A monthly conversation series that zeros in on parts of Canada's health care system where overuse, waste, and harm are an everyday concern.

# CHOOSING WISELY TALKS

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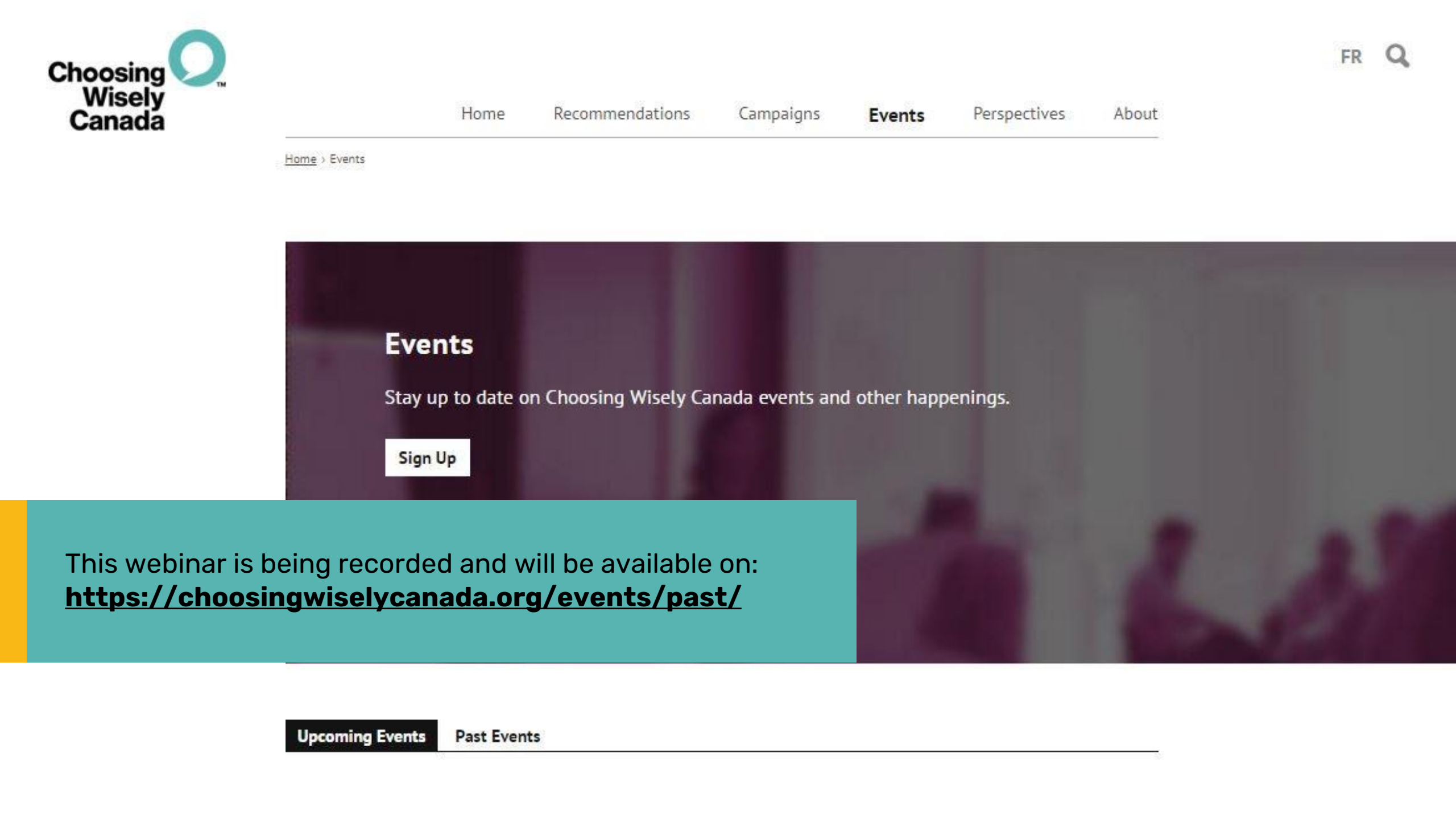
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# TALKS

