National League for Nursing

NLN VISION STATEMENT:
INTEGRATING CHEMOSENSATION (SMELL AND TASTE) IN NURSING EDUCATION CURRICULA

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MISSION

The National League for Nursing promotes excellence in nursing education to build a strong and diverse workforce to advance the health of our nation and the global community (National League for Nursing, n.d.).

CORE VALUES

The National League for Nursing implements its mission guided by four dynamic and integrated core values that permeate the organization and are reflected in its work: caring, integrity, diversity & inclusion, and excellence (National League for Nursing, n.d.).

INTRODUCTION

Nurses, and others, have performed health assessments and interviewed people about their health concerns for decades. The resulting data have been documented in various formats in patient records. However, two critical elements have routinely been absent from physical assessments in most practice settings, smell and taste, and yet they contribute greatly to the quality of people's lives. In part, these data are absent because few health professionals learn to routinely assess, document, and take appropriate action related to issues people experience with these two senses.

Chemosensory science encompasses the study of taste, smell, and chemesthesis (the detection of chemical stimuli through nerve endings, such as the burn of capsaicin or the cooling of menthol). These three interconnected sensory systems shape our perception of flavor and serve critical protective functions (Doty, 2015; Jaime-Lara et al., 2023; Small & Green, 2012). These senses strongly influence human health across multiple domains: nutritional intake, medication adherence, safety awareness, social connection, and emotional well-being (Keller & Malaspina, 2013). Despite their fundamental importance, chemosensory dysfunctions remain underrecognized in health care, with patients often reporting that clinicians dismiss or minimize their concerns about smell and taste loss (Ball et al., 2021).

In addition to content being inadequately addressed in nursing education programs, patients identify their frustration with persistent experiences of being dismissed clinically when concerns about diminished or lack of taste or smell are voiced. This vanguard Vision Statement focuses on

a comprehensive approach to integrating chemosensation as a part of nursing education curricula, establishing the assessment and resultant plan of nursing care, creating a research agenda to determine nurse actions on patient outcomes, and determining the value of such actions on the cost of health care.

BACKGROUND

Millions of Americans, and others globally, struggle with smell and taste challenges (Liu et al, 2016; National Institute on Deafness and Other Communication Disorders, 2024). Most nurses learn little, if anything, about these issues in their nursing education programs. This gap leaves nurses ill-prepared to ensure patient safety when hazard detection is compromised (Pence et al., 2014). As an example, saying "when you smell gas" is a meaningless statement to someone who experiences anosmia. Additionally, nurses are limited in their ability to support the nutritional needs of people who complain about food having no or "bad" tastes or say the texture is disagreeable. Patients report these concerns have been repeatedly dismissed by various health care providers, (Doty & Kamath, 2014; Landis et al., 2009; Murphy et al., 2024) and what makes that dismissal especially dangerous is people feel devalued and changes in chemosensation may be early signs of severe disease, as explained later. As a result, no early intervention strategies are considered. While nursing education has not addressed this topic in a systematic manner or integrated competencies into practice, few other disciplines have done so either. As a result, few practitioners in health care address a systematic assessment and resultant action unless their practice is a specialty focused on these two senses.

Chemosensation and Associated Factors

While recent global health events have drawn attention to chemosensory dysfunction as a symptom of viral infections, the significance of smell and taste disorders extends far beyond infectious disease contexts (Menni et al., 2020; Moein et al., 2020; Parma et al., 2021). Olfactory dysfunction alone affects millions of individuals world-wide (Doty, 2019). Gustatory sensitivity also declines with age, though generally less dramatically than olfaction; this decline is compounded by polypharmacy, as medications and drug–drug interactions represent the most significant yet underappreciated contributors to taste disorders in older adults (Schiffman, 2009). Population-based studies indicate approximately 50% of adults aged 65-79 years of age (Doty & Kamath, 2014; Doty et al., 1984) and 50-75% of those 80 years of age and older (Murphy et al., 2002) exhibit measurable olfactory impairment (Attems et al., 2015; Doty & Kamath, 2014; Doty et al., 1984, Murphy et al., 2002). Smell and taste disorders serve as sentinel symptoms for numerous conditions, offering valuable early indicators of health status changes.

These sensory dysfunctions are present in various illnesses such as diabetes and neurodegenerative diseases (Alzheimer's and Parkinson's disease, and respiratory conditions such as chronic rhinosinusitis (Doty, 2017; Gouveri & Papanas, 2021; Marin et al., 2018).

