

Episode 55 – Aging and Oral Health February 25, 2022

Demographics
Globally, the number and proportion of individuals aged 60 years and older is increasing. In 2019, there were 1 billion individuals 60 years and older and this number is predicted to increase to 1.4 billion by 2030 and 2.1 billion by 2050. [1]

Canadian statistics
In 2021, there were more than 7 million adults aged 65+ (18.5% of the population), with 12,822 being centenarians (80% female). By 2030, the number of individuals 65+ is expected to grow to >9.5 million (23%) and reach ~25% of the overall population by 2040. The oldest group of adults, age 80+ years, is rapidly increasing and represents a growing share of the senior population. [2] [3] [4] [5]

There has been a dramatic demographic population shift since the 1950s as a result of:
- Less children being born (~2 children born per female in 2016, ~4 in 1959);
- Declining mortality rates;
- Increase in life expectancy; and
- Baby boomers aging (born between 1946-1965). [5]

The proportion of older adults is continually increasing whereas that of children is decreasing. As a result, the proportion of older adults (17%) now exceeds the proportion of children <15 years old (16%) and could reach 23% in 2031. [5]

Average life expectancy has increased over time. For example, the average life expectancy was 79 years in 2000 and 82 years in 2020. The average life expectancy is predicted to increase to 84 years in 2030 and 86 years in 2050. Conceivably, the average 65-year-old can expect to live an additional 21 years (~19 years for men; ~22 years for women). [5] [6]

More older adults are working past the age of 65. In 2015, approximately 20% of older adults were employed (26% men; 15% women), the highest proportion since 1981. Those with a university degree, without private retirement income, or living in rural areas were more likely to work than other older adults. [5]

Most older adults (92%) live in private dwellings in the community. About 8% live in residential care facilities (e.g., senior residences, healthcare facilities). Almost one-third (28%) living in independent dwellings reported living alone, with more than half being female. [5]

Disclaimer: This document is educational and not intended to provide clinical advice nor should it be used as a replacement for professional dental or medical advice. Dental hygienists are encouraged to consult with CDHO practice advisors and refer to CDHO guidelines. Dental hygienists are responsible for the decisions they make and for the consequences associated with those decisions. © ODHA

Chronic diseases among older adults

The risk of developing chronic diseases and having multiple chronic conditions rises with age. Considering the Canadian population is aging along with advances in the diagnosis and management of diseases, more Canadian older adults will likely live with multiple chronic diseases for a longer time. In 2021, ~6.3 million Canadian adults aged 65+ were living with a chronic condition. [5]

Prevalence of the most 10 common chronic diseases and conditions among Canadians aged 65+ years include:

- Hypertension (66%)
- Moderate to severe periodontal disease (52%)
- Osteoarthritis (38%)
- Ischemic heart disease (27%)
- Diabetes (27%)
- Osteoporosis[1] (25%)
- Cancer (21%)
- Chronic obstructive pulmonary disease [COPD] (20%)
- Asthma (11%)
- Mood and anxiety disorders (10%) [5] [7]

Other chronic conditions commonly reported by adults 65+ include:

- High blood cholesterol
- Back problems
- Cataracts
- Urinary incontinence
- Sleep apnea [8]

Diseases with the highest prevalence among Canadians aged 85+ include:

- Hypertension (83%)
- Osteoarthritis (54%)
- Ischemic heart disease (42%)
- Osteoporosis (37%)
- COPD (27%) [5]

Multimorbidity

Approximately, 73% of individuals aged 65+ years have at least 1 of the 10 common chronic diseases. Approximately 37% reported having at least 2 of the 10 common chronic diseases, with almost half of those aged 85+ reported multimorbidity (i.e., co-occurrence of 2 or more diseases). [5] [7]

Multimorbidity is associated with diminished quality of life, increased use of healthcare resources, institutionalization, adverse health effects, disability, and premature death. It can also cause additional difficulties, such as chronic pain and multiple medication use

[1] Refer to Episodes 41 & 42 for additional information on osteoporosis.

Disclaimer: This document is educational and not intended to provide clinical advice nor should it be used as a replacement for professional dental or medical advice. Dental hygienists are encouraged to consult with CDHO practice advisors and refer to CDHO guidelines. Dental hygienists are responsible for the decisions they make and for the consequences associated with those decisions. © ODHA

(polypharmacy), which has been linked to an increased risk of inappropriate drug use and adverse drug events. [5] [7]

However, in 2017-2018 almost half of Canadian older adults (46% male; 48% female) viewed their health as very good or excellent, and over two-thirds (72%) reported their mental health as very good or excellent, despite many were living with chronic diseases. This paradox reflects individual perception of personal health status is influenced by factors other than the absence of disease (e.g., economic security, social connectedness, life satisfaction, psychological well-being). Thus, some older adults may report good levels of health, even though living with chronic diseases. [5]

Process of aging

Aging is the irreversibly progressive decline of physiological function. At the biological level, aging results from the accumulation of a broad variety of molecular and cellular damage over time. This leads to a gradual decrease in physical and mental capacity, a growing risk of disease, and eventually death. These changes are neither linear nor consistent, and are only roughly associated with an individual's chronological age.

Several lifestyle factors such as physical inactivity, poor nutrition, tobacco use, high alcohol consumption, poor sleep quality, high body mass index, and psychological stress influence the aging process and are risk factors for many chronic diseases.

Broader societal factors (i.e., social determinants of health) also influence health. Social determinants of health (e.g., early childhood experiences, educational attainment, employment status, income) influence health, life expectancy, and health outcomes. For example, individuals with lower education or income, or lower-status occupations are more likely to have poorer health outcomes than those who are more socially advantaged. Older adults with low social support, a lack of social networks, low levels of social engagement, and are socially isolated are less likely to be in good health. The diversity seen in older age is also associated with other life transitions (e.g., retirement, relocation to alternate housing, death of friends and partners). [5] [9] [10]

Age-related physiologic changes include changes to cellular homeostasis (e.g., regulation of body temperature and blood and extracellular fluid volumes), decreases in organ mass, and deterioration in or loss of body system functional reserves. Central nervous, cardiovascular, respiratory, renal, and immune systems[2] may exhibit decreased function (e.g., decreases in sympathetic response, cardiac output, lung capacity, glomerular filtration, cell-mediated immunity). Changes to the gastrointestinal system include decreases in gastric motility and intestinal blood flow and increased gastric pH. These changes may affect medication absorption and metabolism or an individual's sensitivity to certain medications. [11]

[2] Refer to Episodes 44 & 45 for additional information on the immune system.