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## Antibiotics in Long-Term Care: The Problem with Urine Dipsticks

**NOV 22 | 12 PM ET**

Choosing Wisely Canada™

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# Antibiotics in Long-Term Care: The Problem with Urine Dipsticks

Presenters:
Dr. Jerome Leis
Dr. Sid Feldman
Julie Weir

# Outline

- Brief overview of problem of overdiagnosis of UTI in long-term care (LTC)
- Practice changes endorsed by Choosing Wisely Canada since 2020
- The harms of urine dipsticks and the case for their de-implementation

# 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

# About half of antibiotic prescriptions in LTC are unnecessary or inappropriate

| Author | Year | Population | N | % inappropriate |
|---|---|---|---|---|
| Zimmer | 1986 | 42 U.S. NHs | 1748 | **38%** |
| 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%** |

# 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

## Minimum Loeb Criteria

- **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 rigors, 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 in 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

| | |
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# 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

# 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 the test

- 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 of positive dipsticks

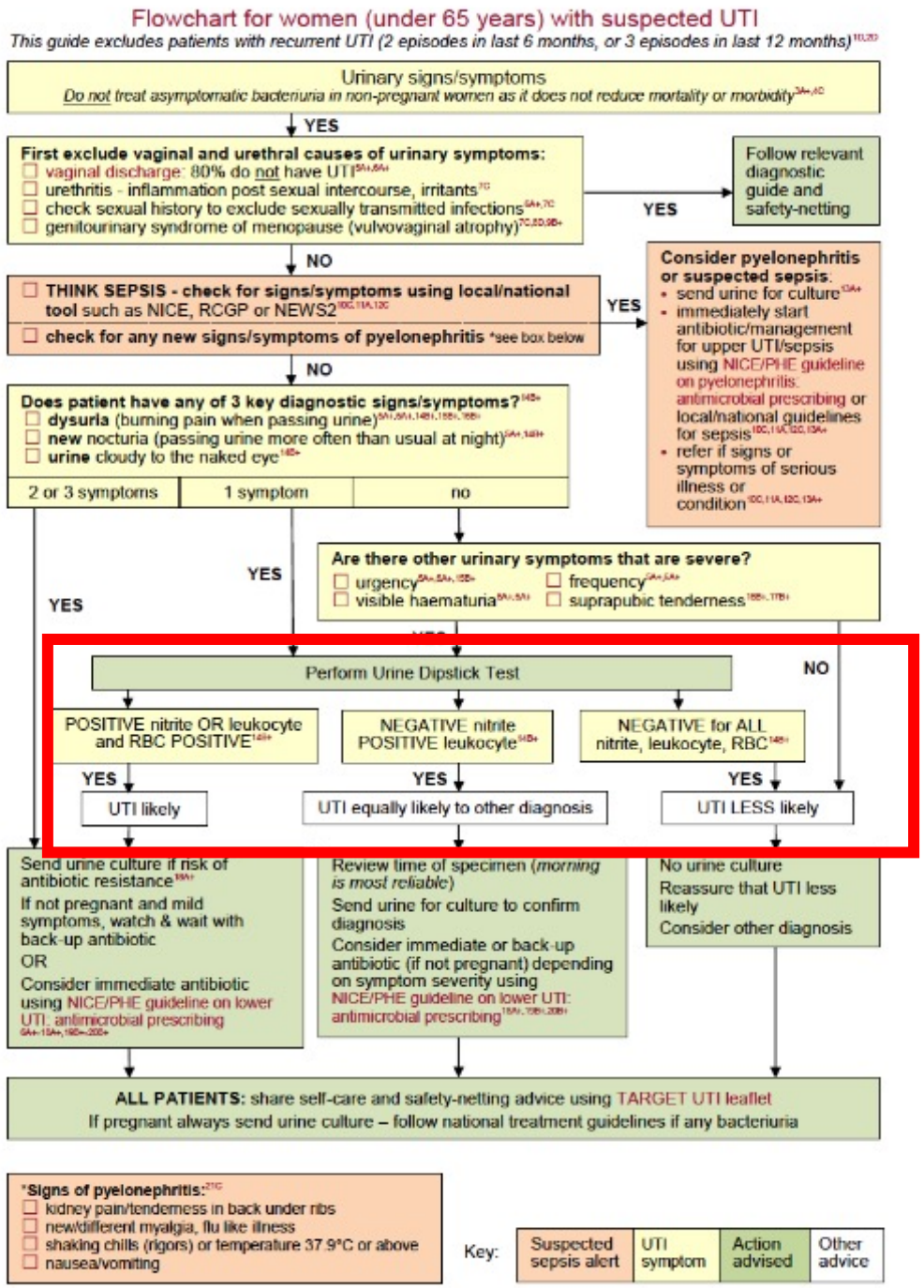
- Widespread belief that positive dipstick supports diagnosis of UTI in older adults
- Impact on diagnostic process - Confirmation bias
- Premature closure bias
  - converting a non- specific unwell patient to a straightforward case requiring a short course of antibiotics