Importantly, chemosensory changes often precede more recognized symptoms. Up to 96% of individuals with Parkinson's disease experience olfactory dysfunction, when compared to young healthy norms, years before motor symptoms manifest (Haehner et al., 2009, 2019), with prevalence estimates varying from 64% to 96% depending on the olfactory test and normative criteria applied (Bagherieh et al., 2023; Doty, 2012; Fullard et al., 2017; Haehner et al., 2009, 2019). Regarding Alzheimer's, olfactory impairment is estimated to affect 85% of individuals with early-stage Alzheimer's disease (Dan et al., 2021), with prevalence approaching 100% depending on the test and diagnostic criteria used (Zou et al., 2016). Olfactory deficits have been shown to precede cognitive decline and serve as early indicators of Alzheimer's disease and amnestic mild cognitive impairment (Audronyte et al., 2023; Roberts et al., 2016; Woodward et al., 2017). These sensory alterations thus offer crucial opportunities for early detection, intervention, and monitoring of disease trajectories.

Age-related sensory decline is associated with increased risks of malnutrition, depression, social isolation, reduced quality of life, and mortality (Attems et al., 2015; Doty & Kamath, 2014; Murphy et al., 2002). Considering the world population's average age is increasing, the potential for these increased risks can add increased burdens for health care services. Both Alzheimer's and Parkinson's diseases have debilitating effects on the person with the diagnosis and those who provide most of the ongoing care. Early intervention has the potential to decrease the costs of care for people with these diagnoses. Knowing health care providers can intervene early based on simple assessment data, there is the potential to affect individuals' lives to increase their quality and provide opportunities for early intervention for potential issues, such as malnutrition, and impact the health care systems, both from a cost and an efficiency perspective. Beyond acquired causes, congenital anosmia, the lifelong absence of smell from birth, affects an estimated 1 in 5,000 to 1 in 10,000 individuals and may occur in isolation or as part of a syndrome such as Kallmann syndrome (Boesveldt et al., 2017). These individuals face unique challenges, including an inability to detect environmental hazards such as gas leaks or smoke, and they often develop compensatory strategies that nurses should recognize and support.

While olfactory dysfunction has received the most research attention, gustatory and chemesthetic dysfunction also carry significant health consequences. Nationally representative findings indicate that more than 5% of U.S. adults report taste disorders, with prevalence rising substantially with age among individuals managing multiple medications (Rawal et al., 2016). Gustatory dysfunction can alter dietary preferences, increase salt and sugar intake, and compound the risk of malnutrition, consequences that are especially dangerous in older adults already managing chronic conditions such as heart failure and diabetes (Doty, 2019).

Medication-induced dysgeusia, a distorted taste perception often described as metallic, bitter, or salty, is among the most common and underrecognized gustatory complaints, associated with more than 250 medications across all major therapeutic classes including antihypertensives, antimicrobials, and chemotherapy agents (Doty et al., 2008; Schiffman, 2018). Nurses who recognize this connection can advocate for medication review and implement taste-modification strategies that improve treatment adherence and nutritional intake. Chemotherapy-induced taste alterations are particularly prevalent, with systematic reviews estimating a weighted prevalence of 56% among patients receiving

chemotherapy (Hovan et al., 2010), and some studies reporting rates as high as 76–100% (Zhang et al., 2025). These alterations including persistent metallic taste, food aversions, and reduced appetite accelerate weight loss and diminish quality of life, yet they are rarely addressed proactively in nursing care plans.

Chemesthesis refers to the detection of chemical irritants through nerve endings that produce sensations such as the burn of chili pepper or the cooling of menthol. Chemesthesis serves as a critical protective function by alerting individuals to potentially harmful substances (Small & Green, 2012). Although studied less at the population level, Parma et al. (2020) demonstrated that COVID-19 impaired chemesthesis function alongside smell and taste confirming that all three chemosensory modalities are clinically vulnerable. Because taste, smell, and chemesthesis interact to produce the experience of flavor and collectively influence nutrition, safety, and quality of life, a comprehensive approach to chemosensory assessment in nursing practice must address all three modalities rather than olfaction alone.

An essential clinical distinction for nurses is that many patients who report "taste loss" are experiencing olfactory dysfunction affecting retronasal flavor perception rather than true gustatory impairment. This differentiation is critical because it guides accurate assessment and documentation, informs patient education about why food seems "flavorless" despite intact basic taste perception, determines appropriate referral pathways, and suggests distinct intervention strategies such as smell training for olfactory dysfunction versus taste-enhancement techniques for gustatory disorders (Doty, 2019).

Finally, COVID-19 highlighted chemosensory dysfunctions. Between 40 and 50% of patients with early variants (decreasing to approximately 5% with Omicron) experienced chemosensory dysfunctions; and 20 to 25% developed persistent symptoms (Reiter et al., 2023; von Bartheld & Wang, 2023). Given that millions of Americans contracted COVID-19, the emergence of long COVID created a substantial cohort with persistent post-viral chemosensory dysfunction requiring ongoing nursing care across all health care settings (Davis et al., 2023). Some patients report ongoing symptoms years after infection, transforming what was initially an acute symptom into a chronic condition with sustained impact on nutritional status, safety, and quality of life. Additionally, we have no reason to believe that subsequent viral infections might not have a similar effect on smell and taste, thus increasing the numbers of people experiencing some degree of loss of one or both senses.

