])

- 194 results
- 40

"nursing home"[Title/Abstract]) OR "skilled nursing facility"[Title/Abstract]) OR "long term care"[Title/Abstract]) OR "old age home"[Title/Abstract]) AND "wound care"[Title/Abstract])

- 46 results
- 9

“nursing home"[Title/Abstract]) OR "skilled nursing facility"[Title/Abstract]) OR "long term care"[Title/Abstract]) OR "old age home"[Title/Abstract]) AND "harm"[Title/Abstract])

- 82 results
- 31

"nursing home"[Title/Abstract]) OR "skilled nursing facility"[Title/Abstract]) OR "long term care"[Title/Abstract]) OR "old age home"[Title/Abstract]) AND "chronic illness"[Title/Abstract])

- 49 results
- 2

"nursing home"[Title/Abstract]) OR "skilled nursing facility"[Title/Abstract]) OR "long term care"[Title/Abstract]) OR "old age home"[Title/Abstract]) AND "chronic disease"[Title/Abstract])

- 108 results
- 5

"nursing home"[Title/Abstract]) OR "skilled nursing facility"[Title/Abstract]) OR "long term care"[Title/Abstract]) OR "old age home"[Title/Abstract]) AND "pain"[Title/Abstract])

- 633 results
- 27 items

"nursing home"[Title/Abstract]) OR "skilled nursing facility"[Title/Abstract]) OR "long term care"[Title/Abstract]) OR "old age home"[Title/Abstract]) AND "patient harm"[Title/Abstract])

- 9
- 1

"nursing home"[Title/Abstract]) OR "skilled nursing facility"[Title/Abstract]) OR "long term care"[Title/Abstract]) OR "old age home"[Title/Abstract]) AND "infection"[Title/Abstract])

- 902
- 40

"nursing home"[Title/Abstract]) OR "skilled nursing facility"[Title/Abstract]) OR "long term care"[Title/Abstract]) OR "old age home"[Title/Abstract]) AND "care transition"[Title/Abstract])

- 21
- 6

"nursing home"[Title/Abstract]) OR "skilled nursing facility"[Title/Abstract]) OR "long term care"[Title/Abstract]) OR "old age home"[Title/Abstract]) AND "discharge planning"[Title/Abstract])

- 60
- 3

"nursing home"[Title/Abstract]) OR "skilled nursing facility"[Title/Abstract]) OR "long term care"[Title/Abstract]) OR "old age home"[Title/Abstract]) AND "medication safety"[Title/Abstract])

- 24
- 9

"nursing home"[Title/Abstract]) OR "skilled nursing facility"[Title/Abstract]) OR "long term care"[Title/Abstract]) OR "old age home"[Title/Abstract]) AND "avoidable hospitalization"[Title/Abstract])

- 6
- 4

Web of Science search:

(TI=(nursing home* OR long term care OR skilled nursing facility OR skilled nursing facilities OR old age home*) AND ALL=(missed care OR abbreviated care OR delayed care OR unmet need OR care rationing OR interrupted care OR partially omitted care OR omitted care OR omission OR omission error* OR unfinished care OR unfinished care OR commission* of care OR error* in care OR inadequate care OR insufficient care OR wrong care OR barriers to care)) *AND* **LANGUAGE:** (English) *AND* **DOCUMENT TYPES:** (Article)

- 1,223 results
- 188 added to Endnote

((TI=(nursing home* OR "long term care" OR skilled nursing facility OR skilled nursing facilities OR old age home* NOT "long term illness" NOT "long-term illness" NOT "long-term outcomes" NOT "long term outcomes" NOT "home care" NOT "homecare" NOT "home care nursing" NOT "homecare nursing" NOT "pediatric" NOT "home health care" NOT "home healthcare") AND ALL=(adverse event* OR disability OR disabilities OR functional limitation* OR pressure sore* OR pressure ulcer* OR morbidity OR multimorbidity OR mortality OR death OR fall* OR weight loss OR depression OR delirium OR wound care OR harm* OR chronic illness OR chronic disease OR chronic illnesses OR chronic diseases OR pain OR patient harm* OR resident harm* OR infection* OR care transition* OR discharge planning OR infection control OR medication safety OR avoidable hospitalization*))) *AND* **LANGUAGE:** (English) *AND* **DOCUMENT TYPES:** (Article)

