Choosing Wisely Canada™

Choisir avec soin MC

Ditch the Dipsticks in Older Adults

April 2024

Jerome Leis MD MSc FRCPC
Division of Infectious Diseases, Department of Medicine
Sunnybrook Health Sciences Centre
Associate Professor, University of Toronto

Conflict of Interest

Relationships with financial sponsors:

- Salary Support from Choosing Wisely Canada to lead Using Antibiotics Wisely
- No other relevant conflicts of interest to declare

Learning Objectives

- Describe evidence supporting de-adoption of urinalysis and urine dipsticks for older adults (over the age of 65)
- Discuss importance of a unified approach across different healthcare sectors
- Identify strategies to successfully de-adopt these tests across both long-term care and acute care settings

The Problem

- Overdiagnosis of UTI is one of the most common reasons for unnecessary use of antibiotics in LTC
- Two decades of quality improvement have not significantly improved antibiotic prescribing

Question #1

- What proportion of UTI diagnosed in older adults (>65) lack minimum signs of symptoms of infection?

a) 10%
b) 20%
c) 30%
d) 40%
e) >50%

Question #1

- What proportion of UTI diagnosed in older adults (>65) lack minimum signs of symptoms of infection?

a) 10%
b) 20%
c) 30%
d) 40%
e) >50%

Over half of antibiotic prescriptions in LTC are unnecessary or inappropriate

Author	Year	Population	N	% inappropriate
Jones	1987	2 Portland NHs	120	**51%**
Loeb	2001	22 chronic care facilities in Canada	3656	**51%**
Rotjapanan	2011	Urinary tract infections in 2 Rhode Island NHs	172	**73%**
Mitchell	2014	Patients with advanced dementia in 21 Boston NHs	214	**56%**
Pulia	2018	5 nursing homes in Wisconsin	213	**55.9%**

Question #2

- Antibiotic prescribing in Emergency Department for UTI is more guideline-concordant than in long-term care homes

a) TRUE
b) FALSE

Question #2

- Antibiotic prescribing in Emergency Department for UTI is more guideline-concordant than in long-term care homes

a) TRUE
b) FALSE

Characteristics of nursing home antibiotic prescriptions by infection type and location

	Overall (***n* = 735**)		NH (***n* = 640**)		ED (***n* = 34**)		Clinic (***n* = 61**)		P-**Value***
	n	%	n	%	n	%	n	%	
Mean Age, (SD)	84.8±9.9		85.2±9.9		83.5±10.4		81.1±9.8		0.006†
Lower Respiratory Tract	195	26.5	181	28.3	7	20.6	7	11.5	0.013†
Skin and Soft Tissue	175	23.8	135	21.1	12	35.3	28	45.9	<0.001‡
Urinary Tract	365	49.7	324	50.6	15	44.1	26	42.6	0.394
Sepsis Criteria Met	109	14.8	99	15.5	5	14.7	5	8.2	0.327

Pulia et al, ARIC, 2018

Rate of inappropriateness by syndrome and location

	Overall		NH		ED		Clinic		P-Value*
	n	%	n	%	n	%	n	%	
Inappropriate use across all Infection Types	359	48.8	304	47.5	16	47.1	39	63.9	0.048
Inappropriate for Lower Respiratory Tract Infections	99	50.7	94	51.9	2	28.6	3	42.9	0.437
Inappropriate for Skin and Soft Tissue Infections	47	26.9	29	21.5	3	25.0	15	53.6	0.002
Inappropriate for Urinary Tract Infections	213	58.4	181	55.9	11	73.3	21	80.8	0.023

Table 1 | International guideline statements on reducing urine tests and antibiotics for asymptomatic bacteriuria

