CanAge

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Urinary Tract Infections 101:
Improving Well-Being with Knowledge & Supports

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Introduction

As anyone who has ever experienced a urinary tract infection (UTI) knows, they can be painful, disruptive, and for some people, highly embarrassing. The impact of UTIs goes well beyond the medical condition itself. At the most personal level, many older adults may be hesitant to bring up UTIs with anyone at all, due to stigma, shame or embarrassment. Depending on how UTI symptoms present, the older person may not even be aware of their condition, or ascribe the symptoms to age or other factors.

Often associated with younger women, many older people may not think of UTIs as conditions which apply to them. Some health care providers may not be as attuned to checking for UTIs in older adults despite their prevalence and negative impacts. Government and health policymakers may not keep UTIs, and their associated treatments, front of mind when they are thinking about health care supports – and may be unaware of the economic impacts of the infection or the need for careful antibiotic stewardship.

In short, UTIs are no joke. They are often medically overlooked, poorly managed and personally underreported. UTIs negatively impact physical, psychological, mental and social well-being. And all of these can be improved with education and awareness, policy change, and destigmatization.

But why is a seniors' advocacy organization focussing on UTIs and incontinence? In short, because UTIs are a growing problem, both in terms of Canada's rapidly aging population in real numbers, and also in terms of impact.

At CanAge, we work tirelessly to educate, empower and mobilize people on the issues that matter most to seniors and their families. As an independent, non-partisan, not-for-profit organization, we believe every Canadian – independent of age – deserves a vibrant, connected, and meaningful life with equitable access to the resources needed to thrive.

As a pan-Canadian organization, CanAge also knows that older Canadians are diverse in their experiences, perspectives, passions, and contexts. As a group, Canadian seniors will represent 23% of the population by 2030. Politically engaged, Canadian seniors are consistently the most active voter group

at the polls, with approximately 72% of seniors indicating that they vote in every election and nearly 80% voting in the last 2 federal elections. The needs of a rapidly aging population must be a key priority for policy-makers.

In 2020, CanAge released its **VOICES of Canada's Seniors: A Roadmap for an Age-Inclusive Canada**. It outlines a way forward for Canada, with 6 Compass Points, 40 Issues and 135 specific evidence-based Recommendations.

The 6 Compass Points of the VOICES Roadmap are:

- **V** **V**iolence and Abuse Prevention
- **O** **O**ptimal Health and Wellness
- **I** **I**nfection Prevention and Disaster Response
- **C** **C**aregiving, Long-Term Care, Home Care and Housing Resources
- **E** **E**conomic Security
- **S** **S**ocial Inclusion

In our UTI 101 series, CanAge explores the effects of incontinence and urinary tract infections amongst each of these 6 Compass Point areas.

V - Violence and Abuse Prevention investigates the links between incontinence, care dependence and elder abuse, neglect and self-neglect.

O - Optimal Health and Wellness digs into issues such as medical under-diagnosis, antibiotic stewardship and co-morbidities and underreporting by individuals due to stigma, embarrassment or conflation of symptomatology.

I - Infection Prevention and Disaster Response explores how long term care IPAC standards intersect with the prevalence, prevention and treatment of UTIs.

C - Caregiving, Long-Term Care, Home Care and Housing Resources delves both how and why avoidable UTIs remain the primary reason for hospital admissions from congregate

care settings and also what we can do to promote urinary health across the housing continuum.

E - Economic Security uncovers both the substantial financial burden UTIs place on the healthcare system as well as the significant cost to an individual for incontinence products and UTI treatments.

S - Social Isolation connects the often tragic and direct links between UTIs on the one hand, and incontinence, loneliness and stigma on the other.

CanAge is committed to the health and well-being of all Canadians as we age. We hope that this series will help to shift minds, policies and treatments options for UTIs and incontinence.

It's time to take this issue on seriously. We hope that this paper, this series and our additional knowledge tools will help to put us on the path to well-being and confidence in aging.

Executive Summary

This paper is an introduction to urinary tract infections (UTIs), for use by stakeholders, government and professionals. It also seeks to be a helpful resource and technical backgrounder for members of the public. Additional knowledge tools are available as companions to this introductory paper, which provide definitions of terms used, and clarifies more complex language used within this report.

UTIs are a common and uncomfortable infection for individuals and a costly burden to our healthcare system. UTIs occur when bacteria enters the urethra, leading to an infection along the urinary tract.

