TITLE: Leading improvements in the delivery of nursing care for older adults with frailty in long-term care using Mitchell's Quality Health Outcome model and health outcome data

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Synopsis: Protecting frail older residents from adverse health outcomes associated with preventable illnesses and conditions, such as geriatric syndromes within the long term care health system requires attention by the healthcare team, led by professional nurse leaders, to all of the operant contextual factors influencing health outcomes. Mitchell's Health Outcomes Model helps to frame these operant contextual factors to help understand how the person and the situation are viewed, which then directs professional nurse leaders' interventions. Utilization of the long-term care facilities Quality Metrics data can shape and inform nurses leaders as to the gaps which can be filled to meet resident care needs operant among these modifiable contextual factors.

Key Words: Frailty, Geriatric syndromes, Quality Metrics, Nursing Leadership, Nursology; Failure to Maintain

Key Points:

- Clinical characteristics associated with frailty and geriatric syndromes among older residents are tabulated monthly across SNFs establishing a benchmark for improvement by nurse leaders

- Use of nurse competencies help direct patient centered interventions to improve resident safety and quality

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INTRODUCTION

The long-term care (LTC) industry provides several types of services to assist older adults to achieve optimal levels of health, function and overall well-being. LTC services encompass short-term rehabilitation, sub-acute level, assisted living and long-term care. These services commonly, but not always, provide professional nursing care twenty-four hours per day, with exception of, depending upon the state, assisted living. Across the United States, nearly 1.3 million persons over the age of 65 years enter into LTC for assistance in management of their health conditions [1] reliant on the care provided by interprofessional teams led by registered nurses.

As many of the recipients of nursing care in LTC facilities are older Medicare or Medicaid beneficiaries, the Centers for Medicare and Medicaid (CMS) monitors the provision of quality care metrics to its members. The CMS's Quality Metric database [2] provides one set of nurse sensitive indicators of quality care recognized by public health authorities (Agency for Healthcare Research and Quality [AHRQ, 3], as critical to the delivery of quality care and resident safety.

Besides CMS, the delivery of quality nursing care is regulated by state licensing agencies, as well as individually by professional nurses who follow practice standards of care according to their scope of practice and licensure [4]. Professional nurses deliver care, guided by the nursing meta-paradigm, with focused attention to human beings, environment, health, and nursing goals [5]. Attention to this broad meta-paradigm by professional nurses, helps to ensure that health deficiencies within these respected domains are minimized. Adherence to nursing standards of practice, regulations and the nursing meta-paradigm, creates an ideal environment to deliver the best possible outcomes for older consumers, the recipient of the delivery of nursing care.

However, as our society continues to age, the demography of the LTC population and environment is changing, with more frail older adults with multiple medical problems. Multi-morbidity includes advanced complex illness, acute exacerbations of conditions, new onset of geriatric syndromes, and frailty. In light of the changing demographics of LTC service users, there is an opportunity for nursing leaders to champion the delivery of quality nursing care to this most vulnerable, and often frail, population.

Frailty is related to multimorbidity [6], and those with frailty may also experience socioeconomic deprivation and increased mortality [7], as well as decreased quality of life and health related quality of life in long term care [8,9]. Therefore, it is imperative that frailty be identified and appropriately managed by nurse leaders working in LTC. Of particular importance for the attention of nurse leaders, is identification of practice gaps that may contribute to complications or geriatric syndromes in people who are experiencing frailty.

The aim of this manuscript is to describe how nurse leaders can use a conceptual framework to guide the identification of practice gaps and associated key leadership competencies to enact practice change for improved quality of care for people experiencing frailty. We provide an overview of the conceptual framework guiding how the person and the situation are viewed, which informs the nursing care provided, how nurse-sensitive outcome measures from the CMS Quality Metrics database can be used to identify potential gaps in nursing care, show how the model can be adapted to monitor frailty, and provide a case study to illustrate how key leadership competencies can be exercised to improve service delivery quality for LTC residents experiencing frailty. Practice gaps can be attributed to individual practice, but more often can be attributed to complexities in organizational systems and processes. Therefore, understanding the context influencing the delivery of nursing care in health care organizations is

essential. Delivery of fundamental quality care to physically fragile older residents and those with complex care needs is achievable when nurse leaders are focused on identifying the dynamic factors operant within a health care organization that influence nursing care delivery.

