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Quality Clinical Care in Nursing Facilities

Barbara J. Zarowitz PharmD [a,b,*], Barbara Resnick PhD, CRNP [c], Joseph G. Ouslander MD [d]

[a] The Peter Lamy Center on Drug Therapy and Aging, University of Maryland, College of Pharmacy, West Bloomfield, MI
[b] Independent Consultant, West Bloomfield, MI
[c] Department of Nursing, University of Maryland School of Nursing, Baltimore, MD
[d] Department of Clinical Biomedical Science, Charles E. Schmidt College of Biomedical Science, Boca Raton, FL

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A B S T R A C T

Despite improvements in selected nursing facility (NF) quality measures such as reduction in antipsychotic use; local, state, and national initiatives; and regulatory incentives, the quality of clinical care delivered in this setting remains inconsistent. Herein, recommendations for overcoming barriers to achieving consistent, high-quality clinical outcomes in long-term (LTC) and post-acute care are provided to address inadequate workforce, suboptimal culture and interprofessional teamwork, insufficiently evidence-based processes of care, and poor adoption and fidelity of technology and integrated clinical decision support. With high staff attrition rates in NFs, mechanisms to measure and close knowledge gaps as well as opportunities for practice simulations should be available to educate and ensure adoption of clinical quality standards on clinician hiring and on an ongoing basis. Multipronged, integrated approaches are needed to further the quest for sustainment of high clinical quality in NF care. In addition to setting a tone for attainment of clinical quality, leadership should champion adoption of practice standards, quality initiatives, and evidence-based guidelines. Maintaining an optimal ratio of hours per resident per day of nurses and nurse aides can improve quality outcomes and staff satisfaction. Clinicians must consistently and effectively apply care processes that include recognition, problem definition, diagnosis, goal identification, intervention, and monitoring resident progress. In order to do so they must have rapid, easy access to necessary tools, including evidence-based standards, algorithms, care plans, during the care delivery process. Embedding such tools into workflow of electronic health records has the potential to improve quality outcomes. On a national and international level, quality standards should be developed by interprofessional LTC experts committed to applying the highest levels of clinical evidence to improve the care of older persons. The standards should be realistic and practical, and basic principles of implementation science must be used to achieve the desired outcomes.

The Centers for Medicare & Medicaid Services (CMS) denote quality of clinical care as a fundamental principle that applies to all treatment and care provided to nursing facility (NF) residents.[1] However, attainment of quality clinical care in the NF environment remains elusive.[2]

The Institute of Medicine report on Nursing Home Quality indicated that high-quality NF care requires (1) a competently conducted, comprehensive assessment of each resident; (2) development of a treatment plan that integrates the contributions of all the relevant nursing home staff, based on the assessment findings; and (3) properly coordinated, competent, and conscientious execution of all aspects of the treatment plan.[2] Though we understand these components and strive to align with these principles, barriers to excellence exist and critical strategies are necessary to succeed.

Key principles enable NFs to deliver consistently safe, effective, efficient, high-quality, and person-centered care.[3] Care should be (1) based on sound clinical principles and reliable evidence; (2) delivered via proper care processes that reflect effective clinical problem solving and decision making; (3) provided by properly qualified individuals who perform their functions effectively and know their roles and their limits; (4) consistent with regulatory standards, but not focus

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* Address correspondence to Barbara J. Zarowitz, PharmD, 4301 Orchard Lake Road, Suite 180-B206, West Bloomfield, MI 48323.
E-mail address: dr.barbarajzarowitz@gmail.com (B.J. Zarowitz).

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primarily on, regulations; and (5) guided and supported by effective management.[3]

In order to achieve higher quality clinical care in NFs, multifaceted strategies must be developed to address 4 pillars that bolster the workforce, enhance interprofessional collaboration, optimize processes of care, and effectively use technology with integrated clinical decision support (CDS). Table 1 summarizes the challenges to clinical quality and calls to action.

Adequate Workforce

Issues

A barrier to high-quality NF care is the insufficient cadre of highly skilled professional staff such as therapists, pharmacists, and physicians with expertise in geriatric care. In addition to clinical skills needed to care effectively for older adults, clinicians must have knowledge of key clinical conditions.

A second workforce challenge is identifying and maintaining the ideal mix of registered nurses (RNs), licensed practical nurses (LPNs), and clinical nurse aides (CNAs). Although maintenance of RN positions with supplementation of CNAs has been shown to improve quality,[4] the issues go beyond the number of each type of staff. Knowledge, skills, experience, and commitment to the type of care provided in NFs play a critical role. Moreover, high attrition rates of NF staff impact quality of care as turnover requires that facilities spend time and resources to continuously train new staff to the culture, policies and procedures, clinical standards of practice, and care processes.

