

Omissions of Care in Nursing Homes

Final Environmental Scan Report

Prepared for:

Agency for Healthcare Research and Quality
U.S. Department of Health and Human Services
5600 Fishers Lane
Rockville, MD 20857
www.ahrq.gov

Contract No. HHSP233201500014I-HHSP23337003T

Prepared by:

American Institutes for Research
Aaron Ogletree, Ph.D.
Rikki Mangrum, M.L.S
Rouguia Barry

AHRQ Publication No. 20-0008-1-EF
October 2019



This project was funded under contract number HHSP233201500014I-HHSP23337003T from the Agency for Healthcare Research and Quality (AHRQ), U.S. Department of Health and Human Services. The authors are solely responsible for this document's contents, findings, and conclusions, which do not necessarily represent the views of AHRQ. Readers should not interpret any statement in this product as an official position of AHRQ or of the U.S. Department of Health and Human Services. None of the authors has any affiliation or financial involvement that conflicts with the material presented in this product.

Public Domain Notice. This product is in the public domain and may be used and reprinted without permission in the United States for noncommercial purposes, unless materials are clearly noted as copyrighted in the document. No one may reproduce copyrighted materials without the permission of the copyright holders. Users outside the United States must get permission from AHRQ to reprint or translate this product. Anyone wanting to reproduce this product for sale must contact AHRQ for permission.

Citation of the source is appreciated.

Suggested Citation

Ogletree A, Mangrum R, Barry R. AHRQ Omissions of Care in Nursing Homes: Final Environmental Scan Report. (Prepared by American Institutes for Research under contract number HHSP233201500014I-HHSP23337003T). Rockville, MD: Agency for Healthcare Research and Quality; October 2019.

Contents

	Page
Executive Summary.....	i
Introduction	1
Framework for the Environmental Scan.....	1
Research Questions	2
Methods.....	2
Peer-Reviewed Literature	2
Gray Literature: AHRQ Resources.....	7
Gray Literature: Stakeholder Websites and the Wider Internet	7
Gap Analysis.....	7
Methods for Abstraction	8
Results.....	8
Characteristics of Literature Included in This Report	8
Findings From the Literature Relevant to Defining Omissions of Care	9
Summary of Findings on Adverse Events.....	25
Gap Analysis.....	34
Discussion.....	36
References	37
Appendix A. Definitions of Omissions of Care, Types of Article, Care Settings, and Major Findings for Empirical Works	A-1
Appendix B. Search Terms and Results for Each Data Source in the Peer-Reviewed Literature Search.....	B-1
Appendix C. Abstraction Template for Full-Text Review of OOC Definition Articles	C-1
Appendix D. Bibliography.....	D-1

Tables

	Page
Table 1. Search terms used in the literature review.....	3
Table 2. Inclusion and exclusion criteria for peer-reviewed literature	4
Table 3. Common concepts used in defining OOCs.....	11
Table 4. Evidence from the nursing home literature on adverse events and their connection to omissions of care, interventions, and data sources.....	13

Figures

	Page
Figure 1. PRISMA flow diagram for peer reviewed literature on defining omissions of care.....	5
Figure 2. PRISMA flow diagram for peer-reviewed literature on adverse events.....	6

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
<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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

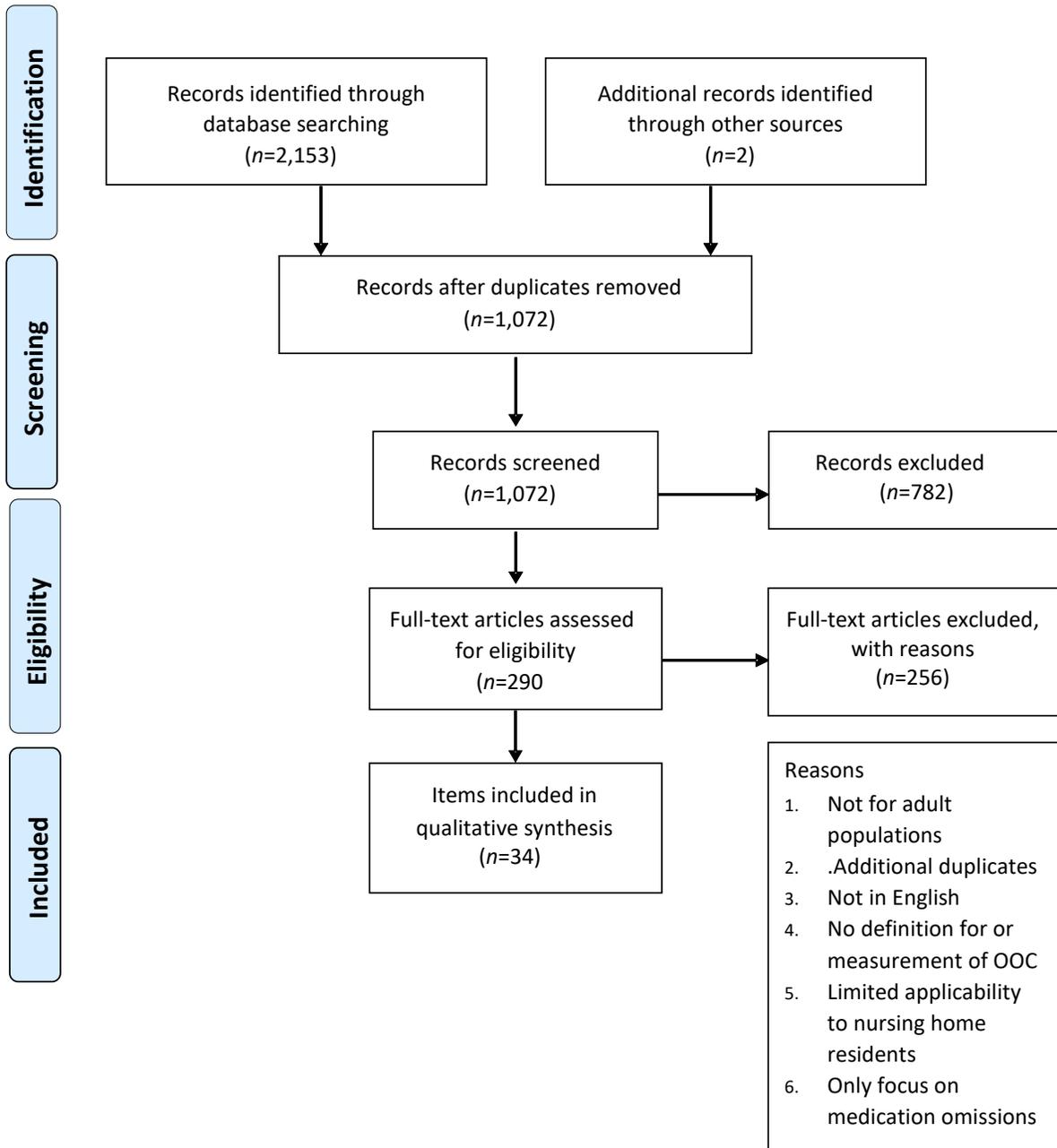
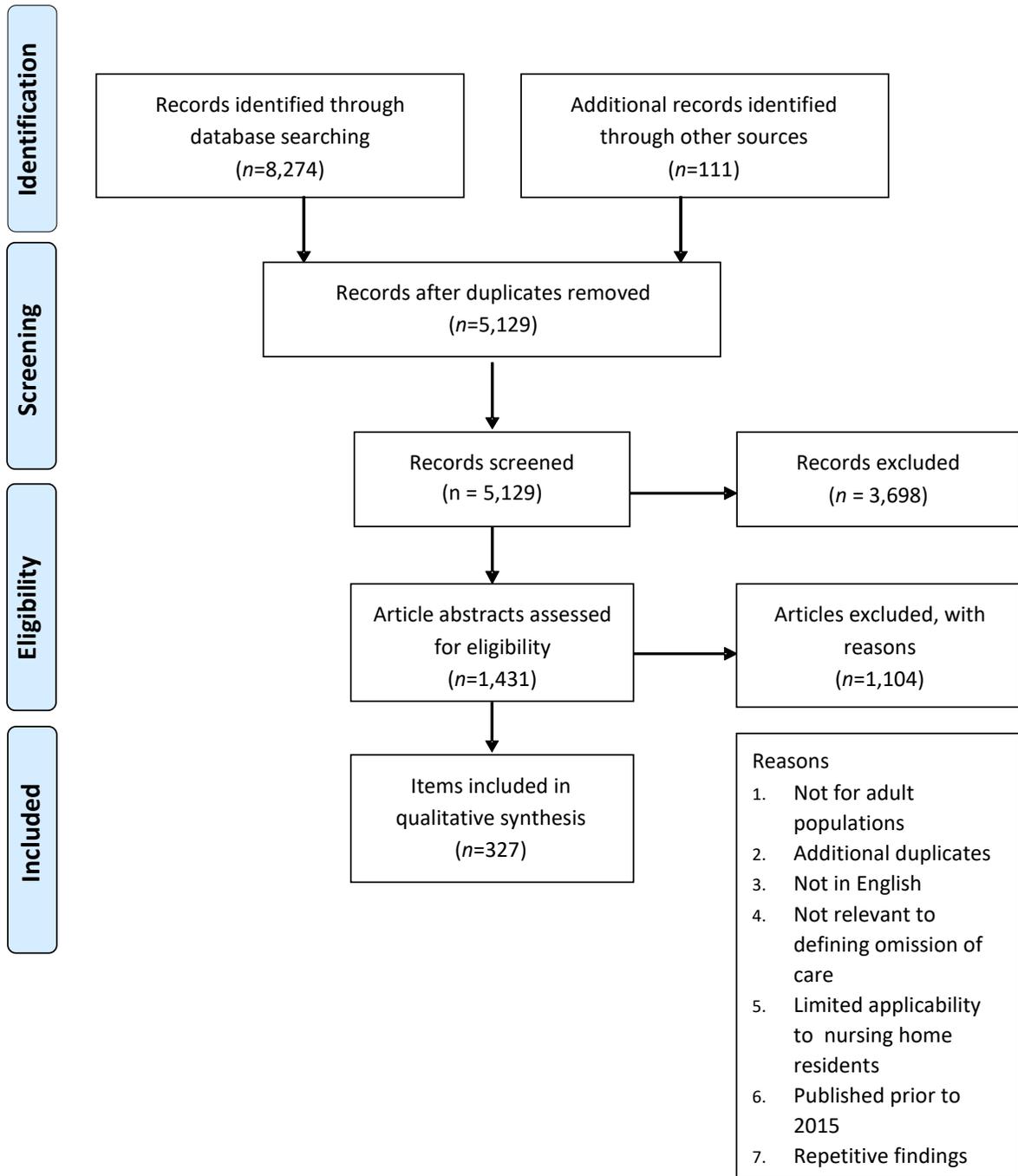


Figure 2. PRISMA flow diagram for peer-reviewed literature on adverse events



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, Lehnbohm, 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)	<p>Omissions That Contribute to Incidence:</p> <ul style="list-style-type: none"> • 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 <p>Risk Factors Appropriate for Monitoring:</p> <ul style="list-style-type: none"> • High risk of falls and depression • Malnutrition 	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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)	<p>Omissions That Contribute to Incidence:</p> <ul style="list-style-type: none"> • Misdiagnoses in residents with dementia • Lack of monitoring of patients taking atypical psychoactive drugs 	<ul style="list-style-type: none"> • Nonpharmacological interventions to reduce use of atypical antipsychotics, which increase risk for cardiovascular events • COSMOS intervention 	<ul style="list-style-type: none"> • 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
		<ul style="list-style-type: none"> • Deprescribing preventive cardiovascular medication for frail residents 	
Cognitive decline (n=9)	<p>Omissions That Contribute to Incidence:</p> <ul style="list-style-type: none"> • Lack of physical activity or ADL-related programs • Greater level of unmet need <p>Risk Factors Appropriate for Monitoring:</p> <ul style="list-style-type: none"> • Malnourishment 	<ul style="list-style-type: none"> • Physical activity interventions (ADL training) for residents with moderate to severe dementia • OASIS trial for residents with cognitive impairment 	<ul style="list-style-type: none"> • Claims data • Minimum Data Set–Cognition Scale
Death—All-cause mortality (n=56)	<p>Omissions That Contribute to Incidence:</p> <ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • Multifaceted hand hygiene intervention • INTERACT and INTERACT II 	<ul style="list-style-type: none"> • 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
	<ul style="list-style-type: none"> • 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 <p>Risk Factors Appropriate for Monitoring:</p> <ul style="list-style-type: none"> • 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)	<p>Omissions That Contribute to Incidence:</p> <ul style="list-style-type: none"> • 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 <p>Risk Factors Appropriate for Monitoring:</p> <ul style="list-style-type: none"> • Depression • Being male • Residing in nursing home <12 months • Health deterioration • PTSD • Schizophrenia 	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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)	<p>Omissions That Contribute to Incidence:</p> <ul style="list-style-type: none"> • Insufficient provider knowledge or awareness of medication interactions • Untreated pain <p>Risk Factors Appropriate for Monitoring:</p> <ul style="list-style-type: none"> • Acute infection • Pain • Use of antipsychotics 	<ul style="list-style-type: none"> • Stop Delirium! Intervention • Hospital Elder Life Program (HELP-LTC) 	<ul style="list-style-type: none"> • Minimum Data Set (2009 Medicare Current Beneficiary Survey; Resident Assessment Instrument)
Depression (n=28)	<p>Omissions That Contribute to Incidence:</p> <ul style="list-style-type: none"> • 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) 	<ul style="list-style-type: none"> • BE-ACTIV Intervention (walking and talking) • ACT • PPW quality improvement intervention • Group reminiscence therapies 	<ul style="list-style-type: none"> • 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
	<ul style="list-style-type: none"> Lack of relevant therapies, such as cognitive behavioral therapy and reminiscence 		
Disability/functional decline (<i>n</i> =20)	<p>Omissions That Contribute to Incidence:</p> <ul style="list-style-type: none"> Lack of vitamin D supplementation <p>Risk Factors Appropriate for Monitoring:</p> <ul style="list-style-type: none"> Cognitive decline Has undergone surgery (minor) Prevalent geriatric syndromes 	<ul style="list-style-type: none"> Rehabilitation interventions Multicomponent interventions that include supervised exercises 	<ul style="list-style-type: none"> National Long-Term Care Survey Medicare Current Beneficiary Survey (linked to claims data) Minimum Data Set (ADL Scale) Precipitating Events Project
Falls (<i>n</i> =54)	<p>Omissions That Contribute to Incidence:</p> <ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> Multifactorial interventions for residents at greatest risk for falls The Sunbeam Program (balance and moderate-intensity progressive resistance training) 	<ul style="list-style-type: none"> 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
	<ul style="list-style-type: none"> Lack of understanding and education among nurses regarding causal reasons for falls <p>Risk Factors Appropriate for Monitoring:</p> <ul style="list-style-type: none"> 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	<p>Omissions That Contribute to Incidence:</p> <ul style="list-style-type: none"> Lack of interventions to maintain continence <p>Risk Factors Appropriate for Monitoring:</p> <ul style="list-style-type: none"> White race Physical inactivity Greater ADL limitations Stroke Cognitive decline Comorbidities 	<ul style="list-style-type: none"> Educational intervention for incorporating knowledge of best practices through use of workshops, assessment guidelines, and educational outreach visits 	<ul style="list-style-type: none"> National Care Indicators Programme (New Zealand) Minimum Data Set
Infections—General (n=46)	<p>Omissions That Contribute to Incidence:</p> <ul style="list-style-type: none"> Lack of infection preventionist on staff Lack of vaccination among staff and residents Lack of routine assessment 	<ul style="list-style-type: none"> AHRQ’s Safety Program for Long-Term Care: Healthcare-Associated Infections/Catheter-Associated Urinary Tract Infections 	<ul style="list-style-type: none"> 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
	<ul style="list-style-type: none"> 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) 	<ul style="list-style-type: none"> Pulsed-xenon ultraviolet disinfection device to remove microbes on environmental surfaces 	<ul style="list-style-type: none"> National Survey of Nursing Homes Minimum Data Set
Infections— Respiratory (n=10)	<p>Omissions That Contribute to Incidence:</p> <ul style="list-style-type: none"> Lack of environmental infection control practices (surface cleaning) Poor hygiene practices <p>Risk Factors Appropriate for Monitoring:</p> <ul style="list-style-type: none"> Dysphagia Vitamin D deficiency 	<ul style="list-style-type: none"> Pulsed-xenon ultraviolet disinfection device to remove microbes on environmental surfaces 	<ul style="list-style-type: none"> Minimum Data Set
Infections—UTI (n=14)	<p>Omissions That Contribute to Incidence:</p> <ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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
	<ul style="list-style-type: none"> Lack of environmental infection control practices (surface cleaning) <p>Risk Factors Appropriate for Monitoring:</p> <ul style="list-style-type: none"> Indwelling catheter use 		
Loneliness (n=6)	<p>Omissions That Contribute to Incidence:</p> <ul style="list-style-type: none"> Lack of social support or poor social contact among residents Lack of dignity and self-determination; deficiencies in resident input regarding care Unaddressed grief 	<ul style="list-style-type: none"> Peer-led program to reduce pain management led to decreases in loneliness REAP program for increasing social identity, reciprocal relationships, and social productivity 	<ul style="list-style-type: none"> Not specified
Medication errors and omissions (n=25)	<p>Omissions That Contribute to Incidence:</p> <ul style="list-style-type: none"> 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 <p>Risk Factors Appropriate for Monitoring:</p> <ul style="list-style-type: none"> Greater number of transfers between care settings Number and types of medications and comorbidities Dysphagia 	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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 (<i>n</i> =19) Dehydration Weight loss Malnourishment	<p>Omissions That Contribute to Incidence:</p> <ul style="list-style-type: none"> • Poor oral health practices • Lack of support for eating dependency • Lack of care to support dysphagia, including diet modification <p>Risk Factors Appropriate for Monitoring:</p> <ul style="list-style-type: none"> • Dysphagia • Eating dependency • Leaving 25% or more food uneaten • Chewing problems • Voluntary stopping of eating and drinking 	<ul style="list-style-type: none"> • Oral liquid nutrition supplement to increase caloric intake • nutritionDay Project 	<ul style="list-style-type: none"> • National Care Indicators Programme (New Zealand) • TURN study data (Braden nutrition subscale) • nutritionDay Project data
Pain (<i>n</i> =28)	<p>Omissions That Contribute to Incidence:</p> <ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • INTERACT intervention • Meta-analysis reports that analgesics are most effective in reducing pain 	<ul style="list-style-type: none"> • 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)	<p>Omissions That Contribute to Incidence:</p> <ul style="list-style-type: none"> • 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 <p>Risk Factors Appropriate for Monitoring:</p> <ul style="list-style-type: none"> • Deficits in ADLs • Physical impairment • Cognitive impairment 	<ul style="list-style-type: none"> • Use of Munsell color charts to measure changes in skin tone 	<ul style="list-style-type: none"> • 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)	<p>Omissions That Contribute to Incidence:</p> <ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • Not specified 	<ul style="list-style-type: none"> • 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 MEducation 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, reliance 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 associated 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?