UTIs can impact people of all ages. However, older people and people living with comorbidities can experience UTIs more frequently and are at higher risk for life-threatening complications such as sepsis. Older people tend to be more at risk for UTIs because of hormonal, immunological and physical changes that can occur with age and/or resulting from a variety of conditions. These factors simultaneously make UTIs more difficult to diagnose. Misdiagnosis can lead to inappropriately prescribed antibiotics, which poses risks to the health of the individual and contributes to the pressing public health problem of antibiotic resistance.

This paper provides a brief overview of these topics, as well as treatment and prevention of UTIs. It is the first in a series of papers that will explore different aspects of UTIs and incontinence, including: **Prevention of Urinary Tract Infections: Reducing Risk and Protecting Older Adults**, **Treatment Challenges: Urinary Tract Infections, Older Adults and Antibiotic Resistance**, and **Urinary Incontinence: The Impact on the Well-being of Older Adults**.

For further information on these topics, please refer to the individual papers in the series.

1. What is a UTI?

As one of the most common infections worldwide, UTIs are a pressing and costly healthcare issue.[1, 2] Although not generally life threatening, UTIs can be painful and disruptive to everyday life: "a misery," according to one 79 year old woman.[3] UTIs occur when bacteria enters the urethra, leading to an infection along the urinary tract (located between the urethra and the kidneys).[4]

Symptoms for UTIs can vary. For bladder infections, a type of UTI, symptoms include pain when urinating, needing to urinate more frequently and urgently, and not being able to fully empty one's bladder. Kidney infections, another type of UTI, often have the same symptoms, as well as fever, chills, flank pain and a feeling of being unwell.[5] Studies have found that up to 70% of women will have at least one UTI in their life, and almost a third of those will have recurrent UTIs.[6] Recurrent UTIs are defined as two or more UTIs in a six-month period and are associated with decreased quality of life and increased risk of antibiotic resistance.[7,8]

2. UTIs and Older Adults: An Urgent Issue

UTIs affect people of all ages, but older adults may experience more dangerous consequences more frequently such as hospitalization and sepsis. A US-based study found the average age for a UTI-related hospitalization has consistently been people in their 70's: 73.2 in 1998 to 74.7 in 2011.[9] Additionally, age, specifically the weakening of our immune system as we age, is a risk factor for urosepsis.[10] People in long-term care are also particularly impacted by UTIs: in Canada, UTIs were the third most common reason for residents to be transferred to hospital in 2019.[11] Complicated UTIs are considered higher risk and are often experienced by older people.[12] They are characterized by anatomical, functional or disease-related issues affecting the urinary and/or genital systems, including catheterization.[4] One study found frailty, not age, was associated with recurrent UTIs although the exact mechanism of the relationship is not known.[13] Compounding the impact of UTIs on older people is the difficulty in accurately diagnosing and treating UTIs in this population, leading to inappropriate antibiotic prescribing.

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3. How Does Age Intersect with UTIs?

Age Related Risk Factors

Changes to hormonal, physical, and immunological responses to infections put older adults at higher risk for UTIs. As we age, the structure and function of the bladder may evolve. This can lead to reduced bladder capacity and an increase in residual urine, both of which can contribute to chances of acquiring a UTI.[14] UTIs tend to occur more in post-menopausal women, although after the age of 85, UTIs become frequent in all genders.[15] There are anatomical factors, such as a shortened urethra, that make women more susceptible to UTIs.[16] Individuals with a history of recurrent UTIs as children, youth, and adults are at an increased risk for UTIs in older adulthood.[14, 15, 17] Individuals with reduced functional status, such as cognitive impairment and disability are at higher risk to develop UTIs.[17] Lastly, certain neurological and medical conditions such as stroke, diabetes, Parkinson's disease and multiple sclerosis may reduce the functionality of certain muscles and nerves needed to control the bladder, leading to an increased risk for UTI development.[14] As these medical conditions are more prevalent in older adult populations, understanding their impact as related to UTIs is vital for older adult health and wellbeing.