CONCEPTUAL FRAMEWORK AND PRACTICE DELIVERY MODELS OF CARE

Mitchell's Quality Health Outcomes Model is a dynamic, multidimensional framework of contextual factors operative within healthcare systems which impact the delivery of care. It has been modified for LTC settings (refer to Figure 1; [10]). This framework illustrates the structures, resources and policy domains influencing the delivery of nursing care to vulnerable populations which expose potential practice gaps within the LTC facility, and that create opportunities for improvement in nursing care delivery.

The health outcomes within Mitchell's Quality Health Outcomes Model are noted to be interdependent on the surrounding multidimensional contextual factors that include:

1) The demographic and health characteristics of older NH residents;
2) System characteristics within the LTC facility influencing the delivery of professional nursing care, such as nurse practice environment, skill mix and staffing ratios;
3) Process of care characteristics influencing the delivery of nursing care goals and intervention; and
4) Adverse outcomes including readmission rates and resident quality of life.

These four contextual factors broadly represent the nursing metaparadigm of the human being, environment, nursing goals and health [5]. Demographic and health characteristics of the human being embody "person", system characteristics and external regulatory characteristics embody

"environment", process of nursing care embody "nursing goals" and adverse health outcomes embody "health".

Nursing assessment of these four contextual factors is an important role of the professional nurse leader within the health care organization. This conceptual framework reflects how the person and the situation are viewed, which then direct what nurse leaders and nursologists think about, and does with, for each person [11a]. Nursologists utilize theory such as Roy's Adaptation Model or Neuman's Systems Model to frame how the person and their situation are viewed. The way by which nursing is delivered to persons occurs through various practice delivery models such as primary nursing, team nursing, or patient-centered care, among others [11b]. Through nursing assessment, gaps in the delivery of nursing care can be identified and nursing care goals established to embrace the person, environment, and nursing goals for improved health outcomes. Nurse leaders in LTC facilities can develop effective nursing care interventions to manage the clinical nuances associated with frailty and burgeoning geriatric syndromes. Therefore, this review providers nurse leaders with the existing evidence from the QM database to illustrate how one symptom of frailty, coupled with structure, or process of care resources impact health outcomes.

USING CMS QUALITY METRICS TO IDENTIFY POTENTIAL GAPS IN NURSING CARE

To illustrate how to maximize leadership opportunities for nurse's charged with the resident's care, we present nurse sensitive Quality Metric [2] indicators among an older resident with symptoms of frailty along with three broad contextual factors that have impacted the

delivery of quality care to this resident (i.e., organizational and systems level factors, resident characteristics and nursing interventions-process of care factors).

The importance of looking for practice gaps

A gap in care exists when the desired performance levels (i.e., goals of care), are unaligned with current performance (i.e., actual nursing care) [12]. Gaps in care can lead to reduced remuneration to the LTC facility, loss of time to the resident to achieve their goals, health complications and geriatric syndromes that can lead to fines levied by state licensing inspection agencies and more importantly, inadequate quality resident outcomes. For example, researchers have identified the relationship between specific gaps in nursing care and adverse outcomes including pneumonia, urinary tract infection, pressure injury and delirium have been grouped together in the concept of 'failure to maintain' [13]. Not undertaking fundamental nursing care contributes to the development of these hospital-acquired complications, which are sometimes identified as geriatric syndromes.

Frailty and cascade iatrogenesis

Frailty is defined as "a state of vulnerability to poor resolution of homoeostasis after a stressor event, as a consequence of cumulative decline in many physiological systems during a lifetime [14]". Frailty impacts the physical functional ability of an older resident. Considering their symptom experiences of exhaustion, low physical activity and slowed speed of gait predisposes the older resident to need additional time to perform an activity as well as additional assistance to perform the activity safely. When it comes to the fundamental activities of daily living such as, transferring, ambulation, bathing, dressing, toileting and feeding, over 90% of

residents have greater disability requiring assistance compared to non-institutionalized older adults (U.S. Census Bureau, 2017). Physical frailty is also associated with activities of daily living such as the ability to move independently, and thus it is important to recognize various degrees or severities progressing along a continuum of functional limitation and decline, from needing active assistance to move, to complete dependency- unable to move to perform the activity. Older residents who are bedridden may no longer possess the muscular strength or energy to move independently in bed, increasing their need for help with daily activities.