The lack of physicians trained in Geriatric Medicine is another major challenge to providing high-quality care in the NF setting. Almost half of fellowship positions in Geriatric Medicine go unfilled, and there are not enough fellowship-trained geriatricians to provide care for the NF population. In 2017, there were only 272 fellowship applicants nationwide.[5]

Examples of Solutions to Workforce Challenges in NFs

In response to the shortage of geriatricians in NF, the Society for Post-Acute and Long-Term Care Medicine (AMDA) has developed the Futures Program and an extensive core curriculum for certified medical directors.[6] The Futures Program is a one-day educational session that occurs in conjunction with the annual AMDA conference and provides residents, fellows, and other members of the interdisciplinary team with information about the roles and responsibilities of the different disciplines within post-acute and LTC medicine. In addition, AMDA has developed a core curriculum for attending physicians that may be helpful in providing practicing physicians, including hospitalists who are increasingly providing care in NFs, the basic knowledge to provide quality care in the NF setting. Centers such as the Peter Lamy Center on Drug Therapy and Aging, at the University of Maryland, provide interprofessional continuing education focused on enhancing assessment and care planning for older adults that can improve medication safety and increase pharmacotherapeutic knowledge of team members. CNAs, like other health professional groups, can benefit from additional training on management of residents with complex comorbidities. Specifically, there is evidence to support the value of extended training of CNAs to enhance their skills, boost their self-esteem, and reinforce the significance of their role in providing resident care.[7,8]

Recommendations

The presence of board-certified geriatric practitioners in the NF must be increased to bolster clinical quality. Physicians interested in working in the NF settings should be encouraged to become a certified medical director, and NF corporations should incentivize physicians to achieve this certification. Practicing internists, family physicians, and hospitalists should be encouraged to take the AMDA core curriculum for attending physicians. This curriculum can enhance the clinical skills and knowledge necessary to provide high quality clinical care. Pharmacy providers are encouraged to recruit and retain consultant pharmacists who are board-certified in geriatric pharmacy (BCGP). A particularly critical area of focus for improved NF care relates to excessive use (ie, misuse and overuse) of potentially unnecessary medications (ie, antipsychotics and others) that increase residents' risks of falls, mental status changes, urinary retention, cardiac arrhythmias, stroke, and death.[9]

Optimizing the RN time spent/resident/day from 16 minutes to 30-40 minutes has been shown to reduce pressure ulcer development, hospitalization, and UTIs.[10–12] Facilities with RN-supervised, well-trained CNAs, given autonomy to fulfill their responsibilities of resident care, perform well on quality indicators.[11,13,14] These CNAs also are more likely to be satisfied and remain in their positions, thereby reducing turnover.[11] Leaders need to relay to their administrators the business case for investing in education and training of CNAs and maintaining a ratio of hours per resident per day of 0.2 to 0.7 RN, 0.5 to 0.7 licensed practical nurse, and 1.95 to 3.4 CNA.[4,11] Leaders should also be encouraged to develop career ladders for CNAs that recognize their experience and additional training with both titles and salary increases.

Optimal Culture and Interprofessional Teamwork

Issues

Facility culture and attitude can be barriers to quality when they are not supportive of clinicians, residents, and their families.[15–17] A culture that is focused on cost reduction and task completion without a balance of passion for person-centered care of older adults can run counter to high-quality clinical care. NF for-profit status is associated with a significantly higher percentage of residents with pressure ulcers, significantly lower mean practice environment scores, higher use of antipsychotics, and more 30-day hospital readmissions.[18–20] NF with greater percentages of Medicaid residents tend to have a greater use of potentially harmful medications (eg, antipsychotics), consistent with poor clinical quality.[19]

Suboptimal interprofessional collaboration can be a barrier to medication safety within NFs.[21–24] For example, adverse drug events have been attributed to limited access to physicians and consultant pharmacists.[21,22,24] When clinical assessment and care planning is shared interprofessionally and communicated effectively, adherence to recommended practices, and patient functional status may be improved.[25,26]

Example Solutions for Improving Culture and Teamwork

A culture that supports a true team approach, the participation of nurses in organizational decisions, and adequate resources with optimal deployment of CNAs, has been associated with better outcomes, including a lower percentage of residents with pressure ulcers and fewer quality deficiencies.[14,18] For example, when pharmacists and physicians conduct medication reviews collaboratively, inappropriate medications can be discontinued successfully in NF residents.[27] Such interprofessional collaborations should be patient-centered, comprehensive, encourage continuous dialogue, support cohesive thinking, and develop consensus agreement on approaches to care.[28]

The THRIVE research collaborative initiated, disseminated, and studied the Green House Model of NF culture, which includes architectural and social changes with transformation of the NF's organizational culture.[29] On startup, Green House adopters receive

Table 1
Challenges and Approaches for Improvement of Clinical Quality Care in NFs

