



How and Why the Five Senses Matter for Quality of Life

A Guide for Long-Term Care
Communities Everywhere


QUALITY OF LIFE SERVICES


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A research collaboration between Sodexo and the University of Ottawa Life Research Institute



is the world leader in services that improve quality of life, an essential factor in individual and organizational performance. Operating in 80 countries, Sodexo serves 75 million consumers each day through its unique combination of Onsite Services, Benefits and Rewards Services, and Personal and Home Services. At Sodexo, we have worked to make quality of life something that is concrete and operational, matching individuals' needs with the goals of care communities. We have identified six dimensions of quality of life on which our services have a direct impact for residents:



Physical Environment

Creating crisp, clean spaces that are safe and provide all the comforts of home



Health and Well-Being

Providing opportunities to make residents healthier



Social Interaction

Strengthening the connections between residents and their families, friends and caregivers



Recognition

Engaging caregivers so they can bring their caring and expertise to work every day



Ease and Efficiency

Simplifying the daily experience to ensure comfort and access



Personal Growth

Inspiring curiosity and continuous learning



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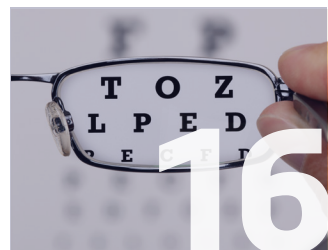
Created in 2016, the Life Research Institute (LRI) is a research hub housed in the Faculty of Health Sciences at the University of Ottawa, Canada. It brings together multidisciplinary and multi-sectorial expertise to advance knowledge and training on the biological, physical, mental and social issues that arise throughout the full life cycle. It takes a new and comprehensive approach to the study of aging. Housed within the Faculty of Health Sciences with over 4,000 students and eight professional training programs as well as many other fundamental programs in the health sciences, LRI is well positioned to be a key research collaborator with Sodexo. Its primary partner is the International Longevity Centre-Canada (ILC-Canada), which is an independent policy think tank.

As one of 17 centers worldwide that make up the ILC Global Alliance, ILC-Canada focuses on advocating for the rights of older people and supports the generation and application of knowledge needed to positively impact our aging world.



Since 2009, the Sodexo Institute for Quality of Life has served as a resource to help Sodexo deepen its understanding of quality of life. In the manner of an in-house 'think tank', it was founded on Sodexo's conviction that improving quality of life leads to the progress of individuals and contributes to the performance of organizations. The Institute's objective is to gather and develop insight into the drivers of quality of life and their impact. It focuses its gaze mainly outside of Sodexo to develop and leverage external relationships, in particular with academia.

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Almost everyone, everywhere will have some form of sensory impairment as they age. Changes in sight and hearing and all senses can radically change the way a person lives and interacts with others.

Although we know that senses change as we age, less is known about how to adjust environments for the comfort of those with diminished senses. We can take actions – large or small, alone or in combination – to improve comfort, wellness and enjoyment. Knowing how and when to make these adjustments has the potential to meaningfully improve quality of life for seniors.

At Sodexo, our mission is to improve quality of life for our residents and the clients we serve. We believe that by placing quality of life at the center of our thinking, we create uplifting environments that help residents age well and live their lives to the fullest.

We set out to study the senses to ensure that our services have a real and lasting impact on residents. To improve quality of life, we must continually raise the standards for ourselves and our industry.

Through our range of services including food services, cleaning, linen and laundry, maintenance and facilities management, digital communication platform, meal delivery and more, we want to ensure that we consider how our work can be sense-sensitive and improve aging.

Our work on this topic will continue as we build tools to measure a senior's environment for sense sensitivity. We intend to raise the level of care for seniors at home and in long-term care communities. By regularly measuring and making changes, we will improve quality of life for seniors.

It is an honor to work with the team at the University of Ottawa and Sodexo's Institute for Quality of Life to help us advance our work and help everyone in this field improve quality of life for residents. My thanks to the University as well as to our research team, our clients who are helping to test and implement the recommendations, our vendor partners who share in our efforts to continually raise the bar and our team of employees who bring their passion for service to work each and every day.

Marc Plumart
CEO Healthcare & Seniors Worldwide





The only French-English bilingual institution and one of the top ten comprehensive, research-intensive universities in Canada, the University of Ottawa offers a learning environment that recognizes the need for institutions of higher learning to play an active citizenship role and to foster opportunities for academia to contribute positively to society.

True to this perspective and to its academic mission, the Faculty of Health Sciences strives to respond proactively to the rapid, frequent and profound changes that our systems of care are experiencing. Convinced that scientific and technological advances are part of the solution for better health care, the Faculty has made it a priority to encourage and support creative thinking and innovation to advance knowledge and to ensure that its programs of study are driven and informed by research outcomes and emerging science.

Program outcomes must however find significance and meaning within global realities and their impact and repercussions on the working environment. This cannot be achieved in isolation. The world is seeing an unprecedented demographic shift towards a predominance of older adults who wish to live fully in an environment that understands and cares. Key collaboration and partnerships are therefore instrumental to provide access to a wide range of training grounds and milieus for research translation into policies and action, knowledge transfer and applied learning, so that graduates are appropriately prepared to serve as decision-makers and providers of care for tomorrow.

As Dean of the Faculty of Health Sciences, I feel extremely privileged that the Faculty has found in Sodexo an industry partner that not only shares a common vision for the importance of quality of life, but also one that embraces the opportunity to work towards creating long-term solutions anchored in real-life situations, to help shape how we define and apply “Quality of Life” principles.

It is, therefore, with much excitement that the Faculty celebrates a first landmark in what it hopes will be a long-lasting collaborative partnership with a shared goal: to expand on the inventory of opportunities and alternatives for individuals as they move through life’s trajectory and to enhance the quality and level of care for them to age with respect and dignity.

Hélène Perrault Ph.D.

Professor and Dean, Faculty of Health Sciences, University of Ottawa



Following our initial research into a “sense-sensitive” approach to long-term care communities for older adults, I am delighted to have collaborated so closely with the University of Ottawa Faculty of Health Sciences and Sodexo Seniors colleagues to research how and why the five senses matter for quality of life. This collaboration has enabled us to produce an informative study and a practical tool to measure sensitivity to the senses.