Statement	Society (country)
Asymptomatic bacteriuria should not routinely be screened for, or treated with antibiotics in men or non-pregnant women, because it is not a risk factor for harm in these groups	National Institute for Health and Care Excellence (UK)
Discuss the need for antibiotics for asymptomatic bacteriuria in older people. Many older people have bacteria in their urine normally	Choosing Wisely UK (UK)
Do not perform urine dipsticks for suspected urinary tract infection in adults with a catheter or those over 65	Public Health England (UK)
Do not treat asymptomatic bacteriuria in non-pregnant women of any age	Healthcare Improvement Scotland (UK)
Do not screen or treat ASB in older people in long term care and do not carry out routine urine cultures in people who are asymptomatic with a catheter	European Association of Urology (Europe)
In older persons resident in long term care facilities, we recommend against screening for or treating asymptomatic bacteriuria	Infectious Diseases Society of America (US)
Don't recommend antimicrobials to treat bacteriuria in older adults unless specific urinary tract symptoms are present	Canadian Nurses Association (Canada)
Don't use antimicrobials to treat asymptomatic bacteriuria in older adults	Canadian Urological Association (Canada)
Don't use antimicrobials to treat bacteriuria in older adults unless specific urinary tract symptoms are present	Canadian Geriatrics Society (Canada)
Do not order urine cultures unless the person has symptoms consistent with urinary tract infection	American Society for Microbiology (US)
Don't use antimicrobials to treat bacteriuria in older adults unless specific urinary tract symptoms are present	American Geriatrics Society (US)
Do not perform surveillance urine cultures or treat bacteriuria in older people in the absence of symptoms or signs of infection	The Royal College of Pathologists of Australasia (Australia)
Follow-up testing of positive urine cultures after treatment is not indicated in the absence of persistent clinical symptoms	The New Zealand Microbiology Network (New Zealand)

Practice change recommendations

1.	Don’t perform screening urinalysis/urine dipstick and/or urine culture and sensitivity for residents on admission
2.	Don’t perform urine dipstick/urinalysis to diagnose a UTI.
3.	Don’t assume a UTI is the cause of any change in health status, including behaviors, until alternate explanations are excluded
4.	Don’t collect a urine culture upon request without first seeking to understand and address resident/substitute decision-maker/family concerns
5.	Don’t order a urine culture unless **minimum criteria** for a UTI are present (modified Loeb criteria).
6.	Don’t prescribe antibiotics before first asking why a urine culture was submitted, and if the initial reason has improved already without antibiotic treatment, don’t treat
7.	Don’t treat a UTI for excessive durations.
8.	Don’t forget to reassess the need for antibiotic therapy within 3 days of starting antibiotics to check antibiotic sensitivity results and that the resident is improving.
9.	Don’t routinely screen residents from LTC homes with a urinalysis/urine dipstick unless **minimum criteria** (see Practice Change Recommendation #5) for a UTI are present.

How to make a clinical diagnosis of UTI in frail seniors

Urinary tract infection

- For residents with an indwelling catheter, a prescription was considered adherent if at least 1 of the following 2 scenarios applied:
  1. fever; or
  2. a new case of costovertebral angle tenderness, or symptoms of rigor or new symptoms of delirium.
- For residents without an indwelling catheter, a prescription was considered adherent if the resident had pain or difficulty with urination or fever, and at least 1 of the following:
  1. new or increased urgency to urinate;
  2. new or increased frequency of urination;
  3. new or increased suprapubic pain;
  4. new case of costovertebral angle tenderness;
  5. obvious blood in urine; or
  6. new/worsened urinary incontinence.

Loeb et al, BMJ, 2005

Barriers to appropriate antibiotic prescribing in LTC

- Off-site physicians
  - up to half of antibiotic prescriptions called in by phone
- Limited histories in cognitively impaired patients
- Blunted febrile responses in older patients
- Changes in clinical status may signal onset of sepsis
- Off-site radiology and laboratory testing
- Non-urinary presentations attributed to UTI
- Urine testing is easy and may be perceived as more objective
- Asymptomatic pyuria and bacteriuria are highly prevalent

Nicolle *ICHE* 2000; Crnich *Drugs Aging* 2015; Katz *Arch IM* 1990

Prevalence of asymptomatic bacteriuria

- **5%** of young healthy adults
- **10-20%** among elderly residing in community
- **35%** elderly men residing in long-term care
- **50%** of elderly women residing in long-term care

Nicolle et al, IDSA guidelines for diagnosis and treatment of ASB, Clin Infect Dis, 2019

Practice change recommendations

1.	Don’t perform screening urinalysis/urine dipstick and/or urine culture and sensitivity for residents on admission
2.	**Don’t perform urine dipstick/urinalysis to diagnose a UTI.**
3.	Don’t assume a UTI is the cause of any change in health status, including behaviors, until alternate explanations are excluded
4.	Don’t collect a urine culture upon request without first seeking to understand and address resident/substitute decision-maker/family concerns
5.	Don’t order a urine culture unless **minimum criteria** for a UTI are present (modified Loeb criteria).
6.	Don’t prescribe antibiotics before first asking why a urine culture was submitted, and if the initial reason has improved already without antibiotic treatment, don’t treat
7.	Don’t treat a UTI for excessive durations.
8.	Don’t forget to reassess the need for antibiotic therapy within 3 days of starting antibiotics to check antibiotic sensitivity results and that the resident is improving.
9.	Don’t routinely screen residents from LTC homes with a urinalysis/urine dipstick unless **minimum criteria** (see Practice Change Recommendation #5) for a UTI are present.