Challenges to Clinical Care Quality in NFs	Description	Call to Action
Inadequate workforce	• Low ratio of registered nurses to residents/patients with complex clinical needs • Not enough rehabilitation therapists and pharmacists with special training in geriatrics or post-acute and long-term care • High turnover of NF staff leads to undertrained, overburdened CNAs, RNs, and LPNs • Physicians who are not trained in Geriatric or Palliative Medicine or as a Certified Medical Director oversee care for a large proportion of the NF population • Not enough nurse practitioners to work in collaborative practices with physicians • Insufficient training for CNAs who can serve as front-line "poor-quality" detectors	• Increase number of RNs relative to LPNs in high-acuity NFs • Improve training and decision support for licensed nursing staff • Ensure adequate staffing and a mix of qualified health care professionals and sufficient CNA to provide high-quality, "high-touch" care • Augment training, recognition, and respect for existing RN, LPN, and CNA • Work with professional organizations to encourage more specialization in geriatrics and gerontology • NF leadership should assess the clinical knowledge and competence of their professional staff • Incentivize physicians to become certified in Geriatric and/or Palliative Medicine • Disseminate the AMDA curriculum for primary care clinicians and incentivize hospitalists, primary care physicians, and family nurse practitioners to take it • Make the business case for optimizing the ratio of RN/LPN/CNA hours per resident per day • Share workforce within a hospital or health system in accountable care organizations and bundled payment programs
Suboptimal culture and interprofessional teamwork	• Most facilities are for-profit, and finances may take precedent over quality • Care planning meetings frequently do not include clinicians who oversee clinical care • Communication among disciplines about care planning for individual residents/patients is not well executed at many NFs • Inadequate regulations pertaining to the need for NF resident access to qualified social workers, irrespective of the size of the NF	• Robust implementation of quality assurance and performance improvement (QAPI) is necessary* • Medical directors should take leadership for setting a positive tone on their interprofessional teams • Deimplement unproven and ineffective healthcare practices • NF leadership must give positive reinforcement for evidence of excellence in care and hold staff accountable • Train NF in a culture of respect for all staff, with recognition for the contribution they make to quality outcomes • Employ metrics for the effectiveness of physician accountability and communication • Expansion of successful care models, such as the Green House Model • Advocacy for improved access to qualified social workers in NF • Incentivize leadership and teamwork training
Inconsistent application of evidence-based and expert consensus–derived care processes	• Numerous practice guidelines exist specific for conditions common in the NF population, but are not adhered to • Clinical practice guidelines and evidence are not applied correctly to the NF population, resulting in adverse events (eg, overtreatment of hypertension, diabetes, and presumed bacterial infections) • Inappropriate prescribing and resulting polypharmacy and adverse drug effects are common	• Continue to disseminate appropriate practice guidelines • Disseminate AMDA and AGS Choosing Wisely recommendations • Develop valid and clinically appropriate quality measures and incentivize clinicians to achieve good outcomes based on the measures • Develop and provide easy access to necessary tools, note templates, standards, algorithms, order sets, care plans, and other quality-related clinical information during the care delivery process • Disseminate evidence-based guidelines and recommendations by networks of recognized expert clinicians • Establish learning collaborators among facilities to disseminate evidence and share best practices • Pursue research and publication of rigorously conducted clinical trials assessing and documenting the value of quality initiatives • Utilize implementation science to promote more complete adoption of "ideal" care processes • Utilize networks of clinicians to provide required online education on evidence-based guidelines • Develop robust patient safety initiatives that address inappropriate prescribing and related adverse effects • Monitor inappropriate prescribing practices and feedback benchmarked data to clinicians, ie, prescriber report cards • Implementation of evidence-based processes may be improved if the cost and labor requirements of such practices can be defined

(*continued on next page*)

Table 1 (*continued*)

Challenges to Clinical Care Quality in NFs	Description	Call to Action
Slow adoption of technology that can enhance clinical care quality	• Most NF clinicians do not utilize the NF electronic health record (EHR) • NF EHRs lack CDS tools that can be easily used in everyday practice • Telehealth is promising, but regulatory and reimbursement barriers may hinder its spread	• Work with software companies to embed evidence-based and expert consensus–derived protocols into everyday workflow • Utilize note templates and standardized, but flexible evidence-based order sets, algorithms, assessment templates • Make technology friendly to the NF environment • Utilize telehealth to involve remote clinicians in care planning • Improve utilization of technology to communicate among disciplines on specific clinical issues • Fully integrate CDS with two-way push-pull data capabilities to enable streamlined, evidence-based workflow • Work with information technology officers to reduce alert fatigue from "less important" or incorrect messaging • Ensure that alerts and messaging are all geriatric specific • Work with regulators to facilitate appropriate use of telehealth in NFs • Prepare for disruption; the status quo cannot lead to improvement • Disrupt existing paradigms and adopt radical process changes

AGS, American Geriatric Society; CMDs, certified medical directors; CNAs, certified nurse aides; LPNs, licensed practical nurses; QAPI, quality assurance and performance improvement.