References

1. U.S. Department of Health and Human Services, Office of Inspector General. Adverse Events in Skilled Nursing Facilities: National Incidence Among Medicare Beneficiaries. Publication No. OEI-06-11-00370. Washington, DC: Office of Inspector General; 2014. <https://oig.hhs.gov/oei/reports/oei-06-11-00370.pdf>. Accessed October 3, 2019.
2. Simmons S, Schnelle J, Slagle J, et al. Resident Safety Practices in Nursing Home Settings. Technical Brief No. 24. (Prepared by the Vanderbilt Evidence-based Practice Center under Contract No. 290-2015-00003-I.) AHRQ Publication No. 16-EHC022-EF. Rockville, MD: Agency for Healthcare Research and Quality; 2016. https://effectivehealthcare.ahrq.gov/sites/default/files/pdf/nursing-home-safety_technical-brief.pdf. Accessed October 3, 2019.
3. Hass Z, DePalma G, Craig BA, et al. Unmet need for help with activities of daily living disabilities and emergency department admissions among older Medicare recipients. *Gerontologist*. 2017;57(2):206-10. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5881665/>. Accessed October 3, 2019.
4. Lehnbohm EC, Stewart MJ, Manias E, et al. Impact of medication reconciliation and review on clinical outcomes. *Ann Pharmacother*. 2014;48(10):1298-1312. <https://www.ncbi.nlm.nih.gov/pubmed/25048794>. Accessed October 3, 2019.
5. Kalisch BJ, Landstrom G, Williams R A. Missed nursing care: errors of omission. *Nurs Outlook*. 2009;57(1):3-9. <https://www.ncbi.nlm.nih.gov/pubmed/19150261>. Accessed October 3, 2019.
6. Dabney BW, Kalisch BJ. Nurse staffing levels and patient-reported missed nursing care. *J Nurs Care Qual*. 2015;30(4):306-12. <https://www.ncbi.nlm.nih.gov/pubmed/25929314>.
7. Dhaini SR, Zuniga F, Ausserhofer D, et al. Are nursing home care workers' health and presenteeism associated with implicit rationing of care? A cross-sectional multi-site study. *Geriatr Nurs*. 2017;38(1):33-8. <https://www.ncbi.nlm.nih.gov/pubmed/27492884>. Accessed October 3, 2019.
8. Tappen RM, Newman D, Huckfeldt P, et al. Evaluation of nursing facility resident safety during implementation of the INTERACT quality improvement program. *J Am Med Dir Assoc*. 2018;19(10):907-913. <https://www.ncbi.nlm.nih.gov/pubmed/30108035>. Accessed October 3, 2019.

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: <ul style="list-style-type: none"> • 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	<p>"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."</p> <p>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."</p>	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	<p>“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.”</p> <p>Results showed that common missed care tasks included talking to and comforting patients, developing and updating care plans, and educating patients and families.</p>	<p>Cross-sectional analysis of three linked secondary data sources:</p> <ol style="list-style-type: none"> 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	<p>“Missed nursing care is the omission of any aspect of required nursing care.”</p> <p>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.</p>	<p>Cross-sectional analysis of primary survey data from 232 nurses in 13 general nursing units in Korea.</p> <p>Measures included: MISSCARE survey (perception of missed care and reasons for missed care)</p>

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	<p>Errors of omission are defined as “failure to do the right thing” and result in the potential for undesirable outcomes.</p> <p>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.</p>	<p>Cross-sectional analysis of secondary data from 729 patients in 20 units of two hospitals linked with administrative records (ARs)</p> <p>Measures included:</p> <ul style="list-style-type: none"> • 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	<p>Task omission is defined as any reduction of standard clinical practice, including nursing tasks directly related to patient care and safety.</p> <p>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.</p>	<p>Cross-sectional analysis of secondary data from 3,239 care workers in the SHURP</p> <p>Measures included:</p> <ul style="list-style-type: none"> • 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	<p>“An error of omission is an action that is not performed, whereas an error of commission is an action that is performed incorrectly.”</p> <p>“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.”</p>	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	<p>Omissions were defined in terms of “inadequate or inaccurate communication between care settings that may lead to significant distress for patients and their caregivers.”</p> <p>Results showed that patients whose discharge plans did not include a designated physician for followup care were more likely to be hospitalized or die.</p>	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	<p>"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.</p> <p>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.</p>	<p>Cross-sectional analysis of primary data from 241 RNs and 99 nursing assistants</p> <p>Measures included:</p> <ul style="list-style-type: none"> • 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	<p>"... 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."</p> <p>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.</p>	<p>Systematic review of 18 articles focused on "missed care" or "implicit rationing" or "task left undone" or "unfinished care"</p> <p>Measures in reviewed studies included:</p> <ul style="list-style-type: none"> • 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	<p>“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.”</p> <p>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.</p>	<p>Cross-sectional analysis of primary data from 922 nurses and other care workers in Australia</p> <p>Measures included:</p> <ul style="list-style-type: none"> • 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	<p>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.</p>	<p>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?”</p>

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 incompleteness, 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: <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • 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	<p>“Missed nursing care refers to any aspect of required patient care that is omitted, in part or in whole, or delayed.”</p> <p>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.</p>	<p>Cross-sectional analysis of primary data from 459 nurses</p> <p>Measures included:</p> <ul style="list-style-type: none"> • MISSCARE survey
Kalisch, 2009b: Missed nursing care: Errors of omission	Empirical: Quantitative	Hospital	<p>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.</p> <p>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.</p>	<p>Qualitative concept analysis of published articles focused on “missed nursing care”</p>
Kind, 2011: Omission of dysphagia therapies in hospital discharge communications	Empirical: Quantitative	Hospital	<p>Omitted care is conceptualized as missing care plan recommendations in hospital discharge summaries.</p> <p>Results showed that discharge summaries omitted all categories of provider recommendations at notably high rates for patients with dysphagia-specific accommodations.</p>	<p>Retrospective cohort study of 187 patients; data regarding dysphagia recommendation omissions in discharge summaries came from hospital notes and discharge summaries</p>

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	<p>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.</p> <p>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.</p>	<p>Cross-sectional analysis of primary data from 616 nursing home staff members in Norway</p> <p>Measures included:</p> <ul style="list-style-type: none"> 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	<p>Omission errors manifested as diagnostic inconsistencies between referring physicians and medical staff at nursing home admission.</p> <p>The authors pointed to issues with correct diagnoses when the patient’s behavioral issues may interfere with the identification of physical disease symptoms.</p>	<p>Cross-sectional analysis of primary and secondary diagnoses for 100 recently admitted nursing home residents</p>

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	<p>“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.”</p> <p>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.</p>	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
<p>Nelson, 2015: Relationship between missed care and urinary tract infections in nursing homes</p>	<p>Empirical: Quantitative</p>	<p>Nursing homes</p>	<p>“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.”</p> <p>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.</p>	<p>Cross-sectional analysis of secondary data from 340 nurses in 63 nursing homes</p> <p>Measures included:</p> <ul style="list-style-type: none"> • 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	<p>“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.”</p> <p>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.</p>	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	<p>“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.”</p> <p>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.</p>	<p>Cross-sectional analysis of primary data from 157 RNs in oncology units</p> <p>Measures included:</p> <ul style="list-style-type: none"> • 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	<p>"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."</p> <p>Results showed that the main errors of omission were patient teaching, patient followup, emotional support, and addressing mental health needs.</p>	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	<p>"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."</p> <p>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.</p>	<p>Systematic review of 14 articles focused on "missed nursing care" or "care rationing" or "care left undone" or "unfinished care"</p> <p>Measures in reviewed studies included:</p> <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • 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	<p>“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.”</p> <p>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.”</p> <p>Results showed that care workers ration care documentation and social care more than ADL care.</p>	<p>Cross-sectional analysis of data from 4,307 nursing home workers from a sub-study of SHURP</p> <p>Measures included:</p> <ul style="list-style-type: none"> • 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

Appendix D. Bibliography

References for Definitions of Omissions of Care

- Ball JE, Murrells T, Rafferty AM, et al. 'Care left undone' during nursing shifts: associations with workload and perceived quality of care. *BMJ Qual Saf.* 2014;23(2):116-25. doi:10.1136/bmjqs-2012-001767
- Berlin L. Medical errors, malpractice, and defensive medicine: an ill-fated triad. *Diagnosis (Berl).* 2017;4(3):133-9. doi:10.1515/dx-2017-0007
- Bittner NP, Gravlin G, Hansten R, et al. Unraveling care omissions. *J Nurs Adm.* 2011;41(12):510-2. doi:10.1097/NNA.0b013e3182378b65
- Carthon JM, Lasater KB, Sloane DM, et al. The quality of hospital work environments and missed nursing care is linked to heart failure readmissions: a cross-sectional study of U.S. hospitals. *BMJ Qual Saf.* 2015;24(4):255-63. doi:10.1136/bmjqs-2014-003346
- Cho SH, Kim YS, Yeon KN, et al. Effects of increasing nurse staffing on missed nursing care. *Int Nurs Rev.* 2015;62(2):267-74. doi:10.1111/inr.12173
- Dabney BW, Kalisch BJ. Nurse staffing levels and patient-reported missed nursing care. *J Nurs Care Qual.* 2015;30(4):306-12. doi:10.1097/ncq.000000000000123
- Dhaini SR, Zuniga F, Ausserhofer D, et al. Are nursing home care workers' health and presenteeism associated with implicit rationing of care? A cross-sectional multi-site study. *Geriatr Nurs.* 2017;38(1):33-8. doi:10.1016/j.gerinurse.2016.07.003
- Gillespie A, Reader TW. Patient-centered insights: using health care complaints to reveal hot spots and blind spots in quality and safety. *Milbank Q.* 2018;96(3):530-67. doi:10.1111/1468-0009.12338
- Gilmore-Bykovskiy AL, Kennelty KA, DuGoff E, et al. Hospital discharge documentation of a designated clinician for follow-up care and 30-day outcomes in hip fracture and stroke patients discharged to sub-acute care. *BMC Health Serv Res.* 2018;18(1):103. doi:10.1186/s12913-018-2907-2
- Gravlin G, Phoenix Bittner N. Nurses' and nursing assistants' reports of missed care and delegation. *J Nurs Adm.* 2010;40(7-8):329-35. doi:10.1097/NNA.0b013e3181e9395e
- Griffiths P, Recio-Saucedo A, Dall'Ora C, et al. The association between nurse staffing and omissions in nursing care: a systematic review. *J Adv Nurs.* 2018;74(7):1474-87. doi:10.1111/jan.13564
- Hass Z, DePalma G, Craig BA, et al. Unmet need for help with activities of daily living disabilities and emergency department admissions among older Medicare recipients. *Gerontologist.* 2017;57(2):206-10. doi:10.1093/geront/gnv142

Hayward RA, Asch SM, Hogan MM, et al. Sins of omission: getting too little medical care may be the greatest threat to patient safety. *J Gen Intern Med.* 2005;20(8):686-91. doi:10.1111/j.1525-1497.2005.0152.x

Henderson J, Willis E, Xiao L, et al. Missed care in residential aged care in Australia: an exploratory study. *Collegian.* 2017;24(5):411-16. doi:10.1016/j.colegn.2016.09.001

Hirst SP. Defining resident abuse within the culture of long-term care institutions. *Clin Nurs Res.* 2002;11(3):267-84. doi:10.1177/10573802011003004

Jones TL, Hamilton P, Murry N. Unfinished nursing care, missed care, and implicitly rationed care: state of the science review. *Int J Nurs Stud.* 2015;52(6):1121-37. doi:10.1016/j.ijnurstu.2015.02.012

Kalisch BJ, Doumit M, Lee KH, et al. Missed nursing care, level of staffing, and job satisfaction: Lebanon versus the United States. *J Nurs Adm.* 2013;43(5):274-9. doi:10.1097/NNA.0b013e31828eebaa

Kalisch BJ, Landstrom G, Williams RA. Missed nursing care: errors of omission. *Nurs Outlook.* 2009;57(1):3-9. doi:10.1016/j.outlook.2008.05.007

Kalisch BJ, Landstrom GL, Hinshaw AS. Missed nursing care: a concept analysis. *J Adv Nurs.* 2009;65(7):1509-17. doi:10.1111/j.1365-2648.2009.05027.x

Kind A, Anderson P, Hind J, et al. Omission of dysphagia therapies in hospital discharge communications. *Dysphagia.* 2011;26(1):49-61. doi:10.1007/s00455-009-9266-4

Lehnbom EC, Stewart MJ, Manias E, et al. Impact of medication reconciliation and review on clinical outcomes. *Ann Pharmacother.* 2014;48(10):1298-1312. doi:10.1177/1060028014543485

Malmedal W, Hammervold R, Saveman B. To report or not report? Attitudes held by Norwegian nursing home staff on reporting inadequate care carried out by colleagues. *Scand J Public Health.* 2009;37(7):744-50. doi:10.1177/1403494809340485

Miller MB, Elliott DF. Errors and omissions in diagnostic records on admission of patients to a nursing home. *J Am Geriatr Soc.* 1976;24(3):108-16.