Diagnostic stewardship

- Leverages changes to laboratory testing to improve antimicrobial
- Powerful approach to overcoming our cognitive biases
  - Treat the patient/resident – not the test result

Morgan et al, JAMA 2017
Leis et al, Clin Infect Dis 2015
Yin et al, JAMA Intern Med 2015

Proof of concept

	Control (Routine reporting of catheter urines)		Intervention (modified reporting of non-catheter urines)	
	Control	Intervention	Control	Intervention
Urine culture reported	100%	100%	100%	**14%**
Antibiotics for asymptomatic bacteriuria	42%	41%	48%	**12%**

Leis et al, Clin Infect Dis, 2014

Impact of urine dipstick results on ‘downstream’ over-ordering

- Prospective cohort study of consecutive patients on admission to general medicine (n=450)
  - 250 (62.0%) had a urine dipstick upon admission
  - 211 (84.4%) lacked signs or symptoms of UTI
  - 198 (79.2%) lacked any other reason to have a dipstick
- Positive dipstick results (42%) associated with increased probability of
  - urine culture ($P < .001$)
  - antibiotic prescription ($P < .001$)

Yin et al, JAMA Intern Med 2015

Question #3

Why is ‘urinalysis in older adults’ a diagnostic stewardship target?

a) Poor positive predictive value
b) Poor negative predictive value
c) Both

Traditionally quoted performance characteristics of urine dipsticks

- Gold standard is bacteriuria (urine CFU of $>10^5$)
- High prevalence in older institutionalized adults (80-90% positive)

PPV	NPV
30-50%	70-100%

Juthani-Mehta, JAGS, 2009
Nicolle, CID, 2005

Flaws in older adults

- Dipsticks were introduced in practice before standards for POCT
- Test packaging warn against using the test as a diagnostic or therapeutic decision-making tool
- Sensitivity and specificity of leucocyte esterase and nitrite positivity have been mainly studied in children and pre-menopausal women where asymptomatic bacteria is uncommon
- In older people - urine dipsticks are both too insensitive and too non-specific to be used to in clinical decision making

A, Joseph (2020) The Diagnosis and Management of UTI in >65s: To Dipstick or Not? The Argument Against Dipsticks. Infections in Prevention in Practice. https://doi.org/10.1016/j.infpip.1010.100064
K, Piggot, J Trimble, and J, A Leis (2023) Reducing unnecessary urine culture testing in residents of longer term care facilities. BMJ 2023;382;e075566