*US Department of Health and Human Services, Health Resources and Services Administration Quality Improvement, adapted from http://www.hrsa.gov/healthit/toolbox/HealthITAdoptiontoolbox/QualityImprovement/whatarediffbtwqinqa.html.

implementation guidance, regulatory advocacy, architectural guidance, staff training, and ongoing technical support as requested. Sustainability of this model of NF care occurs by fostering collaborative problem-solving skills in self-managed work teams and coaching skills for team leaders. The Green House model is an example of promoting CNAs to increasing job demands following extensive training, accompanied by higher wages.

Others have promoted the role of social workers in attaining high clinical quality of care for NF residents, given their importance in collaborating on a comprehensive care plan.[30] Because of the nature of residing in NF, residents present complex psychosocial challenges of lack of identity, unfulfilled roles, absence of meaningful connections with others, and grief superimposed upon cognitive deficits, dementia, depression, and anxiety. Despite these findings, only NF with greater than 120 residents are required to have a qualified social worker on staff and qualifications outline at least 1 year of professional service but they are not required to hold a social worker degree.

Recommendations for Improving Culture and Teamwork

NF leadership, including administrators, directors of nursing, and medical directors must assume leadership for setting a positive tone within the collaborative team and hold team members accountable for attaining high clinical quality. Each team member contributes their unique expertise, for example, drug therapy knowledge and medication safety by the consultant pharmacist, diagnostic skills by physicians, and psychosocial and functional assessment by nurse practitioners and social workers, leading to the development of a more comprehensive, holistic plan of care. Tools such as the *Effectiveness of Physician Accountability and Communication (EPAC)* may be useful to measure processes of care and improve metrics related to physician involvement and effectiveness in resident care.[31] Deploying CNAs as the first line of resident observation reduces development of pressure ulcers and improves resident satisfaction with their care.[14,32] Consumers see the CNA as the "care" provider and suggest a balance of reasonable workload, respect for their work, and wage adjustment or provision of health benefits as means to enhance CNA satisfaction and retention.[33]

Expansion of successful care models, such as the Green House Model, and regulatory requirements for provision of qualified social workers are other areas of focus for care improvement.

Consistent Application of Evidence-Based Processes of Care

Issues

The degree of successful oversight and coordination of a facility's care processes and practices heavily influences attainment of safe, effective, efficient, and person-centered care.[34] High-quality facilities have a leadership-driven culture that focuses on an evidence-based care delivery process.[3] Clinicians must consistently and effectively apply the medical care delivery process, including recognition, problem definition, diagnosis, goal identification, intervention, and monitoring progress.[6] Challenges to implementation include overcoming negative staff beliefs in the benefit of the intervention, lack of coordination of care between all members of the health care team, lack of administrative support and full engagement of champions, insufficient resources, and lack of fit of the new approach to care within the current system.

How and to what extent NFs adopt quality standards varies considerably.[34] Moreover, quality measures derived from the Minimum Data Set that are reported on the CMS website and contribute to NF 5-Star ratings are imperfect and, in some situations can be misleading. Despite issues with quality standards, NFs inconsistently implement policies that can affect these measures, such as policies on advanced care planning for residents with dementia, clinical practice guidelines, and quality improvement approaches.[34–36] Adoption is the continuous process of keeping users informed and engaged, providing innovative ways for them to become proficient in new tasks, measuring changes in clinical outcomes, and striving to sustain that level of performance long-term.[37]

Implementation of evidence-based care is hampered by a lack of evidence. Older adults in NF are under-represented in high-quality

clinical trials given the complexity of their comorbidities, physiologic changes of aging, risk of mortality, and difficulty obtaining informed consent. The resulting scarcity of evidence places clinicians at risk of misusing evidence that is not applicable to the population. A concerning observation is the application of guideline recommendations from younger, noninstitutionalized adults to NF residents, leading to overtreatment and harm with conditions such as diabetes (eg, hypoglycemia), hypertension (eg, syncope and falls), and bacterial infections (eg, antibiotic-associated adverse drug events).[38–40]

Examples of Solutions to Improve Consistent Application of Evidence-Based Processes of Care

At times deimplementing or eliminating inaccurate entrenched practices must occur.[41,42] Challenges to deimplementation include confirmation bias, beliefs in clinical experience, focus on individual causality versus epidemiologic findings, comfort with the familiar, and the endowment effect of things being important when they are taken away.[43,44] To overcome these challenges, a multilevel approach is needed that includes residents, families, staff, the units involved, and organization culture and policies.