Thomas Jelley

Vice President, Sodexo Institute for Quality of Life



LINDA GARCIA, PhD

Professor, Interdisciplinary School of Health Sciences and Founding Director, Life Research Institute, Faculty of Health Sciences, University of Ottawa

Dr. Garcia's research interests focus on the impact of these environments on the functioning of individuals with neurological disorders, especially dementia. Working with colleagues from other professions and her students, she strives to offer solutions for facilitating the social integration of individuals with functional limitations. She is interested in developing interventions that include approaches based on human interactions. She is keenly interested in improving quality of life in long-term care.



CHANTAL BACKMAN, RN, MHA, PhD

Assistant Professor, School of Nursing, University of Ottawa and Affiliate Investigator, Clinical Epidemiology Program, The Ottawa Hospital Research Institute

Dr. Backman's research program is focused on improving the quality, safety and experience of older adults as they navigate the healthcare system. The overall goal of her research is to understand, measure and evaluate the effectiveness of: 1) quality and safety interventions for patients in acute care hospitals, 2) safe person- and family-centered care interventions for older adults with multiple chronic conditions during their care transition between hospital and home, and 3) sense-sensitive practices for residents living in long-term care homes.



MICHELLE CRICK

PhD Candidate, School of Nursing, University of Ottawa

Crick is a Registered Mental Health Nurse and has worked in various clinical, managerial and educational roles in the U.K. and New Zealand. She is currently a PhD candidate in the School of Nursing, Faculty of Health Sciences at the University of Ottawa. Her research is investigating the role of regulatory processes and the impact they have on the care of older people with depression living in long-term care in Ontario.



DANIELLE CHO-YOUNG

Master's Student, School of Nursing, University of Ottawa

Cho-Young earned her bachelor of science in nursing from Western University in 2013. As a Registered Nurse, Danielle spent almost three years working on the Inpatient Clinical Neurosciences Unit at University Hospital in London, Ontario, Canada. It was there that she provided care for many acutely ill older adults who experienced head trauma from falling at home. After recognizing the prevalence of these hospital admissions, Danielle is interested in reducing the incidence of falls in older adults and ultimately promoting optimal aging at home.



MEGAN SCHARF

4th-year Nursing Student, School of Nursing,
University of Ottawa

Scharf is interested in research involving outpatient nursing with a focus on long-term community care. She would also like to study the use of technology to improve access to healthcare information and services. Megan has accomplished many things since attending the University of Ottawa, including participating in the Undergraduate Research Opportunity Program (2016-2017), earning a merit scholarship (2017), and being named to the Dean's Honour List (2012-present).

The world's senior population is growing fast. As of 2015, there were approximately 900 million people over the age of 60, according to the United Nations. The U.N. projects that the global senior population will grow to 1.4 billion by 2030. With this growing population, the number of people impacted by an age-related disease or health condition will also skyrocket. In fact, more than 90 percent of adults will have a deficit in at least one of their five senses, according to the Journal of the American Geriatrics Society.

Little awareness exists regarding the negative effects sensory impairments have on seniors living in long-term care communities. Without proper consideration for the five senses, seniors could be at greater risk for lower quality of life and poor health outcomes.¹ Having more than one impaired sense can further prevent older adults from participating in daily activities or performing the most basic tasks.

The Five Senses Study is aimed at the development and implementation of a five-senses approach for use in long-term care communities.

The long-term care environment is known by different terms in different parts of the world. The environment might be referred to as a nursing home, residential care, skilled nursing facility or rest home. Throughout this guide, we refer to the long-term care environment using the term “long-term care communities.” We define it as a domestic environment that provides any level of care (e.g., independent living, assisted living, skilled nursing care), where services may be organized (e.g., housing, food) or functional support and care may be provided.²

Our goal is to share existing and new knowledge that can be used by residents, families, care providers, leaders, and policy-makers to optimize the environment for residents with sensory impairments. Understanding the impact of sensory impairments within the context of long-term care communities, and knowing what to do about them will lead to better person- and family-centered care and ultimately, improved quality of life for residents and their families. This is the first part of a research collaboration between the University of Ottawa and Sodexo on aging and the senses.

This guide is for:



Care providers working in long-term care communities



Management teams and leaders in long-term care communities



Long-term care community residents and their families

What is the purpose of this guide?

Sensory impairment can mask what an individual is truly able to do: their real competence. The purpose of the guide is to raise awareness about the impact of the senses on the quality of life of residents living in long-term care communities and offer some evidence-based strategies to address their needs. Many features of long-term care communities can impact the way individuals with sensory impairments live. For instance, they might not turn after being called (hearing), they might not eat because they cannot see the food on their plate (vision) or they may fall more frequently (vision, hearing and touch). Yet, there are many strategies that can be used to minimize the impact these sensory losses might have on the daily life of residents as well as their families and care providers.

We believe that everyone — residents, families, care providers and leaders — can contribute to changing environments and approaches so that those with sensory loss have the best possible chance of engaging with others, regardless of other health challenges.

What is included in this guide?

We present each of the five senses individually and discuss:

- What is important to know about sensory changes in residents
- How sensory changes affect residents' experiences in long-term care communities
- What promising practices long-term care communities can adopt

We conclude the guide with a proposed 'five-senses approach' that can be implemented in a long-term care community.

How was this guide developed?

We used an interactive, participatory approach to develop the content of the guide, which included a comprehensive review of the literature, an environmental scan and targeted feedback from key stakeholders. This guide includes the current practices available worldwide but makes no judgments about the quality of the evidence that supports these claims.

The Five Senses Study is part of a multi-phased project that includes on-site audits and validation. Preliminary consultations have already been conducted to validate the findings. Ongoing learning will help us to validate and update the contents and ensure the contents are easy to read and take action on. The involvement of our target audience in the development of the guide was crucial to ensuring that the information catered to the specific needs and preferences of the audience.

In a future phase of our work, we will formally evaluate the impact of the guide using the Knowledge-to-Action Framework.³ Specifically, we will identify barriers and facilitators effecting the implementation of the five-senses approach in long-term care. We will address the modifiable barriers, and we will implement the five-senses approach across multiple sites and compare the results of the implementation across these sites.