Harms in older adults

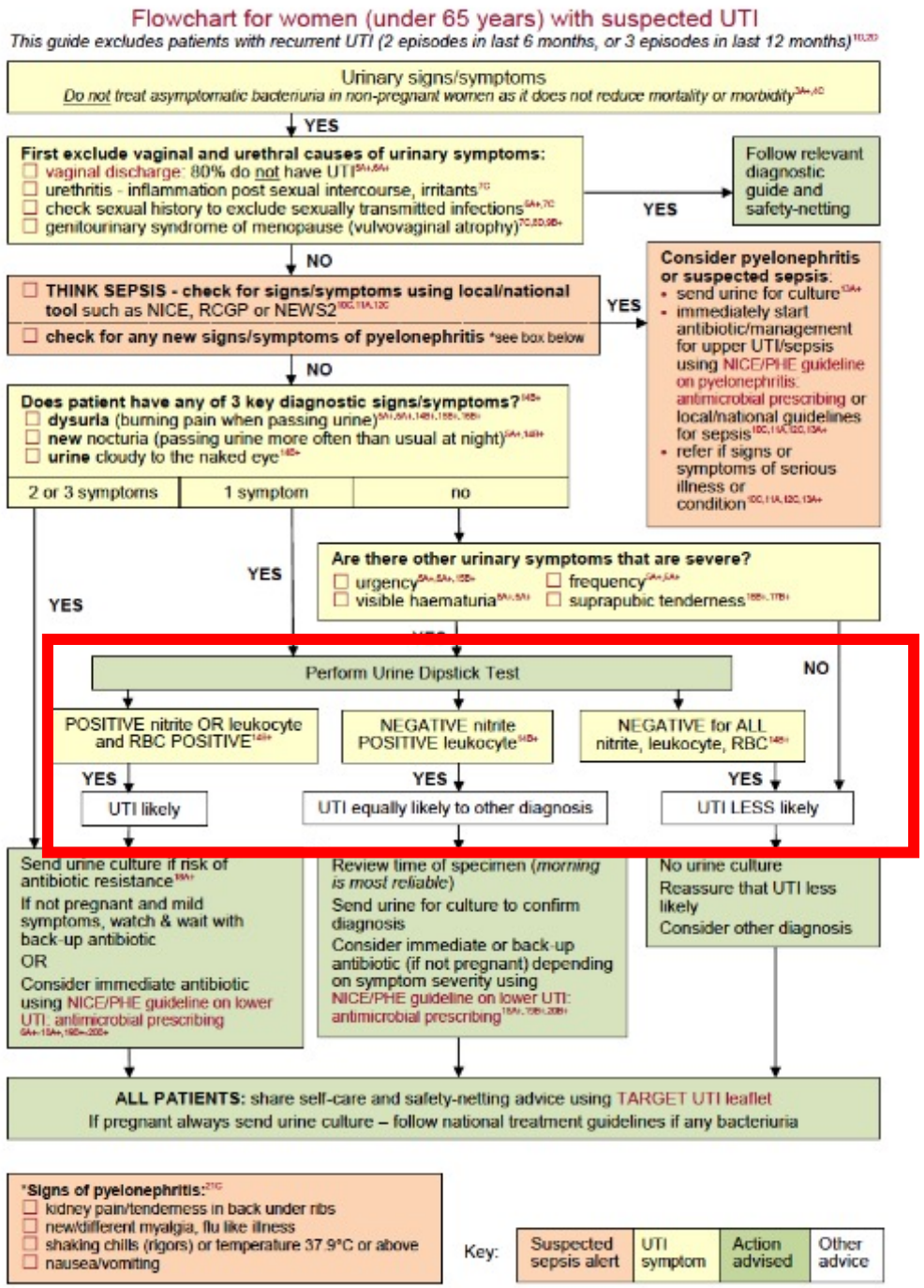
- Confirmation bias
  - Widespread belief that positive dipstick supports diagnosis of UTI in older adults
- Premature closure bias
  - Converts a complex unwell patient to a straightforward case requiring a short course of antibiotics
- Negative result does not rule out

A, Joseph (2020) The Diagnosis and Management of UTI in >65s: To Dipstick or Not? The Argument Against Dipsticks. Infections in Prevention in Practice. https://doi.org/10.1016/j.infpip.1010.100064
K, Piggot, J Trimble, and J, A Leis (2023) Reducing unnecessary urine culture testing in residents of longer term care facilities. BMJ 2023;382;e075566