The basis for improving patient outcomes is the discovery, translation, and integration of knowledge into practice. Implementation of evidence-based medicine is a systematic approach to apply relevant research results to clinical practice.[422] Sources of information that specifically evaluate evidence for use of interventions for older adults in post-acute and LTC settings include the *Geriatric Pharmaceutical Care* Guidelines (GPCG), the Clinical Practice Guidelines developed by AMDA,[45,46] quality improvement programs such as the Fall Management Program, and the Interventions to Reduce Acute Care Transfers (INTERACT) program, and evidence-based and consensus-derived tools such as standardized order sets for acute changes in condition.[47–49] For example, from the early 1990s through 2016, the GPCG, was a source of clinical evidence for pharmacotherapy of more than 50 common geriatric conditions, written independently by the University of the Sciences in Philadelphia, externally peer-reviewed and endorsed annually by the American Geriatric Society as the nationally recognized best practice for pharmacy care in seniors.[45]

Recommendations to Improve Consistent Application of Evidence-Based Processes of Care

Quality standards should be developed by interprofessional LTC experts committed to applying the highest levels of clinical evidence to improve the care of older persons. Moreover, these approaches should be realistic and practical and utilize theoretically based application of implementation science approaches such as the Evidence Integration Triangle and the consolidated framework for advancing implementation science.[50,51] CMS should continue to refine the MDS-derived quality measures to make them as valid as possible for different segments of the diverse NF population.

Networks of clinicians can provide online education on evidence-based guidelines. Learning collaboratives can work together to impart evidence-based tools and techniques to improve quality.[52] Additional studies on multifaceted interventions are needed to help translate research into process improvements in NFs. Robust safety initiatives are needed that address appropriate prescribing and deprescribing to minimize the risk of adverse drug effects.

Application of evidence-based processes of care such as the examples listed above can be facilitated by their inclusion in electronic health records (EHRs) as order sets, algorithms, alerts, and care plans. Improved clinical outcomes have been achieved with clinical decision support (CDS) in hospitalized adults with pneumonia and sepsis.[53,54] Research is needed to document similar results in NF.

Improve Adoption of Technology and CDS

Issues

Electronic access to CDS is resource-limited, leading to reliance on manual systems and the potential for compromised clinical quality.[55,56] Quality outcomes improve when clinical tools are embedded into workflow and/or EHRs.[42] EHRs should be easy to use, prevent errors, create appropriate alerts without creating alert fatigue, provide methods to document responses to alerts, provide measures so that clinical managers can improve processes of care and enable documentation that meets regulatory standards, reduces the risk of successful legal actions, and generates appropriate billing codes. However, adoption of EHR-embedded CDS has been slow. The acute care experience with embedded CDS has had the unintended consequences of alert fatigue leading to overriding, new errors, and difficulty keeping the content current, all of which must be anticipated and avoided in LTC applications.[57] EHR vendors have not kept pace with the rapid rate of product evolution needed to catapult the clinical quality movement through CDS. Integrated CDS carries a perception of increased workload among clinicians that must be addressed.[58]

Another barrier to achieving high-quality outcomes, expressed by selected registered nurse participants in a study of NF transfers, is a lack of confidence in their own clinical skills and judgment.[59] The nurses stated that it would have been comforting to confirm their findings with a nurse practitioner or physician either directly or through telemedicine. A systematic review conducted in 2013 found very few, poor-quality evaluations of telemedicine in NF.[60]

Example Solutions for Improving Adoption of CDS Technology

An example of an effective CDS is the Geriatric Risk Assessment MedGuide. This guide was tested in a randomized cluster trial and noted that there was a lower incidence of falls, delirium, and death and an increase in the number of hospitalizations among those managed with the guide.[61] Given that most medication errors occur at the time of prescribing, the Geriatric Risk Assessment MedGuide involved the use of a mobile device with drug reference software to help 236 American NF physicians identify potential adverse drug events.[61] Having this necessary clinical information available at the time of prescribing improved medication safety. Similarly, integration of CDS into a computerized order entry system improved drug orders and the quality of prescribing for LTC residents with renal insufficiency.[62]

As part of the CMS Initiative to Reduce Avoidable Hospitalizations among NF, the University of Pittsburgh Medical Center (UPMC) used telehealth coupled with clinical care support from advanced practice RNs to reduce all-cause hospitalization by 12.6% and potentially avoidable emergency department visits by 28.2%.[63] RNs used INTERACT tools to help NF intervene appropriately when urgent changes in condition may have led to hospitalization. The UPMC team incorporated the INTERACT CDS tools into their EHR for sustained improvements in care process and outcome measures.[64]

Recommendations for Improving Adoption of Technology

These findings suggest that (1) LTC should embrace and learn from the CDS technology experience in acute care; (2) NF should work to integrate CDS into their EHRs, and (3) there is a niche for telemedicine combined with CDS to provide expertise and assessment remotely.[65] For improved quality outcomes, electronic, just-in-time access to clinical tools, quality metrics, clinical algorithms, order sets, and care maps is needed. There is evidence for the value of telemedicine in NF, particularly in specialty areas such as dermatology, geriatrics, psychiatry, neurology, and multiple allied specialties.[60,66] These studies

indicate that provision of telemedicine services in NF is feasible and participants expressed high satisfaction with the services. However, more-robust studies are needed to build the evidence base for this application. Regulatory and reimbursement barriers may hinder widespread adoption of telemedicine.