Disclaimer: This document is educational and not intended to provide clinical advice nor should it be used as a replacement for professional dental or medical advice. Dental hygienists are encouraged to consult with CDHO practice advisors and refer to CDHO guidelines. Dental hygienists are responsible for the decisions they make and for the consequences associated with those decisions. © ODHA

Normal physiologic changes with aging [12]

System	Change with age	
	Decreased	**Increased**
Central nervous system	Neural density Reflexes Sympathetic response	
Cardiovascular system	Cardiac output Baroreceptor activity	Total peripheral resistance
Respiratory system	Lung capacity Tidal volume Vital capacity	Residual volume
Gastrointestinal system	Gastric emptying Gastrointestinal motility Intestinal blood flow	Gastric pH
Renal system	Renal blood flow Glomerular filtration Tubular secretion	
Immune system	White blood cells Cell-mediated immunity Neurohumoral response	

Age-related conditions & pathologies

Common conditions associated with aging include hearing loss, decrease in visual acuity (e.g., due to cataracts, age-related macular degeneration, presbyopia, glaucoma, diabetic retinopathy), decline in muscle mass and strength (sarcopenia), and immunosenescence.[3]

Age-related pathologies include hypertension, cardiovascular disease (CVD),[4] osteoarthritis, COPD, diabetes, osteoporosis, dementia (e.g., Alzheimer's disease), Parkinson's disease, and cancer. As individuals age, they are more likely to experience several conditions at the same time.

Older age is also characterized by the emergence of several complex health states commonly called geriatric syndromes. Normal age-related changes and accumulated pathology contribute to functional changes seen with aging. The term geriatric syndrome is used to capture those clinical conditions in older adults that do not fit into discrete disease categories. They are believed to develop when an individual experiences accumulated impairments in multiple systems that compromise their

[3] Immunosenescence is a process of immune dysfunction that occurs with older age leading to changes in the immune function and a progressive reduction in the ability to trigger effective antibody and cellular responses against infections and vaccinations. [44]

[4] Refer to Episode 37 for information on cardiovascular diseases.

Disclaimer: This document is educational and not intended to provide clinical advice nor should it be used as a replacement for professional dental or medical advice. Dental hygienists are encouraged to consult with CDHO practice advisors and refer to CDHO guidelines. Dental hygienists are responsible for the decisions they make and for the consequences associated with those decisions. © ODHA

compensatory ability. Geriatric syndromes include frailty, urinary incontinence,[5] falls,[6] delirium,[7] dizziness, syncope, functional decline, and pressure ulcers. Geriatric syndromes share many common features. For example, they are highly prevalent in older adults, especially the frail elderly and they significantly impact quality of life. [9] [13] [14]

Frailty syndrome

Frailty is an aging-related syndrome of physiological decline in reserve and function. It is characterized by increased vulnerability to adverse outcomes, such as disability, falls,[8] institutionalization (e.g., hospitalization, long-term care), and death. Frail older adults often experience a variety of symptoms including muscle loss, weakness, fatigue, slowed walking speed, low activity level, decreased grip strength, reduced tolerance to medical and surgical interventions, and poor response to, and recovery from (even mild) stress. Awareness of frailty and associated risks for adverse health outcomes can improve care for this vulnerable population. [15] [16] [17] [18]

The 'Clinical Frailty Scale' may be used to summarize the overall level of fitness or frailty of an older adult after evaluation by an experienced clinician. It is used to screen for and roughly quantify an individual's overall health status. [19]

Clinical Frailty Scale [20]

Level	Category	Description
1	Very fit	Robust, active, energetic, motivated Regularly exercises, among fittest for their age
2	Fit	No active disease symptoms Less fit than the first category Often exercises or occasionally very active (e.g., seasonally)
3	Managing well	Well controlled medical problems Often not regularly active beyond routine walking
4	Living with very mild frailty	Not dependent on others for daily help but symptoms may limit activities Common complaint of being slowed up and/or tired during the day Marks transition from complete independence
5	Living with mild frailty	More evident slowing; need help with some activities of daily living (e.g., finances, heavy housework, transportation) Progressive impairment with ability to e.g., shop, walk outside alone, prepare meals, do light housework
6	Living with moderate frailty	Need help with all outside activities & keeping house

[5] Urinary incontinence (lack of bladder control) can lead to problems such as falls, depression, and isolation. In most cases, incontinence can be cured or greatly improved with treatment.

[6] Falls are a leading cause of serious injury in older adults. Risk factors for falling include safety hazards in the home, medication side effects, walking and vision problems, dizziness, arthritis, weakness, and malnutrition. Similar to other geriatric syndromes, falls usually have more than 1 cause.

[7] Delirium is characterized by inattention, disorganized thinking and altered level of consciousness. Onset is acute with changes occurring over hours or days. Delirium usually resolves within days or weeks. It is often unrecognized and can be misdiagnosed as dementia.
Refer to Episode 29 for additional information on delirium.

[8] Refer to Episode 41 for additional information on falls.

Disclaimer: This document is educational and not intended to provide clinical advice nor should it be used as a replacement for professional dental or medical advice. Dental hygienists are encouraged to consult with CDHO practice advisors and refer to CDHO guidelines. Dental hygienists are responsible for the decisions they make and for the consequences associated with those decisions. © ODHA

Level	Category	Description
		Possibly problems with stair climbing, may need help with bathing & dressing
7	Living with severe frailty	Completely dependent for personal care due to physical or cognitive reasons Stable, not at high risk of dying within 6 months
8	Living with very severe frailty	Completely dependent for personal care Approaching end of life Probably would not recover from minor illness
9	Terminally ill	Approaching end of life Also applies to individuals with life expectancy <6 months who are not living with severe frailty

Dementia[9]

Dementia is an umbrella term that describes a set of symptoms affecting brain function. It is usually considered as 3 stages: mild (early), moderate (middle), and severe (late). Stages refer to how far an individual's dementia or Alzheimer's disease has progressed. Dementia is usually progressive and occurs at different rates. Defining the stage helps determine best treatments and aids communication between healthcare professionals and caregivers. [21]

Stages of dementia [21] [22]

Stage	Common signs & symptoms
Mild (early)	May be able to function independently Short-term memory lapses (e.g., forgetting recent event details but still recalls the event) Repeating the same question or story Personality changes (e.g., anger, depression) Forgetfulness (e.g., misplacing things) Difficulty with complex tasks or problem solving Struggling to express ideas or emotions
Moderate (middle)	Needs assistance with personal care (e.g., dressing, bathing) Recent memory is very impaired with memory loss reaching further into the past Poor judgment Increasing confusion and frustration Significant personality changes
Severe (late)	Requires full-time assistance for personal care Inability to maintain bodily functions (e.g., walking, swallowing & bladder control) Inability to communicate Increased risk for infections

[9] Refer to Episode 29 for additional information on dementia.

Disclaimer: This document is educational and not intended to provide clinical advice nor should it be used as a replacement for professional dental or medical advice. Dental hygienists are encouraged to consult with CDHO practice advisors and refer to CDHO guidelines. Dental hygienists are responsible for the decisions they make and for the consequences associated with those decisions. © ODHA

Dementia and oral health[10]
Individuals with dementia often experience:

- Higher prevalence of coronal and root caries, periodontal disease, and presence of root remnants
- Increased tooth loss and untreated caries
- Poor oral and denture hygiene [23]

Increased risk for developing caries and poor oral health in people with dementia is associated with:

- Inability to accurately perform oral hygiene
- Increased dependency on others for daily oral care
- Decreased use of professional oral health services
- Increased compliance problems in the final stages of dementia
- Shift in dietary intake towards more sweet foodstuffs
- Decreased salivary flow due to medications use [23]

Polypharmacy
Polypharmacy, often defined as regular use of at least 5 medications, is common in older adults and increases the risk of inappropriate drug use, medication errors, and adverse drug interactions, drug reactions, and medical outcomes. [11] [12] [24]