The results of The Five Senses Study will provide:

- Insight into the complexity of the interactions among the five senses
- Insight into the relationship between person- and family-centered care and sensory changes
- Increased awareness of the degree that sensory impairment can “mask” a person’s true abilities and make it appear that they suffer from cognitive or other impairments

The approach we propose will allow stakeholders (i.e., residents, families, care providers and leaders) to assess their long-term care community for sense-sensitivity and make the appropriate changes to improve the quality of life and experiences of long-term care residents and their families.



THE FINDINGS

Did you know?

As we age, the five senses — hearing, vision, taste, smell and touch — become less acute.^{4,5} Age-related sensory changes may create difficulties in communicating, enjoying activities and staying connected to people.¹ As life expectancies increase, the prevalence of age-related sensory impairments is predicted to increase globally.⁵ Sensory changes can affect day-to-day activities and often lead to increased feelings of isolation and depression.^{1,4,6}

Through the senses, we receive information from the environment in the form of sound, light, smells, tastes, and touch.⁴ With age, we need more stimulation to be aware of these sensations.^{1,4,6} Hearing and vision are the two senses that most commonly diminish as we age.^{1,4} Glasses and hearing aids, as well as lifestyle or environmental changes, can make these impairments more manageable.^{4,6}

Seniors deserve to have the best possible care. Long-term care communities should routinely assess residents for sensory changes to ensure they can offer care that is attuned to the changing needs of seniors.

TWO SAMPLE SCENARIOS

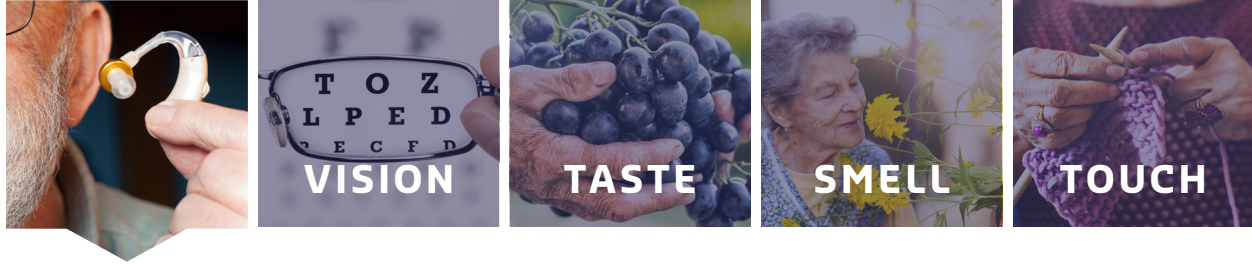
Imagine these fictional seniors as you read

Jasmine Dubois is a 78-year-old widow who lives in a skilled nursing home. She has four adult children who live some distance away, and she does not see them as often as she would like. She is mobile with the help of a walker, but needs help if she goes outside. She has type 2 diabetes, has had recent cataract surgery and has arthritis, osteoporosis and cardiovascular disease. She needs help with activities of daily living such as washing, dressing and bathing. Jasmine uses hearing aids. Sometimes the batteries need replacing, and she cannot change them herself. She has glasses but leaves them in her room at times, which means she cannot see the television or read. Sometimes she tells her care team that she has a funny taste in her mouth and has lost her appetite. She used to enjoy walking through the garden but she can't smell the flowers anymore. She tells care providers that she misses petting her dog.



Vikram Hakesh is an 82-year-old man. He is married, but since his stroke three years ago he has lived in a long-term care community. His wife visits him every day. The stroke has left Mr. Hakesh with memory loss and confusion, weakness on his left side and a tendency toward impulsive behavior. He cannot see people or objects on his left side. He has used hearing aids for many years, but since the stroke he refuses to wear them. He has difficulty swallowing since the stroke, and he is sensitive to unpleasant smells. At night, he needs help from care providers for his toileting and regular repositioning.





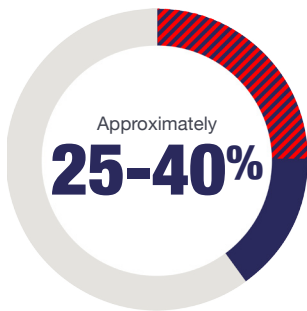
HEARING | Facts and Figures



of the world's population (360 million) have **disabling hearing loss**.⁷

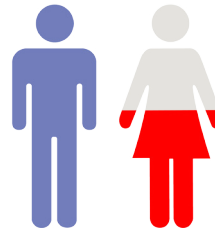


of individuals **over the age of 85** will experience **noticeable hearing loss**.⁴



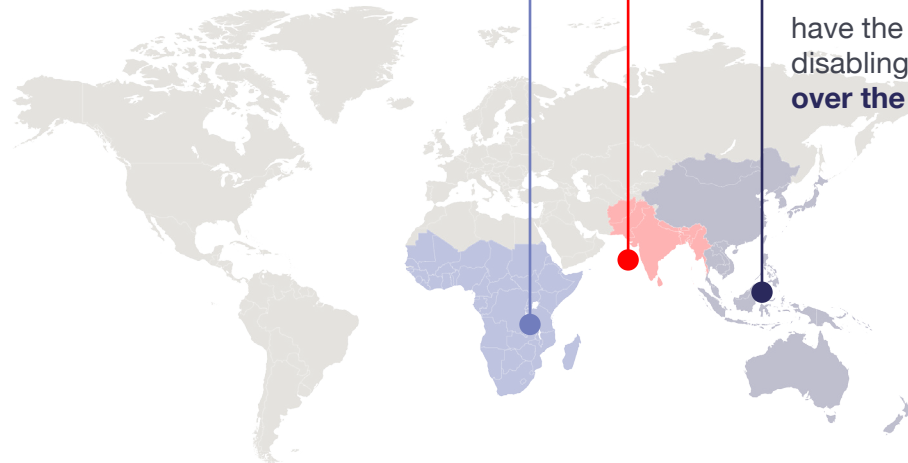
of individuals **over the age of 65** suffer from **noticeable hearing loss**.

This hearing decline typically starts with the loss of the ability to hear higher frequencies.⁴



The rate of hearing loss in **men over 30** is **twice that of women of the same age**.^{1, 4, 5, 8}

Sub-Saharan Africa, South Asia & Asia-Pacific



have the highest prevalence of **disabling hearing loss in adults over the age of 65**.⁷

PROMISING PRACTICE

Provide the opportunity to listen to **nature sounds**.¹⁷



What is important to know about changes in residents' hearing?