NF with licensed nursing staff levels above the average resources (more Medicare-paid than Medicaid-paid residents), not-for-profit status, high occupancy, larger size and chain-affiliation, and those in a more competitive environment have tended to adopt CDS.[67] A federal mandate may be needed to prompt remaining NF to acquire CDS. Implicit in the use of CDS is that clinical quality can be improved and for many facilities this could improve their Five-Star Quality Rating and thus market share, incentives, and rewards, without adding personnel costs.

Limitations

A cautionary perspective should be adopted when reviewing the science on clinical quality improvement in the NF. The vast majority of literature provides evidence for recommended interventions that was of low to moderate quality at best.[68] Other than a few controlled trials, most interventions were uncontrolled and not blinded. Quality metrics chosen as the subject of the improvement process varied among trials, thereby limiting comparability and our ability to draw conclusions about the relative value of the interventions. In most instances, interventions that may have been successful in selected NF environments are unlikely to be generalizable widely given the potential biases in facility selection, low number of participants (ie, residents and/or facilities), and lack of standardization and controls. Many publications, written by experienced geriatric clinical scientists, offer guidance based on the shortcomings noted above tempered by the authors' years of experience in the field. These limitations notwithstanding, there is abundant passion for attaining quality clinical care of NF residents as measured by the numerous "calls-to-action" in the literature.

Implications for Practice, Policy, and/or Research

In order to achieve quality clinical outcomes, several components and multipronged approaches that address all 4 of these areas are needed. Successful improvement and attainment of clinical quality is predicated on the interplay of human factors and accessible assets. Further, the pursuit of quality must occur with consistency and standardization.

For an individual facility to achieve quality clinical care, several foundational pillars need to exist. Providers must lead improvements in NF quality through actions like those specified in Table 1. Disruption of current practice paradigms may be needed to facilitate development of high-value, clinical, quality care.

Conclusions

The opportunity to improve quality and outcomes related to the health and safety of NF residents is still great. At times, undertaking clinical quality initiatives appears Sisyphean—an endless task that ineffectively moves performance toward quality outcomes. Despite the frustrations, the passion and sense of urgency for quality of care enhancements in NF are driving ongoing efforts to improve outcomes for the complex NF population. Although the task is formidable, the journey of discovery to best practices is necessary and worthy.