When homoeostatic reserves are depleted, and minor stressor events occur, they trigger disproportionate changes in older adult's health [14]. The older resident population in LTC facilities experience acute episodic changes in condition, considered "stressor events", that are often not specific to their underlying disease [15], in addition to the burden of their chronic multi-morbidities. Weight loss, exhaustion, reduced grip strength, low physical activity, and slow walking pace are the five hallmark characteristics of frailty [14]. Two of the five symptoms, exhaustion and reduced physical activity, are also associated with the development of a preventable type of fall, which is recognized as a geriatric syndrome. Both exhaustion and reduced physical activity, left untreated, give rise to muscular weakness, loss of muscle mass i.e., sarcopenia, and further reduced mobility and immobility, two additional preventable geriatric syndromes. Should fall episodes continue without improvement in resident's symptoms of exhaustion or physical activity, inevitable changes in upright mobility occur leading to further reduced mobility and immobility. Bedridden older residents are then at high risk for development of pressure injury and/or nosocomial infection of the pressure injury. An event in one body system "can trigger larger complications or outcomes in another, or cascade iatrogenesis, among older adults with complex, high acuity needs" [16]. Monitoring physical frailty and adverse

outcomes related to development of geriatric syndromes can be accomplished through identification of nurse-sensitive quality metric data.

Monitoring practice gaps in relation to frailty

The CMS Quality Metric database (NH compare data. Medicare.gov) provides a range of metrics that could be considered sensitive to nursing care. These quality metrics are tabulated quarterly within all LTC facilities, across the states, serving as a gauge to monitor their quality improvement performance efforts to achieve resident safety and quality of care. To monitor the prevalence of frailty in a facility, the key primary outcome indicators captured in the CMS Quality Metric database most theoretically aligned to functional decline and/or worsening physical frailty include LTC residents' ability to move independently and an increase in needing help in activities of daily living (refer to Box 1).

Box 1. Example of some Quality Metrics linked to frailty in long-stay residents

Quality Metric Number	Quality Metric Definition
QM 401	The percentage of long-stay residents whose need for help with daily activities has increased
QM 404	The percentage of long-stay residents who lose too much weight
QM 410	The percentage of long-stay residents experiencing one or more falls with major injury
QM 451	The percentage of residents whose ability to move independently worsened.
QM 453	The percentage of long-stay residents with pressure ulcers (injury)

QM 521	The number of outpatient emergency department visits per 1000 long-stay resident days

CASE STUDY OF NURSING LEADERSHIP IN QUALITY IMPROVEMENT

The resident, Mrs. G. (pseudonym), is an 86-year-old female, recently widowed, who is admitted to the LTC facility, in an assisted living unit, for management of her medications and assistance with activities of daily living. The characteristics of this case are outlined using the four meta-paradigm concepts: person, environment, nursing care, and health and illustrated in Figure 2.

Person: Mrs G

Mrs. G's medical history includes comorbidities of advanced coronary artery disease, peripheral vascular disease, multi-infarct dementia and high-risk status for the development of infection, related to an underlying immunodeficiency. Her current symptoms experienced include physical exhaustion after ambulation in her room for more than 15 feet with assistance, and decreased participation on the unit in physical activities such as group exercises, stretching and chair yoga. She does not participate regularly in group exercises because she forgets. Mrs. G's physical functional ability reveals dependency in mobility- using a wheeled walker for assistance, grooming, dressing and toileting-experiencing stress urinary incontinence. She is able to select her clothes and feed herself. Her short-term rehabilitation goals are to: ambulate without use of the wheeled walker:increase her lower extremity strength, and; stay at the facility for her remaining years.