The aging process can cause internal ear structures to shift and change shape, and one common result is a decreased ability to detect sounds.^{4,6} The medical term for age-related hearing loss is presbycusis.^{4,6} Age-related hearing loss affects both ears and typically starts with a decreased ability to hear higher frequency sounds (e.g., a child's voice or a bird chirping).^{4,8}

Our ears are not only important for hearing but also for maintaining balance, so these functional changes may also manifest as problems with balance during activities of daily living and may affect residents even when sitting.^{4,6}

As hearing loss progresses, residents may eventually have difficulty discriminating between sounds of different frequencies.^{4,6} This may lead to difficulty hearing conversations where there is background noise, such as in a busy dining room or during group gatherings.^{4,6}

Another common hearing-related problem in residents is the perception of noise or ringing in the ears, often referred to as tinnitus. Tinnitus is not a condition by itself but is typically a symptom of an underlying disorder. In older adults, tinnitus may be caused by age-related changes to internal ear structures as result of wax build-up or of the side effects of particular medications.⁹



What is the impact of hearing changes on residents' experiences in long-term care?

The noise level in long-term care communities can play a significant role in residents' experiences, even for those not suffering from hearing loss.^{4,6} When residents have impaired hearing, they may have the greatest difficulties during social interactions.^{4,6} Hearing impairment can make participating in conversation more difficult and may lead to social isolation.^{4,6} Residents with hearing impairment may appear confused during medical assessments, which may lead to a misdiagnosis of cognitive impairment or dementia.⁶

In general, noise levels in long-term care communities have risen over time due to the increased use of medical and communications technologies, such as mobile telephones and personal alarms.⁴ Common sources of noise in long-term care communities include:

- Busy corridors (e.g., visitors, staff, other residents coming and going, shift changes)^{4,6}
- Entertainment devices (e.g., television, radio)^{4,6}
- Use or movement of equipment (e.g., elevator doors, alarms, telephone, overhead pagers, and housekeeping carts)^{4,6}

High noise levels can have direct, negative physical and psychological effects on residents. They can disrupt sleep, increase stress and make residents more likely to have a negative impression of their caregivers' competence.¹⁰ Significant research exists documenting the negative outcomes of high noise levels. For example:

- Exposure to sudden, unexpected noise can raise a person's heart rate and has been proven to negatively influence recovery times¹⁰
- Exposure to constant high levels of sound can cause an increase in blood pressure over time^{11,12,13}

What promising practices can long-term care communities adopt?

All noises are sounds, but not all sounds are noise. Noise is defined as “any sound that may produce an undesired physiological or psychological effect in an individual or group.”¹⁴ In short, noise can be thought of as “unwanted sound.”¹⁵ How noise is perceived is very individual and very subjective. For example, the sound of a nurse walking in the corridor can be comforting and reassuring to some residents but disturbing to others. Likewise, the sound of someone playing the piano can be calming and relaxing to some and disturbing to others.¹⁶

There are promising practices that can help make the long-term care communities more comfortable for those with hearing impairment. These sense-sensitive practices include:



Introducing soothing sounds into the environment

While some sounds are unwanted, the right kind of auditory stimulation can be an effective way to enhance mood and promote relaxation and cognition. A multi-sensory environment can offer soothing auditory stimulation by providing the opportunity to listen to:

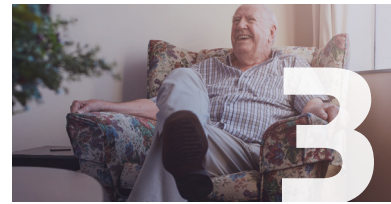
- Nature sounds (e.g., birdsong, waterfall, ocean waves)¹⁷
- Different musical genres based on individual preferences¹⁸



Reducing unnecessary noise

Take simple actions to minimize unwanted sounds. Some recommended noise reduction strategies^{19,20,21} include:

- Minimize background noise (e.g., through the choice, design and maintenance of heating, ventilation and air conditioning systems)
- Use vibrating rather than noise-emitting technology (e.g., mobile phones)
- Use sound-absorbing materials (e.g., floor coverings, ceiling panels and soft furnishings) wherever possible
- Separate quiet areas (e.g., bedrooms) from areas that produce more noise (e.g., dining rooms)
- Create housekeeping and maintenance schedules that do not disrupt sleeping, resting or therapeutic activities



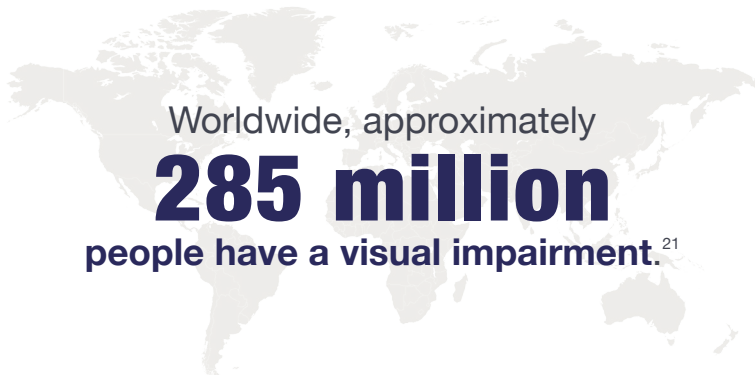
Increasing sound privacy and confidentiality

The ability to have private conversations is important in a long-term care community. If the level of continuous sound or noise is too low, conversations can be easily overheard. Conversely, unexpected loud noises can startle people. The aim is to achieve a balance between absolute silence and excessive background noise. If privacy is an issue in the long-term care community due to noise levels, organizations can take one or more of the following actions:

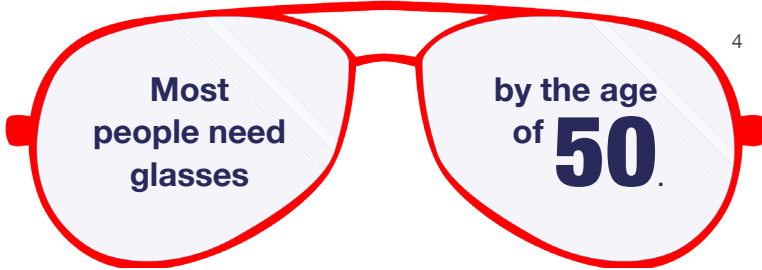
- Install a sound masking system²⁰
- Provide access to private space¹⁹
- Ensure that staff are aware of privacy issues and noise¹⁹



VISION | Facts and Figures



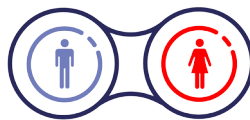

With age, **eyes produce fewer tears** and individuals experience increased discomfort due to dry eyes.⁴



Most people need glasses by the age of **50**.⁴



As people age, eye muscles weaken and **limit the eye's rotation, decreasing the field of view.**²³



The prevalence of vision impairments is **the same in men and women.**²³



Older adults may have a harder time **seeing a contrast between light and dark**, and some may report **decreased color-sensitivity.**²³

PROMISING PRACTICE

Use different colored lights for different times of day.³²



What is important to know about changes in residents' vision?