Naden D, Rehnsfeldt A, Raholm MB, et al. Aspects of indignity in nursing home residences as experienced by family caregivers. *Nurs Ethics.* 2013;20(7):748-61. doi:10.1177/0969733012475253

Nelson ST, Flynn L. Relationship between missed care and urinary tract infections in nursing homes. *Geriatr Nurs.* 2015;36(2):126-30. doi:10.1016/j.gerinurse.2014.12.009

Papastavrou E, Andreou P, Vryonides S. The hidden ethical element of nursing care rationing. *Nurs Ethics.* 2014;21(5):583-93. doi:10.1177/0969733013513210

Papastavrou E, Charalambous A, Vryonides S, et al. To what extent are patients' needs met on oncology units? The phenomenon of care rationing. *Eur J Oncol Nurs*. 2016;21:48-56. doi:10.1016/j.ejon.2016.01.002

Poghosyan L, Norful AA, Fleck E, et al. Primary care providers' perspectives on errors of omission. *J Am Board Fam Med*. 2017;30(6):733-42. doi:10.3122/jabfm.2017.06.170161

Recio-Saucedo A, Dall'Ora C, Maruotti A, et al. What impact does nursing care left undone have on patient outcomes? Review of the literature. *J Clin Nurs*. 2018;27(11-12):2248-59. doi:10.1111/jocn.14058

Schnelle JF, Schroyer LD, Saraf AA, et al. Determining nurse aide staffing requirements to provide care based on resident workload: a discrete event simulation model. *J Am Med Dir Assoc*. 2016;17(11):970-7. doi:10.1016/j.jamda.2016.08.006

Simmons S, Schnelle J, Slagle J, et al. Resident Safety Practices in Nursing Home Settings. Technical Brief No. 24. (Prepared by the Vanderbilt Evidence-based Practice Center under Contract No. 290-2015-00003-I.) AHRQ Publication No. 16-EHC022-EF. Rockville, MD: Agency for Healthcare Research and Quality; 2016.

Smith JG. Does missed care in isolated rural hospitals matter? *West J Nurs Res*. 2018;40(6):775-8. doi:10.1177/0193945918759467

Srulovici E, Drach-Zahavy A. Nurses' personal and ward accountability and missed nursing care: a cross-sectional study. *Int J Nurs Stud*. 2017;75:163-71. doi:10.1016/j.ijnurstu.2017.08.003

Suhonen R, Scott AP. Missed care: a need for careful ethical discussion. *Nurs Ethics*. 2018;25(5):549-51.

U.S. Department of Health and Human Services, Office of Inspector General. Adverse Events in Skilled Nursing Facilities: National Incidence Among Medicare Beneficiaries. (OEI-06-11-00370). Washington, DC: Office of Inspector General; 2014.

VanFosson CA, Jones TL, Yoder LH. Unfinished nursing care: an important performance measure for nursing care systems. *Nurs Outlook*. 2016;64(2):124-36. doi:10.1016/j.outlook.2015.12.010

Zúñiga F, Ausserhofer D, Hamers JP, et al. The relationship of staffing and work environment with implicit rationing of nursing care in Swiss nursing homes--a cross-sectional study. *Int J Nurs Stud*. 2015;52(9):1463-74. doi:10.1016/j.ijnurstu.2015.05.005

References for Adverse Events

Avoidable Hospitalizations

Connolly MJ, Boyd M, Broad JB, et al. The aged residential care healthcare utilization study (ARCHUS): a multidisciplinary, cluster randomized controlled trial designed to reduce acute avoidable hospitalizations from long-term care facilities. *J Am Med Dir Assoc*. 2015;16(1):49-55. doi:10.1016/j.jamda.2014.07.008

Driessen J, Bonhomme A, Chang W, et al. Nursing home provider perceptions of telemedicine for reducing potentially avoidable hospitalizations. *J Am Med Dir Assoc.* 2016;17(6):519-24. doi:10.1016/j.jamda.2016.02.004

Dwyer R, Stoelwinder J, Gabbe B, et al. Unplanned transfer to emergency departments for frail elderly residents of aged care facilities: a review of patient and organizational factors. *J Am Med Dir Assoc.* 2015;16(7):551-62. doi:10.1016/j.jamda.2015.03.007

Ferrah N, Lovell JJ, Ibrahim JE. Systematic review of the prevalence of medication errors resulting in hospitalization and death of nursing home residents. *J Am Geriatr Soc.* 2017;65(2):433-42. doi:10.1111/jgs.14683

Glette MK, Roise O, Kringeland T, et al. Nursing home leaders' and nurses' experiences of resources, staffing and competence levels and the relation to hospital readmissions - a case study. *BMC Health Serv Res.* 2018;18(1):955. doi:10.1186/s12913-018-3769-3

Ingber MJ, Feng Z, Khatutsky G, et al. Initiative to reduce avoidable hospitalizations among nursing facility residents shows promising results. *Health Aff (Millwood).* 2017;36(3):441-50. doi:10.1377/hlthaff.2016.1310

Jeon B, Tamiya N, Yoshie S, et al. Potentially avoidable hospitalizations, non-potentially avoidable hospitalizations and in-hospital deaths among residents of long-term care facilities. *Geriatr Gerontol Int.* 2018;18(8):1272-9. doi:10.1111/ggi.13458

McAndrew RM, Grabowski DC, Dangi A, et al. Prevalence and patterns of potentially avoidable hospitalizations in the U.S. long-term care setting. *Int J Qual Health Care.* 2016;28(1):104-9. doi:10.1093/intqhc/mzv110

Ouslander JG, Handler SM. Consensus-derived interventions to reduce acute care transfer (INTERACT)-compatible order sets for common conditions associated with potentially avoidable hospitalizations. *J Am Med Dir Assoc.* 2015;16(6):524-6. doi:10.1016/j.jamda.2015.02.016

Ouslander JG, Lamb G, Perloe M, et al. Potentially avoidable hospitalizations of nursing home residents: frequency, causes, and costs: [see editorial comments by Drs. Jean F. Wyman and William R. Hazzard, pp. 760-761]. *J Am Geriatr Soc.* 2010;58(4):627-35. doi:10.1111/j.1532-5415.2010.02768.x

Rantz MJ, Flesner MK, Franklin J, et al. Better care, better quality reducing avoidable hospitalizations of nursing home residents. *J Nurs Care Qual.* 2015;30(4):290-7. doi:10.1097/NCQ.000000000000145

Unroe KT, Hickman SE, Carnahan JL, et al. Investigating the avoidability of hospitalizations of long stay nursing home residents: opportunities for improvement. *Innov Aging.* 2018;2(2):igy017. doi:10.1093/geroni/igy017

Cardiovascular Events

Benetos A, Labat C, Rossignol P, et al. Treatment with multiple blood pressure medications, achieved blood pressure, and mortality in older nursing home residents: the PARTAGE Study. *JAMA Intern Med.* 2015;175(6):989-95. doi:10.1001/jamainternmed.2014.8012

Chiu Y, Bero L, Hessol NA, et al. A literature review of clinical outcomes associated with antipsychotic medication use in North American nursing home residents. *Health Policy.* 2015;119(6):802-13. doi:10.1016/j.healthpol.2015.02.014

Gulla C, Flo E, Kjome RL, et al. Deprescribing antihypertensive treatment in nursing home patients and the effect on blood pressure. *J Geriatr Cardiol.* 2018;15(4):275-83. doi:10.11909/j.issn.1671-5411.2018.04.011

Jansen S, Bhangu J, de Rooij S, et al. The association of cardiovascular disorders and falls: a systematic review. *J Am Med Dir Assoc.* 2016;17(3):193-9. doi:10.1016/j.jamda.2015.08.022

Jorgensen LB, Thorleifsson BM, Selbaek G, et al. Physical diagnoses in nursing home residents - is dementia or severity of dementia of importance? *BMC Geriatr.* 2018;18(1):254. doi:10.1186/s12877-018-0943-8

Lapeyre-Mestre M. A review of adverse outcomes associated with psychoactive drug use in nursing home residents with dementia. *Drugs Aging.* 2016;33(12):865-88. doi:10.1007/s40266-016-0414-x

Makan AM, van Hout H, Onder G, et al. Prevalence of preventive cardiovascular medication use in nursing home residents. Room for deprescribing? The SHELTER study. *J Am Med Dir Assoc.* 2017;18(12):1037-42. doi:10.1016/j.jamda.2017.06.022

Cognitive Decline

Bali V, Chatterjee S, Johnson ML, et al. Risk of cognitive decline associated with paroxetine use in elderly nursing home patients with depression. *Am J Alzheimers Dis Other Demen.* 2016;31(8):678-86. doi:10.1177/1533317516673463

Bauer U, Pitzer S, Schreier MM, et al. Pain treatment for nursing home residents differs according to cognitive state - a cross-sectional study. *BMC Geriatr.* 2016;16:124. doi:10.1186/s12877-016-0295-1

Brodsky H, Aerts L, Harrison F, et al. Antipsychotic deprescription for older adults in long-term care: the HALT study. *J Am Med Dir Assoc.* 2018;19(7):592-600. doi:10.1016/j.jamda.2018.05.002

Chen LY, Liu LK, Hwang AC, et al. Impact of malnutrition on physical, cognitive function and mortality among older men living in veteran homes by minimum data set: a prospective cohort study in Taiwan. *J Nutr Health Aging.* 2016;20(1):41-7. doi:10.1007/s12603-015-0646-1

Ferreira AR, Dias CC, Fernandes L. Needs in nursing homes and their relation with cognitive and functional decline, behavioral and psychological symptoms. *Front Aging Neurosci.* 2016;8:72. doi:10.3389/fnagi.2016.00072

Helvik AS, Selbæk G, Šaltytė Benth J, et al. The course of neuropsychiatric symptoms in nursing home residents from admission to 30-month follow-up. *PLoS One.* 2018;13(10):1-18. doi:10.1371/journal.pone.0206147

Henskens M, Nauta Ilse M, van Eekeren MCA, et al. Effects of physical activity in nursing home residents with dementia: a randomized controlled trial. *Dement Geriatr Cogn Disord.* 2018;46(1/2):60-80. doi:10.1159/000491818

Tjia J, Hunnicutt JN, Herndon L, et al. Association of a communication training program with use of antipsychotics in nursing homes. *JAMA Intern Med.* 2017;177(6):846-53. doi:10.1001/jamainternmed.2017.0746

Zhu HY. Unmet needs in long-term care and their associated factors among the oldest old in China. *BMC Geriatr.* 2015;15:46. doi:10.1186/s12877-015-0045-9

Death—All-Cause

Allers K, Hoffmann F. Mortality and hospitalization at the end of life in newly admitted nursing home residents with and without dementia. *Soc Psychiatry Psychiatr Epidemiol.* 2018;53(8):833-9. doi:10.1007/s00127-018-1523-0

Antwi YA, Bowblis JR. The impact of nurse turnover on quality of care and mortality in nursing homes: evidence from the great recession. *Am J Health Econ.* 2018;4(2):131-63. doi:10.1162/ajhe_a_00096

Bali V, Chatterjee S, Johnson ML, et al. Risk of mortality in elderly nursing home patients with depression using paroxetine. *Pharmacotherapy.* 2017;37(3):287-96. doi:10.1002/phar.1898

Bellenger E, Ibrahim JE, Bugeja L, et al. Physical restraint deaths in a 13-year national cohort of nursing home residents. *Age Ageing.* 2017;46(4):688-93. doi:10.1093/ageing/afw246

Bellenger EN, Ibrahim JE, Lovell JJ, et al. The nature and extent of physical restraint-related deaths in nursing homes: a systematic review. *J Aging Health.* 2018;30(7):1042-61. doi:10.1177/0898264317704541

Buckinx F, Croisier JL, Reginster JY, et al. Prediction of the incidence of falls and deaths among elderly nursing home residents: the SENIOR study. *J Am Med Dir Assoc.* 2018;19(1):18-24. doi:10.1016/j.jamda.2017.06.014

Bugeja L, Woolford MH, Willoughby M, et al. Frequency and nature of coroners' recommendations from injury-related deaths among nursing home residents: a retrospective national cross-sectional study. *Inj Prev.* 2018;24(6):418-23. doi:10.1136/injuryprev-2017-042370

- Caspi E. The circumstances surrounding the death of 105 elders as a result of resident-to-resident incidents in dementia in long-term care homes. *J Elder Abuse Negl.* 2018;30(4):284-308. doi:10.1080/08946566.2018.1474515
- Chatterjee S, Bali V, Carnahan RM, et al. Risk of mortality associated with anticholinergic use in elderly nursing home residents with depression. *Drugs Aging.* 2017;34(9):691-700. doi:10.1007/s40266-017-0475-5
- Chen LY, Liu LK, Hwang AC, et al. Impact of malnutrition on physical, cognitive function and mortality among older men living in veteran homes by minimum data set: a prospective cohort study in Taiwan. *J Nutr Health Aging.* 2016;20(1):41-7. doi:10.1007/s12603-015-0646-1
- Damian J, Pastor-Barriuso R, Garcia Lopez FJ, et al. Urinary incontinence and mortality among older adults residing in care homes. *J Adv Nurs.* 2017;73(3):688-99. doi:10.1111/jan.13170
- De Silva TR, Theou O, Vellas B, et al. Frailty screening (FRAIL-NH) and mortality in French nursing homes: results from the incidence of pneumonia and related consequences in nursing home residents study. *J Am Med Dir Assoc.* 2018;19(5):411-4. doi:10.1016/j.jamda.2017.12.101
- Falcone M, Russo A, Silverj FG, et al. Predictors of mortality in nursing-home residents with pneumonia: a multicentre study. *Clin Microbiol Infect.* 2018;24(1):72-7. doi:10.1016/j.cmi.2017.05.023
- Fernandes-Taylor S, Berg S, Gunter R, et al. Thirty-day readmission and mortality among Medicare beneficiaries discharged to skilled nursing facilities after vascular surgery. *J Surg Res.* 2018;221:196-203. doi:10.1016/j.jss.2017.08.041
- Ferrah N, Ibrahim JE, Kipsaina C, et al. Death following recent admission into nursing home from community living: a systematic review into the transition process. *J Aging Health.* 2018;30(4):584-604. doi:10.1177/0898264316686575
- Gilmore-Bykovskiy AL, Kennelty KA, DuGoff E, et al. Hospital discharge documentation of a designated clinician for follow-up care and 30-day outcomes in hip fracture and stroke patients discharged to sub-acute care. *BMC Health Serv Res.* 2018;18(1):103. doi:10.1186/s12913-018-2907-2
- Gruenewald DA. Voluntarily stopping eating and drinking: a practical approach for long-term care facilities. *J Palliat Med.* 2018;21(9):1214-20. doi:10.1089/jpm.2018.0100
- Hendriks SA, Smalbrugge M, Galindo-Garre F, et al. From admission to death: prevalence and course of pain, agitation, and shortness of breath, and treatment of these symptoms in nursing home residents with dementia. *J Am Med Dir Assoc.* 2015;16(6):475-81. doi:10.1016/j.jamda.2014.12.016
- Heppenstall CP, Broad JB, Boyd M, et al. Progress towards predicting 1-year mortality in older people living in residential long-term care. *Age & Ageing.* 2015;44(3):497-501. doi:ageing/afu206