Trigger event and stressor event leading to functional decline. While ambulating with the physical therapy aide on the unit, Mrs G experiences a fall, and is subsequently diagnosed with

an acute fragility fracture in her right hip. Following surgery at the local hospital, she attends rehabilitation for 6 weeks at a short-term stay rehabilitation unit, in order to regain her strength and physical mobility before returning to the LTC unit. On readmission to the skilled nursing unit, Mrs. G is physically exhausted by activities such as sitting on the side of bed or transferring from her bed to bedside chair for meals. Her ability to turn herself independently in bed is drastically reduced and she requires assistance of the nursing staff to turn and position her.

Environment: Organizational Level Characteristics

The 110 bed skilled nursing unit where Mrs. G resides has received on average four health deficiencies related to failure to administer meals and prescription medications during 2020. The facility is a privately owned chain facility, with 60% of the residents receiving Medicaid, and the remaining residents being dual eligible for Medicare and Medicaid. The average resident census is full capacity at 110 beds. The case mix staffing hours per resident day is 0.36 as noted on the Quality Metric CM-RN). This is a measure of staffing and reimbursement for nursing based on resident acuity. From a national perspective, the average Case Mix is 0.37, showing that this state is slightly lower than the national average. The reported LPN Staffing Hours per Resident per day is 0.87 noted as Quality Metric VOCHRD. This is on par with the national data of 0.87, therefore this facility meets the percentage of LPN staffing hours as compared to the national average. According to the Quality Metric performance indicators for the last cycle, QM 401 (the percentage of long stay residents whose need for help with daily activities increased) shows 11.1% of all long stay residents need for help with activities has increased. Compared to the national average, which is 14.5%, this figure is lower. QM 453 (the percentage of long stay residents with pressure sore injury) is 8.2%, compared to the national average of 7.3%. Overall, these last two sets of data reflect a poor performance for management

of pressure sore injury and an on par performance for care of residents needing help with activities.

Nursing: Nursing Care Goals and Interventions

Post hip repair surgery, the nursing interventions centered on activities to assist with ambulation and to progress Mrs G's mobility within her room and eventually on the unit. When in bed, nurses turned and positioned Mrs. G every four hours around the clock. Because of the recent hip fracture, Mrs. G's care centered on assessment for post-operative infection by monitoring her cognitive status and vital signs. Nurses provided guidance in instruction for coughing and deep breathing exercises. Mrs. G also was given anti-embolic stockings to prevent blood clots. The nurse reported a tar appearing black mark on her heel which was evaluated and determined to be a stage IV heel pressure sore with dry necrosis. The area was debrided with Santyl and monitored three times per week.

Health: Outcomes

For Mrs G, her ability to move independently was decreasing with overall reduction in mobility. She developed the pressure injury. Two weeks' post-admission to the LTC facility, Mrs. G was noted to have nausea, vomiting and an alteration in level of consciousness requiring an emergency room evaluation. Mrs. G was diagnosed with sepsis and admitted to the hospital In hospital, she rapidly deteriorated, requiring intensive care unit monitoring. Within twenty-four hours Mrs. G passed away with family at her bedside.

Using the quality metrics, or outcome indicators, areas of nursing practice that would be open to further investigation include: ambulation, skin integrity, and monitoring for infection. Another indicator of frailty, loss of weight [17], was absent from the case study but also bears further investigation.

NURSING LEADERSHIP

To enact leadership in the area of quality and safety, nurses should be able to incorporate data driven benchmarks to monitor system performance, evaluate the alignment of system data and comparative patient safety benchmarks, lead the analysis of actual errors, near misses and potential situations that would impact safety, foster a culture of safety and respect [18]. Nurse leaders need to be familiar with the quality metrics listed on the CMS database, identify those that may reflect nursing care, master the ability to run reports from the database, and monitor these findings over time. While the CMS Quality Metrics are available for use by nurse managers in LTC facilities, how these can be aligned into benchmarks to establish industry standards and support comparison between individual facilities requires greater investment. We have illustrated that they can be used to benchmark around key conditions prevalent in the LTC context, in this case around frailty.