Polypharmacy is independently associated with having multiple chronic conditions. Older adults with 2 or more chronic diseases are about 3 times more likely to report multiple medication use than those with none or 1 chronic disease. In 2016, Canadian older adults were prescribed an average of 7 different drug classes yearly. [5]

The average older adult takes 4 or 5 prescription drugs and 2 or 3 over-the-counter (OTC) medications. The most commonly used classes of OTC medications include analgesics, laxatives, vitamins, and minerals. [12]

Herbal supplements are also used by older adults and pose serious risk when combined with prescription medications. For instance, many herbal preparations (e.g., ginkgo, ginseng, garlic, ginger) have anti-platelet and anticoagulation properties and may potentiate the effects of other anticoagulation drugs (e.g., warfarin). Synergistic interactions may also occur between herbal medications and other anti-platelet drugs (e.g., ASA, nonsteroidal anti-inflammatory drugs [NSAIDs]). These factors stress the importance of regularly reviewing client medical history and medications, including prescribed, self-prescribed, and OTC medications, supplements, and herbal products and advising clients accordingly. [12]

Polypharmacy risk factors
Risk factors for polypharmacy include:

- Older age
- Cognitive impairment
- Developmental disability

[10] Refer to Episode 29 for additional information on dementia and oral health.

Disclaimer: This document is educational and not intended to provide clinical advice nor should it be used as a replacement for professional dental or medical advice. Dental hygienists are encouraged to consult with CDHO practice advisors and refer to CDHO guidelines. Dental hygienists are responsible for the decisions they make and for the consequences associated with those decisions. © ODHA

- Frailty
- Mental health conditions
- Multiple chronic conditions (e.g., pain, diabetes, cancer, CVD)
- Residing in long-term care facilities (frailty, multiple morbidities, and cognitive impairment may warrant pharmacologic treatment)
- Lack of a primary care provider
- Multiple healthcare providers
- Utilizing multiple pharmacies
- Stepwise medication additions to manage chronic diseases[11] (e.g., type 2 diabetes, hypertension, asthma)
- Poor medical record keeping
- Use of automated prescription refill systems [12] [24]

Top 10 drug classes prescribed to older adults [25]

Drug class	Common uses	Rate of use				
		Female	Male	Age 65-74	Age 75-84	Age 85+
Statins	High cholesterol	42%	56%	47%	53%	42%
Proton pump inhibitors	Gastroesophageal reflux disease, peptic ulcer disease	34%	29%	28%	35%	39%
Angiotensin-converting enzyme (ACE) inhibitors, excluding combinations	High blood pressure, heart failure	21%	29%	22%	27%	27%
Beta-blocking agents, selective	High blood pressure, heart failure, angina	21%	26%	19%	28%	32%
Dihydropyridine calcium channel blockers	High blood pressure	22%	21%	18%	25%	30%
Thyroid hormones	Hypothyroidism	26%	11%	16%	21%	27%
Angiotensin II antagonists, excluding combinations	High blood pressure, heart failure	17%	14%	14%	18%	18%
Natural opium alkaloids	Management of moderate to severe pain	15%	15%	14%	15%	18%
Biguanides	Diabetes	12%	18%	15%	16%	11%
Benzodiazepine derivatives	Agitation, anxiety, insomnia, seizures	16%	9%	11%	14%	17%

[11] A stepwise approach to pharmacologic therapy, in which the dose and number of medications and frequency of administration are increased as necessary (step-up therapy) and decreased (step-down therapy), when possible, is used to achieve and maintain control of a chronic medical condition. Step-down therapy is used to identify the minimum medication necessary to maintain control.

Disclaimer: This document is educational and not intended to provide clinical advice nor should it be used as a replacement for professional dental or medical advice. Dental hygienists are encouraged to consult with CDHO practice advisors and refer to CDHO guidelines. Dental hygienists are responsible for the decisions they make and for the consequences associated with those decisions. © ODHA

Cannabis use

In Canada, cannabis became legal to produce, distribute, purchase, and use non-medicinally for adults on October 17, 2018. Recent research by Health Canada demonstrated Canadians aged 65+ were less likely to consume cannabis than younger age groups. However, cannabis consumption among older adults accelerated at a faster pace than other age groups. For example, in 2012, less than 1% of older adults (~40,000) reported using cannabis, contrasting with estimates from 2019 indicating >400,000 older adults had used cannabis in the past 3 months. Although, older adults were less likely to use cannabis on a daily or almost daily basis. [26]

Older adults were more likely to use cannabis for medical reasons with 52% of older adults reporting using cannabis exclusively for medical reasons. The remaining adults were split between non-medical only (24%) and both medical and non-medical reasons (24%). [26]

Older adults (41%) were more likely to have purchased their cannabis exclusively from a legal source compared with about one-quarter of younger consumers (23% to 29%, depending on age). [26]

Tumati et al. (2021) examined surveys conducted by a commercial medical cannabis provider from 2014 to 2020, and found a gradual increase in the proportion of older adults aged 65+ who used medical cannabis (18% in 2017 to 31% in 2019). A majority of participants (68%) used cannabis to relieve pain, which was more common in women. A majority (84%) also preferred cannabidiol (CBD) oils over tetrahydrocannabinol (THC). The use of CBD-containing cannabis oils also increased over the study duration (i.e., a shift away from herbal cannabis).

More than 40% of opioid users stated their opioid doses had “mildly” or “significantly” decreased. A majority of participants reported improvement in pain, mood, and sleep after medical cannabis use. Though 15% to 20% also reported no improvement or worsening of these factors. [27]

Despite potential benefits, concerns remain regarding safety of cannabis use and possible harms in older adults such as:

- Reported increase use of opioid medications after cannabis use
- Adverse effects of medical cannabis (e.g., drowsiness, dizziness) increasing risk of falls, injury, and impaired driving
- Improved risk perception associated with cannabis may lead to higher dose use and, consequently, to higher rates of adverse effects
- Stopping cannabis use can be associated with poor sleep and anxiety, prompting continued usage and dependency
- Concentration and memory problems
- Anxiety, panic, and elevated heart rate
- Nausea and vomiting
- Paranoia and psychosis [27] [28]

Disclaimer: This document is educational and not intended to provide clinical advice nor should it be used as a replacement for professional dental or medical advice. Dental hygienists are encouraged to consult with CDHO practice advisors and refer to CDHO guidelines. Dental hygienists are responsible for the decisions they make and for the consequences associated with those decisions. © ODHA

Also, cannabis effects may differ in older adults due to altered metabolism, comorbidities, and use of concurrent medications. These findings highlight the need for high-quality research to determine safe cannabis use among older adults and the importance of asking clients about their cannabis use. [27] [28] [29]

Oral health characteristics

Data from the Canadian Health Survey on Seniors (2020) remain fairly constant suggesting people who are healthy at 65 may have the opportunity to remain healthy throughout. [30]

Oral health characteristics, 2020 Canadian Health Survey on Seniors [30]

	Age group			
Indicators	**65-74 years**	**75-84 years**	**≥85 years**	**≥65 years (total)**
Reported mouth health (e.g., teeth or dentures, tongue, gums, lips & jaw joints) as very good or excellent	60.2%	60.5%	53.8%	59.6%
Reported mouth health (e.g., teeth or dentures, tongue, gums, lips & jaw joints) as fair or poor	9.4%	9.4%	9.3%	9.4%
Able to brush teeth or dentures without help	99.1%	99.1%	98.0%	99.0%