- Ibrahim JE, Bugeja L, Willoughby M, et al. Premature deaths of nursing home residents: an epidemiological analysis. *Med J Aust.* 2017;206(10):442-7.
- Jacobs H, Zeeb H, Hoffmann F. Incidence rates of and mortality after hip fracture among German nursing home residents. *Int J Environ Res Pub Health.* 2018;15(2). doi:10.3390/ijerph15020289
- Klotz AL, Hassel AJ, Schroder J, et al. Is compromised oral health associated with a greater risk of mortality among nursing home residents? A controlled clinical study. *Aging Clin Exp Res.* 2018;30(6):581-8. doi:10.1007/s40520-017-0811-y
- Kurichi JE, Bogner HR, Streim JE, et al. Predicting 3-year mortality and admission to acute-care hospitals, skilled nursing facilities, and long-term care facilities in Medicare beneficiaries. *Arch Gerontol Geriatr.* 2017;73:248-56. doi:10.1016/j.archger.2017.08.005
- Levy C, Kheirbek R, Alemi F, et al. Predictors of six-month mortality among nursing home residents: diagnoses may be more predictive than functional disability. *J Palliat Med.* 2015;18(2):100-6. doi:10.1089/jpm.2014.0130
- Li S, Middleton A, Ottenbacher KJ, et al. Trajectories over the first year of long-term care nursing home residence. *J Am Med Dir Assoc.* 2018;19(4):333-41. doi:10.1016/j.jamda.2017.09.021
- Lopes H, Mateus C, Rosati N. Impact of long-term care and mortality risk in community care and nursing homes populations. *Arch Gerontol Geriatr.* 2018;76:160-8. doi:10.1016/j.archger.2018.02.009
- Lucchetti G, Lucchetti ALG, Pires SL, et al. Predictors of death among nursing home patients: a 5-year prospective study. *Geriatr Gerontol Int.* 2015;15(2):234-6. doi:10.1111/ggi.12324
- Mello S, O'Connor KA. Morbidity and mortality following relocation of highly dependent long-term care residents: a retrospective analytical study. *J Gerontol Nurs.* 2016;42(11):34-8. doi:10.3928/00989134-20160908-01
- Mikami Y, Watanabe Y, Eda Hiro A, et al. Relationship between mortality and Council of Nutrition Appetite Questionnaire scores in Japanese nursing home residents. *Nutrition.* 2019;57:40-5. doi:10.1016/j.nut.2018.05.030
- Moon KJ, Park H. Outcomes of patients with delirium in long-term care facilities: a prospective cohort study. *J Gerontol Nurs.* 2018;44(9):41-50. doi:10.3928/00989134-20180808-08
- Murphy B, Bugeja L, Pilgrim J, et al. Deaths from resident-to-resident aggression in Australian nursing homes. *J Am Geriatr Soc.* 2017;65(12):2603-9. doi:10.1111/jgs.15051
- Nijsten JMH, Leontjevas R, Pat-El R, et al. Apathy: risk factor for mortality in nursing home patients. *J Am Geriatr Soc.* 2017;65(10):2182-9. doi:10.1111/jgs.15007

Ogarek JA, McCreedy EM, Thomas KS, et al. Minimum data set changes in health, end-stage disease and symptoms and signs scale: a revised measure to predict mortality in nursing home residents. *J Am Geriatr Soc.* 2018;66(5):976-81. doi:10.1111/jgs.15305

O'Keeffe ST. Physical restraints and nursing home residents: dying to be safe? *Age & Ageing.* 2017;46(4):536-7. doi:10.1093/ageing/afx014

Pelaez VC, Ausin L, Mambrilla MR, et al. Ankle-brachial index, risk of clinical fractures, mortality and low bone mass in nursing home residents. *Eur Rev Med Pharmacol Sci.* 2015;19(9):1577-82.

Rådholm K, Festin K, Falk M, et al. Blood pressure and all-cause mortality: a prospective study of nursing home residents. *Age & Ageing.* 2016;45(6):826-32. doi:10.1093/ageing/afw122

Rauh SP, Heymans MW, Mehr DR, et al. Predicting mortality in patients treated differently: updating and external validation of a prediction model for nursing home residents with dementia and lower respiratory infections. *BMJ Open.* 2016;6(8). doi:10.1136/bmjopen-2016-011380

Schlesinger A, Weiss A, Nenaydenko O, et al. Does polypharmacy in nursing homes affect long-term mortality? *J Am Geriatr Soc.* 2016;64(7):1432-8. doi:10.1111/jgs.14213

Simms AD, Weston CF, West RM, et al. Mortality and missed opportunities along the pathway of care for ST-elevation myocardial infarction: a national cohort study. *Eur Heart J Acute Cardiovasc Care.* 2015;4(3):241-53. doi:10.1177/2048872614548602

Sjögren P, Wårdh I, Zimmerman M, et al. Oral care and mortality in older adults with pneumonia in hospitals or nursing homes: systematic review and meta-analysis. *J Am Geriatr Soc.* 2016;64(10):2109-15. doi:10.1111/jgs.14260

Streicher M, Wirth R, Schindler K, et al. Dysphagia in nursing homes-results from the NutritionDay project. *J Am Med Dir Assoc.* 2018;19(2):141-7. doi:10.1016/j.jamda.2017.08.015

Sund Levander M, Milberg A, Rodhe N, et al. Differences in predictors of 5-year survival over a 10-year period in two cohorts of elderly nursing home residents in Sweden. *Scand J Caring Sci.* 2016;30(4):714-20. doi:10.1111/scs.12284

Suskind AM, Zhao S, Walter LC, et al. Mortality and functional outcomes after minor urological surgery in nursing home residents: a national study. *J Am Geriatr Soc.* 2018;66(5):909-15. doi:10.1111/jgs.15302

Tabue-Teguo M, Kelaiditi E, Demougeot L, et al. Frailty index and mortality in nursing home residents in France: results from the INCUR study. *J Am Med Dir Assoc.* 2015;16(7):603-6. doi:10.1016/j.jamda.2015.02.002

Tanuseputro P, Chalifoux M, Bennett C, et al. Hospitalization and mortality rates in long-term care facilities: does for-profit status matter? *J Am Med Dir Assoc.* 2015;16(10):874-83. doi:10.1016/j.jamda.2015.06.004

- Ten Koppel M, Onwuteaka-Philipsen BD, Pasma HR, et al. Are older long term care residents accurately prognosticated and consequently informed about their prognosis? Results from SHELTER study data in 5 European countries. *PLoS One*. 2018;13(7):1-14. doi:10.1371/journal.pone.0200590
- Trang DT, Cool C, de Mazieres CL, et al. Mortality and antipsychotic drug use in elderly patients with Parkinson disease in nursing homes. *J Am Med Dir Assoc*. 2017;18(9):791-6. doi:10.1016/j.jamda.2017.04.014
- Veronese N, Cereda E, Solmi M, et al. Inverse relationship between body mass index and mortality in older nursing home residents: a meta-analysis of 19,538 elderly subjects. *Obes Rev*. 2015;16(11):1001-15. doi:10.1111/obr.12309
- Vetrano DL, Collamati A, Magnavita N, et al. Health determinants and survival in nursing home residents in Europe: results from the SHELTER study. *Maturitas*. 2018;107:19-25. doi:10.1016/j.maturitas.2017.09.014
- Vetrano DL, La Carpia D, Grande G, et al. Anticholinergic medication burden and 5-year risk of hospitalization and death in nursing home elderly residents with coronary artery disease. *J Am Med Dir Assoc*. 2016;17(11):1056-9. doi:10.1016/j.jamda.2016.07.012
- Vossius C, Selbaek G, Benth JS, et al. Mortality in nursing home residents: a longitudinal study over three years. *PLoS One*. 2018;13(9). doi:10.1371/journal.pone.0203480
- Willoughby M, Kipsaina C, Ferrah N, et al. Mortality in nursing homes following emergency evacuation: a systematic review. *J Am Med Dir Assoc*. 2017;18(8):664-70. doi:10.1016/j.jamda.2017.02.005
- Woolford MH, Bugeja L, Weller C, et al. Unexplained absence resulting in deaths of nursing home residents in Australia: a 13-year retrospective study. *Int J Geriatr Psychiatry*. 2018;33(8):1082-9. doi:10.1002/gps.4896
- Woolford MH, Weller C, Ibrahim JE. Unexplained absences and risk of death and injury among nursing home residents: a systematic review. *J Am Med Dir Assoc*. 2017;18(4):366.e1-366.e15. doi:10.1016/j.jamda.2017.01.007
- Zhen Z, Feng Q, Gu D. The impacts of unmet needs for long-term care on mortality among older adults in China. *J Disabil Policy Stud*. 2015;25(4):243-51. doi:10.1177/1044207313486521
- Zhou W, Kozikowski A, Pekmezaris R, et al. Association between weight change, health outcomes, and mortality in older residents in long-term care. *South Med J*. 2017;110(7):459-65. doi:10.14423/smj.0000000000000673

Death—Suicide

- Gruenewald DA. Voluntarily stopping eating and drinking: a practical approach for long-term care facilities. *J Palliat Med*. 2018;21(9):1214-20. doi:10.1089/jpm.2018.0100

Ibrahim JE, Bugeja L, Willoughby M, et al. Premature deaths of nursing home residents: an epidemiological analysis. *Med J Aust*. 2017;206(10):442-7.

Mezuk B, Lohman M, Leslie M, et al. Suicide risk in nursing homes and assisted living facilities: 2003-2011. *Am J Public Health*. 2015;105(7):495-1502. doi:10.2105/AJPH.2015.302573

Mills PD, Gallimore BI, Watts BV, et al. Suicide attempts and completions in Veterans Affairs nursing home care units and long-term care facilities: a review of root-cause analysis reports. *Int J Geriatr Psychiatry*. 2016;31(5):518-25. doi:10.1002/gps.4357

Murphy BJ, Bugeja L, Pilgrim J, et al. Completed suicide among nursing home residents: a systematic review. *Int J Geriatr Psychiatry*. 2015;30(8):802-14. doi:10.1002/gps.4299

Murphy BJ, Bugeja LC, Pilgrim JL, et al. Suicide among nursing home residents in Australia: a national population-based retrospective analysis of medico-legal death investigation information. *Int J Geriatr Psychiatry*. 2018;33(5):786-96. doi:10.1002/gps.4862

Saladin N, Schnepf W, Fringer A. Voluntary stopping of eating and drinking (VSED) as an unknown challenge in a long-term care institution: an embedded single case study. *BMC Nurs*. 2018;17:39. doi:10.1186/s12912-018-0309-8

Delirium

Boockvar KS, Teresi JA, Inouye SK. Preliminary data: an adapted hospital elder life program to prevent delirium and reduce complications of acute illness in long-term care delivered by certified nursing assistants. *J Am Geriatr Soc*. 2016;64(5):1108-13. doi:10.1111/jgs.14091

Cheung ENM, Benjamin S, Heckman G, et al. Clinical characteristics associated with the onset of delirium among long-term nursing home residents. *BMC Geriatr*. 2018;18(1):39. doi:10.1186/s12877-018-0733-3

Kosar CM, Thomas KS, Inouye SK, et al. Delirium during postacute nursing home admission and risk for adverse outcomes. *J Am Geriatr Soc*. 2017;65(7):1470-5. doi:10.1111/jgs.14823

Miu DK, Chan CW, Kok C. Delirium among elderly patients admitted to a post-acute care facility and 3-months outcome. *Geriatr Gerontol Int*. 2016;16(5):586-92. doi:10.1111/ggi.12521

Moon KJ, Park H. Outcomes of patients with delirium in long-term care facilities: a prospective cohort study. *J Gerontol Nurs*. 2018;44(9):41-50. doi:10.3928/00989134-20180808-08

Morichi V, Fedecostante M, Morandi A, et al. A point prevalence study of delirium in Italian nursing homes. *Dement Geriatr Cogn Disord*. 2018;46(1/2):27-41. doi:10.1159/000490722

Moyo P, Huang TY, Simoni-Wastila L, et al. Exploratory and confirmatory factor analyses of delirium symptoms in a sample of nursing home residents. *J Applied Gerontol*. 2018;37(2):228-255. doi:10.1177/0733464816633859

Onder G, Giovannini S, Sganga F, et al. Interactions between drugs and geriatric syndromes in nursing home and home care: results from Shelter and IBenC projects. *Aging Clin Exp Res*. 2018;30(9):1015-21. doi:10.1007/s40520-018-0893-1

Siddiqi N, Cheater F, Collinson M, et al. The PiTSTOP study: a feasibility cluster randomized trial of delirium prevention in care homes for older people. *Age Ageing*. 2016;45(5):652-61. doi:10.1093/ageing/afw091

Depression

Abrams RC, Nathanson M, Silver S, et al. A training program to enhance recognition of depression in nursing homes, assisted living, and other long-term care settings: description and evaluation. *Gerontol Geriatr Educ*. 2017;38(3):325-45. doi:10.1080/02701960.2015.1115980

Arrieta H, Rezola-Pardo C, Echeverria I, et al. Physical activity and fitness are associated with verbal memory, quality of life and depression among nursing home residents: preliminary data of a randomized controlled trial. *BMC Geriatr*. 2018;18(1):80. doi:10.1186/s12877-018-0770-y

Azulai A, Walsh CA. Screening for geriatric depression in residential care facilities: a systematic narrative review. *J Gerontol Soc Work*. 2015;58(1):20-45. doi:10.1080/01634372.2014.904469

Bali V, Chatterjee S, Johnson ML, et al. Risk of mortality in elderly nursing home patients with depression using paroxetine. *Pharmacotherapy*. 2017;37(3):287-96. doi:10.1002/phar.1898

Blytt KM, Bjorvatn B, Husebo B, et al. Effects of pain treatment on sleep in nursing home patients with dementia and depression: a multicenter placebo-controlled randomized clinical trial. *Int J Geriatr Psychiatry*. 2018;33(4):663-70. doi:10.1002/gps.4839

Borza T, Engedal K, Bergh S, et al. The course of depressive symptoms as measured by the Cornell scale for depression in dementia over 74 months in 1158 nursing home residents. *J Affect Disord*. 2015;175:209-16. doi:10.1016/j.jad.2014.12.053

Chen KM, Huang HT, Cheng YY, et al. Sleep quality and depression of nursing home older adults in wheelchairs after exercises. *Nurs Outlook*. 2015;63(3):357-65. doi:10.1016/j.outlook.2014.08.010

Chun A, Reinhardt JP, Ramirez M, et al. Depression recognition and capacity for self-report among ethnically diverse nursing homes residents: evidence of disparities in screening. *J Clin Nurs*. 2017;26(23-24):4915-26. doi:10.1111/jocn.13974

Crespy SD, Van Haitsma K, Kleban M, et al. Reducing depressive symptoms in nursing home residents: evaluation of the Pennsylvania Depression Collaborative Quality Improvement Program. *J Healthc Qual*. 2016;38(6):E76-88. doi:10.1097/JHQ.000000000000009

Davison TE, Eppingstall B, Runci S, et al. A pilot trial of acceptance and commitment therapy for symptoms of depression and anxiety in older adults residing in long-term care facilities. *Aging Ment Health*. 2017;21(7):766-73. doi:10.1080/13607863.2016.1156051

Erdal A, Flo E, Selbaek G, et al. Associations between pain and depression in nursing home patients at different stages of dementia. *J Affect Disord.* 2017;218:8-14. doi:10.1016/j.jad.2017.04.038

Hsiao CY, Lan CF, Chang PL, et al. Development of the psychometric property of a minimum data-set-based depression rating scale for use in long-term care facilities in Taiwan. *Aging Ment Health.* 2015;19(2):129-35. doi:10.1080/13607863.2014.920294

Kavana GV, Sparshadeep EM, Shiyas MA, et al. Assessment of depression and social support in elderly subjects residing in an old age home: a pilot study. *J Clin Diagn Res.* 2018;12(12): LC10-14. doi:10.7860/JCDR/2018/37658.12403

Kvaal LAH, Bergland A, Telenius EW. Associations between physical function and depression in nursing home residents with mild and moderate dementia: a cross-sectional study. *BMJ Open.* 2017;7(7):e016875. doi:10.1136/bmjopen-2017-016875

Mansbach WE, Mace RA, Clark KM. The Brief Anxiety and Depression Scale (BADSD): a new instrument for detecting anxiety and depression in long-term care residents. *Int Psychogeriatr.* 2015;27(4):673-81. doi:10.1017/s1041610214002397

Meeks S, Ludwin BM, Looney SW. Falls as adverse events in psychosocial treatment of depression: findings from a clinical trial in nursing homes. *Contemp Clin Trials Commun.* 2016;3:139-41. doi:10.1016/j.conctc.2016.05.006

Meeks S, Van Haitsma K, Schoenbachler B, et al. BE-ACTIV for depression in nursing homes: primary outcomes of a randomized clinical trial. *J Gerontol B Psychol Sci Soc Sci.* 2015;70(1):13-23. doi:10.1093/geronb/gbu026

Murphy BJ, Bugeja L, Pilgrim J, et al. Completed suicide among nursing home residents: a systematic review. *Int J Geriatr Psychiatry.* 2015;30(8):802-14. doi:10.1002/gps.4299