- 4,423 RESULTS
- 2,034 were from 2015+
- 298 items added to Endnote

Academic Premier search:

AB (nursing home or long term care or residential care or nursing homes or skilled nursing facility or snf) AND AB (missed care or care omission or abbreviated care or delayed care or unmet need or care rationing or interrupted care or partially omitted care or omitted care or omission or omission errors or unfinished care or commissions of care or errors in care or inadequate care or insufficient care or wrong care or barriers to care)

Limiters - Scholarly (Peer Reviewed) Journals; Published Date: 20080101-20190231; Publication Type: Periodical; Document Type: Article; Language: English

Search modes - Boolean/Phrase

- 567 results
- 53 articles exported to Endnote
- 41 imported after removing duplicates

TI (nursing home or long term care or residential care or nursing homes or skilled nursing facility or snf) AND AB (adverse event or disability or functional limitations or pressure sores or pressure ulcers or morbidity or mortality or death or falls or weight loss or depression or delirium or wound care or harm or chronic illness of chronic disease or pain or patient harm or resident harm or infections or care transition or discharge planning or infection control or medication safety or avoidable hospitalization) ...[search record automatically truncated at download]

Limiters - Scholarly (Peer Reviewed) Journals; Published Date: 20150101-20190231; Publication Type: Periodical; Document Type: Article; Language: English

Search modes - Boolean/Phrase

- 809 results
- 197 exported to Endnote
- 125 imported after removing duplicates

CINAHL search:

(TI "nursing home" or "long term care" or "skilled nursing facility" or "snf" or "old age home") AND (AB "missed care" or "abbreviated care" or "delayed care" or "unmet need" or "care rationing" or "interrupted care" or "partially omitted care" or "omitted care" or "omission" or "care omission" or "error of omission" or "omission error" or "unfinished care" or "commissions

of care" or "errors in care" or "inadequate care" or "insufficient care" or "wrong care" or "barriers to care")

Limiters - Scholarly (Peer Reviewed) Journals; Publication Date: 20080101-20191231

Expanders - Apply equivalent subjects

Search modes - Boolean/Phrase

- 317 results
- Limit to CINAHL and English
  - 54 results
  - 12 items exported
  - 3 items imported after removing duplicates

(TI "nursing home" or "long term care" or "skilled nursing facility" or "snf" or "old age home") AND (AB "adverse event" or "disability" or "functional limitation" or "functional limitations" or "pressure sore" or "pressure sores" or "pressure ulcer" or "pressure ulcers" or "morbidity" or "mortality" or "death" or "falls" or "weight loss" or "depression" or "delirium" or "wound care" or "harm" or "chronic illness" or "chronic disease" or "pain" or "patient harm" or "resident harm" or "infection" or "infections" or "care transition" or "discharge planning" or "care planning" or "infection control" or "medication safety" or "avoidable hospitalization" or "avoidable hospitalizations")

Limiters - Scholarly (Peer Reviewed) Journals; Publication Date: 20150101-20191231

Expanders - Apply equivalent subjects

Narrow by Language: - English

Search modes - Boolean/Phrase

- 7,354 results
- Narrow by SubjectMajor: Long term care
  - 788 results
  - Export 107
  - 63 imported

Appendix C. Abstraction Template for Full-Text Review of OOC Definition Articles

1. Author and year
2. Title
3. Type of resource (article, gray literature, etc.)
4. Public domain? (Yes or No)
5. Care setting (Nursing homes or other?)
6. Short-term or long-term residents?
7. Resident characteristics
8. Target stakeholders
9. Framework/conceptual model
10. Type of omission
11. Cause of omission
12. Definition of omission
13. Harm or adverse event
14. Who reports/documents the omission? (Is this nurse-reported, based on claims data, or from the resident or his or her family?)
15. Other outcomes
16. Research study type
17. Summary of main findings
18. Summary description of tool/resources
19. Evaluation of tool/resources
20. Intervention to reduce omission
21. Factors that may affect the intervention
22. Sustainability plans
23. Intervention intensiveness
24. Appropriateness of tool or intervention
25. Mode of dissemination
26. Facilitators to implementation or use
27. Barriers to implementation or use
28. Organizational issues
29. Patient and family factors
30. Regulatory, legal, or policy issues

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