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Urinary Incontinence and Residual Urine

There is a bi-directional relationship between urinary incontinence and UTIs. Urinary incontinence happens when a person has little control of their bladder and leakage occurs. Urinary incontinence can be caused by weakened bladder muscles, medication, urinary tract infections, and neurological conditions. In some cases, urinary incontinence can be a predictor for UTI development in older adult populations.[17, 18] Retention or incomplete voiding poses the greatest risk for UTIs related to incontinence. When a person is unable to completely empty their bladder, the remaining urine can become a place for bacterial growth. During incontinence, with little control of the bladder, urine retention may occur which can lead to infection along the urinary tract.[14]

Individuals who are incontinent and wear briefs or sanitary pads may be at heightened risk for UTI. Incontinence is highly

associated with populations with cognitive impairment and poor physical function.[18] These populations are less likely to use proper hygiene practices and may have challenges with communication, both of which can contribute to greater probability of infections. There is inconclusive evidence to indicate that frequent changing of sanitary pads reduces the occurrence of UTIs amongst older adults.[18] However, older adults who wear pads are at significant risk for the pressure ulcers, sores, and rashes, which can develop in a moist environment. These skin irritations can lead to further infection, isolation, challenges in participation in daily activities, and hospitalization.[19]

Catheterization

Urinary catheters are devices used to help empty the bladder of urine. The use of catheters makes the urinary tract particularly vulnerable to infection, as these devices create clear access for bacteria to reach urinary organs. Additionally, misuse (ex. using too often or for too long) can lead to a higher the risk of infection.[20] In 2019, The Canadian Agency for Drugs and Technologies in Health (CADTH) found about 80% of all healthcare-associated UTIs can be attributed to use of indwelling urethral catheters.[20] Across three surveys conducted in 18 Canadian hospitals in 2002, 2009 and 2017, UTIs were the most common healthcare-associated infection and people 65+ consistently accounted for approximately 50% of infections.[21]

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Diagnostic Challenges

Diagnosing UTIs in older adults is challenging because: the classic symptoms (pain when urinating, frequent and urgent urination, feeling of not fully emptying one's bladder) are not always present, symptoms that are present could be caused by other conditions, and diagnostic tools are not as reliable in older adults. For example, urine cultures are often used to diagnose UTIs, with a positive urine culture often being followed by treatment with antibiotics.[22] For some older populations, collecting good quality, mid stream urine samples for testing can also be difficult.[22] And importantly, many older people consistently have benign bacteria present in their urine, a condition called asymptomatic bacteriuria (ABU), which can

also return a positive urine culture. Some studies have found 25 to 50% in women and 15 to 40% in men in long-term care facilities experience ABU.[23] Although ABU looks like a UTI, it is not generally considered dangerous and should not be treated with antibiotics.[24] This evidence is reflected in widely endorsed practice recommendations created for long-term care to not use urine dipstick/analysis to diagnose UTIs in residents.[25]

Many older people consistently have benign bacteria present in their urine, a condition called asymptomatic bacteriuria (ABU), which can also return a positive urine culture. Some studies have found 25 to 50% in women and 15 to 40% in men in long-term care facilities experience ABU.[23]

Additionally, while UTIs have "classic" symptoms, they may or may not be present in older adults. Instead, older adults often experience symptoms such as changes in cognitive or physical function. These symptoms can be indicators of a UTI, but may also be attributed to other conditions such as pain, dehydration and changes to medication.[26] A UTI misdiagnosis might mean an underlying cause of symptoms is missed. Congregate care residents tend to have more comorbidities and diminished immune function, increasing complexity when making a diagnosis.[3] Cognitive decline also poses a challenge, as people living with dementia might have difficulty communicating their symptoms to their doctor.[24]

Delirium

Delirium is a syndrome characterized by disturbed cognitive function and altered consciousness that can come on acutely or fluctuate. It can occur after experiencing various health issues, being hospitalized and/or an intersection of different factors.[27] Studies included in a systematic review found an association between UTIs and delirium.[28] But though the presence of delirium is frequently considered a reason to suspect a UTI in practice, there is little high quality evidence to support UTIs as a cause of delirium.[28, 29] This shift in thinking is reflected in best practices created by Public Health Ontario for managing UTIs in long-term care which emphasize that delirium is not a clinical sign of a UTI.[30] A similar shift in thinking is also emerging concerning falls as a sign or symptom or a UTI. While UTI and falls may both be present, it is not a recommended diagnostic tool.[26, 30]

The presence of delirium is frequently considered a reason to suspect a UTI in practice. However, there is little high quality evidence to support UTIs as a cause of delirium.[28, 29]