Simning A, Simons KV. Treatment of depression in nursing home residents without significant cognitive impairment: a systematic review. *Int Psychogeriatr.* 2017;29(2):209-26. doi:10.1017/s1041610216001733

Syed Elias SM, Neville C, Scott T. The effectiveness of group reminiscence therapy for loneliness, anxiety and depression in older adults in long-term care: a systematic review. *Geriatr Nurs.* 2015;36(5):372-80. doi:10.1016/j.gerinurse.2015.05.004

Tarakci E, Zenginler Y, Kaya Mutlu E. Chronic pain, depression symptoms and daily living independency level among geriatrics in nursing home. *Agri.* 2015;27(1):35-41. doi:10.5505/agri.2015.14238

Travers C. Increasing enjoyable activities to treat depression in nursing home residents with dementia: a pilot study. *Dementia (London).* 2017;16(2):204-18. doi:10.1177/1471301215586069

Ulbricht CM, Rothschild AJ, Hunnicutt JN, et al. Depression and cognitive impairment among newly admitted nursing home residents in the USA. *Int J Geriatr Psychiatry*. 2017;32(11):1172-81. doi:10.1002/gps.4723

Wang JJ, Simmons SF, Maxwell CA, et al. Home health nurses' perspectives and care processes related to older persons with frailty and depression: a mixed method pilot study. *J Community Health Nurs*. 2018;35(3):118-36. doi:10.1080/07370016.2018.1475799

Wu MC, Sung HC, Lee WL, et al. The effects of light therapy on depression and sleep disruption in older adults in a long-term care facility. *Int J Nurs Pract*. 2015;21(5):653-9. doi:10.1111/ijn.12307

Yeu-Hui C, Li-Min K. Nurses' confidence in providing and managing care for older persons with depressive symptoms or depression in long-term care facilities: a national survey. *Int J Ment Health Nurs*. 2018;27(6):1767-75. doi:10.1111/inm.12483

Yoon S, Moon SS, Pitner R. Effective treatments of late-life depression in long-term care facilities. *Res Soc Work Pract*. 2018;28(2):116-30. doi:10.1177/1049731515621165

Zhao X, Zhang D, Wu ML, et al. Loneliness and depression symptoms among the elderly in nursing homes: a moderated mediation model of resilience and social support. *Psychiatry Res*. 2018;268:143-51. doi:10.1016/j.psychres.2018.07.011

Disability/Functional Decline

Buurman BM, Han L, Murphy TE, et al. Trajectories of disability among older persons before and after a hospitalization leading to a skilled nursing facility admission. *J Am Med Dir Assoc*. 2016;17(3):225-31. doi:10.1016/j.jamda.2015.10.010

Chen LY, Liu LK, Hwang AC, et al. Impact of malnutrition on physical, cognitive function and mortality among older men living in veteran homes by minimum data set: a prospective cohort study in Taiwan. *J Nutr Health Aging*. 2016;20(1):41-7. doi:10.1007/s12603-015-0646-1

Ferreira AR, Dias CC, Fernandes L. Needs in nursing homes and their relation with cognitive and functional decline, behavioral and psychological symptoms. *Front Aging Neurosci*. 2016;8:72. doi:10.3389/fnagi.2016.00072

Jerez-Roig J, Ferreira L, de Araujo JRT, et al. Functional decline in nursing home residents: a prognostic study. *PLoS One*. 2017;12(5). doi:10.1371/journal.pone.0177353

Kamiya K, Adachi T, Sasou K, et al. Risk factors for disability progression among Japanese long-term care service users: a 3-year prospective cohort study. *Geriatr Gerontol Int*. 2017;17(4):568-74. doi:10.1111/ggi.12756

Kotlarczyk MP, Perera S, Ferchak MA, et al. Vitamin D deficiency is associated with functional decline and falls in frail elderly women despite supplementation. *Osteoporos Int*. 2017;28(4):1347-53. doi:10.1007/s00198-016-3877-z

Laffon de Mazières C, Morley JE, Levy C, et al. Prevention of functional decline by reframing the role of nursing homes? *J Am Med Dir Assoc.* 2017;18(2):105-10. doi:10.1016/j.jamda.2016.11.019

Lane NE, Wodchis WP, Boyd CM, et al. Disability in long-term care residents explained by prevalent geriatric syndromes, not long-term care home characteristics: a cross-sectional study. *BMC Geriatr.* 2017;17(1):49. doi:10.1186/s12877-017-0444-1

Liu ZY, Han L, Leo-Summers L, et al. The subsequent course of disability in older persons discharged to a skilled nursing facility after an acute hospitalization. *Exp Gerontol.* 2017;97:73-9. doi:10.1016/j.exger.2017.08.004

Merilahti J, Viramo P, Korhonen I. Wearable monitoring of physical functioning and disability changes, circadian rhythms and sleep patterns in nursing home residents. *IEEE J Biomed Health Inform.* 2016;20(3):856-64. doi:10.1109/jbhi.2015.2420680

Min L, Galecki A, Mody L. Functional disability and nursing resource use are predictive of antimicrobial resistance in nursing homes. *J Am Geriatr Soc.* 2015;63(4):659-66. doi:10.1111/jgs.13353

Murphy BJ, Bugeja L, Pilgrim J, et al. Completed suicide among nursing home residents: a systematic review. *Int J Geriatr Psychiatry.* 2015;30(8):802-14. doi:10.1002/gps.4299

Pezzin LE, Bogner HR, Kurichi JE, et al. Preventable hospitalizations, barriers to care, and disability. *Medicine (Baltimore).* 2018;97(19):e0691. doi:10.1097/md.00000000000010691

Serrano-Urrea R, Gomez-Rubio V, Palacios-Cena D, et al. Individual and institutional factors associated with functional disability in nursing home residents: an observational study with multilevel analysis. *PLoS One.* 2017;12(8):e0183945. doi:10.1371/journal.pone.0183945

Suskind AM, Zhao S, Walter LC, et al. Mortality and functional outcomes after minor urological surgery in nursing home residents: a national study. *J Am Geriatr Soc.* 2018;66(5):909-15. doi:10.1111/jgs.15302

Tang V, Zhao SJ, Boscardin J, et al. Functional status and survival after breast cancer surgery in nursing home residents. *JAMA Surg.* 2018;153(12):1090-96. doi:10.1001/jamasurg.2018.2736

Taylor MG, Ureña S, Lynch SM. Race differences in ADL disability decline 1984-2004: evidence from the National Long-Term Care Survey. *J Aging Health.* 2018;30(2):167-89. doi:10.1177/0898264316673178

Wysocki A, Thomas KS, Mor V. Functional improvement among short-stay nursing home residents in the MDS 3.0. *J Am Med Dir Assoc.* 2015;16(6):470-74. doi:10.1016/j.jamda.2014.11.018

Zhu HY. Unmet needs in long-term care and their associated factors among the oldest old in China. *BMC Geriatr.* 2015;15:46. doi:10.1186/s12877-015-0045-9

Zullo AR, Hersey M, Lee Y, et al. Outcomes of “diabetes-friendly” vs “diabetes-unfriendly” beta-blockers in older nursing home residents with diabetes after acute myocardial infarction. *Diabetes Obes Metab*. 2018;20(12):2724-32. doi:10.1111/dom.13451

Falls

Altintas HK, Aslan GK, Sisman NY, et al. Effects of pain and sleep quality on falls among nursing home residents in Turkey. *Res Gerontol Nurs*. 2018;11(5):257-64. doi:10.3928/19404921-20180810-01

Amrein K, Altendorfer E. High-dose monthly vitamin D3 can help to prevent acute respiratory infections in older long-term care residents, but may increase risk of falls. *Evid Based Nurs*. 2017;20(4):120-1. doi:10.1136/eb-2017-102613

Araujo AHN, Patricio A, Ferreira MAM, et al. Falls in institutionalized older adults: risks, consequences and antecedents. *Rev Bras Enferm*. 2017;70(4):719-25. doi:10.1590/0034-7167-2017-0107

Aspinall SL, Springer SP, Zhao X, et al. Central nervous system medication burden and risk of recurrent serious falls and hip fractures in veterans affairs nursing home residents. *J Am Geriatr Soc*. 2019;67(1):74-80. doi:10.1111/jgs.15603

Baixinho C, Dixe M, Henriques MAP. Falls in long-term care institutions for elderly people: protocol validation. *Rev Bras Enferm*. 2017;70(4):740-6. doi:10.1590/0034-7167-2017-0109

Barbosa FA, del Pozo-Cruz B, del Pozo-Cruz J, et al. Factors associated with the risk of falls of nursing home residents aged 80 or older. *Rehabil Nurs*. 2016;41(1):16-25. doi:10.1002/rnj.229

Bor A, Matuz M, Csatorjai M, et al. Medication use and risk of falls among nursing home residents: a retrospective cohort study. *Int J Clin Pharm*. 2017;39(2):408-15. doi:10.1007/s11096-017-0426-6

Botwinick I, Johnson JH, Safadjou S, et al. Geriatric nursing home falls: a single institution cross-sectional study. *Arch Gerontol Geriatr*. 2016;63:43-8. doi:10.1016/j.archger.2015.12.002

Bronskill SE, Campitelli MA, Iaboni A, et al. Low-dose trazodone, benzodiazepines, and fall-related injuries in nursing homes: a matched-cohort study. *J Am Geriatr Soc*. 2018;66(10):1963-71. doi:10.1111/jgs.15519

Buckinx F, Croisier JL, Reginster JY, et al. Prediction of the incidence of falls and deaths among elderly nursing home residents: the SENIOR study. *J Am Med Dir Assoc*. 2018;19(1):18-24. doi:10.1016/j.jamda.2017.06.014

Cameron EJ, Bowles SK, Marshall EG, et al. Falls and long-term care: a report from the care by design observational cohort study. *BMC Fam Pract*. 2018;19(1):73. doi:10.1186/s12875-018-0741-6

Cameron ID, Dyer SM, Panagoda CE, et al. Interventions for preventing falls in older people in care facilities and hospitals. *Cochrane Database Syst Rev.* 2018;9:CD005465. doi:10.1002/14651858.CD005465.pub4

Cantalice Alves AH, Freire de Araújo Patrício AC, Fernandes de Albuquerque K, et al. Occurrence of falls among elderly institutionalized: prevalence, causes and consequences. *Revista de Pesquisa: Cuidado e Fundamental.* 2016;8(2):4376-86. doi:10.9789/2175-5361.2016.v8i2

Carryer J, Weststrate J, Yeung P, et al. Prevalence of key care indicators of pressure injuries, incontinence, malnutrition, and falls among older adults living in nursing homes in New Zealand. *Res Nurs Health.* 2017;40(6):555-63. doi:10.1002/nur.21835

Cary MP, Hall RK, Anderson AL, et al. Management team perceptions of risks and strategies for preventing falls among short-stay patients in nursing homes. *Health Care Manage (Frederick).* 2018;37(1):76-85. doi:10.1097/HCM.0000000000000192

Chan DKY, Chan LKM. Falls in nursing homes: challenges from a nursing perspective. *Br J Community Nurs.* 2019;24(1):6-9. doi:10.12968/bjcn.2019.24.1.6

Choi WJ, Wakeling JM, Robinovitch SN. Kinematic analysis of video-captured falls experienced by older adults in long-term care. *J Biomech.* 2015;48(6):911-20. doi:10.1016/j.jbiomech.2015.02.025

Cox CA, van Jaarsveld HJ, Houterman S, et al. Psychotropic drug prescription and the risk of falls in nursing home residents. *J Am Med Dir Assoc.* 2016;17(12):1089-93. doi:10.1016/j.jamda.2016.07.004

Dever Fitzgerald T, Hadjistavropoulos T, Williams J, et al. The impact of fall risk assessment on nurse fears, patient falls, and functional ability in long-term care. *Disabil Rehabil.* 2016;38(11):1041-52. doi:10.3109/09638288.2015.1085102

Dhargave P, Sendhilkumar R. Prevalence of risk factors for falls among elderly people living in long-term care homes. *J Clin Gerontol Geriatr.* 2016;7(3):99-103. doi:10.1016/j.jcgg.2016.03.004

Duarte M, Bouça-Machado R, Domingos J, et al. Feasibility of using risk prompts to prevent falls, dehydration and pulmonary aspiration in nursing homes: a clinical study protocol. *Pilot Feasibility Stud.* 2018;4:39. doi:10.1186/s40814-018-0236-1

Eckstrom E, Neal MB, Cotrell V, et al. An interprofessional approach to reducing the risk of falls through enhanced collaborative practice. *J Am Geriatr Soc.* 2016;64(8):1701-7. doi:10.1111/jgs.14178

Gebara MA, Lipsey KL, Karp JF, et al. Cause or effect? Selective serotonin reuptake inhibitors and falls in older adults: a systematic review. *Am J Geriatr Psychiatry.* 2015;23(10):1016-28. doi:10.1016/j.jagp.2014.11.004

Gimm GW, Kitsantas P. Falls, depression, and other hospitalization risk factors for adults in residential care facilities. *Int J Aging Hum Dev.* 2016;83(1):44-62. doi:10.1177/0091415016645347

Gray-Miceli D, de Cordova PB, Crane GL, et al. Nursing home registered nurses' and licensed practical nurses' knowledge of causes of falls. *J Nurs Care Qual.* 2016;31(2):153-60. doi:10.1097/ncq.0000000000000157

Hall RK, Landerman LR, O'Hare AM, et al. Chronic kidney disease and recurrent falls in nursing home residents: a retrospective cohort study. *Geriatr Nurs.* 2015;36(2):136-41. doi:10.1016/j.gerinurse.2014.12.012

Hanlon JT, Zhao X, Naples JG, et al. Central nervous system medication burden and serious falls in older nursing home residents. *J Am Geriatr Soc.* 2017;65(6):1183-9. doi:10.1111/jgs.14759

Herculano de Araújo Neto A, Freire de Araújo Patrício AC, Minhaqui Ferreira MA, et al. Falls in institutionalized older adults: risks, consequences and antecedents. *Rev Bras Enferm.* 2017;70(4):719-25. doi:10.1590/0034-7167-2017-0107

Hewitt J, Goodall S, Clemson L, et al. Progressive resistance and balance training for falls prevention in long-term residential aged care: a cluster randomized trial of the sunbeam program. *J Am Med Dir Assoc.* 2018;19(4):361-9. doi:10.1016/j.jamda.2017.12.014

Jansen S, Bhangu J, de Rooij S, et al. The association of cardiovascular disorders and falls: a systematic review. *J Am Med Dir Assoc.* 2016;17(3):193-9. doi:10.1016/j.jamda.2015.08.022

Javelot H, Marquis A, Antoine-Bernard E, et al. Benzodiazepines withdrawal: initial outcomes and long-term impact on falls in a French nursing home. *Pharmacy.* 2018;6(2). doi:10.3390/pharmacy6020030

Kotlarczyk MP, Perera S, Ferchak MA, et al. Vitamin D deficiency is associated with functional decline and falls in frail elderly women despite supplementation. *Osteoporos Int.* 2017;28(4):1347-53. doi:10.1007/s00198-016-3877-z

Lannering C, Ernsth Bravell M, Midlov P, et al. Factors related to falls, weight-loss and pressure ulcers--more insight in risk assessment among nursing home residents. *J Clin Nurs.* 2016;25(7-8):940-50. doi:10.1111/jocn.13154

Lee SH, Kim HS. Exercise Interventions for preventing falls among older people in care facilities: a meta-analysis. *Worldviews on Evid Based Nurs.* 2017;14(1):74-80. doi:10.1111/wvn.12193

Lipsitz LA, Tchalla AE, Iloputaife I, et al. Evaluation of an automated falls detection device in nursing home residents. *J Am Geriatr Soc.* 2016;64(2):365-8. doi:10.1111/jgs.13708

Mackenzie LA, Byles JE. Circumstances of falls with fractured femur in residents of Australian nursing homes: an analysis of falls reports. *J Aging Health.* 2018;30(5):738-57. doi:10.1177/0898264317690667