Public Health England

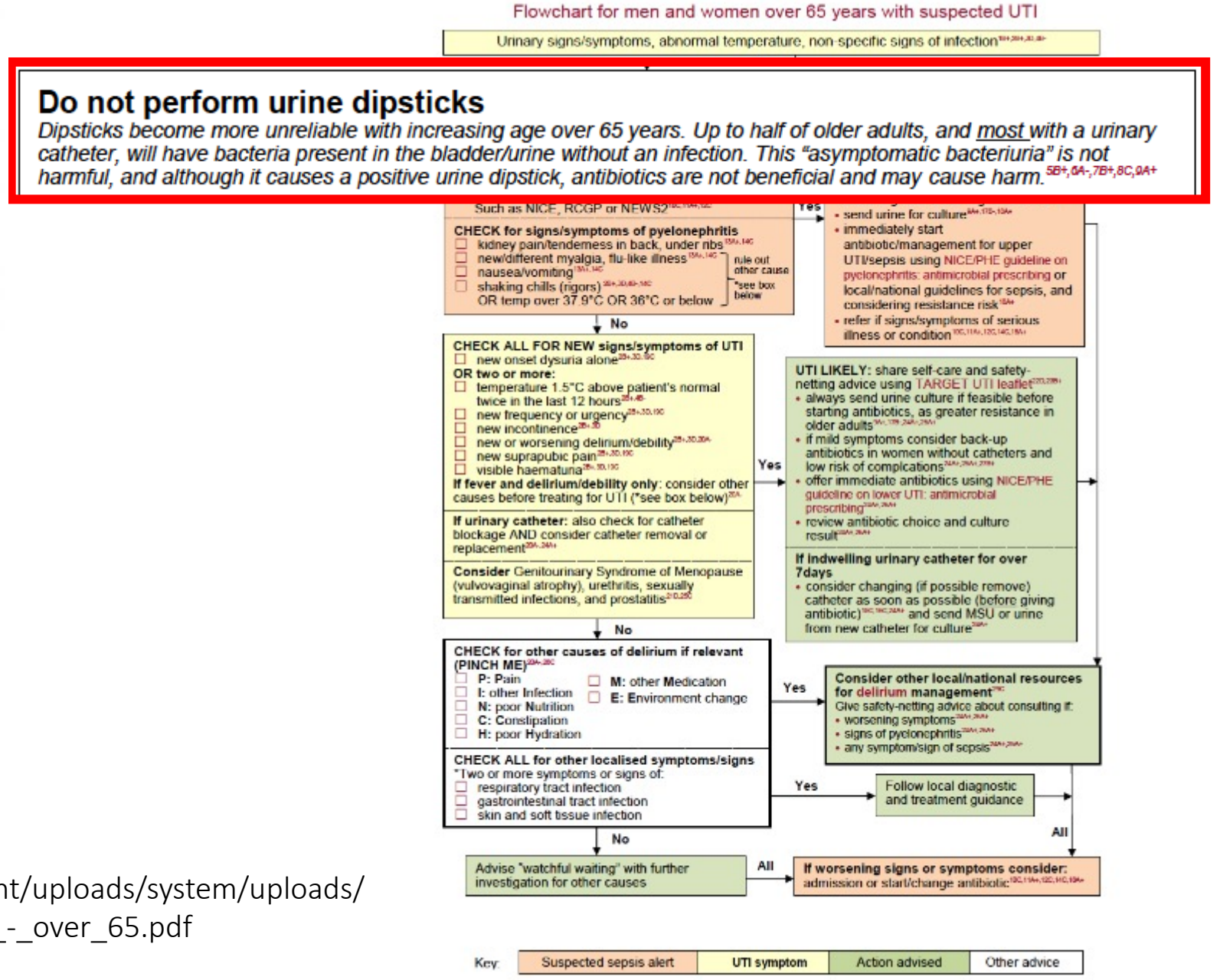
Diagnosis of UTI, in <65

https://clinical-pathways.org.uk/sites/default/files/referral-support/Urology/pheutiflowchart-under65women.pdf



Public Health England

Diagnosis of UTI, in >65



https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/755889/PHE_UTI_flowchart_-_over_65.pdf

Question #4

Which of the following is the *greatest* barrier to ‘ditching the dipstick’ for use in older adults?

a) Engrained practice patterns
b) Widespread availability of dipsticks
c) Consistent practice across healthcare sectors
d) Use of dipsticks for non-infectious reasons

Proposed streamlined model of care

Long-Term Care	Emergency Department/clinics

• **<u>Remove all dipsticks</u>**
• Urine R/M orderable for non-infectious indications only:
  • Hematuria
  • Hypertension/renal injury (proteinuria)
 	
NOTE: Urine culture orderable (+/- empiric antibiotic therapy) if minimum Loeb criteria are present
	<u>Age <65 AND community dwelling</u>
	
	Urine dipstick only if acute LUTS or hematuria/renal injury
	
	<u>Age >65 OR long-term care residing</u>
	• No urine dipsticks performed
	• Urine R/M orderable for non-infectious indications only:
	  • Hematuria
	  • Hypertension/renal injury (proteinuria)

Joint Statement on Dipstick Use in LTC

Antibiotics are overused in long-term care. Overdiagnosis of UTI is one of the most common reasons for unnecessary use of antibiotics in older populations. **Using urine dipsticks leads to inappropriate use of antibiotics.** We believe that urine dipsticks should NOT be performed in residents of long-term care or any adult older than 65.

Therefore, we support the following recommendations:

- Do NOT purchase, store, or use urine dipsticks in long-term care homes.
- Do NOT perform urine dipstick in adults > 65 years old who present to a clinic, an Emergency Department or any other healthcare setting.