References

1. Centers for Medicare & Medicaid Services, State Operations Manual: Guidance for Surveyors of Long-term Care Facilities, Appendix PP, F684, §483.25 Quality of Care, page 260. Available at:https://www.cms.gov/Regulations-and-Guidance/Guidance/Manuals/downloads/som107ap_pp_guidelines_ltcf.pdf. Accessed January 17, 2018.
2. Institute of Medicine. Improving the Quality of Care in Nursing Homes. Washington, DC: The National Academies Press [online]. Available at:https://doi.org/10.17226/646. Accessed January 17, 2018.
3. Levenson SA. The basis for improving and reforming long-term care. Part 3: Essential elements for quality care. J Am Med Dir Assoc 2009;10:597–606.
4. Kim H, Kovner C, Harrington C, et al. A panel analysis of the relationships of nursing home staffing levels and standards to regulatory deficiencies. J Gerontol Soc Sci 2009;64B:269–278.
5. Geriatric Medicine. Association of American Medical Colleges, Electronic Residency Application Service, 2017. Available at:https://www.aamc.org/download/360174/data/geriatricmedicineim.pdf. Accessed August 13, 2018.
6. Nelson D, Pederson J, Olsan T. Developing the skills for quality assurance and performance improvement in long-term care, American Medical Directors Association, 2015. Available at:https://paltc.org/product-store/developing-skills-quality-assurance-and-performance-improvement-long-term-care-0. Accessed March 13, 2018.
7. Han K, Trinkoff AM, Storr CL, et al. Associations between state regulations, training length, perceived quality and job satisfaction among certified nursing assistants: Cross-sectional secondary data analysis. Int J Nurs Stud 2014;51:1135–1141.
8. Trinkoff AM, Storr CL, Lerner NB, et al. CAN training requirements and resident care outcomes in nursing homes. Gerontol 2017;57:501–508.
9. American Geriatrics Society 2015 Beers Criteria Update Expert Panel. American Geriatrics Society 2015 updated Beers Criteria for potentially inappropriate medication use in older adults. J Am Geriatr Soc 2015;63:2227–2246.
10. Horn SD. The business case for nursing in long-term care. Policy Polit Nurs Pract 2008;9:88–93.
11. Bostick JE, Rantz MJ, Flesner MK, et al. Systematic review of studies of staffing and quality in nursing homes. J Am Med Dir Assoc 2006;7:366–376.
12. Horn SD, Buerhaus P, Bergstrom N, Smout RJ. Association between registered nurse staffing time and outcomes of long-stay nursing home residents. Am J Nurs 2005;105:58–71.
13. Liu LF, Liu WP, Wang JY. Work autonomy of certified nursing assistants in long-term care facilities: Discrepant perceptions between nursing supervisors and certified nursing assistants. J Am Med Dir Assoc 2011;12:524–534.
14. Wogamon CL. Exploring the effect of educating certified nursing assistants on pressure ulcer knowledge and incidence in a nursing home setting. Ostomy Wound Manag 2016;62:42–50.
15. Tolson D, Morley JE, Rolland Y, Vellas B. Advancing nursing home practice: The International Association of Geriatrics and Gerontology Recommendations. Geriatr Nurs 2011;32:195–197.
16. Pentrice D, Black M. Coming and staying a qualitative exploration of working in nursing homes. Int J Older People Nurs 2007;2:198–203.
17. Morley JE. Clinical practice in nursing homes as a key for progress. J Nutr Health Aging 2010;14:586–593.
18. Flynn L, Liang Y, Dickson GL, Aiken LH. Effects of nursing practice environments on quality outcomes in nursing homes. J Am Geriatr Soc 2010;58:2401–2410.
19. Cioltan H, Alshehri S, Howe C, et al. Variation in use of antipsychotic medications in nursing homes in the United States: A systematic review. BMC Geriatr 2017;17:32.
20. Grabowski DC, Feng Z, Hirth R, et al. Effect of nursing home ownership on the quality of post-acute care: An instrumental variable approach. J Health Econ 2013;32:12–21.
21. Barber ND, Alldred DP, Raynor DK, et al. Care homes' use of medicines study: Prevalence, causes and potential harm of medication errors in care homes for older people. Qual Saf Health Care 2009;18:341–346.
22. Dilles T, Elseviers MM, Van Rompaey B, et al. Barriers for nurses to safe medication management in nursing homes. J Nurs Scholarsh 2011;43:171–180.
23. Tija JB, Briesacher A, McGee BA, et al. Medication discrepancies upon hospital to skilled NF transitions. J Gen Intern Med 2009;24:630–635.
24. Mahmood A, Chaudhury A, Rust T. Long-term care physical environments—Effect on medication errors. Int J Health Care Qual Assur 2012;25:431–441.
25. Reeves S, Pelone F, Harrison R, et al. Interprofessional collaboration to improve professional practice and healthcare outcomes (Review). Cochrane Database Syst Rev; 2017:CD000072.
26. Sargeant J, Loney E, Murphy G. Effective interprofessional teams: "Contact is not enough" to build a team. J Contin Ed Health Prof 2008;28:228–234.
27. Wouters H, Scheper J, Koning H, et al. Discontinuing inappropriate medication use in nursing home residents: A cluster randomized controlled trial. Ann Intern Med 2017;167:609–617.
28. D'amour D, Oandasan I. Interprofessionality as the field of interprofessional practice and interprofessional education: An emerging concept. J Interprof Care 2005;19:8–20.
29. Bowers B, Nolet K, Jacobson N. Sustaining culture change: Experiences in the Green House Model. Health Serv Res 2016;51:398–417.
30. Bern-Klug M, Byram E, Sabbagh Steinberg N, et al. Nursing home residents' legal access to onsite professional psychosocial care: Federal and State regulations do not meet minimum professional social work standards. Gerontologist 2018;58:e260–e272.