Nurses should lead the analysis of individual resident journeys, when poor outcomes including death, are experienced. Developing specialist skills in analytical techniques, such as those for root cause analysis [19], position nurses working in the LTC sector well. We recommend that nurse leaders in LTC facilities undertake training in methodologies related to case analysis, to ensure that the issues are clearly identified. From this case study, a focus on nursing practices related to ambulation, skin integrity, monitoring for infection, and by implication, monitoring weight are worthy of further investigation. Follow up investigation would require a review of practice, possible through audit or direct observation to fully understand any barriers and enablers in the care of residents who have been identified as frail. Here it would be very important to note which practice delivery models were most impactful in

the LTC facility? For example, greater improvement in health outcomes may be noted from use of patient-centered care practice delivery models. In the analysis of individual resident journeys, nurseologist have a critical role, paving the way for thinking about the best venue for delivery of nursing care. This is especially important in the LTC industry where older adults may spend their remaining years alongside professional nurses. Nursologists draw upon existing conceptual models, such as Roy's Adaptation Model or Neuman's Systems Model, and/or other conceptual models and mid-range theories to shape how the person and their situation are viewed, ultimately influencing the delivery of nursing care.

Finally, fostering a culture of safety and respect is critical for continuous improvement [20]. Relationally focused leadership styles, such as transformational leadership [21], individualized consideration [22], and resonant leadership [23], promote a positive workplace culture [20]. For nurse leaders in LTC facilities, it is important to mentor others in their professional growth and accountability, and influence and monitor intentional change to ensure continuous organizational improvement.

Specifically, in relation to the case study, a root cause analysis would consider:

- Person: How frailty is recognized and managed. The use of a frailty scale [24] for early recognition of frailty in the LTC setting is worthy of further investigation.
- Environment: Ask about the culture of care and safety, nurse staffing and skill-mix, such as the number of RN hours per resident day, and resident census. Evidence suggests that higher levels or nurse staffing are correlated with higher quality of care [25]. Skill mix in facilities that had higher numbers of registered nurses (RNs) compared to licensed practical nurses had significantly lower re-hospitalization and ED use [26].

- Nursing care: Are nursing staff able to meet the care requirements for the residents? For example, missing meals is one example a gap in practice [27] that requires monitoring. Audits or direct observations of practice may be required to gather further information about the delivery of nursing care.

Nurse experts have long noted these dynamic factors which influence the practice delivery model include, among others, a supportive practice environment, i.e. adequate RN coverage and appropriate staffing according to resident's needs, and provision of RNs who possess geriatric nursing and leadership competencies [28]. The COVID-19 pandemic has revealed however, shortcomings and "longstanding internal problems in nursing homes and the weak structures and policies that are meant to protect residents", further eroding supportive practice environments [28]. Two of the quintessential elements needed to deliver quality care, such as identifying and utilizing an effective practice delivery model and utilization of a conceptual model by nurses, to care for frail residents, are often under the direct control of nurse managers and leaders.

SUMMARY

How nurse leaders can use Mitchell's Health Outcome conceptual framework to guide the identification of practice gaps and associated key leadership competencies to enact practice change for improved quality of care for people experiencing frailty was outlined in this manuscript. Using an established conceptual framework, key nurse-sensitive outcome measures from the CMS Quality Metrics database were used to identify potential gaps in nursing care. Nurse leadership, in relation to quality improvement in LTC settings, should focus on how to incorporate data driven benchmarks to monitor system performance, develop a structured

approach for team analysis of actual errors, near misses and potential situations that would impact safety, and foster a culture of safety and respect [18].

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Figure 1. Conceptual Relationship Among Contextual Factors Impacting the Delivery of Nursing Care in Nursing Homes Based on the Quality Health Outcomes Model (Mitchell, 1998; From Gray-Miceli D, Rogowski J, de Cordova PB, Boltz M. A framework for delivering nursing care to older adults with COVID-19 in nursing homes. *Public Health Nurs*. 2021;00:1– 17. https://doi.org/10.1111/phn.12885 ; with permission).