Note: routine and microscopic urine evaluation should be used for non-infectious indications only (e.g. to rule out hematuria, proteinuria).

Joint Statement on Dipstick Use in LTC

College of Family Physicians of Canada	Endorsed
Canadian Society for Long-Term Care Medicine	Endorsed
Canadian Nurses Association	Endorsed
Canadian Pharmacist Association	Endorsed
Nurse Practitioner Association of Canada	Endorsed
Association of Medical Microbiology and Infectious Disease Canada	Endorsed
Canadian Urological Association	Endorsed
Canadian Geriatrics Society	Endorsed
Canadian Association for Long Term Care	Endorsed

* Other societies pending…

Question #5

Are urine dipsticks still in use in your local Long Term Care home?

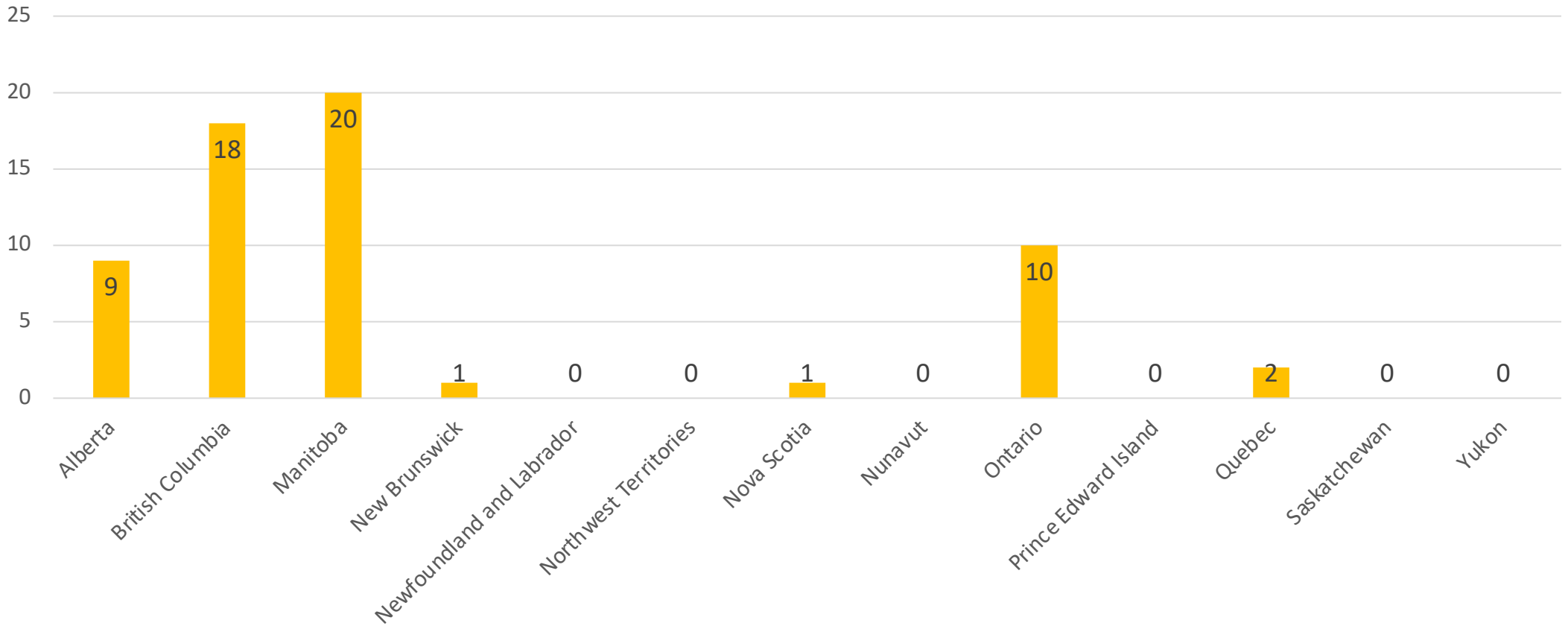
Methods

Two surveys (survey monkey) –open and continuous convenience sample

1. Long-Term Care Medical Directors
   - 277 medical directors across Canada
   - Steering Committee Members sent survey out
   - 3 questions