Oral health and aging

Physiologic changes occur in the oral cavity as individuals age and are considered a normal part of the aging process. Thinning of the oral mucosa, loss of masticatory muscle mass, tooth wear and loss of enamel, tooth discolouration, and limited attachment loss are some examples of physiologic oral aging. [11]

Pathologic oral conditions associated with aging include xerostomia, root and coronal caries, periodontitis, tooth loss, and oral cancer. [11]

Older adults often face barriers accessing oral health care and treatment in part because they lose their dental insurance coverage upon retirement and are less likely to have consulted an oral health professional in the last 12 months. [5]

Xerostomia

A decrease in salivary flow (hyposalivation), leading to a complaint of dry mouth (xerostomia), is common in older individuals. Salivary dysfunction and xerostomia are not a normal part of aging. The production of saliva[12] and its composition are largely age independent in healthy people. Complaints of dry mouth and findings of salivary hypofunction in older adults should not be attributed to their age and an appropriate diagnosis is warranted. [31] [32]

[12] Refer to Episode 14 for additional information on saliva.

Disclaimer: This document is educational and not intended to provide clinical advice nor should it be used as a replacement for professional dental or medical advice. Dental hygienists are encouraged to consult with CDHO practice advisors and refer to CDHO guidelines. Dental hygienists are responsible for the decisions they make and for the consequences associated with those decisions. © ODHA

It is estimated xerostomia affects 30% of individuals older than 65 years and up to 40% in those older than 80 years. [11]

Xerostomia in older age is mainly caused by medications, systemic diseases, head and neck radiotherapy, and chemotherapy. It also reflects reduced functional reserve. Xerostomia is also associated with smoking, mouth breathing, dehydration, emotional stress, local surgery, salivary gland diseases, and mechanical blockage. [31] [33]

Medications (prescription and non-prescription) are the most common cause of xerostomia in older adults. It has been reported 80% of the most commonly prescribed medications cause xerostomia, with more than 400 medications associated with salivary gland dysfunction as an adverse side effect. General drug classes that are strongly associated with xerostomia include antidepressants, antipsychotics, antihypertensives, antihistamines, and anticholinergics (e.g., for urinary incontinence). [31] [32] [34]

Systemic diseases associated with xerostomia include Sjögren's syndrome, HIV/AIDS, Alzheimer's disease, Parkinson's disease, hepatitis C, and poorly controlled diabetes. [11] [35]

Effects of xerostomia

Xerostomia can produce serious negative effects on an individual's health, dietary intake, and quality of life. Effects of salivary hypofunction include:

- Susceptibility to dental caries, periodontal disease, and tooth loss
- Increase risk of oral infection, including candidiasis
- Dry lips and mouth
- Dysgeusia (altered sense of taste)
- Dysphagia (difficulty swallowing)
- Halitosis
- Mastication problems
- Chronic burning sensation
- Intolerance of spicy foods
- Difficulties wearing dentures (e.g., tolerance, retention, denture sores)
- Speech difficulty
- Sleeping difficulty
- Traumatic oral lesions [31] [32]

Management of xerostomia

Xerostomia management depends on the etiology. Establishing a diagnosis is important (if possible). Diagnosis frequently involves multidisciplinary consultation because many older adults have concomitant medical problems and polypharmaceutical complications. Goals of managing xerostomia include relieving discomfort and preventing complications (e.g., dental caries, periodontal infections). [11] [36]

Recommendations for individuals with xerostomia may include:

- Drinking or sipping water throughout the day
- Sucking on ice chips

Disclaimer: This document is educational and not intended to provide clinical advice nor should it be used as a replacement for professional dental or medical advice. Dental hygienists are encouraged to consult with CDHO practice advisors and refer to CDHO guidelines. Dental hygienists are responsible for the decisions they make and for the consequences associated with those decisions. © ODHA

- Limiting alcoholic beverages and beverages high in sugar or caffeine, such as juices, sodas, teas or coffee (especially sweetened).
- Smoking cessation
- OTC commercial saliva substitutes, moisturizers, and lubricants
- Sugarless gums, mints, lozenges to help stimulate saliva flow (e.g., xylitol-sweetened)
- Using lip lubricants frequently
- Low sugar diet to help prevent dental caries
- Daily use of fluoridated dentifrice (e.g., high-fluoride toothpaste)
- Nighttime use of bedside humidifiers
- Frequent recare examinations and regular dental hygiene appointments
- Thorough denture hygiene (e.g., brushing) and removal of dentures to sleep
- Topical fluoride applications (e.g., fluoride varnish)
- Use of self-adhering xylitol discs
- Drug substitutions if similar drugs are available with fewer xerostomic side effects [31] [32] [33] [36]

Root caries

Older adults are at great risk for root caries because of increased comorbidities and use of xerostomic medications, dietary habits, exposed root surfaces through gingival recession, and the presence of removable and fixed appliances. Canadian older adults aged 60-79 years in a national representative sample had more untreated root caries (11%) compared to younger age groups (4% for 20-39 years; 8% for 40-59 years). [5]

Preventive strategies to reduce risk of root caries may include:

- Use of topical fluoride (e.g., daily mouth rinses, high fluoride toothpaste, regular fluoride varnish application)
- Power toothbrushes
- Reduced sugar intake
- Utilization of glass ionomer restorations
- Use of topical chlorhexidine varnish
- Use of silver diamine fluoride (SDF) to arrest caries
- Increased recare visits based on risk level [11] [37] [38]

Periodontitis

Periodontal diseases and their sequelae are highly prevalent among older adults. It is estimated 70% of adults 65+ years have periodontal disease and over half (52%) of adults aged 65-79 have moderate-to-severe periodontal disease. [5] [39]

Tooth loss

Research indicates adults aged 60-79 have a greater mean number of missing teeth (6, on average), 42% had fewer than 21 remaining teeth, and were more likely to be edentulous (22%) than adults aged 40-59 (2 missing teeth on average; 4% complete edentulism). [5]

Disclaimer: This document is educational and not intended to provide clinical advice nor should it be used as a replacement for professional dental or medical advice. Dental hygienists are encouraged to consult with CDHO practice advisors and refer to CDHO guidelines. Dental hygienists are responsible for the decisions they make and for the consequences associated with those decisions. © ODHA

Studies indicate an increase number of older adults are retaining more of their teeth beyond age 65 years. Surveys found less than 1 in every 5 older adults (19%) were edentulous in 2011-2012 compared with nearly 30% in 1988-1994. Although the prevalence of edentulism is projected to decrease further in future, persistent sociodemographic disparities in tooth loss are expected. The decreasing prevalence of edentulism reflects preventive oral care advancements and shifts in perceptions around aging. [40]

Oral cancer[13]
Oral cancer can occur at any age. Individuals over the age of 45 are at higher risk and those over the age of 60 have the highest incidence of oral cancer. [41]