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

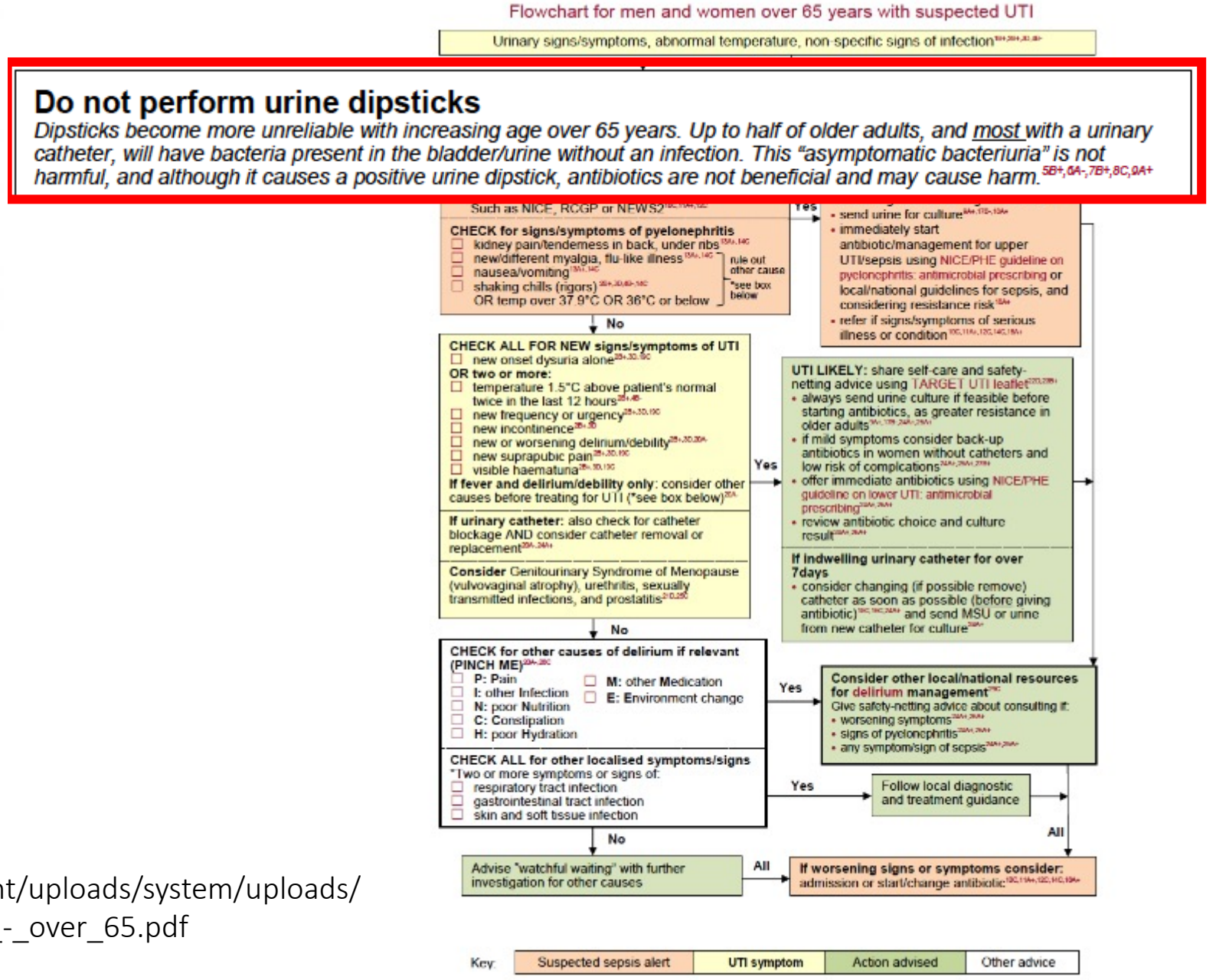
# Diagnosis of UTI, in <65

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



Public Health England

# Diagnosis of UTI, in >65

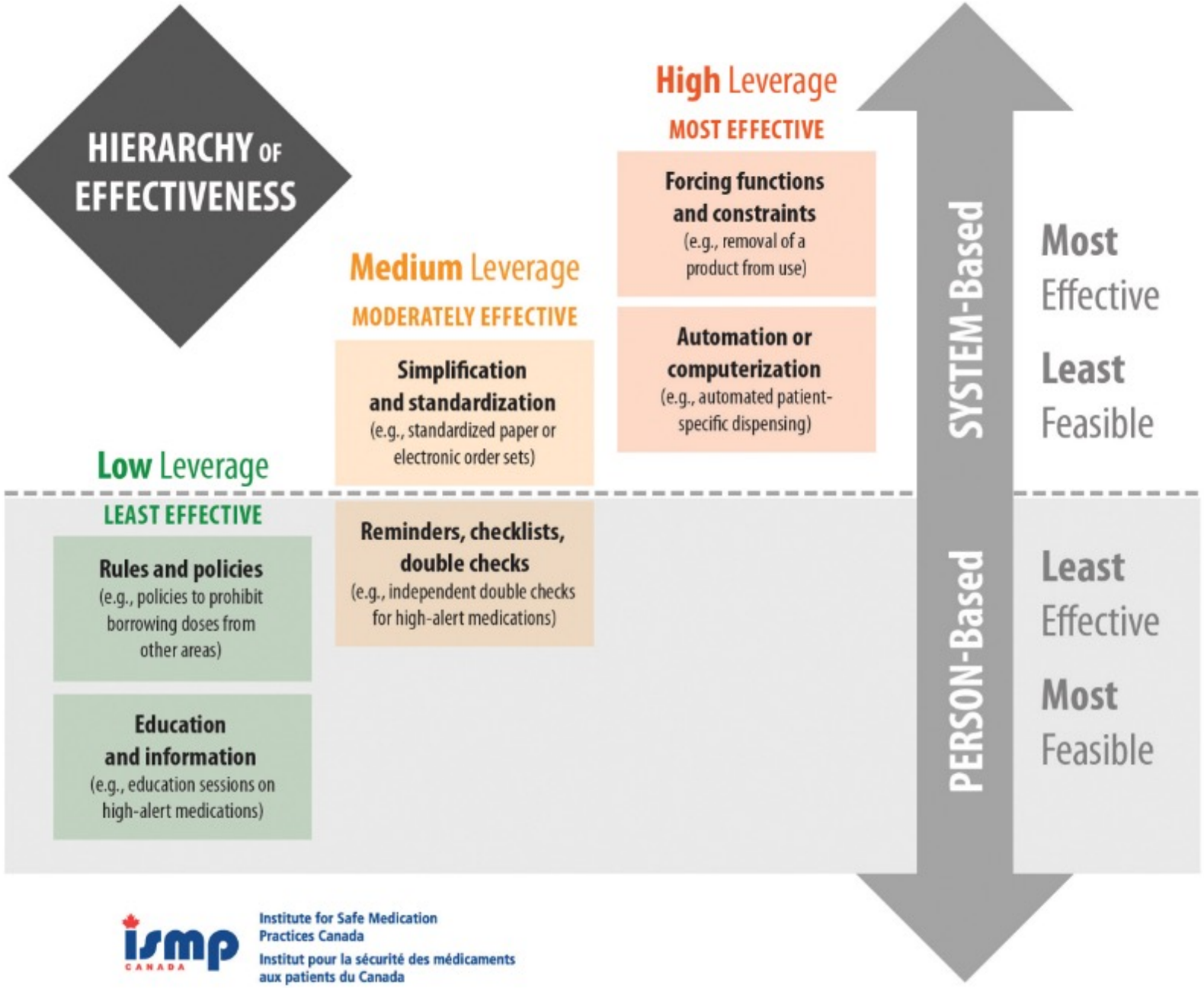



https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/755889/PHE_UTI_flowchart_-_over_65.pdf

# What are potential downsides of de-implementing urine dipsticks?

| Common questions | Responses |
| --- | --- |
| Value of NPV on antibiotic stewardship? | Over-estimated<br>Outweighed by poor PPV |
| Unintended consequences of increased urine culturing and empiric antibiotics? | Not supported by data<br>Must be paired with broad awareness about asymptomatic bacteriuria |
| Value for diagnosis of non-infectious renal conditions? | Urinalysis must still be available (for non-infectious indications only) if urine dipstick removed |

# What change will lead to 'ditching the dipstick'?



## Long-Term Care

- Remove all dipsticks
- 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

## Emergency Department, Hospital Ambulatory Clinics

**Age <65 AND community dwelling**

Urine dipstick only if:

- Acute dysuria
- Urinary frequency
- Urinary urgency
- Suprapubic pain
- Flank pain
- Hematuria
- Hypertension/renal injury (proteinuria)

**Age >65 OR long-term care residing**

- No urine dipsticks performed
- Urine R/M orderable for non-infectious indications only:
  - Hematuria
  - Hypertension/renal injury (proteinuria)