The Patient Perspective

Given the known association between chemosensory disorders and at least 139 unique health conditions, these reported symptoms need to be assessed and documented at the point of care (Leon et al., 2024). Most frustrating for patients must be the dismissal of their symptoms by health care providers. The pattern of inadequate attention to chemosensory complaints are often minimized or overlooked entirely (Doty & Kamath, 2014; Landis et al., 2009; Murphy et al., 2024). This invalidation can lead to delayed diagnoses, inappropriate treatment, and psychological distress as patients

question their own experience. One study reported that 60% of patients with anosmia received unclear, unsatisfactory, or no information about their disorder or its consequences (Landis et al., 2009). As many as 50% of patients with a chemosensory dysfunction reported frustration with the lack of knowledge and the presence of a dismissive attitude they encountered in consulting health care providers (Murphy et al., 2024). Further, multiple studies have addressed the emotional impact people experience (Bochicchio et al., 2023; Croy et al., 2014; Herz, 2016; Kohli et al., 2016; Zou, et al., 2016, 2021).

To ground these findings in lived experience, Appendix B presents patients' own accounts of what chemosensory dysfunction means in daily life. The patient's voice is critical to understanding the chemosensory experience and is consistently reported as minimized or devalued. Appendix B is included to enrich the value of this vanguard Vision Statement by providing a few examples of what patients with smell and taste disorders attempt to convey to health care providers.

Nurses must receive comprehensive education in chemosensory science to detect, report, and manage chemosensory dysfunctions effectively. This includes understanding the underlying mechanisms of smell and taste, recognizing symptoms of dysfunction, including these symptoms in differential diagnosis, and implementing appropriate interventions (Hoffman et al., 2016). Such preparation will empower nurses to provide whole-person care that addresses the sensory aspects of health, which are often overlooked but crucial for patient well-being and quality of life. The evidence and lived experiences presented here provide a clear imperative for nursing education.

CALL TO ACTION

A triangulation of events brings us to a critical juncture: patients have a clearly defined, unmet concern, which currently is dismissed when addressed with many health care providers and is irregularly assessed and documented. Nursing education is identifying distinct contributions nurses make to the full range of health care services. Nursing education accreditation considers how educational programs address emerging population needs and incorporate those needs into their programs to prepare graduates who are appropriately prepared to address current and emerging health care needs. Chemosensation meets the intersection of these three critical factors influencing curriculum decisions.

Nurses function in various settings from acute settings to community settings, serving the young and the old. Nurses work with the populations where chemosensory challenges are most likely to be present; and in many situations, nurses are present more frequently than any other health professional group. These facts support the need for nursing education programs to incorporate chemosensation into programmatic curricula.

Moreover, nurses can play a key role in advancing chemosensory research. By collecting data on patients' sensory experiences and outcomes, nurses can contribute valuable insights to the scientific and medical community. This collaboration could lead to the development of new diagnostic tools,

treatments, and preventive strategies for chemosensory dysfunctions (Rawal et al., 2016; Reed et al., 2021), as well as enhancing current diagnostic and therapeutic approaches for a variety of other disorders (Leon et al., 2024). By preparing nurses in chemosensory science, they will be prepared to support the inclusion of routine chemosensory testing in nursing practice (Munger et al., 2025).

The NLN calls on nursing programs, nursing program leaders, nurse educators, and clinical practice partners to advance the rapid deployment of knowledge, skills, and abilities related to chemosensation to meet this learning need and provide opportunities for early intervention, and thus potentially decrease health care needs and costs for people and the health care system.

RECOMMENDATIONS

FOR THE NATIONAL LEAGUE FOR NURSING

- Provide faculty development programs related to chemosensation.
- Advocate for inclusion of assessment of smell and taste in the electronic health record.
- Support differentiation of competencies for chemosensory education by programmatic types.
- Advocate for research initiatives examining the impact of chemosensory education on patient outcomes.

FOR LEADERSHIP IN NURSING PROGRAMS (DEANS/DIRECTORS/CHAIRS)

- Provide for faculty development related to chemosensory education.
- Support curriculum initiatives designed to include chemosensory content.
- Support interprofessional educational opportunities, as appropriate.
- Facilitate partnerships with clinical settings with the intent for faculty and students to assess patients with actual or potential chemosensory issues.