With aging, structures in the eyes change. For example, the pupils may respond more slowly to changing light levels and may have more difficulty accommodating differences in light intensity. As a result, it may become harder to tolerate glare. Additionally, the sharpness of vision (i.e., visual acuity) and depth perception slowly decrease, and individuals may struggle to focus their eyes on objects that are nearby.²⁴ It may even be challenging to see and speak with someone who is sitting within reach.

The natural loss of vision that occurs with aging is known as presbyopia and can be corrected with glasses, contact lenses, or surgery.²⁵ In addition, there are several common eye disorders that increase in prevalence with age, including:

- Cataracts (cloudiness seen in the lens of the eye)²⁶
- Glaucoma (a rise in fluid pressure within the eye)²⁶
- Macular degeneration (disease in the macula, the part of the eye responsible for central vision)²⁶
- Retinopathy (a disease in the retina that can be caused by diabetes or high blood pressure)²⁶
- Hemianopia (visual spatial neglect, which is an inability to report or respond to external sensory stimulation, for example, not being able to see one side of a dinner plate or a clock face; this is often a side-effect of a stroke, and is linked to the brain's ability to process images, not the eyes' ability to form an image)²⁷

These disorders can cause spotted, blurred, decreased peripheral or decreased central vision.²⁶ This may inhibit an individual's ability to interact with others and limit his or her regular activities.

Age can also cause deterioration in the ability to see colors and distinguish between them.²⁴

Color vision deficiency may also result from eye disorders or other common age-related conditions such as diabetes.²⁸

What is the impact of changes in vision on residents' experiences in long-term care?

In long-term care communities, the physical environment and non-verbal communication can pose particular challenges for residents with visual impairment. Visual elements of non-verbal communication include gestures, facial expression, body posture and eye contact.¹⁰ When a person has difficulty seeing gestures that others take for granted, it can be easy to misinterpret a conversation or situation. For example, a resident who has poor vision may not react appropriately when another resident is becoming restless or agitated.

Certain aspects of the physical environment can also present difficulties for residents with decreased vision. For example, a resident whose vision on one side has been affected by a stroke may not see hazards on that side.²⁷ Other environmental features can also create challenges for residents with low vision including:

- Pale colors or monochromatic color schemes (i.e., multiple shades of the same color)²⁹
- Colors that blend together (e.g., the color blue is less visible than other colors and blues and greens often blend together)²⁴
- Overhead lighting in the blue region of the color spectrum may decrease sleep quality and efficiency if used at night³⁰
- Visually complicated or unfamiliar surroundings²⁴ (e.g., multiple corridors where it might be difficult to orient)
- Clutter or unfamiliar objects in common areas, in hallways and on tables²⁴
- Light reflecting off surfaces (e.g., glare from a highly polished floor) and different levels of lighting between different rooms/ areas (e. g., moving from a bright dining room to a dim hallway)²⁴

What promising practices can long-term care communities adopt?



Use of lighting

- Install consistent and non-patchy illumination to minimize confusion and disorientation³¹
- Use red night-lights in hallways or bathrooms to make it easier for residents to navigate at night while having the least effect on the circadian rhythm³²
- Use different colored lights for different times of day (e.g., blue during the day and red at night)³²
- Let the resident control his or her own lighting (e.g., by installing obvious, wall-mounted light switches, or remote-controlled, voice-controlled or movement-controlled lighting)³²
- Provide a minimum lighting level of 323 lux (broadly defined as lumens per unit area) in all rooms to ensure residents with diminished vision have enough light to see clearly³³
- Maintain similar levels of lighting in different rooms³¹
- Use multiple sources of light as opposed to one intense light that may produce glare²⁴
- Utilize windows to provide natural lighting³¹



Avoiding glare

- Install minimum-glare flooring (e.g., carpets) helps to minimize eye-strain and discomfort³¹
- Use matte finishes on walls, tables and other internal surfaces can reduce glare²⁴



Avoiding clutter

- Keep the physical environment tidy to assist residents with decreased vision (e.g., fewer objects on a table will make it easier to locate what is needed)²⁴
- Keep objects, equipment, and furniture in the same locations²⁴ to help residents easily find what they need and decrease the risk of falls

CIRCADIAN RHYTHM

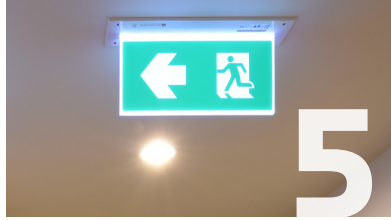
The circadian rhythm refers to the changes that occur within the body during a 24-hour period. Both internal and external factors strongly influence these changes, the most notable being light. One important function of the circadian rhythm is to help regulate the sleep-wake cycle.³⁴

Melatonin is a hormone that is secreted in the brain during the night when it is naturally darker outside to promote sleep as part of the circadian rhythm.³⁴ Research has suggested that blue lighting in particular suppresses the release of melatonin more than other colored lights, making it difficult for people to fall asleep or stay asleep.^{35,36}



Use of colors

- Use contrasting warm/light colors against cold/dark colors (e.g., yellow against blue) to improve residents' ability to see and differentiate between areas³⁷
- Create color contrast between two surfaces or objects (e.g., flooring and walls, toilet and wall, dishware and tablecloth) to help residents navigate their environment by making it easier to see³⁸
- Use standard color coding (e.g., different colored signage for different areas, for instance, green represents restrooms)²⁴
- Use bright colors rather than pastels³⁹