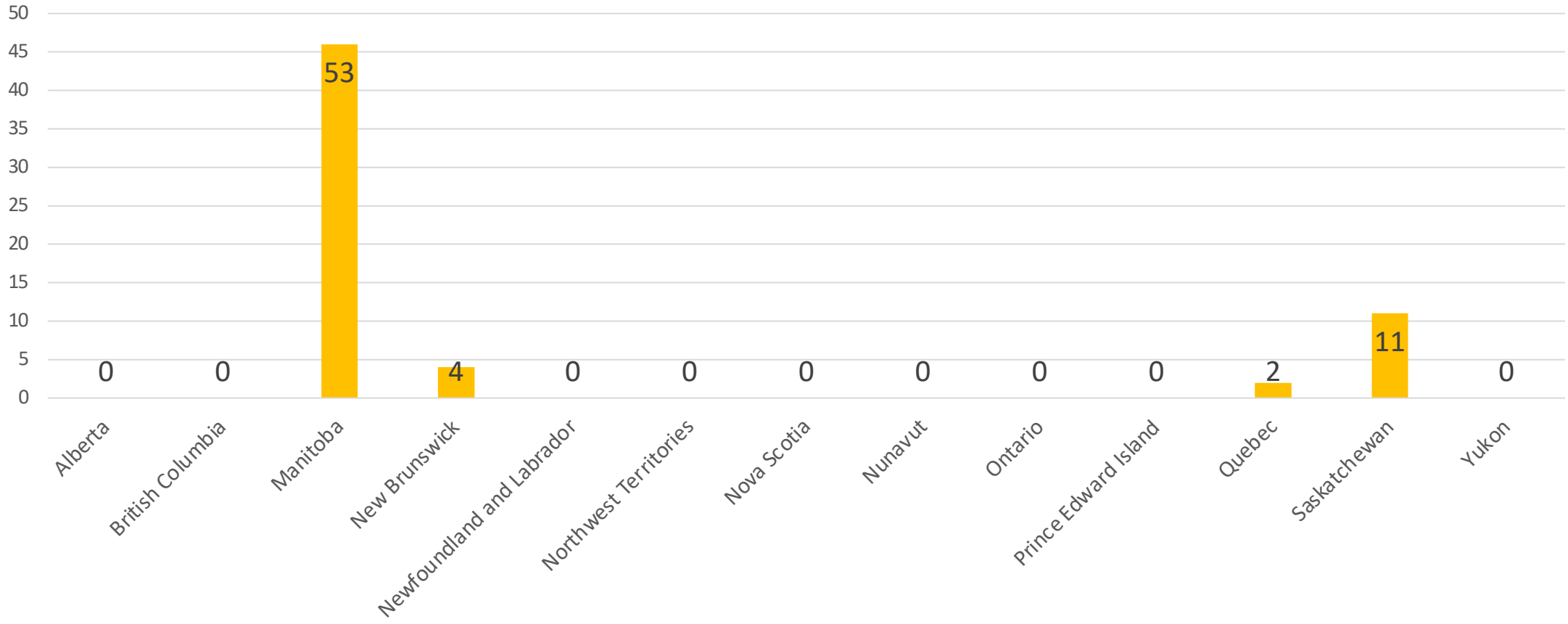
2. Facility Leadership i.e. Facility Directors, Nursing Leads, etc.
   - Canadian Associations of Long Term Care (CALTC)
   - Steering Committee Members sent survey out
   - 4 questions