FOR NURSE EDUCATORS

- Capitalize on existing educational materials for self-development related to chemosensory science and skills.
- Develop basic chemosensory skills in assessment, patient education, and interventions (consistent with nursing practice acts).

- Integrate chemosensory content into existing courses (didactic, practicum, and simulation as appropriate).

FOR COLLABORATION WITH CLINICAL PRACTICE PARTNERS

- Co-create practicum experiences where students are likely to be able to assess patients with actual or potential chemosensory issues.
- Assist with experiences to develop nurses in practice to gain the knowledge, skills, and attitudes to meet the needs of patients with chemosensory needs.
- Create collaborative research projects to determine effectiveness of nurse interventions in care of patients with chemosensory needs.

CONCLUSION

Integrating chemosensory science into nursing education represents a central and important opportunity to enhance patient care across the lifespan and health care continuum. By preparing nurses with the knowledge and skills to assess, interpret, and address chemosensory dysfunction, nurse educators can address a significant gap in current healthcare delivery.

The expanding body of evidence linking chemosensory function to neurological health, nutritional status, psychological well-being, and overall quality of life highlights the importance of this curricular integration. Nurses equipped with expertise in chemosensory science will be positioned to validate patient experiences often dismissed in current practice, implement evidence-based interventions that mitigate the negative consequences of sensory loss, and contribute to early detection of conditions where chemosensory changes serve as sentinel symptoms.

As we look to the future of nursing education, practice, and research, the integration of chemosensory science stands not as an additional burden on already-crowded curricula, but as an opportunity to deepen nursing's scientific foundation and expand its capacity to improve human health. Through this vision, nursing education can lead health care's response to the growing recognition of chemosensory health as integral to overall well-being, ultimately fulfilling nursing's enduring commitment to comprehensive, compassionate, and evidence-based patient care.

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APPENDIX A
KEY TERMS AND DEFINITIONS

Chemosensory Terms	Definitions
Ageusia	Complete loss of taste
Anosmia	Complete loss of smell
Congenital Anosmia	The lifelong absence of smell from birth
Chemesthesis	Detection of chemical stimuli through nerve endings (e.g., burning, cooling)
Chemosensation	Smell, taste, and related senses
Chemosensory science	The study of taste, smell, and chemesthesis and their roles in health and disease
Dysgeusia	Distorted taste perception
Flavor	The combined sensory experience produced by the integration of taste, smell, and chemesthesis
Hypogeusia	Decreased taste sensitivity
Hyposmia	Decreased ability to detect odors
Olfaction	The sense of smell
Gustation	The sense of taste
Parosmia	Distorted perception of odors
Phantosmia	Perception of odors that are not present

APPENDIX B
THE PATIENT'S VOICE

The literature is rich with examples of patient concerns related to social, nutrition, safety, emotional, employment, lifestyle, and health care and supportive services. In a national survey of 4,728 U.S. patients with smell and taste disorders, only 38% reported receiving a documented diagnosis, and fewer than one-third of those who consulted family practitioners received any smell testing (Naimi et al., 2023). The quotes below illustrate why these gaps matter in the patients' own words. These selective quotes represent experiences across domains of daily life from safety and nutrition to emotional well-being and clinical encounter.

Clinical Dismissal

Patients consistently report their chemosensory concerns are minimized or dismissed by health care providers, leaving them feeling unheard and unsupported.

"I have a neurologist, primary care doc, and I went to an ENT [ear, nose, and throat]. I feel like it's that same look when I tell them my story. They say, yeah, that's COVID. It is very condescending. I say, 'But this is my life, and it's been going on for a year and three months, and if affects really every aspect of my life and my job and my happiness.'"

Medical Errors and Misunderstanding

A lack of familiarity with chemosensory conditions among providers can lead to misdiagnosis and inaccurate health records, errors that compound patient frustration and may affect future care.

"I was prescribed budesonide as an off-label (asthma) drug to use as a nasal rinse after having nasal surgery. I later found that my PCP's [primary care providers] records indicated I had asthma instead of anosmia."

Emotional and Quality-of-Life Impact

Chemosensory loss diminishes everyday experiences that most people take for granted, contributing to grief, depression, and a diminished sense of connection to the world.

"I could smell freshly mowed grass for five seconds, but I can't smell the earth and the trees and even after fresh rain. And that depresses me because I love nature and the outdoors."

Safety Hazards

Without the ability to detect smoke, gas leaks or spoiled food, patients with anosmia live with constant vulnerability, a risk that extends to their families.

"We actually did have a gas leak in our house; it was a very minor one. But that has just really haunted me that my family could smell it, and I couldn't."

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NLN STRATEGIC ACTION GROUP

Vision Statement: Integrating Chemosensation (Smell and Taste) in Nursing Education Curricula

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