Augmented visual communication

- Create clear signage and cues for rooms, exits, etc. (e.g., use large and simple font, appropriate spacing and color contrast between writing and background)³⁷
- Employ strategies to reduce the effects of hemianopia (see page 17), such as encouraging affected residents to use their neglected side or approaching them from their neglected side to increase awareness;²⁶ this must be balanced with ensuring that the residents' needs are met (e.g., helping them see all of their meal when eating, ensuring that they are aware of potential hazards)





TASTE | Facts and Figures

We have approximately **9,000 taste buds** that detect



sweet, sour, salty, bitter & umami flavors.¹

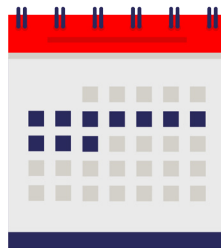
The number of taste buds significantly declines between the ages of:



40-50
in women



50-60
in men.¹



Taste cells last for about

10 days

and are **regularly replaced** throughout our lifespan.⁴⁰

PROMISING PRACTICE

Grow **therapeutic kitchen gardens** which can be a source of food as well as a healing activity.⁴⁶



What is important to know about changes in residents' sense of taste?

Taste plays an important role in the enjoyment of and interest in eating. It also protects people from consuming unsafe foods. All sensory cells within any taste bud can detect the five basic tastes: sweet, sour, salty, bitter, and umami (i.e., savory).⁴¹ The ability to recognize these different tastes decreases with age.⁴² Taste and smell work together, as taste is often enhanced by the aromas of food.⁴³ As sense of smell decreases with age, it can also impact sense of taste.

Several factors contribute to a reduced sense of taste, including:

- The number of taste buds and their sensitivity, both of which diminish with age¹
- Saliva production, which decreases with age, leading to a dry mouth⁴⁴
- The use of dentures⁴⁴
- Sub-optimal oral hygiene²⁴
- Certain medications²⁴, especially if they are mixed into food
- Conditions such as cancer and diabetes
- Certain treatments, such as radiation therapy²⁴

When a resident experiences a decrease in the sense of taste, they can lose interest in food. This can cause a loss of appetite leading to weight loss, poor nutrition and weakened immunity.⁴⁴

What is the impact of changes in sense of taste on residents' experiences in long-term care?

Many factors in long-term care communities can influence residents' sense of taste. They include:

- Medications residents are taking and medical treatments they are undergoing²⁴
- The temperature at which food is served⁴⁵
- The colors and appearance of food and place settings²⁴
- The texture of the food served²⁴
- The frequency of menu changes and the variety of food available to residents⁴⁵
- The experience of the meal service⁴⁵
- The need for residents to eat modified diets (e.g., low salt diets)²⁴



What promising practices can long-term care communities adopt?

Long-term care communities can employ promising practices to improve the quality of life of a resident whose sense of taste has diminished. They include:



Preparation

- In food preparation, focus on quality ingredients, attractive presentation and texture that is safe but highlights flavor⁴⁶
- Where feasible, source local, seasonal produce⁴⁶
- Employ trained kitchen/dietary staff⁴⁶
- Adhere to standards for monitoring the temperature of food⁴⁵



Meet physical needs

- Ensure residents maintain good oral hygiene by providing access to dental/oral care⁴⁷
- Help residents avoid dry mouth by providing appropriate hydration, avoiding serving dry foods and providing saliva replacement products⁴⁷
- Provide foods that meet individual nutritional needs (e.g., some residents may have larger appetites as a result of different body compositions which will mean different energy requirements)⁴⁷
- Assess residents' medications to identify those which may alter taste and appetite⁴⁸ and consider the availability of alternative medications that do not have these side-effects



Menu - variety and choice

- Offering choices can stimulate taste and improve nutrition for residents living in long-term care communities. Strategies to add variety to food choices include:
- Offer food around the clock (e.g., snacks available at all times)⁴⁶
 - Provide different flavors to accommodate preference (e.g., a large selection of juices)⁴⁷
 - Cook with a variety of herbs and spices rather than adding sweeteners or salt²⁴
 - Offer regular changes to the menu⁴⁵
 - Add texture to food (e.g., serve chunky apple sauce instead of blended apple sauce) to increase palatability since chewing food will enhance its flavor²⁴
 - Offer culturally appropriate foods (e.g., appropriate for specific religious beliefs or social customs)⁴⁹
 - Offer small, frequent and nutritionally enriched meals⁴⁷



Presentation

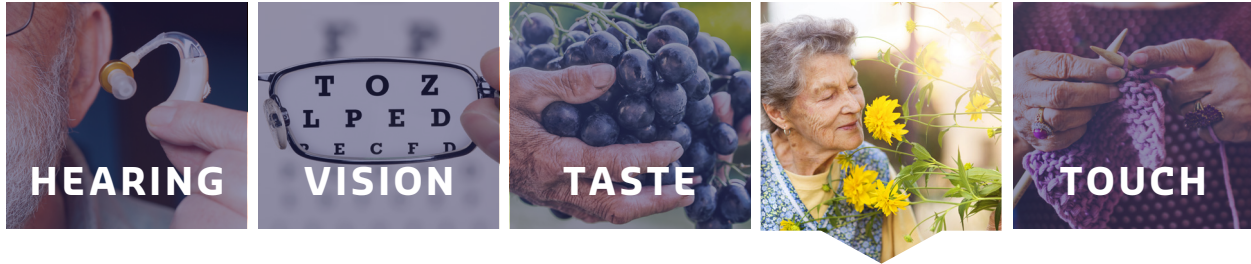
- Involve residents in food preparation activities, which is therapeutic and creates a home-like environment^{50,51}
- Arrange the layout of the kitchen and the food preparation area so that residents can see and smell food as it is prepared⁴⁶
- Treat residents like restaurant customers to enhance meal services¹⁹
- Offer finger foods to agitated residents or residents living with dementia who might be unsettled and cannot sit and eat²⁰
- Arrange food attractively on the plate to help residents see, anticipate and appreciate the different ingredients, colors and textures that make up their meal²⁴



Resident and family engagement

- Encourage relatives to be fully engaged in the dining experience (e.g., ask relatives to switch off their phones in the dining room) as social interaction helps to stimulate appetite²⁴
- Encourage residents' participation in developing the dining experience (e.g., ask residents to help to design the menu)⁴⁵
- Implement a community dining model (e.g., The Greenhouse Model)⁵¹
- Grow therapeutic kitchen gardens which can be a source of food as well as a healing activity⁴⁶
- Respect special celebrations, religious, historical and regional events





SMELL | Facts and Figures



Smell can be influenced by **chronic health conditions** (e.g., diabetes).⁵⁴



Some **medications** can affect the sense of smell in older adults.⁵⁵



PROMISING PRACTICE

Use cooking and baking smells to **stimulate pleasant memories**.⁶⁰



What is important to know about changes in residents' sense of smell?