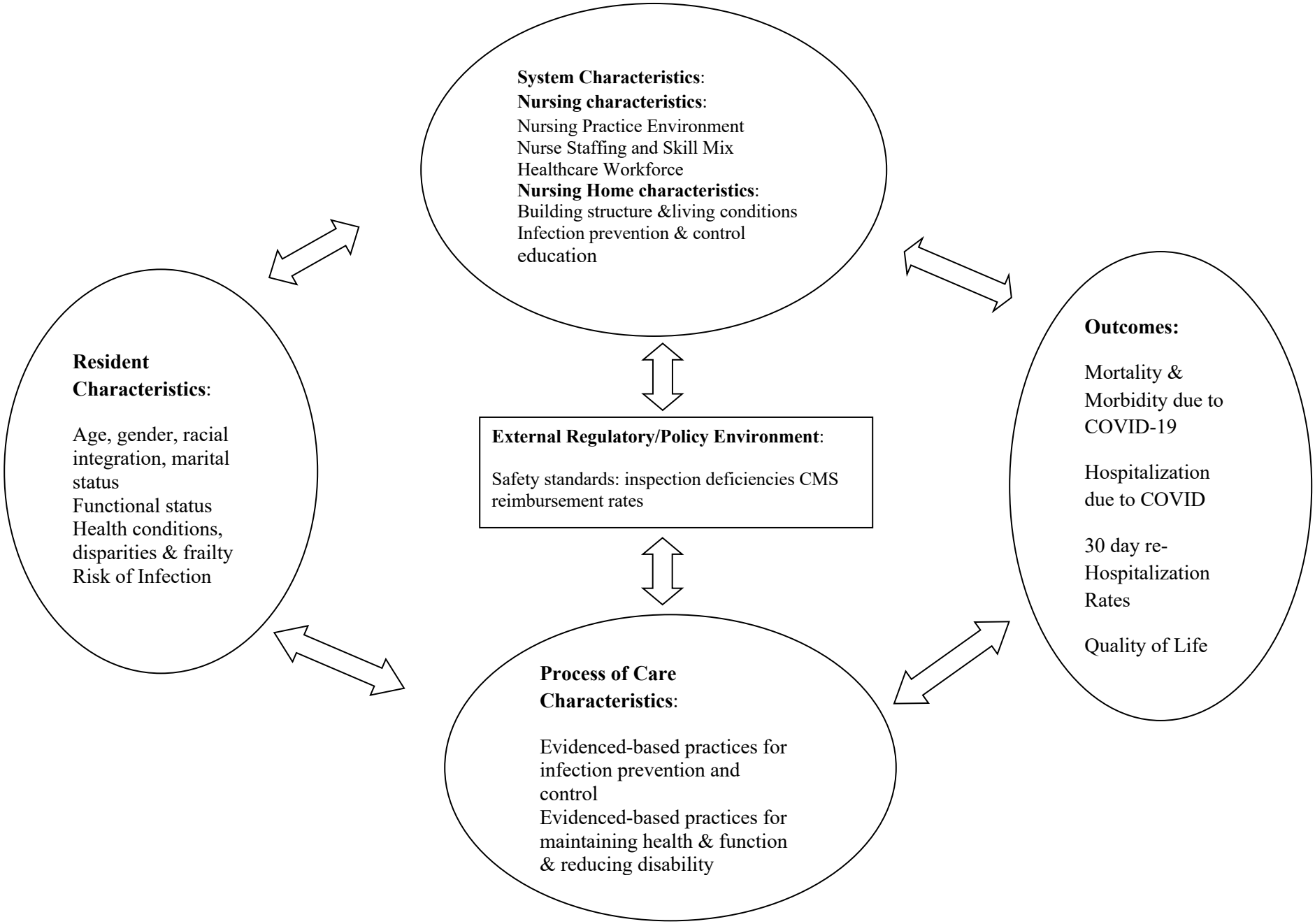

Figure 2. Conceptual Relationship Among Contextual Factors Impacting the Continuum of Functional Decline Based on the Quality Health Outcomes Model (Mitchell, 1998; Data from Dr. Gray-Miceli, copyright, 2021, all rights reserved).