A number of factors are associated with an increased risk of oral cancer including:
- Increased age
- Tobacco and alcohol use, especially combined use
- Smokeless tobacco use, including snuff and chewing tobacco
- Betel quid, areca nut, and paan use
- Immunosuppression
- Human papilloma virus (HPV) infection with high-risk types[14]
- Cannabis smoking
- Exposure to environmental tobacco smoke
- Low fruit and vegetable intake [42]
- Periodontitis[15] [43]

Oral cancer screening for all clients should be an integral part of an oral health clinician's routine, including review of client medical history and risk factors. Clinicians should also educate clients on how to perform oral cancer self-examinations and reduce risk factors (e.g., smoking cessation, limit alcohol use, etc.). Early diagnosis of oral cancer through screening and early detection is vital since survival is much better when the lesion is diagnosed at an early stage. [42]

Oral selfcare & manual dexterity
Individualized preventive plans to reduce the burden of oral disease should also include an evaluation of older adults' manual dexterity and their ability to perform adequate home care. Older adults who experience difficulties in performing oral selfcare may benefit from the use of:
- Power toothbrushes
- Flossing devices
- Oral irrigators
- Interdental brushes
- Manual toothbrushes with modified handles (e.g., with a Velcro strap, tennis ball, or bicycle handle grip to assist with toothbrush holding)

[13] Refer to Episode 53 for additional information on oral cancer.
[14] Refer to Episode 7 & 53 for information on HPV and oral cancer.
[15] Refer to Episode 9 for information on oral cancer and periodontal disease.

Disclaimer: This document is educational and not intended to provide clinical advice nor should it be used as a replacement for professional dental or medical advice. Dental hygienists are encouraged to consult with CDHO practice advisors and refer to CDHO guidelines. Dental hygienists are responsible for the decisions they make and for the consequences associated with those decisions. © ODHA

- Antimicrobial mouthrinses may also be useful to complement their plaque control measures [40]

Take home messages

- Older adults' life expectancy is increasing and Canadians are living longer.
- As a result of aging populations, oral health professionals will be caring for more older adults. These adults will need more oral health services, driven by increased tooth retention and a desire of continued oral healthcare throughout their life. There will also be increased need and demand for complex restorative procedures, implants, and esthetic procedures.
- More older adults will be at a risk of periodontal disease and root caries as a result of reduced tooth loss and edentulism. The increase in the prevalence and incidence of chronic diseases will increase the risk and severity of oral diseases adding complexity to oral disease management in older adults.
- The increase in number of older adults living with chronic diseases and conditions also means an increase in pharmaceutical use. The pharmacokinetics and pharmacodynamics of many drugs are altered in those of advanced age. Thus, oral health professionals must be aware of the pharmacologic status of each client and consider the likelihood of interactions between prescribed drugs and self-administered drugs, including OTC medications and herbal supplements.
- Oral health is essential for total health, quality of life, and overall wellbeing. The primary types of oral diseases, caries, periodontal disease, and oral cancer, are largely preventable and often inter-related with other chronic conditions. Poor oral hygiene, a diet low in fruits and vegetables and high in sugars, smoking, and harmful use of alcohol can increase risk of developing an oral disease. A growing body of research demonstrates a link between oral and general health. For example, periodontal disease has been associated with type 2 diabetes, chronic respiratory diseases, dementia,[16] CVDs, and cancer.
- Individual lifestyle behaviours increase the risk of developing chronic diseases and conditions. Four key behavioural risk factors include tobacco use, harmful use of alcohol, unhealthy eating, and physical inactivity. Oral health professionals can use their health coaching skills to assist clients to make informed decisions about their health, oral health, and lifestyle choices.

References

[1] World Health Organization, "Ageing," 14 February 2022. [Online]. Available: https://www.who.int/health-topics/ageing#tab=tab_1. [Accessed February 2022].

[2] Statistics Canada, "Population estimates on July 1st, by age and sex," 29 September 2021. [Online]. Available: https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1710000501. [Accessed 14 February 2022].

[3] Statistics Canada, "Canada's population estimates: Age and sex, July 1, 2021," 1 July 2021. [Online]. Available: https://www150.statcan.gc.ca/n1/daily-quotidien/210929/dq210929d-eng.htm. [Accessed 14 February 2022].

[16] Refer to Episode 29 for additional information on periodontal disease and dementia.

Disclaimer: This document is educational and not intended to provide clinical advice nor should it be used as a replacement for professional dental or medical advice. Dental hygienists are encouraged to consult with CDHO practice advisors and refer to CDHO guidelines. Dental hygienists are responsible for the decisions they make and for the consequences associated with those decisions. © ODHA

[4] Government of Canada, "Government of Canada — Action for Seniors report," 16 February 2021. [Online]. Available: https://www.canada.ca/en/employment-social-development/programs/seniors-action-report.html. [Accessed 14 February 2022].

[5] Government of Canada, "Aging and chronic diseases: A profile of Canadian seniors," December 2020. [Online]. Available: https://www.canada.ca/en/public-health/services/publications/diseases-conditions/aging-chronic-diseases-profile-canadian-seniors-report.html. [Accessed 14 February 2022].

[6] Macrotrends LLC, "Canada Life Expectancy 1950-2022," 2022. [Online]. Available: https://www.macrotrends.net/countries/CAN/canada/life-expectancy. [Accessed 14 February 2022].

[7] Government of Canada, "Prevalence of Chronic Diseases and Risk Factors among Canadians aged 65 years and older," 24 December 2020. [Online]. Available: https://www.canada.ca/en/services/health/publications/diseases-conditions/prevalence-chronic-disease-risk-factors-canadians-aged-65-years-older.html. [Accessed 14 February 2022].

[8] Statistics Canada, "Chronic conditions among seniors aged 65 and older, Canadian Health Survey on Seniors," 1 October 2021. [Online]. Available: https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1310078801. [Accessed 14 February 2022].

[9] World Health Organization, "Ageing and health," 4 October 2021. [Online]. Available: https://www.who.int/news-room/fact-sheets/detail/ageing-and-health. [Accessed 15 February 2022].

[10] World Health Organization, "Ageing - Risk factors," 2022. [Online]. Available: https://platform.who.int/data/maternal-newborn-child-adolescent-ageing/ageing-data/ageing---risk-factors. [Accessed 15 February 2022].

[11] American Dental Association, "Aging and Dental Health," 9 November 2021. [Online]. Available: https://www.ada.org/resources/research/science-and-research-institute/oral-health-topics/aging-and-dental-health. [Accessed 16 February 2022].

[12] A. Ouanounou and D. Haas, "Pharmacotherapy for the elderly dental patient," *JCDA,* vol. 80, pp. 1-11, 25 September 2015.

[13] S. Inouye, S. Studenski, M. Tinetti and G. Kuchel, "Geriatric syndromes: Clinical, research and policy implications of a core geriatric concept," *Journal of the American Geriatrics Society,* vol. 55, no. 5, pp. 780-791, May 2007.

[14] A. Magnuson, S. Sattar, G. Nightingale, R. Saracino, E. Skonecki and K. Trevino, "A practical guide to geriatric syndromes in older adults with cancer: A focus on falls, cognition, polypharmacy, and depression," *American Society of Clinical Oncology Educational Book,* vol. 39, pp. e96-e109, 17 May 2019.

[15] J. Walston, "Frailty," UpToDate, Inc., 2022. [Online]. Available: https://www.uptodate.com/contents/frailty. [Accessed 15 February 2022].