- Marrero J, Fortinsky RH, Kuchel GA, et al. Risk factors for falls among older adults following transition from nursing home to the community. *Med Care Res Rev.* 2019;76(1):73-88. doi:10.1177/1077558717697012
- McArthur C, Gonzalez DA, Roy E, et al. What are the circumstances of falls and fractures in long-term care? *Can J Aging.* 2016;35(4):491-8. doi:10.1017/s0714980816000556
- Meeks S, Ludwin BM, Looney SW. Falls as adverse events in psychosocial treatment of depression: findings from a clinical trial in nursing homes. *Contemp Clin Trials Commun.* 2016;3:139-41. doi:10.1016/j.conctc.2016.05.006
- Moyer HS, Gale J, Severe S, et al. Outcome measures correlated with falls in nursing home residents—a pilot study. *Physiother Theory Pract.* 2017;33(9):725-32. doi:10.1080/09593985.2017.1345027
- Muniz R, Gomez S, Curto D, et al. Reducing physical restraints in nursing homes: a report from Maria Wolff and Sanitas. *J Am Med Dir Assoc.* 2016;17(7):633-9. doi:10.1016/j.jamda.2016.03.011
- Okada K, Okada M, Kamada N, et al. Reduction of diuretics and analysis of water and muscle volumes to prevent falls and fall-related fractures in older adults. *Geriatr Gerontol Int.* 2017;17(2):262-9. doi:10.1111/ggi.12719
- Seijo-Martinez M, Cancela JM, Ayan C, et al. Influence of cognitive impairment on fall risk among elderly nursing home residents. *Int Psychogeriatr.* 2016;28(12):1975-87. doi:10.1017/S1041610216001113
- Song W, Intrator O, Lee S, et al. Antihypertensive drug deintensification and recurrent falls in long-term care. *Health Serv Res.* 2018;53(6):4066-86. doi:10.1111/1475-6773.13074
- Sterke CS, Panneman MJ, Erasmus V, et al. Increased care demand and medical costs after falls in nursing homes: a Delphi study. *J Clin Nurs.* 2018;27(13-14):2896-903. doi:10.1111/jocn.14488
- Stubbs B, Denkinger MD, Brefka S, et al. What works to prevent falls in older adults dwelling in long term care facilities and hospitals? An umbrella review of meta-analyses of randomised controlled trials. *Maturitas.* 2015;81(3):335-42. doi:10.1016/j.maturitas.2015.03.026
- Teresi JA, Ramirez M, Fulmer T, et al. Resident-to-resident mistreatment: evaluation of a staff training program in the reduction of falls and injuries. *J Gerontol Nurs.* 2018;44(6):15-23. doi:10.3928/00989134-20180326-01
- Towne SD, Jr, Cho J, Smith ML, et al. Factors associated with injurious falls in residential care facilities. *J Aging Health.* 2017;29(4):669-87. doi:10.1177/0898264316641083
- Uymaz PE, Nahcivan NO. Evaluation of a nurse-led fall prevention education program in Turkish nursing home residents. *Educ Gerontol.* 2016;42(5):299-309. doi:10.1080/03601277.2015.1109403

van Schooten KS, Yang YJ, Feldman F, et al. The association between fall frequency, injury risk, and characteristics of falls in older residents of long-term care: do recurrent fallers fall more safely? *J Gerontol A Biol Sci Med Sci*. 2018;73(6):786-91. doi:10.1093/gerona/glx196

Woolrych R, Zecevic A, Sixsmith A, et al. Using video capture to investigate the causes of falls in long-term care. *Gerontologist*. 2015;55(3):483-94. doi:10.1093/geront/gnu053

Yang Y, Feldman F, Leung PM, et al. Agreement between video footage and fall incident reports on the circumstances of falls in long-term care. *J Am Med Dir Assoc*. 2015;16(5):388-94. doi:10.1016/j.jamda.2014.12.003

Yang YJ, van Schooten KS, Sims-Gould J, et al. Sex differences in the circumstances leading to falls: evidence from real-life falls captured on video in long-term care. *J Am Med Dir Assoc*. 2018;19(2):130-5. doi:10.1016/j.jamda.2017.08.011

Zhang N, Lu SF, Zhou YH, et al. Body mass index, falls, and hip fractures among nursing home residents. *J Gerontol A Biol Sci Med Sci*. 2018;73(10):1403-9. doi:10.1093/gerona/gly039

Incontinence

Blekken LE, Nakrem S, Gjeilo KH, et al. Feasibility, acceptability, and adherence of two educational programs for care staff concerning nursing home patients' fecal incontinence: a pilot study preceding a cluster-randomized controlled trial. *Implement Sci*. 2015;10:72. doi:10.1186/s13012-015-0263-8

Blekken LE, Vinsnes AG, Gjeilo KH, et al. Exploring faecal incontinence in nursing home patients: a cross-sectional study of prevalence and associations derived from the Residents Assessment Instrument for Long-Term Care Facilities. *J Adv Nurs*. 2016;72(7):1579-91. doi:10.1111/jan.12932

Bliss DZ, Gurvich OV, Eberly LE, et al. Racial disparities in primary prevention of incontinence among older adults at nursing home admission. *Neurourol Urodyn*. 2017;36(4):1124-30. doi:10.1002/nau.23065

Bliss DZ, Gurvich OV, Savik K, et al. Analysis of racial and ethnic disparities as possible risk factors for development of incontinence by nursing home residents. *Res Nurs Health*. 2015;38(6):449-61. doi:10.1002/nur.21680

Bliss DZ, Mathiason MA, Gurvich O, et al. Incidence and predictors of incontinence-associated skin damage in nursing home residents with new-onset incontinence. *J Wound Ostomy Continence Nurs*. 2017;44(2):165-71. doi:10.1097/WON.0000000000000313

Carryer J, Weststrate J, Yeung P, et al. Prevalence of key care indicators of pressure injuries, incontinence, malnutrition, and falls among older adults living in nursing homes in New Zealand. *Res Nurs Health*. 2017;40(6):555-63. doi:10.1002/nur.21835

Damian J, Pastor-Barriuso R, Garcia Lopez FJ, et al. Urinary incontinence and mortality among older adults residing in care homes. *J Adv Nurs*. 2017;73(3):688-99. doi:10.1111/jan.13170

Jerez-Roig J, Santos MM, Souza DLB, et al. Prevalence of urinary incontinence and associated factors in nursing home residents. *Neurourol Urodyn*. 2016;35(1):102-7. doi:10.1002/nau.22675

Melo LS, Ercole FF, Oliveira DU, et al. Urinary tract infection: a cohort of older people with urinary incontinence. *Rev Bras Enferm*. 2017;70(4):838-44. doi:10.1590/0034-7167-2017-0141

Zarowitz BJ, Allen C, O'Shea T, et al. Clinical burden and nonpharmacologic management of nursing facility residents with overactive bladder and/or urinary incontinence. *Consult Pharm*. 2015;30(9):533-42. doi:10.4140/TCP.n.2015.533

Infections – General

Amrein K, Altendorfer E. High-dose monthly vitamin D3 can help to prevent acute respiratory infections in older long-term care residents, but may increase risk of falls. *Evid Based Nurs*. 2017;20(4):120-1. doi:10.1136/eb-2017-102613

Assab R, Temime L. The role of hand hygiene in controlling norovirus spread in nursing homes. *BMC Infect Dis*. 2016;16:395. doi:10.1186/s12879-016-1702-0

Athar P, Hasbun R, Nolan MS, et al. Long-term neuromuscular outcomes of west nile virus infection: a clinical and electromyographic evaluation of patients with a history of infection. *Muscle Nerve*. 2018;57(1):77-82. doi:10.1002/mus.25660

Black CL, Williams WW, Arbeloa I, et al. Trends in influenza and pneumococcal vaccination among U.S. nursing home residents, 2006-2014. *J Am Med Dir Assoc*. 2017;18(8):735.e1-14. doi:10.1016/j.jamda.2017.05.002

Cardemil CV, Parashar UD, Hall AJ. Norovirus infection in older adults: epidemiology, risk factors, and opportunities for prevention and control. *Infect Dis Clin North Am*. 2017;31(4):839-70. doi:10.1016/j.idc.2017.07.012

Cassir N, Delaroziere JC, Dubourg G, et al. A regional outbreak of clostridium difficile PCR-Ribotype 027 infections in Southeastern France from a single long-term care facility. *Infect Control Hosp Epidemiol*. 2016;37(11):1337-41. doi:10.1017/ice.2016.164

Chi-Young L, Min-Hye L, Seong-Hyeon L, et al. Nurses' views on infection control in long-term care facilities in South Korea: a focus group study. *Korean J Adult Nurs*. 2018;30(6):634-42. doi:10.7475/kjan.2018.30.6.634

Clifton M, Kralovic SM, Simbartl LA, et al. Achieving balance between implementing effective infection prevention and control practices and maintaining a home-like setting in U.S. Department of Veterans Affairs nursing homes. *Am J Infect Control*. 2018;46(11):1307-10. doi:10.1016/j.ajic.2018.04.221

Cohen CC, Dick A, Stone PW. Isolation precautions use for multidrug-resistant organism infection in nursing homes. *J Am Geriatr Soc*. 2017;65(3):483-9. doi:10.1111/jgs.14740

- Daugherty JD, Blake SC, Grosholz JM, et al. Influenza vaccination rates and beliefs about vaccination among nursing home employees. *Am J Infect Control*. 2015;43(2):100-6. doi:10.1016/j.ajic.2014.08.021
- Detweiler K, Mayers D, Fletcher SG. Bacteruria and urinary tract infections in the elderly. *Urol Clin North Am*. 2015;42(4):561-8. doi:10.1016/j.ucl.2015.07.002
- Dhawan N, Pandya N, Khalili M, et al. Predictors of mortality for nursing home-acquired pneumonia: a systematic review. *Biomed Res Int*. 2015;2015: 285983. doi:10.1155/2015/285983
- Falcone M, Russo A, Silverj FG, et al. Predictors of mortality in nursing-home residents with pneumonia: a multicentre study. *Clin Microbiol Infect*. 2018;24(1):72-7. doi:10.1016/j.cmi.2017.05.023
- Fassmer AM, Spreckelsen O, Hoffmann F. Incidence of pneumonia in nursing home residents in Germany: results of a claims data analysis. *Epidemiol Infect*. 2018;146(9):1123-9. doi:10.1017/S0950268818000997
- Feldstein D, Sloane PD, Weber D, et al. Current prescribing practices for skin and soft tissue infections in nursing homes. *J Am Med Dir Assoc*. 2017;18(3):265-70. doi:10.1016/j.jamda.2016.09.024
- Herzig CTA, Dick AW, Sorbero M, et al. Infection trends in U.S. nursing homes, 2006-2013. *J Am Med Dir Assoc*. 2017;18(7). doi:10.1016/j.jamda.2017.04.003
- Herzig SJ, LaSalvia MT, Naidus E, et al. Antipsychotics and the risk of aspiration pneumonia in individuals hospitalized for nonpsychiatric conditions: a cohort study. *J Am Geriatr Soc*. 2017;65(12):2580-6. doi:10.1111/jgs.15066
- Hollaar VRY, van der Putten GJ, van der Maarel-Wierink CD, et al. Nursing home-acquired pneumonia, dysphagia and associated diseases in nursing home residents: a retrospective, cross-sectional study. *Geriatr Nurs*. 2017;38(5):437-41. doi:10.1016/j.gerinurse.2017.02.007
- Hubner NO, Dittmann K, Begunk R, et al. Infection control measures and prevalence of multidrug-resistant organisms in non-hospital care settings in northeastern Germany: results from a one-day point prevalence study. *J Hosp Infect*. 2017;97(3):234-40. doi:10.1016/j.jhin.2017.08.002
- Kariya N, Sakon N, Komano J, et al. Current prevention and control of health care-associated infections in long-term care facilities for the elderly in Japan. *J Infect Chemother*. 2018;24(5):347-52. doi:10.1016/j.jiac.2017.12.004
- Katz MJ, Gurses AP. Infection prevention in long-term care: re-evaluating the system using a human factors engineering approach. *Infect Control Hosp Epidemiol*. 2019;40(1):95-9. doi:10.1017/ice.2018.308

Kaur J, Stone PW, Travers JL, et al. Influence of staff infection control training on infection-related quality measures in U.S. nursing homes. *Am J Infect Control*. 2017;45(9):1035-40. doi:10.1016/j.ajic.2017.04.285

Kistler CE, Zimmerman S, Scales K, et al. The antibiotic prescribing pathway for presumed urinary tract infections in nursing home residents. *J Am Geriatr Soc*. 2017;65(8):1719-25. doi:10.1111/jgs.14857

Kline KA, Bowdish, DM. Infection in an aging population. *Curr Opin Microbiol*. 2016;29: 63-7. doi:10.1016/j.mib.2015.11.003

Laudisio A, Marinosci F, Gemma A, et al. The burden of comorbidity is associated with antibiotic resistance among institutionalized elderly with urinary infection: a retrospective cohort study in a single Italian nursing home between 2009 and 2014. *Microb Drug Resist*. 2017;23(4):500-6. doi:10.1089/mdr.2016.0016

Lee DT, Yu D, Ip M, et al. Evaluation on the implementation of respiratory protection measures in old age homes. *Clin Interv Aging*. 2017;12:1429-38. doi:10.2147/cia.S142522

Lim CW, Choi Y, An CH, et al. Facility characteristics as independent prognostic factors of nursing home-acquired pneumonia. *Korean J Intern Med*. 2016;31(2):296-304. doi:10.3904/kjim.2014.256

McConeghy KW, Baier R, McGrath KP, et al. Implementing a pilot trial of an infection control program in nursing homes: results of a matched cluster randomized trial. *J Am Med Dir Assoc*. 2017;18(8):707-12. doi:10.1016/j.jamda.2017.03.003

Melo LS, Ercole FF, Oliveira DU, et al. Urinary tract infection: a cohort of older people with urinary incontinence. *Rev Bras Enferm*. 2017;70(4):838-44. doi:10.1590/0034-7167-2017-0141

Min L, Galecki A, Mody L. Functional disability and nursing resource use are predictive of antimicrobial resistance in nursing homes. *J Am Geriatr Soc*. 2015;63(4):659-66. doi:10.1111/jgs.13353

Nace DA, Archbald-Pannone LR, Ashraf MS, et al. Pneumococcal vaccination guidance for post-acute and long-term care settings: recommendations from AMDA's infection advisory committee. *J Am Med Dir Assoc*. 2017;18(2):99-104. doi:10.1016/j.jamda.2016.11.010

Pae M, Wu D. Nutritional modulation of age-related changes in the immune system and risk of infection. *Nutr Res*. 2017;41:14-35. doi:10.1016/j.nutres.2017.02.001

Pereira R, Oliveira S, Almeida A. Nursing home-acquired pneumonia presenting at the emergency department. *Intern Emerg Med*. 2016;11(7):999-1004. doi:10.1007/s11739-016-1412-z

Pogorzelska-Maziarz M, Kalp EL. Infection prevention outside of the acute care setting: results from the MegaSurvey of infection preventionists. *Am J Infect Control*. 2017;45(6):597-602. doi:10.1016/j.ajic.2017.03.020