Survey Results – Medical Directors



N= 61

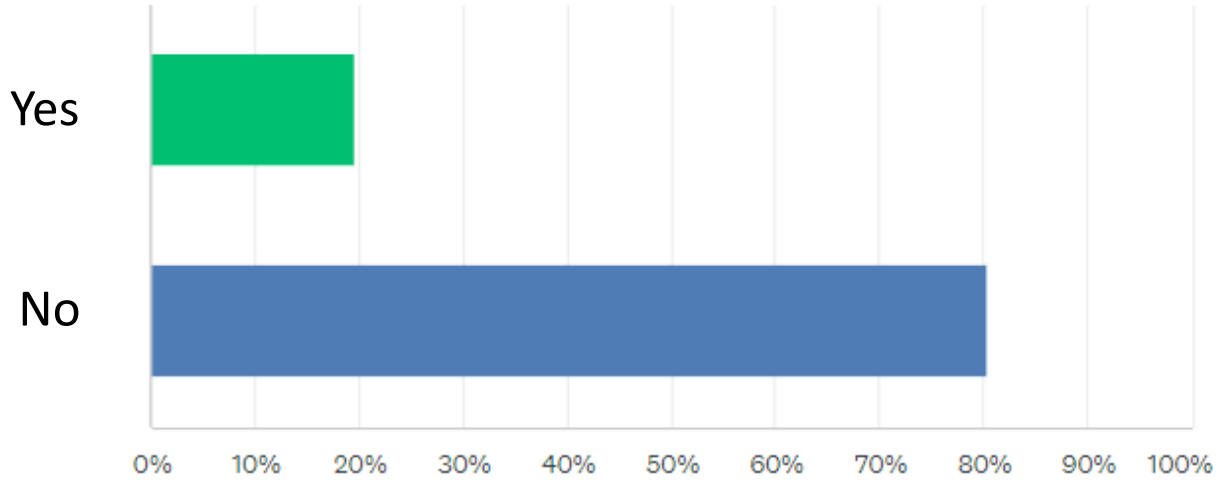
Survey Results – Facility Leadership



N= 71

Survey Results – Medical Directors

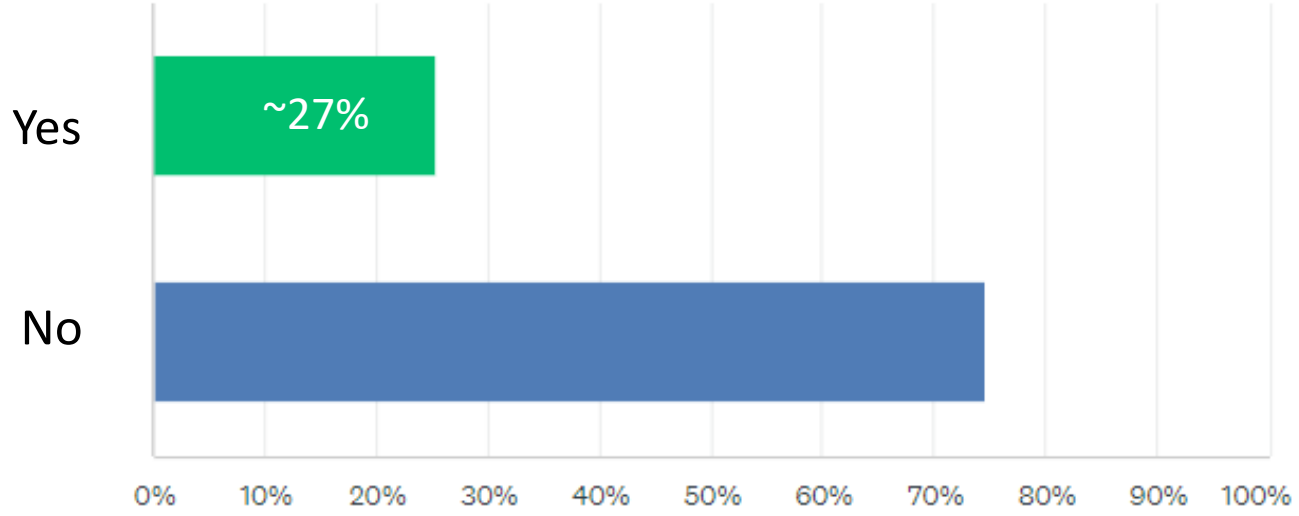
As an attending physician, in the past month have you used/asked staff to use urine dipsticks for your residents in Long Term Care Home(s)?



N= 61

Survey Results – Facility Leadership

Do staff in your care home use urine dipsticks to test residents' urine?



N= 71

Survey Results – Facility Leadership

Survey Respondent Comments:

- “Our LTC home receives stock of urine dipsticks from local hospital”
- “nurses are reluctant to stop using dip sticks and want to treat "infections" rather than considering pushing fluids or considering additional factors.”
- “I use them more to rule out a UTI, not to diagnose one.”
- “I feel if we could utilize the dipstick to get a quick idea of the urine, there would be a lot less inappropriate urinalysis being sent to lab.”
- “I understand why we removed dipsticks from clinical settings, but it does seem that we send far more UA's than we used to because of it.”
- “Doctors don't trust these [dipsticks] and will send for Culture if the resident is symptomatic.”

Summary

- Strong consensus to de-adopt use of urine dipsticks for older adults
- Most LTC homes have already moved in this direction but there remains significant opportunity
- Physical removal from LTC is needed to sustain practice change and supported by alignment in practice in non-LTC sectors