[16] Canadian Frailty Network, "What is frailty?," 2022. [Online]. Available: https://www.cfn-nce.ca/frailty-matters/what-is-frailty/. [Accessed 15 February 2022].

Disclaimer: This document is educational and not intended to provide clinical advice nor should it be used as a replacement for professional dental or medical advice. Dental hygienists are encouraged to consult with CDHO practice advisors and refer to CDHO guidelines. Dental hygienists are responsible for the decisions they make and for the consequences associated with those decisions. © ODHA

[17] K. Rockwood and S. Howlett, "Fifteen years of progress in understanding frailty and health in aging," *BMC Medicine,* vol. 16, article 220, pp. 1-4, 18 November 2018.

[18] Q. Xue, "The frailty syndrome: Definition and natural history," *Clinics in Geriatric Medicine,* vol. 27, no. 1, pp. 1-15, 1 February 2011.

[19] K. Rockwood, X. Song, C. MacKnight, H. Bergman, D. Hogan, I. McDowell and A. Mitnitski, "A global clinical measure of fitness and frailty in elderly people," *CMAJ,* vol. 173, no. 5, pp. 489-495, 30 August 2005.

[20] Dalhousie University, "Geriatric Medicine Research," [Online]. Available: https://www.dal.ca/sites/gmr/our-tools/clinical-frailty-scale.html. [Accessed 15 February 2022].

[21] Dementia Care Central, "Stages of Alzheimer's & Dementia: Durations & Scales Used to Measure Progression (GDS, FAST & CDR)," 24 April 2020. [Online]. Available: https://www.dementiacarecentral.com/aboutdementia/facts/stages/. [Accessed 15 February 2022].

[22] W. Leonard, "Everything to Know About Dementia," Healthline, 14 February 2022. [Online]. Available: https://www.healthline.com/health/dementia. [Accessed 16 February 2022].

[23] M. Tonetti, P. Bottenberg, G. Conrads, P. Eickholz, P. Heasman, et al., "Dental caries and periodontal diseases in the ageing population: call to action to protect and enhance oral health and well-being as an essential component of healthy ageing – Consensus report of group 4 of the joint EFP/ORCA workshop on the boundaries between caries and periodontal diseases," *Journal of Clinical Periodontology,* vol. 44, no. S18, pp. S135-S144, 6 March 2017.

[24] A. Halli-Tierney, C. Scarbrough and D. Carroll, "Polypharmacy: Evaluating risks and deprescribing," *American Family Physician,* vol. 100, no. 1, pp. 32-38, 1 July 2019.

[25] Canadian Institute for Health Information, "Drug Use Among Seniors in Canada, 2016," Canadian Institute for Health Information, Ottawa, 2018.

[26] Statistics Canada, "National Cannabis Survey, third quarter 2019," 30 October 2019. [Online]. Available: https://www150.statcan.gc.ca/n1/daily-quotidien/191030/dq191030a-eng.htm. [Accessed 17 February 2022].

[27] S. Tumati, K. Lanctôt, R. Wang, A. Li, A. Davis and N. Herrmann, "Medical cannabis use among older adults in Canada: Self-reported data on types and amount used, and perceived effects," *Drugs & Aging,* pp. 1-11, 23 December 2021.

[28] Canadian Centre on Substance Use and Addiction, "A Guide to Cannabis for Older Adults," 2020. [Online]. Available: https://www.ccsa.ca/guide-cannabis-older-adults. [Accessed 17 February 2022].

[29] Canadian Coalition for Seniors' Mental Health, "What Older Adults Need to Know about Cannabis," Canadian Coalition for Seniors' Mental Health, Markham, Ontario, 2020.

[30] Statistics Canada, "Health characteristics of seniors aged 65 and over, Canadian Health Survey on Seniors," 1 October 2021. [Online]. Available:

Disclaimer: This document is educational and not intended to provide clinical advice nor should it be used as a replacement for professional dental or medical advice. Dental hygienists are encouraged to consult with CDHO practice advisors and refer to CDHO guidelines. Dental hygienists are responsible for the decisions they make and for the consequences associated with those decisions. © ODHA

https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1310078901. [Accessed 17 February 2022].

[31] M. Turner and J. Ship, "Dry mouth and its effects on the oral health of elderly people," *JADA,* vol. 138, suppl. 1, pp. S15-S20, 1 September 2007.

[32] A. Gupta, J. Epstein and H. Sroussi, "Hyposalivation in elderly patients," *JCDA,* vol. 72, no. 9, pp. 841-846, November 2006.

[33] J. Burgess, "Salivary Abnormalities in Dentistry," Medscape, 2020 December 2020. [Online]. Available: https://emedicine.medscape.com/article/2091828-overview. [Accessed 17 February 2022].

[34] J. Kalmar, "Oral Manifestations of Drug Reactions," Medscape, 8 March 2019. [Online]. Available: https://emedicine.medscape.com/article/1080772-overview. [Accessed 17 February 2022].

[35] MedlinePlus, "Dry Mouth," National Institute of Health, 12 November 2021. [Online]. Available: https://medlineplus.gov/drymouth.html. [Accessed 17 February 2022].

[36] American Dental Association, "Xerostomia (Dry Mouth)," 22 February 2021. [Online]. Available: https://www.ada.org/resources/research/science-and-research-institute/oral-health-topics/xerostomia. [Accessed 17 February 2022].

[37] A. Huynh, K. Stier and V. Benvenuto, "Maintaining Oral Health in Older Adults," Dimensions of Dental Hygiene, 16 September 2020. [Online]. Available: https://dimensionsofdentalhygiene.com/article/maintaining-oral-health-in-older-adults/. [Accessed 18 February 2022].

[38] A. Hendre, G. Taylor, E. Chávez and S. Hyde, "A systematic review of silver diamine fluoride: Effectiveness and application in older adults," *Gerodontology,* vol. 34, no. 4, pp. 411-419, 15 August 2017.

[39] Centers for Disease Control and Prevention, "Periodontal Disease," 10 July 2013. [Online]. Available: https://www.cdc.gov/oralhealth/conditions/periodontal-disease.html. [Accessed 18 February 2022].

[40] L. Al-Nasser and I. Lamster, "Prevention and management of periodontal diseases and dental caries in the older adults," *Periodontology 2000,* vol. 84, no. 1, pp. 69-83, 25 August 2020.

[41] Government of Canada, "Oral cancer," 6 May 2021. [Online]. Available: https://www.canada.ca/en/public-health/services/oral-diseases-conditions/oral-cancer.html. [Accessed 19 February 2022].

[42] D. Laronde, G. Hislop, J. Elwood and M. Rosin, "Oral cancer: Just the facts," *JCDA,* vol. 74, no. 3, pp. 269-272, 2008.

[43] O. Elebyary, A. Barbour, N. Fine, H. Tenenbaum and M. Glogauer, "The crossroads of periodontitis and oral squamous cell carcinoma: Immune implications and tumor promoting capacities," *Frontiers in Oral Health,* vol. 1, no. Article 584705, pp. 1-18, 20 January 2021.