31. Lima JC, Intrator O, Wetle T. Physicians in nursing homes: Effectiveness of physician accountability and communication. J Am Med Dir Assoc 2015;16:755–761.
32. Kajonius PJ, Kazemi A. Structure and process as predictors of satisfaction with care. Health Soc Care Commun 2016;24:699–707.
33. Teal C. Direct care workers—number one quality indicator in long-term care: A consumer's perspective. N C Med J 2002;63:102–105.
34. Levenson SA. The basis for improving and reforming long-term care. Part 4: Identifying meaningful improvement approaches (Segment 2). J Am Med Dir Assoc 2010;11:161–170.
35. Ampe S, Sevenants A, Smets T, et al. Advance care planning for nursing home residents with dementia: Policy vs. practice. J Adv Nurs 2016;72:569–581.
36. Diehl Graverholt B, Espehaug B, Lund H. Implementing guidelines in nursing homes: A systematic review. BMC Health Services Res 2016;16:298.
37. Haugen H, Fred CL. Beyond Implementation: A Prescription for the Adoption of Healthcare Technology. 2nd ed. Denver, CO: Magnusso-Skor Publishing, Inc; 2016.
38. Lipska KJ, Ross JS, Wang Y, et al. National trends in US hospital admissions for hyperglycemia and hypoglycemia among Medicare beneficiaries, 1999-2011. JAMA Intern Med 2014;174:1116–1124.
39. Sink KM, Evans GW, Shorr RI, et al. Syncope, hypotension, and falls in the treatment of hypertension: Results from the randomized clinical systolic blood pressure intervention trial. J Am Geriatr Soc 2018;66:679–686.
40. Tamma PD, Avdic E, Li DX, et al. Association of adverse events with antibiotic use in hospitalized patients. JAMA Intern Med 2017;177:1308–1315.
41. Ubel PA, Asch DA. Creating value in health by understanding and overcoming resistance to de-innovation. Health Aff (Millwood) 2015;34:239–244.
42. Mor V. Defining and measuring quality outcomes in long-term care. J Am Med Dir Assoc 2007;8:E.129–E.137.
43. Prasad V, Ioannidis JPA. Evidence-based de-implementation for contradicted, unproven, and aspiring healthcare practices. Implement Sci 2014;9:1.
44. Niven DJ, Mrklas KJ, Holodinsky JK, et al. Towards understanding the de-adoption of low-value clinical practices: Scoping review. BMC Med 2015;13:255.
45. Geriatric Pharmaceutical Care Guidelines. Cincinnati, OH: Omnicare, Inc; 2016.
46. Choosing Wisely. The Society for Post-acute and Long-term Care (AMDA). Available at:https://paltc.org/choosing-wisely. Accessed August 5, 2018.
47. Taylor JA, Parmelee P, Brown H, et al. A model quality improvement program for the management of falls in nursing homes. J Am Med Dir Assoc 2007;8:S26–S36.
48. Ouslander JG, Bonner A, Herndon L, Shutes J. The INTERACT quality improvement program: An overview for medical directors and primary care clinicians in long-term care. J Am Med Dir Assoc 2014;15:162–170.
49. 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;16:524–526.
50. Resnick B, Kolanowski A, Van Haitsma K, et al. Testing the Evidence Integration Triangle for implementation of interventions to manage behavioral and psychological symptoms associated with dementia: Protocol for a pragmatic trial. Res Nurs Health 2018;41:228–242.
51. Consolidated Framework for Implementation Research. Available at:https://cfirguide.org/. Accessed August 13, 2018.
52. Gillespie SM, Olsan T, Liebel D, et al. Pioneering a nursing home quality improvement learning collaborative: A case study of method and lessons learned. J Am Med Dir Assoc 2016;17:136–141.
53. Micek ST, Roubinian N, Heuring T, et al. Before-after study of a standardized hospital order set for the management of septic shock. Crit Care Med 2006;34:27807–27813.
54. Krive J, Shoolin JS, Zink SD. Effectiveness of evidence-based pneumonia CPOE order sets on measured health outcomes. Online J Public Health Inform 2015;7:e211.
55. Wiener JM. An assessment of strategies for improving quality of care in nursing homes. The Gerontol 2003;43:19–27. Available at:. https://academic.oup.com/gerontologist/article-abstract/43/suppl_2/19/637521.
56. 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;18:470–488. Available at:. https://doi.org/10.1016/j.jamda.2016.12.069.
57. Ash JS, Sittig DF, Campbell EM, et al. Some unintended consequences of clinical decision support systems. AMIA Annu Symp Proc; 2007:26–30.
58. Poon EG, Blumenthal DB, Jaggi T, et al. Overcoming barriers to adopting and implementing computerized physician order entry systems in U.S. hospitals. Health Aff (Millwood) 2004;23:184–190.
59. Laging B, Ford R, Bauer M, Nau R. A meta-synthesis of factors influencing nursing home staff decisions to transfer residents to hospital. J Adv Nurs 2015;71:2224–2236.
60. Edirippulige S, Martin-Khan M, Beattie E, et al. A systematic review of telemedicine services for residents in long term care facilities. J Telemed Telecare 2013;19:127–132.
61. Lapane KL, Hughes CM, Daiella LA, et al. Effect of a pharmacist-led multicomponent intervention focusing on the medication monitoring phase to prevent potential adverse drug events in nursing homes. J Am Geriatr Soc 2011;59:1238–1245.
62. Field TS, Rochon P, Lee M, et al. Computerized clinical decision support during medication ordering for long-term care residents with renal insufficiency. J Am Med Inform Assoc 2009;16:480–485.
63. Gaines J. Evaluation of the Initiative to Reduce Avoidable Hospitalizations Among Nursing Facility Residents: Final Report. Baltimore, MD: Centers for Medicare and Medicaid Innovation. Available at:https://innovation.cms.gov/files/reports/irahnfr-finalvalrpt.pdf. Accessed August 21, 2018.
64. Handler SM, Sharkey SS, Hudak S, Ouslander MG. Incorporating INTERACT II clinical decision support tools into nursing home health technology. Ann Longterm Care 2011;19:23–26.
65. Handler SM, Boyce RD, Ligons FM, et al. Use and perceived benefits of mobile devices by physicians in preventing adverse drug events in the nursing home. J Am Med Dir Assoc 2013;14:906–910.
66. Kane-Gill SL, Niznik JD, Kellum JA, et al. Use of telemedicine to enhance pharmacist services in the NF. Consult Pharm 2017;32:93–98.
67. Zhang N, Lu SF, Xu B, et al. Health information technologies: Which nursing homes adopted them? J Am Med Dir Assoc 2016;17:441–447.
68. Guyatt GH, Oxman AD, Vist GE, et al. GRADE: An emerging consensus on rating quality of evidence and strength of recommendations. BMJ 2008;336:924–926.