The sense of smell can decrease with age (a phenomenon known as presbyosmia). This is especially common after the age of 60⁵⁶ and can be caused by the natural process of aging, lifestyle factors (e.g., smoking, medications, exposure to chemicals), or an underlying condition (e.g., allergies).⁵⁶ Diminished sense of smell can reduce the ability to detect certain dangers, such as spoiled food, smoke from a fire, or a gas leak.¹ The sense of smell is also linked to the part of the brain that processes emotions.⁵⁷ Familiar smells can trigger memories, and a poor sense of smell can lead to depression.⁵⁸ Having a reduced sense of smell may also have an impact on personal hygiene, which could affect an individual's social interaction.⁵⁹

What is the impact of changes in sense of smell on residents' experiences in long-term care?

A wide range of factors may contribute to a resident's perception of smell in the long-term care community, including:

- The smell of food preparation which can be comforting or unpleasant⁶⁰
- Unpleasant odors from other residents⁶¹
- Odors from cleaning and laundry products which can be reassuring or unpleasant⁶²
- Having access to outdoor space and fresh air³⁸
- The location of restrooms and bathrooms^{64,65}



What promising practices can long-term care communities adopt?

In long-term care communities, residents, families and visitors often notice how the environment smells and whether they perceive that smell as clean or unpleasant.⁶⁶ Long-term care communities can improve the environment for residents with a diminished sense of smell in many ways, including:



Using scents for therapeutic benefits

- Employ aromatherapy techniques, which can have a calming effect⁶⁷
- Create sensory gardens^{68,69}
- Use cooking and baking smells to stimulate pleasant memories⁶⁰



Managing the physical environment

- Ensure there is adequate ventilation in all areas, including mechanical ventilation if this is required in garbage rooms, hair salons and areas where batteries are charged⁶³
- Consider the location of laundry, storage and waste facilities, so that smells are contained away from areas where residents spend time⁶³
- Ensure the environment is smoke-free^{70,71}
- Manage garbage disposal and storage to ensure that smells do not impact residents or visitors⁶³
- Establish cleaning standards, as well as disinfection and cleaning schedules⁷²



Managing food services

- Create an open serving area so residents can smell food which helps to stimulate the appetite⁷³
- Use therapeutic smells to engage residents by triggering memories⁶⁰

THE FINDINGS: TOUCH



TOUCH | Facts and Figures



The sense of touch is the **earliest sense which develops in the human embryo.**⁷⁴

Tactile sensation **deteriorates beginning around the age of 18**, with humans **losing around 1% of tactile touch each year.**⁷⁵



Having fewer active receptors in the skin results in a slower reaction time to pain, **increasing the risk of injury from burns.**⁵⁴

PROMISING PRACTICE

Offer animal therapy visits.^{97,98}



What is important to know about changes in residents' sense of touch?

The sense of touch comprises the perceptions of pain, temperature, pressure, vibration, and body position.⁷⁶ With age, sensations may diminish. In addition, some conditions that affect the sense of touch, such as Parkinson's⁸⁰ and diabetes,⁸¹ are more prevalent in older adults.

A diminished sense of touch can lead to an increased risk of injury.⁵⁴ For example, a reduced ability to detect vibration and pressure might mean a resident moves around less, which could lead to pressure sores (sometimes referred to as bedsores).⁷⁷ Further, reduced sensitivity to body position (i.e., reduced spatial awareness) may affect mobility and heighten the risk of falls.^{78,79}

The sense of touch not only protects us from dangers but also meets a basic human need: A touch by another person stimulates the secretion of the hormone oxytocin that helps with relaxation and social bonding.⁸²

What is the impact of changes in sense of touch on residents' experiences in long-term care?

Some factors in the long-term care environment that are related to a resident's sense of touch include:

- The amount of physical contact a resident receives, which can enhance his or her well-being⁸²
- Compassion from care providers, which can be demonstrated through touch and has shown to have positive outcomes for residents and staff⁸³
- Loneliness and depression among residents, which can reduce the opportunities for human physical contact⁸⁴
- Restraint practices used in certain circumstances by care providers, which may involve touch that is unwanted by residents⁸⁵



What promising practices can long-term care communities adopt?

How a person feels about touch is highly individual. Touch can be perceived as threatening or as a kind gesture. Perceptions can be affected by a resident's physical health or level of confusion. The following practices can help residents living in long-term care communities with a diminishing sense of touch (pain, temperature, pressure, vibration, and body position):



Meeting the personal and physical needs of patients

- Conduct regular 'head-to-toe' assessments to check for injuries and changes which may need attention or treatment (especially hands and feet)^{86,87}
- Minimize restraint practices to reduce/avoid the risk of injury⁸⁸
- Ensure call bells are accessible to residents at all times and answered promptly^{89,90}
- Meet residents' needs for intimacy and sexual expression^{38,92}



Implementing factors in the physical environment

- Ensure temperatures in common areas are appropriate to the time of year^{92,93}
- Ensure residents' private rooms and bathrooms have individually controlled heating and cooling units^{92,93}
- Offer access to outdoor areas which provide shelter from the weather⁹⁴
- Use sensory approaches⁹⁵ such as fidget blankets, with residents to reduce the use of medication in agitation⁹⁶
- Offer animal therapy visits^{97,98}

FIDGET BLANKETS

A fidget blanket⁹⁶ is a lap-sized blanket which has a variety of objects attached to it. An older person can 'fidget' with the different objects attached to the blanket, alleviating boredom and helping to keep them occupied. This can reduce levels of agitation without medication.

Features you would normally find on a fidget blanket include textured fabrics such as fur, corduroy and suede as well as features like buttons, zips, pockets, buckles, beads, key rings and other common household items that can be attached and that have different textures for tactile stimulation.

Fidget blankets can be used in different settings, such as in one-to-one interactions with a care provider or a family member, or as part of a more structured activity such as reminiscence therapy.