[44] A. Aiello, F. Farzaneh, G. Candore, C. Caruso, S. Davinelli, et al., "Immunosenescence and its hallmarks: How to oppose aging strategically? a review of potential options for therapeutic intervention," *Frontiers in Immunology,* vol. 10, article 2247, pp. 1-19, 25 September 2019.

Disclaimer: This document is educational and not intended to provide clinical advice nor should it be used as a replacement for professional dental or medical advice. Dental hygienists are encouraged to consult with CDHO practice advisors and refer to CDHO guidelines. Dental hygienists are responsible for the decisions they make and for the consequences associated with those decisions. © ODHA

Client resources

Oral Care for Seniors, ODHA Factsheet
https://odha.on.ca/wp-content/uploads/2016/08/ODHA-Facts-seniors.VFS21.11.pdf

Medication use in older adults: What older adults, their families, and friends need to know. The infographic advises indiviudals what to ask before taking medications, possible side effects, etc. Available in multiple languages.
https://kmb.camh.ca/eenet/resources/infographic-medication-use-among-older-adults

Dry Mouth, ODHA Factsheet
https://odha.on.ca/wp-content/uploads/2016/08/ODHA-Facts-Dry-Mouth.VFS18-copyright.pdf

Dentures and Oral Health, ODHA Factsheet
https://odha.on.ca/wp-content/uploads/2016/08/Dentures-15.1-copyright.pdf

For Caregivers – A Guide to Providing Oral Care, ODHA Factsheet
https://odha.on.ca/wp-content/uploads/2016/08/ODHA-Facts-Caregivers-VFS18-copyright.pdf

Oral Health and Overall Health, ODHA Factsheet
https://odha.on.ca/wp-content/uploads/2016/08/Overall-Health.14.1-copyright.pdf

Periodontal (Gum) Disease, ODHA Factsheet
https://odha.on.ca/wp-content/uploads/2016/08/Gum-Disease.14.1-copyright.pdf

Smoking and Smokeless Tobacco, ODHA Factsheet
https://odha.on.ca/wp-content/uploads/2016/08/ODHA-Facts-Smoking.VFS19.1-copyright.pdf

Tooth Decay (Caries), ODHA Factsheet
https://odha.on.ca/wp-content/uploads/2016/08/Tooth-Decay.14.1-copyright.pdf

Diabetes and Oral Health, ODHA Factsheet
https://odha.on.ca/wp-content/uploads/2016/08/Diabetes-15.1-copyright.pdf

Nutrition and Oral Health, ODHA Factsheet
https://odha.on.ca/wp-content/uploads/2016/08/Nutrition.19.1-copyright.pdf

Oral Cancer Screening, ODHA Factsheet
https://odha.on.ca/wp-content/uploads/2016/08/Oral-Cancer-Screening.14.1-copyright.pdf

Oral Cancer Self-Examination, ODHA Factsheet
https://odha.on.ca/wp-content/uploads/2016/08/Oral-Cancer-Self-Exam14.1-copyright.pdf

Disclaimer: This document is educational and not intended to provide clinical advice nor should it be used as a replacement for professional dental or medical advice. Dental hygienists are encouraged to consult with CDHO practice advisors and refer to CDHO guidelines. Dental hygienists are responsible for the decisions they make and for the consequences associated with those decisions. © ODHA

Cannabis, ODHA Factsheet
https://odha.on.ca/wp-content/uploads/2016/08/ODHA-Facts-Cannabis-19.1.pdf

Why is my dental hygienist asking why about my cannabis use? CDHO Factsheet
https://www.cdho.org/docs/default-source/pdfs/oral-health-rpt/why-is-my-dh-cannabis-use-handout.pdf

Dental care for low-income seniors, Government of Ontario
https://www.ontario.ca/page/dental-care-low-income-seniors

Ministry for Seniors and Accessibility, Government of Ontario
More information about services and programs available to seniors in Ontario, can be found from the Ontario Ministry for Seniors and Accessibility website.
https://www.ontario.ca/page/ministry-seniors-accessibility

Benefits Finder, Government of Canada
The Benefits Finder is a tool individuals can use to help find Benefits and Services they may be eligible to receive.
https://benefitsfinder.services.gc.ca/hm?GoCTemplateCulture=en-CA

Additional Resources

Aging and chronic diseases: A profile of Canadian seniors, Public Healh Agency of Canada, Government of Canada, December 2020, p 1-173
https://www.canada.ca/content/dam/hc-sc/documents/services/publications/diseases-and-conditions/aging-chronic-diseases/canadian-seniors-report_2021-eng.pdf

Aging and dental health, American Dental Association, November 9, 2021
https://www.ada.org/resources/research/science-and-research-institute/oral-health-topics/aging-and-dental-health

Oral health for healthy ageing, Patel, J; Wallace, J; Doshi, M; et al. *The Lancet Healthy Longevity*, Volume 2, Issue 8, August 1, 2021, p E521-E527
https://www.thelancet.com/journals/lanhl/article/PIIS2666-7568(21)00142-2/fulltext

Maintaining oral health in older adults, Huynh, A; Stier, K; Benvenuto, V. *Dimensions of Dental Hygiene*, September 16, 2020
https://dimensionsofdentalhygiene.com/article/maintaining-oral-health-in-older-adults/

Pharmacotherapy for the elderly dental patient, Ouanounou, A; Haas, D. *Journal of the Canadian Dental Association*, Volume 80, September 25, 2015, p 1-10
https://jcda.ca/article/f18

The continuum of aging and age-related diseases: Common mechanisms but different rates, Franceschi, C; Garagnani, P; Morsiani, C; et al. *Frontiers in Medicine*, Volume 5, Article 61, March 2018, p 1-23
https://www.frontiersin.org/articles/10.3389/fmed.2018.00061/full

Disclaimer: This document is educational and not intended to provide clinical advice nor should it be used as a replacement for professional dental or medical advice. Dental hygienists are encouraged to consult with CDHO practice advisors and refer to CDHO guidelines. Dental hygienists are responsible for the decisions they make and for the consequences associated with those decisions. © ODHA

Geriatric syndromes: Clinical, research and policy implications of a core geriatric concept, Inouye, S; Studenski, S; Tinetti, M; Kuchel, G. *Journal of the American Geriatrics Society*, Volume 55, Issue 5, May 2007, p 780-791
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2409147/

A practical guide to geriatric syndromes in older adults with cancer: A focus on falls, cognition, polypharmacy, and depression, Magnuson, A; Sattar, S; Nightingale, G; et al. American Society of Clinical Oncology Educational Book, Volume 39, May 17, 2019, p e96-e109
https://ascopubs.org/doi/full/10.1200/EDBK_237641

The frailty syndrome: Definition and natural history, Xue, Q. *Clinics in Geriatric Medicine*, Volume 27, Issue 1, February 1, 2011, p 1-15
https://www.geriatric.theclinics.com/article/S0749-0690(10)00083-2/fulltext

Dementia, CDHO Advisory, May 25, 2020, p 1-17
https://www.cdho.org/Advisories/CDHO_Advisory_Dementia.pdf

Dementia, CDHO Factsheet, May 25, 2020, p 1-4
https://www.cdho.org/Advisories/CDHO_Factsheet_Dementia.pdf

Parkingson's Disease, CDHO Advisory, February 5, 2018, p 1-15
https://www.cdho.org/Advisories/CDHO_Advisory_Parkinson_s_Disease.pdf