- Reddy D, Walker J, White LF, et al. Latent tuberculosis infection testing practices in long-term care facilities, Boston, Massachusetts. *J Am Geriatr Soc.* 2017;65(6):1145-51. doi:10.1111/jgs.14696
- Sarpel D, Baichoo E, Dieterich DT. Chronic hepatitis B and C infection in the United States: a review of current guidelines, disease burden and cost effectiveness of screening. *Expert Rev Anti Infect Ther.* 2016;14(5):511-21. doi:10.1586/14787210.2016.1174066
- Singh MB, Evans ME, Simbartl LA, et al. Evaluating the effect of a clostridium difficile infection prevention initiative in Veterans Health Administration long-term care facilities. *Infect Control Hosp Epidemiol.* 2018;39(3):343-5. doi:10.1017/ice.2017.305
- Sjögren P, Wårdh I, Zimmerman M, et al. Oral care and mortality in older adults with pneumonia in hospitals or nursing homes: systematic review and meta-analysis. *J Am Geriatr Soc.* 2016;64(10):2109-15. doi:10.1111/jgs.14260
- Stone PW, Herzig CTA, Agarwal M, et al. Nursing home infection control program characteristics, CMS citations, and implementation of antibiotic stewardship policies: a national study. *Inquiry.* 2018;55:46958018778636. doi:10.1177/0046958018778636
- Temime L, Cohen N, Ait-Bouziad K, et al. Impact of a multicomponent hand hygiene-related intervention on the infectious risk in nursing homes: a cluster randomized trial. *Am J Infect Control.* 2018;46(2):173-9. doi:10.1016/j.ajic.2017.08.030
- Travers J, Herzig CT, Pogorzelska-Maziarz M, et al. Perceived barriers to infection prevention and control for nursing home certified nursing assistants: a qualitative study. *Geriatr Nurs.* 2015;36(5):355-60. doi:10.1016/j.gerinurse.2015.05.001
- van der Maaden T, van der Steen JT, de Vet HCW, et al. Prospective observations of discomfort, pain, and dyspnea in nursing home residents with dementia and pneumonia. *J Am Med Dir Assoc.* 2016;17(2):128-35. doi:10.1016/j.jamda.2015.08.010
- Wang J, Foxman B, Mody L, et al. Network of microbial and antibiotic interactions drive colonization and infection with multidrug-resistant organisms. *Proc Natl Acad Sci U S A.* 2017;114(39):10467-72. doi:10.1073/pnas.1710235114
- White MB, Rajagopalan S, Yoshikawa TT. Infectious diarrhea: norovirus and clostridium difficile in older adults. *Clin Geriatr Med.* 2016;32(3):509-22. doi:10.1016/j.cger.2016.02.008
- Yang M, Vleck K, Bellantoni M, et al. Telephone survey of infection-control and antibiotic stewardship practices in long-term care facilities in Maryland. *J Am Med Dir Assoc.* 2016;17(6):491-4. doi:10.1016/j.jamda.2015.12.018
- Zimmerman S, Cohen LW, Scales K, et al. Pneumonia identification using nursing home records. *Res Gerontol Nurs.* 2016;9(3):109-14. doi:10.3928/19404921-20151218-01

Infections – Respiratory

Diaz-Decaro JD, Launer B, McKinnell JA, et al. Bayesian evidence and epidemiological implications of environmental contamination from acute respiratory infection in long-term care facilities. *Epidemiol Infect.* 2018;146(7):832-8. doi:10.1017/s0950268818000729

Ginde AA, Blatchford P, Breese K, et al. High-dose monthly vitamin D for prevention of acute respiratory infection in older long-term care residents: a randomized clinical trial. *J Am Geriatr Soc.* 2017;65(3):496-503. doi:10.1111/jgs.14679

Lee DT, Yu D, Ip M, et al. Evaluation on the implementation of respiratory protection measures in old age homes. *Clin Interv Aging.* 2017;12:1429-38. doi:10.2147/cia.S142522

Murray MT, Jackson O, Cohen B, et al. Impact of infection prevention and control initiatives on acute respiratory infections in a pediatric long-term care facility. *Infect Control Hosp Epidemiol.* 2016;37(7):859-62. doi:10.1017/ice.2016.73

O'Neil CA, Kim L, Prill MM, et al. Preventing respiratory viral transmission in long-term care: knowledge, attitudes, and practices of healthcare personnel. *Infect Control Hosp Epidemiol.* 2017;38(12):1449-56. doi:10.1017/ice.2017.232

Pigłowska M, Kostka J, Kostka T. Association between respiratory tract infections and incidence of falls in nursing home residents. *Pol Arch Med Wewn.* 2013;123(7-8):371-7.

Rauh SP, Heymans MW, Mehr DR, et al. Predicting mortality in patients treated differently: updating and external validation of a prediction model for nursing home residents with dementia and lower respiratory infections. *BMJ Open.* 2016;6(8). doi:10.1136/bmjopen-2016-011380

Uršič, T, Miksić NG, Lusa L, et al. Viral respiratory infections in a nursing home: a six-month prospective study. *BMC Infect Dis.* 2016;16:1-9. doi:10.1186/s12879-016-1962-8

Vaux S, Poujol I, Bonmarin I, et al. Surveillance of lower respiratory tract infections outbreaks in nursing homes in France. *Eur J Epidemiol.* 2009;24(3):149-55. doi:10.1007/s10654-009-9315-1

Wang B, Hylwka T, Smieja M, et al. Probiotics to prevent respiratory infections in nursing homes: a pilot randomized controlled trial. *J Am Geriatr Soc.* 2018;66(7):1346-52. doi:10.1111/jgs.15396

Infections – UTI

Castle N, Engberg JB, Wagner LM, et al. Resident and facility factors associated with the incidence of urinary tract infections identified in the nursing home minimum data set. *J Appl Gerontol.* 2017;36(2):173-94. doi:10.1177/0733464815584666

Cooper D, McFarland M, Petrilli F, et al. Reducing inappropriate antibiotics for urinary tract infections in long-term care: a replication study. *J Nurs Care Qual.* 2019;34(1):16-21. doi:10.1097/NCQ.0000000000000343

Gould D, Gaze S, Drey N, et al. Implementing clinical guidelines to prevent catheter-associated urinary tract infections and improve catheter care in nursing homes: systematic review. *Am J Infect Control*. 2017;45(5):471-6. doi:10.1016/j.ajic.2016.09.015

Hutton, DW, Krein SL, Saint S, et al. Economic evaluation of a catheter-associated urinary tract infection prevention program in nursing homes. *J Am Geriatr Soc*. 2018;66(4):742-7. doi:10.1111/jgs.15316

Kistler CE, Zimmerman S, Scales K, et al. The antibiotic prescribing pathway for presumed urinary tract infections in nursing home residents. *J Am Geriatr Soc*. 2017;65(8):1719-25. doi:10.1111/jgs.14857

Kloby C, Katz M, McKenzie R. Current prescribing patterns for urinary tract infections at a skilled nursing/long term care facility (SN/LTCF). *J Am Med Dir Assoc*. 2018;19(3):B25.

Lemoine L, Dupont C, Capron A, et al. Prospective evaluation of the management of urinary tract infections in 134 French nursing homes. *Med Mal Infect*. 2018;48(5):359-64. doi:10.1016/j.medmal.2018.04.387

Marra F, Mamun A, Patrick D. A decrease in antibiotic utilization for urinary tract infections in women in long-term care facilities. *Can Ger J*. 2018;21(3):262-3. doi:10.5770/cgj.21.303

Mayne S, Sundvall PD, Gunnarsson R. Confusion strongly associated with antibiotic prescribing due to suspected urinary tract infections in nursing homes. *J Am Geriatr Soc*. 2018;66(2):274-81. doi:10.1111/jgs.15179

Meddings J, Saint S, Krein SL, et al. Systematic review of interventions to reduce urinary tract infection in nursing home residents. *J Hosp Med*. 2017;12(5):356-68. doi:10.12788/jhm.2724

Melo LS, Ercole FF, Oliveira DU, et al. Urinary tract infection: a cohort of older people with urinary incontinence. *Rev Bras Enferm*. 2017;70(4):838-44. doi:10.1590/0034-7167-2017-0141

Mody L, Greene MT, Meddings J, et al. A national implementation project to prevent catheter-associated urinary tract infection in nursing home residents. *JAMA Intern Med*. 2017;177(8):1154-62. doi:10.1001/jamainternmed.2017.1689

Smith SN, Greene MT, Mody L, et al. Evaluation of the association between Nursing Home Survey on Patient Safety culture (NHSOPS) measures and catheter-associated urinary tract infections: results of a national collaborative. *BMJ Qual Saf*. 2018;27(6):464-73. doi:10.1136/bmjqs-2017-006610

Sugishita K, Saito T, Iwamoto T. Risk factors for nursing- and healthcare-associated urinary tract infection. *Geriatr Gerontol Int*. 2018;18(8):1183-8. doi:10.1111/ggi.13438

Loneliness

Murphy BJ, Bugeja LC, Pilgrim JL, et al. Suicide among nursing home residents in Australia: a national population-based retrospective analysis of medico-legal death investigation information. *Int J Geriatr Psychiatry*. 2018;33(5):786-96. doi:10.1002/gps.4862

Paque K, Bastiaens H, Van Bogaert P, et al. Living in a nursing home: a phenomenological study exploring residents' loneliness and other feelings. *Scand J Caring Sci*. 2018;32(4):1477-84. doi:10.1111/scs.12599

Syed Elias SM, Neville C, Scott T. The effectiveness of group reminiscence therapy for loneliness, anxiety and depression in older adults in long-term care: a systematic review. *Geriatr Nurs*. 2015;36(5):372-80. doi:10.1016/j.gerinurse.2015.05.004

Theurer K, Mortenson WB, Stone R, et al. The need for a social revolution in residential care. *J Aging Stud*. 2015;35:201-10. doi:10.1016/j.jaging.2015.08.011

Tse MM, Yeung SS, Lee PH, et al. Effects of a peer-led pain management program for nursing home residents with chronic pain: a pilot study. *Pain Med*. 2016;17(9):1648-57. doi:10.1093/pm/pnv121

Zhao X, Zhang D, Wu ML, et al. Loneliness and depression symptoms among the elderly in nursing homes: a moderated mediation model of resilience and social support. *Psychiatry Res*. 2018;268:143-51. doi:10.1016/j.psychres.2018.07.011

Medication Errors and Omissions

Alenius M, Graf P. Use of electronic medication administration records to reduce perceived stress and risk of medication errors in nursing homes. *Comput Inform Nurs*. 2016;34(7):297-302. doi:10.1097/CIN.0000000000000245

Al-Jumaili AA, Doucette WR. Comprehensive literature review of factors influencing medication safety in nursing homes: using a systems model. *J Am Med Dir Assoc*. 2017;18(6):470-88. doi:10.1016/j.jamda.2016.12.069

Anrys P, Strauven G, Boland B, et al. Collaborative approach to Optimise MEDication use for Older people in Nursing homes (COME-ON): study protocol of a cluster controlled trial. *Implement Sci*. 2016;11:35. doi:10.1186/s13012-016-0394-6

Anrys PMS, Strauven GC, Foulon V, et al. Potentially inappropriate prescribing in Belgian nursing homes: prevalence and associated factors. *J Am Med Dir Assoc*. 2018;19(10):884-90. doi:10.1016/j.jamda.2018.06.010

Barker KN, Flynn EA, Pepper GA, et al. Medication errors observed in 36 health care facilities. *Arch Intern Med*. 2002;162(16):1897-1903.

Bonaudo M, Martorana M, Dimonte V, et al. Medication discrepancies across multiple care transitions: a retrospective longitudinal cohort study in Italy. *PLoS One*. 2018;13(1):e0191028. doi:10.1371/journal.pone.0191028

Choi S, Babiak J. Evaluation of pharmacist-initiated discharge medication reconciliation and patient counseling procedures. *Consult Pharm*. 2018;33(4):222-6. doi:10.4140/TCP.n.2018.222

Cooper D, McFarland M, Petrilli F, et al. Reducing inappropriate antibiotics for urinary tract infections in long-term care: a replication study. *J Nurs Care Qual.* 2019;34(1):16-21. doi:10.1097/NCQ.0000000000000343

Dovancescu S, Pellicori P, Mabote T, et al. The effects of short-term omission of daily medication on the pathophysiology of heart failure. *Eur J Heart Fail.* 2017;19(5):643-9. doi:10.1002/ejhf.748

Dubé PA, Portelance J, Corbeil O, et al. Drug administration to the wrong nursing home residents reported to the Québec Poison Center: a retrospective study. *J Am Med Dir Assoc.* 2018;19(10):891-5. doi:10.1016/j.jamda.2018.05.007

Elliott RA, Cik Yin L, Hussainy SY. Evaluation of a hybrid paper-electronic medication management system at a residential aged care facility. *Aust Health Rev.* 2016;40(3):244-50. doi:10.1071/AH14206

Feldstein D, Sloane PD, Feltner C. Antibiotic stewardship programs in nursing homes: a systematic review. *J Am Med Dir Assoc.* 2018;19(2):110-6. doi:10.1016/j.jamda.2017.06.019

Ferrah N, Lovell JJ, Ibrahim JE. Systematic review of the prevalence of medication errors resulting in hospitalization and death of nursing home residents. *J Am Geriatr Soc.* 2017;65(2):433-42. doi:10.1111/jgs.14683

Fuller AEC, Guirguis LM, Sadowski CA, et al. Electronic medication administration records in long-term care facilities: a scoping review. *J Am Geriatr Soc.* 2018;66(7):1428-36. doi:10.1111/jgs.15384

Hutton B, Kanji S, McDonald E, et al. Incidence, causes, and consequences of preventable adverse drug events: protocol for an overview of reviews. *Syst Rev.* 2016;5:1-7. doi:10.1186/s13643-016-0392-4

Ishii S, Kojima T, Ezawa K, et al. The association of change in medication regimen and use of inappropriate medication based on beers criteria with adverse outcomes in Japanese long-term care facilities. *Geriatr Gerontol Int.* 2017;17(4):591-7. doi:10.1111/ggi.12761

Laudisio A, Marinosci F, Gemma A, et al. The burden of comorbidity is associated with antibiotic resistance among institutionalized elderly with urinary infection: a retrospective cohort study in a single Italian nursing home between 2009 and 2014. *Microb Drug Resist.* 2017;23(4):500-6. doi:10.1089/mdr.2016.0016

Lee CY, Beanland C, Goeman D, et al. Improving medication safety for home nursing clients: a prospective observational study of a novel clinical pharmacy service—the Visiting Pharmacist (VIP) study. *J Clin Pharm Ther.* 2018;43(6):813-21. doi:10.1111/jcpt.12712

Mahlknecht A, Nestler N, Bauer U, et al. Effect of training and structured medication review on medication appropriateness in nursing home residents and on cooperation between health care professionals: the InTherAKT study protocol. *BMC Geriatr.* 2017;17(1):24. doi:10.1186/s12877-017-0418-3

Morin L, Laroche ML, Texier G, et al. Prevalence of potentially inappropriate medication use in older adults living in nursing homes: a systematic review. *J Am Med Dir Assoc*. 2016;17(9):862.e1-9. doi:10.1016/j.jamda.2016.06.011

Onder G, Giovannini S, Sganga F, et al. Interactions between drugs and geriatric syndromes in nursing home and home care: results from Shelter and IBenC projects. *Aging Clin Exp Res*. 2018;30(9):1015-21. doi:10.1007/s40520-018-0893-1

Shandilya S, Nizamuddin K, Faisal MW, et al. Omitted medications: a continuing problem. *Clin Med (Lond)*. 2015;15(1):12-14. doi:10.7861/clinmedicine.15-1-12

Sund JK, Sletvold O, Mellingsaeter TC, et al. Discrepancies in drug histories at admission to gastrointestinal surgery, internal medicine and geriatric hospital wards in Central Norway: a cross-sectional study. *BMJ Open*. 2017;7(9): e013427. doi:10.1136/bmjopen-2016-013427

Thiruchelvam K, Hasan SS, Wong PS, et al. Residential aged care medication review to improve the quality of medication use: a systematic review. *J Am Med Dir Assoc*. 2017;18(1): 87.e1-14. doi:10.1016/j.jamda.2016.10.004

Unutmaz GD, Soysal P, Tuven B, et al. Costs of medication in older patients: before and after comprehensive geriatric assessment. *Clin Interv Aging*. 2018;13:607-13. doi:10.2147/cia.S159966

Nutrition

Bauer S, Halfens RJG, Lohrmann C. Changes in nutritional status in nursing home residents and associated factors in nutritional status decline: a secondary data analysis. *J Adv Nurs*. 2017;73(10):2420-9. doi:10.1111/jan.13297

Beck AM. Weight loss, mortality and associated potentially modifiable nutritional risk factors among nursing home residents--a Danish follow-up study. *J Nutr Health Aging*. 2015;19(1):96-101. doi:10.1007/s12603-015-0439-6

Carrier J, Weststrate J, Yeung P, et al. Prevalence of key care indicators of pressure injuries, incontinence, malnutrition, and falls among older adults living in nursing homes in New Zealand. *Res Nurs Health*. 2017;40(6):555-63. doi:10.1002/nur.21835