# Example from New Brunswick

# Starting with a place of consensus

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

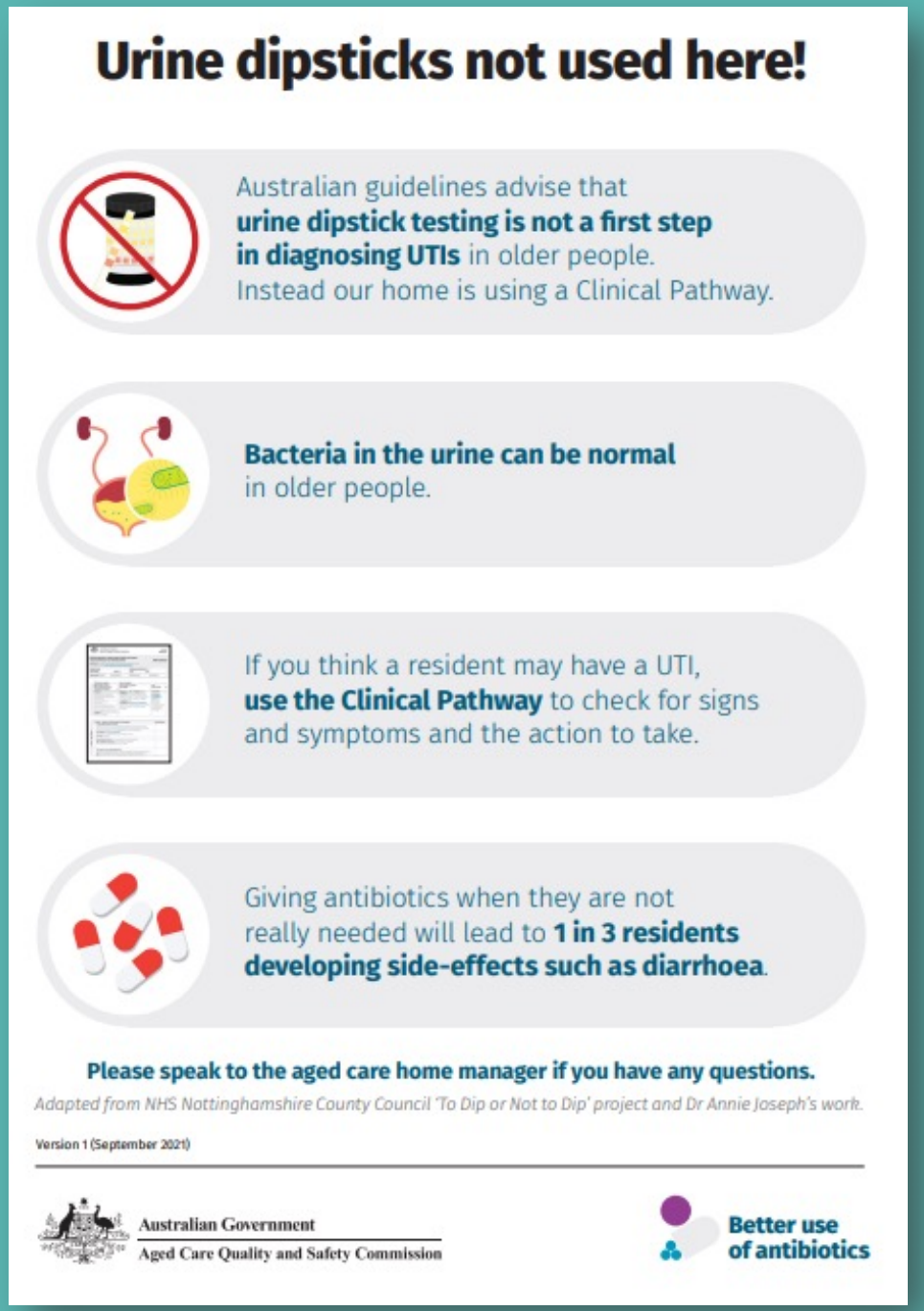
Note: Urine R/M should remain available for non-infectious indications only (eg. to rule out hematuria, proteinuria)

# Endorsement from Societies

- Canadian Society for Long-Term Care Medicine
- Canadian Nurses Association – Gerontology subgroup
- Canadian Pharmacist Association
- Canadian Association for Long-Term Care
- Canadian Academy of Geriatric Psychiatry
- College of Family Physicians of Canada – LTC subgroup
- Association of Medical Microbiology and Infectious Disease Canada
- Other?

# EXAMPLE

- Endorsement from societies on statement
- Posters and tools created to support facilities and clinicians



# Question for discussion

- As a first step, do you think **a joint statement** endorsed by all the societies mentioned would help your facility or team to change practice?
- If you are a family member or caregiver, what information would be helpful to you if you thought the person you are caring for needed a dipstick test?
- If you work in a facility that no longer uses dip sticks, how did you change practice?
- If you work in a facility that still uses dip sticks, what do you believe are some of the barriers to change?

# Sneak Peek

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# TALKS

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## Cardiovascular Disease in Primary Care: Simplifying Lipid Guidelines

**NOV 29 | 12 PM ET**

# Evaluation Survey

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