4. Managing Urinary Tract Infections

Prevention

Although age is a risk factor for UTIs, there are steps individuals can take to maintain urinary health across the life course. These preventative measures include: staying hydrated, avoiding foods and beverages that irritate one's bladder, healthy voiding habits and keeping pelvic floor muscles strong.[31] There are also a number of promising prevention options actively being researched including vaccines and herbal preparations, though most require more research and research targeting older adults.[12, 33] For particular populations, such as residents of long-term care homes, a systematic review found taking measures such as proper hand hygiene, reduced catheter use and duration of use (when possible), infection surveillance, better staff training and standardizing UTI diagnoses may help improve care and reduce CAUTIs (catheter-associated urinary tract infections).[32] Finding new ways of treating and preventing UTIs is vital, especially in the context of antibiotic resistance, a global public health problem discussed in more detail below and in an upcoming CanAge publication.[33]

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Treatment

UTIs in older adults, when correctly diagnosed, are generally treated with antibiotics. The particular antibiotic and duration of treatment should be patient-specific.[34] For recurrent UTIs, taking antibiotics preventatively has been shown to reduce infections, with benefits diminishing once treatment was halted.[35] However, a recent Ontario based study focusing on people 66+, including outpatients and long-term care residents, found increased risk of antibiotic resistant bacteria, emergency room visits and hospitalizations and medication side effects in patients given preventative antibiotics for UTI.[8] There are other treatment options, such as probiotics for recurrent UTIs in postmenopausal women, that are showing promise, though a recent systematic review found there was not yet sufficient evidence to recommend them over antibiotics.[33]

Complications

Sepsis is the body's reaction to an intense, untreated infection. Urosepsis, or UTIs that lead to sepsis, are one of the most common causes of sepsis for older adults.[10] Symptoms of sepsis can vary, be subtle and non-specific, and are dependent on the original source of infection.[36] Some symptoms include: fever, pain, confusion and trouble breathing. Older adults, those with chronic illnesses or immunodeficiencies are at heightened risk for the condition to develop.[37, 38] Sepsis is costly to the Canadian healthcare system – the country spends $325,000,000 annually on sepsis treatment.[39] Sepsis affects 18 million people worldwide and is the 12th leading cause of death in Canada.[39] Survivors of sepsis tend to have increased cognitive impairment as well as increased functional limitations.[40] If untreated, sepsis can lead to organ failure and death.

5. Implications for Healthcare System

Costs

In a study examining infection-related healthcare costs for solid organ transplant recipients, the authors compared their sample to general hospitalization about infections, including UTIs. Between 2009 and 2013, there were 325,385 hospitalizations related to UTIs in Canada (excluding Quebec, Manitoba and the Territories). In 108,777 of those cases, UTI was the most responsible diagnosis for the hospitalization. Of the larger number (where UTI was present but not the primary diagnosis), the average patient age was 75. The authors calculated the average cost per case to be $12,407. 15% of people had a dementia diagnosis and 8.1% died.[41] In the US, total costs of UTIs, including lost labour due to sick days and healthcare costs, has been estimated to be 3.5 billion US dollars.[1]

Antibiotic Resistance

The World Health Organization considers antibiotic resistance one of the biggest threats to global health. Antibiotic resistance occurs when bacteria change in response to the

use of antibiotics, rendering medications useless. Antibiotic resistance is a natural process, but it is unnaturally accelerated when antibiotics are used inappropriately, such as prescribing antibiotics when they aren't needed.[42]

Antibiotic resistance is important to consider in the context of older adults and UTIs on both individual and societal levels. For individuals, given the difficulty in accurately diagnosing UTIs in older adults, it is likely that antibiotics are often being prescribed inappropriately. A recent study conducted in 16 US emergency departments found 31% of antibiotics prescribed for UTIs and ABU were inappropriate, with 10-26% (across the emergency departments) of patients having ABU treated for a UTI. [43] In Ontario, up to 50% of prescriptions for antibiotics in long-term care homes have been found to be inappropriate.[44] Some older adults then suffer from side effects of a useless treatment and the increased chance that bacteria they encounter will become resistant, leading to needing stronger, harsher antibiotics. On a societal level, given that UTIs are one of the main reasons antibiotics are prescribed, they are a flashpoint for antibiotic resistance. Appropriate prescribing to treat UTIs is key to protecting the effectiveness of antibiotics for the people who really need them.[45, 46]

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Conclusion

UTIs are a serious and complex issue impacting a larger number of older adults. As Canada's National Seniors' Advocacy organization, CanAge will continue to spotlight this important issue and work towards improved urological health for all older Canadians through forthcoming reports. Topics include: UTI prevention and treatment strategies, the stigma and social isolation associated with urinary incontinence, and the global health crisis of antibiotic resistance.

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