Parkingson's Disease, CDHO Factsheet, February 4, 2018, p 1-4
https://www.cdho.org/Advisories/CDHO_Factsheet_Parkinsons_Disease.pdf

Polypharmacy: Evaluating risks and deprescribing, *American Family Physician*, Volume 100, Issue 1, July 1, 2019, p 32-38
https://www.aafp.org/afp/2019/0701/p32.html

Drug Use Among Seniors in Canada, 2016, Canadian Institute for Health Information, 2018, p 1-68
https://secure.cihi.ca/free_products/drug-use-among-seniors-2016-en-web.pdf

Medical cannabis use among older adults in Canada: Self-reported data on types and amount used, and perceived effects, Tumati, S; Lanctôt, K; Wang, R; et al. *Drugs & Aging*, Volume 39, December 23, 2022, p 153-163
https://link.springer.com/article/10.1007/s40266-021-00913-y

Cannabis use and patterns among middle and older aged Canadians prior to legalization: A sex-specific analysis of the Canadian Tobacco, Alcohol and Drugs Survey, Keethakumar, A; Mehra, V; Khanlou, N; Tamim, H. *BMC Public Health*, Volume 21, Article 26, January 6, 2021, p 1-14
https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-020-10074-z

Disclaimer: This document is educational and not intended to provide clinical advice nor should it be used as a replacement for professional dental or medical advice. Dental hygienists are encouraged to consult with CDHO practice advisors and refer to CDHO guidelines. Dental hygienists are responsible for the decisions they make and for the consequences associated with those decisions. © ODHA

Cannabis, CDHO Factsheet, October 2, 2020, p 1-6
https://www.cdho.org/Advisories/CDHO_Factsheet_Cannabis.pdf

Dietary-Herbal Supplement Resource Sheet, ODHA Dental Hygiene Resource Sheet, p 1-5
https://odha.on.ca/member-benefits/dental-hygiene-resource-sheets/

Dry mouth and its effects on the oral health of elderly people, Turner, M; Ship, J; *Journal of the American Dental Association*, Volume 138, Supplement 1, September 1, 2007, p S15-S20
https://jada.ada.org/article/S0002-8177(14)62738-0/fulltext

Hyposalivation in elderly patients, Gupta, A; Epstein, J; Sroussi, H. *Journal of the Canadian Dental Association*, Volume 72, Issue 9, November 2006, p 841-846
https://cda-adc.ca/jcda/vol-72/issue-9/841.pdf

Salivary Abnormalities in Dentistry, Burgess, J. *Medscape*, December 22, 2020
https://emedicine.medscape.com/article/2091828-overview

Xerostomia, CDHO Factsheet, May 21, 2020, p 1-3
https://www.cdho.org/Advisories/CDHO_Factsheet_Xerostomia.pdf

Sjögren Syndrome, CDHO Advisory, May 4, 2020, p 1-16
https://www.cdho.org/Advisories/CDHO_Advisory_Sjogren_Syndrome.pdf

Sjögren Syndrome, CDHO Factsheet, May 4, 2020, p 1-4
https://www.cdho.org/Advisories/CDHO_Factsheet_Sjogren_Syndrome.pdf

Oral manifestations of drug reactions, Kalmar, J. *Medscape*, March 8, 2019
https://emedicine.medscape.com/article/1080772-overview

Xerostomia (Dry Mouth), American Dental Association, February 22, 2021
https://www.ada.org/resources/research/science-and-research-institute/oral-health-topics/xerostomia

Xerostomia diagnosis and management, Taverna, M. *Dimensions of Dental Hygiene*, April 28, 2020
https://dimensionsofdentalhygiene.com/article/xerostomia-diagnosis-and-management/

The etiology of xerostomia, Stier, K; Stefanou, L. *Dimensions of Dental Hygiene*, August 8, 2019
https://dimensionsofdentalhygiene.com/article/the-etiology-of-xerostomia/

Candidiasis, CDHO Factsheet, April 20, 2020, p 1-3
https://www.cdho.org/Advisories/CDHO_Factsheet_Oral_Candidiasis.pdf

Disclaimer: This document is educational and not intended to provide clinical advice nor should it be used as a replacement for professional dental or medical advice. Dental hygienists are encouraged to consult with CDHO practice advisors and refer to CDHO guidelines. Dental hygienists are responsible for the decisions they make and for the consequences associated with those decisions. © ODHA

The association between malnutrition and oral health in older people: A systematic review, Algra, Y; Haverkort, E; Kok, W; et al. *Nutrients*, Volume 13, Issue 10, October 13, 2021, p 1-13
https://www.mdpi.com/2072-6643/13/10/3584/htm

Tooth retention predicts good physical performance in older adults, Musacchio, E; Binotto, P; Perissinotto, E; et al. *PLoS ONE*, Volume 16, Issue 9, September 20.2021, p 1-16
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0255741

Oral cancer: Just the facts, Laronde, D; Hislop, T; Elwood, J; Rosin, M. *Journal of the Canadian Dental Association*, Volume 74, Issue 3, April 2008, p 269-272
https://www.cda-adc.ca/jcda/vol-74/issue-3/269.pdf

The crossroads of periodontitis and oral squamous cell carcinoma: Immune implications and tumor promoting capacities, Elebyary, O; Barbour, A; Fine, N; Tenenbaum, H; Glogauer, M. *Frontiers in Oral Health*, Volume 11, Article 584705, January 20, 2021, p 1-18
https://www.frontiersin.org/articles/10.3389/froh.2020.584705/full

Preliminary investigation of family caregiver burden and oral care provided to homebound older patients, *Clinical and Experimental Dental Research*, Volume 7, Issue 5, March 8, 2021, p 840-844
https://onlinelibrary.wiley.com/doi/full/10.1002/cre2.415

Association of oral health and mini nutritional assessment in older adults: A systematic review with meta-analyses, Hussein, S; Kantawalla, R; Dickie, S; et al. *Journal of Prosthodontic Research*, July 2021, p 1-11
https://www.jstage.jst.go.jp/article/jpr/advpub/0/advpub_JPR_D_20_00207/_pdf/-char/en

Combined association of cognitive impairment and poor oral health on mortality risk in older adults: Results from the NHANES with 15 years of follow-up, *Journal of Periodontology*, September 17, 2021, p 1-13
https://aap.onlinelibrary.wiley.com/doi/10.1002/JPER.21-0292

Oral health of older patients in dental practice: An exploratory study, Bots-VantSpijker, P; van der Maarel-Wierink, C; Schols, J; Bruers, J. *Internatonal Dental Journal*, July 6, 2021, p 1-8
https://www.sciencedirect.com/science/article/pii/S002065392100099X

Neurological Conditions and Oral Health Resource Sheet, ODHA Dental Hygiene Resource Sheet, p 1-3
https://odha.on.ca/member-benefits/dental-hygiene-resource-sheets/

Disclaimer: This document is educational and not intended to provide clinical advice nor should it be used as a replacement for professional dental or medical advice. Dental hygienists are encouraged to consult with CDHO practice advisors and refer to CDHO guidelines. Dental hygienists are responsible for the decisions they make and for the consequences associated with those decisions. © ODHA