CONCLUSION

A five-senses approach in long-term care communities

In this guide, we have provided information important to long-term care communities about sensory changes and impairment in residents, and their impact on residents' experiences and quality of life. We have also highlighted promising practices that can help.

Emerging research in this field has demonstrated that improving environmental sense-sensitivity can lead to better outcomes.⁹⁹⁻¹⁰³ Opportunities exist for long-term care communities to incorporate best practices to mitigate the effect that sensory impairment can have on residents and their families. Our proposed 'five-senses approach' is aimed at helping long-term care communities become more aware of sensory impairments and the impact they can have on residents.

Our goal is to help long-term care communities conduct regular audits of their sensitivity to the senses so they can continually improve the quality of life of residents and their families. We encourage all communities to use the information contained in this guide to progress — and to offer feedback to the members of the research team about implementation of the recommendations.

Sensory loss in long-term care residents can be devastating for their quality of life. This is even more important when, in addition to sensory loss, many residents live with cognitive loss such as dementia. We still do not fully understand the impact of these accumulated multiple health challenges and would encourage long-term care communities to share their experiences. To ensure an individualized care plan, care providers must conduct a more formal evaluation of each individual's sensory abilities and losses. While challenging, best practice guidelines and further research can be developed to help care providers minimize the impact of specific sensory losses. With the help of innovative technologies, better practices in long-term care communities and better architectural and physical designs, residents can continue to use their senses to stay safe, engage in meaningful activity and live their lives to the fullest.

Alzheimer's dementia: Progressive mental deterioration that can occur in middle or old age, due to generalized degeneration of the brain

Decibels (dB): A unit used to measure the intensity of a sound

Dementia: A general term for a decline in mental ability which interferes with a person's usual functioning. Memory loss is an example. Alzheimer's is the most common type of dementia.

Diabetes: A disease in which too little or no insulin is produced or insulin is produced but cannot be used normally resulting in high levels of sugar in the blood

Disabling hearing loss: Hearing loss greater than 40 dB in the better hearing ear in adults (15 years and older)

Care provider: The person or the organization that is paid to deliver care and other services to residents

Cataracts: A medical condition in which the lens of the eye becomes progressively opaque, resulting in blurred vision

Glaucoma: A condition of increased pressure within the eyeball, causing gradual loss of vision

Long-term care communities: A general term that is defined as a domestic environment that provides any level of care (e.g., independent living, assisted living, skilled nursing care), where services may be organized (e.g., housing, food) or functional support and care may be provided

Macular degeneration: A degenerative condition affecting the central part of the retina

Older people: Generally considered to be an individual that is 65 years and over

Olfactory: Relating to the sense of smell

Parkinson's: A chronic progressive neurological disease seen mainly in later life that is linked to decreased dopamine production and is marked especially by tremor of resting muscles, rigidity, slowness of movement, impaired balance and a shuffling gait

Pressure sores: Areas of damaged skin caused by staying in one position for too long

Presbycusis: Age-related hearing loss

Retinopathy: Damage to the blood vessels in the light-sensitive tissue called the retina that lines the back of the eye

Tactile: Relating to the sense of touch

The Greenhouse Model: Smaller houses for 6–12 residents where care is provided by consistent, self-directed team of staff who are responsible for all aspects of daily living including personal care-related and domestic tasks (www.thegreenhouseproject.org)

HEARING:

1. American Speech-Language-Hearing Association (ASHA): <http://www.asha.org/>
2. National Institute on Deafness and Other Communication Disorders: <https://www.nidcd.nih.gov/>
3. Canadian Association for the Deaf: www.cad.ca
4. National Association for the Deaf: www.nad.org
5. The Canadian Hearing Society: www.chs.ca
6. Action on Hearing Loss: www.actiononhearingloss.org.uk
7. American Hearing Research Foundation: <http://american-hearing.org/disorders/>
8. Hearing Loss Association of America: <http://www.hearingloss.org>
9. SayWhatClub — A Worldwide Forum for People with Hearing Loss:
<http://www.saywhatclub.com>
10. American Tinnitus Association: <https://www.ata.org>
11. Better Hearing Institute: <http://www.betterhearing.org>
12. Association of Late-Deafened Adults: <https://www.alda.org>
13. Coalition for Global Hearing Health: <http://coalitionforglobalhearinghealth.org>
14. Starkey Hearing Foundation: <https://www.starkeyhearingfoundation.org>
15. AUDIENT— An Alliance for Accessible Hearing Care:
<http://www.audientalliance.org/patient.php>

VISION:

1. Royal National Institute of Blind People: www.rnib.org.uk
2. National Eye Institute: <https://nei.nih.gov/>
3. Macular Degeneration Partnership & Age-related Macular Degeneration: www.amd.org
4. National Federation of the Blind: www.nfb.org
5. Eye Complications — American Diabetes Association: www.diabetes.org › Living With Diabetes › Complications › Eye Complications
6. Glaucoma Research Foundation: <http://www.glaucoma.org>
7. Foundation Fighting Blindness: <http://www.blindness.org/resources-and-support>

TASTE:

1. Loss of Taste in the Elderly:
<https://www.agingcare.com/articles/loss-of-taste-in-the-elderly-135240.htm>
2. National Institute of Aging, Smell and Taste — Spice of Life: <https://www.nia.nih.gov/>
3. Loss of taste and smell — Natural with aging?: <http://www.mayoclinic.org/healthy-lifestyle/healthy-aging/expert-answers/loss-of-taste-and-smell/faq-20058455>
4. Fifth Sense: <http://www.fifthsense.org.uk/whoweare/>

SMELL:

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2. The American Rhinologic Society: http://care.american-rhinologic.org/disorders_of_smell_taste
3. Food Safety — A guide for Ontario's foodhandlers: www.health.gov.on.ca/en/pro/programs/publichealth/enviro/.../training_manual.pdf

TOUCH:

1. Keeping in touch with older people: <http://www.springwell.com/resource/tips-for-staying-close-from-far-away>
2. Ideas for therapeutic garden design: https://www.alzheimers.org.uk/info/20082/living_with_dementia_magazine/474/activity_ideas_for_a_person_with_dementia_in_gardens_and_using_plants_and_flowers
3. Sensory stimulation: <http://seniorcarecorner.com/sensory-stimulation-seniors-dementia-4148>

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