Chen LY, Liu LK, Hwang AC, et al. Impact of malnutrition on physical, cognitive function and mortality among older men living in veteran homes by minimum data set: a prospective cohort study in Taiwan. *J Nutr Health Aging*. 2016;20(1):41-7. doi:10.1007/s12603-015-0646-1

Duarte M, Bouça-Machado R, Domingos J, et al. Feasibility of using risk prompts to prevent falls, dehydration and pulmonary aspiration in nursing homes: a clinical study protocol. *Pilot Feasibility Stud*. 2018;4:39. doi:10.1186/s40814-018-0236-1

Dupuy C, de Souto Barreto P, Ghisolfi A, et al. Indicators of oral nutritional supplements prescription in nursing home residents: a cross-sectional study. *Clin Nutr*. 2016;35(5):1047-52. doi:10.1016/j.clnu.2015.07.015

Gruenewald DA. Voluntarily stopping eating and drinking: a practical approach for long-term care facilities. *J Palliat Med.* 2018;21(9):1214-20. doi:10.1089/jpm.2018.0100

Huppertz VAL, Halfens RJG, van Helvoort A, et al. Association between oropharyngeal dysphagia and malnutrition in Dutch nursing home residents: results of the national prevalence measurement of quality of care. *J Nutr Health Aging.* 2018;22(10):1246-52. doi:10.1007/s12603-018-1103-8

Kamo T, Takayama K, Ishii H, et al. Coexisting severe frailty and malnutrition predict mortality among the oldest old in nursing homes: a 1-year prospective study. *Arch Gerontol Geriatr.* 2017;70:99-104. doi:10.1016/j.archger.2017.01.009

Lannering C, Ernsth Bravell M, Midlov P, et al. Factors related to falls, weight-loss and pressure ulcers--more insight in risk assessment among nursing home residents. *J Clin Nurs.* 2016;25(7-8):940-50. doi:10.1111/jocn.13154

Masot O, Lavedán A, Nuin C, et al. Risk factors associated with dehydration in older people living in nursing homes: scoping review. *Int J Nurs Stud.* 2018;82:90-8. doi:10.1016/j.ijnurstu.2018.03.020

Pae M, Wu D. Nutritional modulation of age-related changes in the immune system and risk of infection. *Nutr Res.* 2017;41:14-35. doi:10.1016/j.nutres.2017.02.001

Pizzato S, Sergi G, Bolzetta F, et al. Effect of weight loss on mortality in overweight and obese nursing home residents during a 5-year follow-up. *Eur J Clin Nutr.* 2015;69(10):1113-8. doi:10.1038/ejcn.2015.19

Saladin N, Schnepf W, Fringer A. Voluntary stopping of eating and drinking (VSED) as an unknown challenge in a long-term care institution: an embedded single case study. *BMC Nurs.* 2018;17:39. doi:10.1186/s12912-018-0309-8

Simmons SF, Keeler E, Zhuo X, et al. Prevention of unintentional weight loss in nursing home residents: a controlled trial of feeding assistance. *J Am Geriatr Soc.* 2008;56(8):1466-73. doi:10.1111/j.1532-5415.2008.01801.x

Streicher M, Wirth R, Schindler K, et al. Dysphagia in nursing homes-results from the nutritionDay project. *J Am Med Dir Assoc.* 2018;19(2):141-7. doi:10.1016/j.jamda.2017.08.015

Veronese N, Cereda E, Solmi M, et al. Inverse relationship between body mass index and mortality in older nursing home residents: a meta-analysis of 19,538 elderly subjects. *Obes Rev.* 2015;16(11):1001-15. doi:10.1111/obr.12309

Wirth R, Pourhassan M, Streicher M, et al. The impact of dysphagia on mortality of nursing home residents: results from the nutritionDay Project. *J Am Med Dir Assoc.* 2018;19(9):775-8. doi:10.1016/j.jamda.2018.03.016

Wirth R, Streicher M, Smoliner C, et al. The impact of weight loss and low BMI on mortality of nursing home residents - results from the nutritionDay in nursing homes. *Clin Nutr*. 2016;35(4):900-6. doi:10.1016/j.clnu.2015.06.003

Pain

Abrahamson K, DeCrane S, Mueller C, et al. Implementation of a nursing home quality improvement project to reduce resident pain: a qualitative case study. *J Nurs Care Qual*. 2015;30(3):261-8. doi:10.1097/ncq.0000000000000099

Altintas HK, Aslan GK, Sisman NY, et al. Effects of pain and sleep quality on falls among nursing home residents in Turkey. *Res Gerontol Nurs*. 2018;11(5):257-64. doi:10.3928/19404921-20180810-01

Bauer U, Pitzer S, Schreier MM, et al. Pain treatment for nursing home residents differs according to cognitive state - a cross-sectional study. *BMC Geriatr*. 2016;16:124. doi:10.1186/s12877-016-0295-1

Blytt KM, Bjorvatn B, Husebo B, et al. Effects of pain treatment on sleep in nursing home patients with dementia and depression: a multicenter placebo-controlled randomized clinical trial. *Int J Geriatr Psychiatry*. 2018;33(4):663-70. doi:10.1002/gps.4839

Courvoisier DS, Righi L, Béné N, et al. Variation in pressure ulcer prevalence and prevention in nursing homes: a multicenter study. *Appl Nurs Res*. 2018;42:45-50. doi:10.1016/j.apnr.2018.06.001

Drager D, Budnick A, Kuhnert R, et al. Pain management intervention targeting nursing staff and general practitioners: pain intensity, consequences and clinical relevance for nursing home residents. *Geriatr Gerontol Int*. 2017;17(10):1534-43. doi:10.1111/ggi.12924

Erdal A, Flo E, Selbaek G, et al. Associations between pain and depression in nursing home patients at different stages of dementia. *J Affect Disord*. 2017;218:8-14. doi:10.1016/j.jad.2017.04.038

Estevez-Guerra GJ, Farina-Lopez E, Nunez-Gonzalez E, et al. The use of physical restraints in long-term care in Spain: a multi-center cross-sectional study. *BMC Geriatr*. 2017;17(1):29. doi:10.1186/s12877-017-0421-8

Flaig TM, Budnick A, Kuhnert R, et al. Physician contacts and their influence on the appropriateness of pain medication in nursing home residents: a cross-sectional study. *J Am Med Dir Assoc*. 2016;17(9):834-8. doi:10.1016/j.jamda.2016.05.014

Good H, Riley-Doucet CK, Dunn KS. The prevalence of uncontrolled pain in long-term care: a pilot study examining outcomes of pain management processes. *J Gerontol Nurs*. 2015;41(2):33-41. doi:10.3928/00989134-20141028-01

Hendriks SA, Smalbrugge M, Galindo-Garre F, et al. From admission to death: prevalence and course of pain, agitation, and shortness of breath, and treatment of these symptoms in nursing home residents with dementia. *J Am Med Dir Assoc*. 2015;16(6):475-81. doi:10.1016/j.jamda.2014.12.016

Kaasalainen S, Agarwal G, Dolovich L, et al. Managing pain medications in long-term care: nurses' views. *Br J Nurs*. 2015;24(9):484, 486-9. doi:10.12968/bjon.2015.24.9.484

Khandelwal N, Curtis JR, Freedman VA, et al. How often is end-of-life care in the United States inconsistent with patients' goals of care? *J Palliat Med*. 2017;20(12):1400-4. doi:10.1089/jpm.2017.0065

Knopp-Sihota JA, Patel P, Estabrooks CA. Interventions for the treatment of pain in nursing home residents: a systematic review and meta-analysis. *J Am Med Dir Assoc*. 2016;17(12):1163.e1119-28. doi:10.1016/j.jamda.2016.09.016

Kolanowski A, Mogle J, Fick DM, et al. Pain, delirium, and physical function in skilled nursing home patients with dementia. *J Am Med Dir Assoc*. 2015;16(1):37-40. doi:10.1016/j.jamda.2014.07.002

Lee KH, McConnell ES, Knafelz GJ, et al. Pain and psychological well-being among people with dementia in long-term care. *Pain Med*. 2015;16(6):1083-9. doi:10.1111/pme.12739

Mamhidir AG, Sjolund BM, Flackman B, et al. Systematic pain assessment in nursing homes: a cluster-randomized trial using mixed-methods approach. *BMC Geriatr*. 2017;17(1):61. doi:10.1186/s12877-017-0454-z

Monroe TB, Misra S, Habermann RC, et al. Specific physician orders improve pain detection and pain reports in nursing home residents: preliminary data. *Pain Manag Nurs*. 2015;16(5):770-80. doi:10.1016/j.pmn.2015.06.002

Monroe TB, Parish A, Mion LC. Decision factors nurses use to assess pain in nursing home residents with dementia. *Arch Psychiatr Nurs*. 2015;29(5):316-20. doi:10.1016/j.apnu.2015.05.007

Pimentel CB, Briesacher BA, Gurwitz JH, et al. Pain management in nursing home residents with cancer. *J Am Geriatr Soc*. 2015;63(4):633-41. doi:10.1111/jgs.13345

Shen X, Zuckerman IH, Palmer JB, et al. Trends in prevalence for moderate-to-severe pain and persistent pain among Medicare beneficiaries in nursing homes, 2006-2009. *J Gerontol A Biol Sci Med Sci*. 2015;70(5):598-603. doi:10.1093/gerona/glu226

Simmons SF, Schnelle JF, Saraf AA, et al. Pain and satisfaction with pain management among older patients during the transition from acute to skilled nursing care. *Gerontologist*. 2016;56(6):1138-45. doi:10.1093/geront/gnv058

Tappen RM, Newman D, Huckfeldt P, et al. Evaluation of nursing facility resident safety during implementation of the INTERACT quality improvement program. *J Am Med Dir Assoc.* 2018;19(10):907-13. doi:10.1016/j.jamda.2018.06.017

Tarakci E, Zenginler Y, Kaya Mutlu E. Chronic pain, depression symptoms and daily living independency level among geriatrics in nursing home. *Agri.* 2015;27(1):35-41. doi:10.5505/agri.2015.14238

Torvik K, Nordtug B, Brenne IK, et al. Pain assessment strategies in home care and nursing homes in mid-Norway: a cross-sectional survey. *Pain Manag Nurs.* 2015;16(4):602-8. doi:10.1016/j.pmn.2015.01.001

Tse MM, Yeung SS, Lee PH, et al. Effects of a peer-led pain management program for nursing home residents with chronic pain: a pilot study. *Pain Med.* 2016;17(9):1648-57. doi:10.1093/pm/pnv121

van der Maaden T, van der Steen JT, de Vet HCW, et al. Prospective observations of discomfort, pain, and dyspnea in nursing home residents with dementia and pneumonia. *J Am Med Dir Assoc.* 2016;17(2):128-35. doi:10.1016/j.jamda.2015.08.010

Zullo AR, Zhang TT, Beaudoin FL, et al. Pain treatments after hip fracture among older nursing home residents. *J Am Med Dir Assoc.* 2018;19(2):174-6. doi:10.1016/j.jamda.2017.11.008

Pressure Ulcers

Bliss DZ, Gurvich O, Savik K, et al. Racial and ethnic disparities in the healing of pressure ulcers present at nursing home admission. *Arch Gerontol Geriatr.* 2017;72:187-94. doi:10.1016/j.archger.2017.06.009

Bliss DZ, Gurvich O, Savik K, et al. Are there racial-ethnic disparities in time to pressure ulcer development and pressure ulcer treatment in older adults after nursing home admission? *J Aging Health.* 2015;27(4):571-93. doi:10.1177/0898264314553895

Carryer J, Weststrate J, Yeung P, et al. Prevalence of key care indicators of pressure injuries, incontinence, malnutrition, and falls among older adults living in nursing homes in New Zealand. *Res Nurs Health.* 2017;40(6):555-63. doi:10.1002/nur.21835

Courvoisier DS, Righi L, Béné N, et al. Variation in pressure ulcer prevalence and prevention in nursing homes: a multicenter study. *Appl Nurs Res.* 2018;42:45-50. doi:10.1016/j.apnr.2018.06.001

Hansen RL, Fossum M. Nursing documentation of pressure ulcers in nursing homes: comparison of record content and patient examinations. *Nurs Open.* 2016;3(3):159-67. doi:10.1002/nop2.47

Hartmann CW, Shwartz M, Zhao S, et al. Longitudinal pressure ulcer rates after adoption of culture change in Veterans Health Administration nursing homes. *J Am Geriatr Soc.* 2016;64(1):151-5. doi:10.1111/jgs.13879

Hartmann CW, Solomon J, Palmer J, et al. Contextual facilitators of and barriers to nursing home pressure ulcer prevention. *Adv Skin Wound Care*. 2016;29(5):226-38; quiz E221. doi:10.1097/01.ASW.0000482113.18800.1c

Kwong EWY, Lee PH, Yeung KM. Study protocol of a cluster randomized controlled trial evaluating the efficacy of a comprehensive pressure ulcer prevention programme for private for-profit nursing homes. *BMC Geriatr*. 2016;16:20. doi:10.1186/s12877-016-0189-2

Lannering C, Ernsth Bravell M, Midlov P, et al. Factors related to falls, weight-loss and pressure ulcers--more insight in risk assessment among nursing home residents. *J Clin Nurs*. 2016;25(7-8):940-50. doi:10.1111/jocn.13154

Lavallee JF, Gray TA, Dumville J, et al. Barriers and facilitators to preventing pressure ulcers in nursing home residents: a qualitative analysis informed by the theoretical domains framework. *Int J Nurs Stud*. 2018;82:79-89. doi:10.1016/j.ijnurstu.2017.12.015

Lundgren J. Business CONSULT. Restorative nursing programs help prevent pressure ulcers. *Wound Care Advisor*. 2016;5(1):26-7.

McCreath HE, Bates-Jensen BM, Nakagami G, et al. Use of Munsell color charts to measure skin tone objectively in nursing home residents at risk for pressure ulcer development. *J Adv Nurs*. 2016;72(9):2077-85. doi:10.1111/jan.12974

Moon M, Lee SK. Applying of decision tree analysis to risk factors associated with pressure ulcers in long-term care facilities. *Healthc Inform Res*. 2017;23(1):43-52. doi:10.4258/hir.2017.23.1.43

Mossman B, Hampton S. Effectiveness of a pressure-redistributing cushion for low-to medium-risk patients in care homes. *Br J Community Nurs*. 2016;21(Sup6):S29-36. doi:10.12968/bjcn.2016.21.Sup6.S29

Raetz JG, Wick KH. Common questions about pressure ulcers. *Am Fam Physician*. 2015;92(10):888-94.

van Leen M, Halfens R, Schols J. Preventive effect of a microclimate-regulating system on pressure ulcer development: a prospective, randomized controlled trial in Dutch nursing homes. *Adv Skin Wound Care*. 2018;31(1):1-5. doi:10.1097/01.ASW.0000527288.35840.0a

van Leen MWF, Schols J, Hovius SER, et al. A secondary analysis of longitudinal prevalence data to determine the use of pressure ulcer preventive measures in Dutch nursing homes, 2005-2014. *Ostomy Wound Manage*. 2017;63(9):10-16. doi:10.25270/owm.09.1020

Wogamon CL. Exploring the effect of educating certified nursing assistants on pressure ulcer knowledge and incidence in a nursing home setting. *Ostomy Wound Manage*. 2016;62(9):42-50.

Yap TL, Kennerly SM, Bergstrom N, et al. An evidence-based cue-selection guide and logic model to improve pressure ulcer prevention in long-term care. *J Nurs Care Qual*. 2016;31(1):75-83. doi:10.1097/ncq.000000000000128

Poor Resident-Centered Care

Harrison J, Frampton S. Resident-centered care in 10 U.S. nursing homes: residents' perspectives. *J Nurs Scholarsh*. 2017;49(1):6-14. doi:10.1111/jnu.12247

Richter C, Berg A, Fleischer S, et al. Effect of person-centred care on antipsychotic drug use in nursing homes (EPCentCare): study protocol for a cluster-randomised controlled trial. *Implement Sci*. 2015;10:82. doi:10.1186/s13012-015-0268-3

Van Humbeeck L, Dillen L, Piers R, et al. Grief and loss in older people residing in nursing homes: (un)detected by nurses and care-assistants? *J Adv Nurs*. 2016;72(12):3125-36. doi:10.1111/jan.13063