

# ***Choosing Wisely Canada – top five list in infectious diseases: An official position statement of the Association of Medical Microbiology and Infectious Disease (AMMI) Canada***

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**BACKGROUND:** Overuse of investigations, treatments and procedures contribute to rising health care costs and may cause patient harm. In an attempt to promote higher value health care, the *Choosing Wisely Canada* campaign has encouraged professional societies to develop statements that are directly actionable by their members. Currently, there are variations in infectious diseases practice that lead some patients to receive therapies and investigations that lack benefit and are potentially harmful.

**METHODS:** The Association of Medical Microbiology and Infectious Disease Canada (AMMI) Canada established its *Choosing Wisely Canada* top five list of recommendations using the framework put forward by *Choosing Wisely Canada*. Following an electronic survey of its members regarding low-value practices within infectious diseases, AMMI Canada convened a working group that developed a list of draft recommendations and ranked the top five recommendations by consensus. This list was shared with the AMMI Canada membership electronically and during a national open forum. Following revisions based on feedback received, the AMMI Canada Executive Council and Guidelines Committee endorsed the final list, which was disseminated online.

Overuse of investigations, treatments and procedures contribute to rising health care costs, and may cause patient harm (1). The American Board of Internal Medicine launched the *Choosing Wisely* campaign in 2012, which sought to create discussions between patients and providers that promote better value care (2). One of the most visible platforms for these discussions has been the dissemination of lists created by professional societies of “Five Things that Physicians and Patients Should Question”. In the form of declarative statements, the lists identify practices that should be reduced or eliminated because they lack proven benefit or may cause harm to patients. This campaign was introduced in Canada in 2014 and >40 medical and surgical society lists have since been created (3).

**RESULTS:** The top five declarative statements on infectious diseases practices that physicians and patients should question include: do not routinely prescribe intravenous forms of highly bioavailable antimicrobial agents for patients who can reliably take and absorb oral medications; do not prescribe alternative second-line antimicrobials to patients reporting nonsevere reactions to penicillin when beta-lactams are the recommended first-line therapy; do not routinely repeat CD4 measurements in patients with HIV infection with HIV-1 RNA suppression for >2 years and CD4 counts >500/ $\mu$ L, unless virological failure occurs or intercurrent opportunistic infection develops; do not routinely repeat radiologic imaging in patients with osteomyelitis demonstrating clinical improvement following adequate antimicrobial therapy; and do not prescribe aminoglycosides for synergy to patients with bacteremia or native valve infective endocarditis caused by *Staphylococcus aureus*.

**CONCLUSIONS:** The *Choosing Wisely Canada* statements in infectious diseases endorsed by AMMI Canada represent a starting point to engage AMMI Canada members in broader discussions related to resource stewardship within infectious diseases practice and to take action.

**Key Words:** Choosing Wisely; Health care resources; Infectious diseases; Resource stewardship; Value

Currently, infectious diseases physicians are engaged in resource stewardship from the perspectives of reducing unnecessary antimicrobial prescribing and overuse of devices that contribute to health care-associated infections. These activities include consultative practice as well as formal participation in antimicrobial stewardship and infection prevention and control programs to enhance the value of care provided.

*Choosing Wisely Canada* has encouraged professional societies to preferentially focus on practices that are within their purview of practice to develop statements that are directly actionable by their members. Currently, there are variations in practice that lead some patients to receive therapies or investigations that lack benefit and may also be

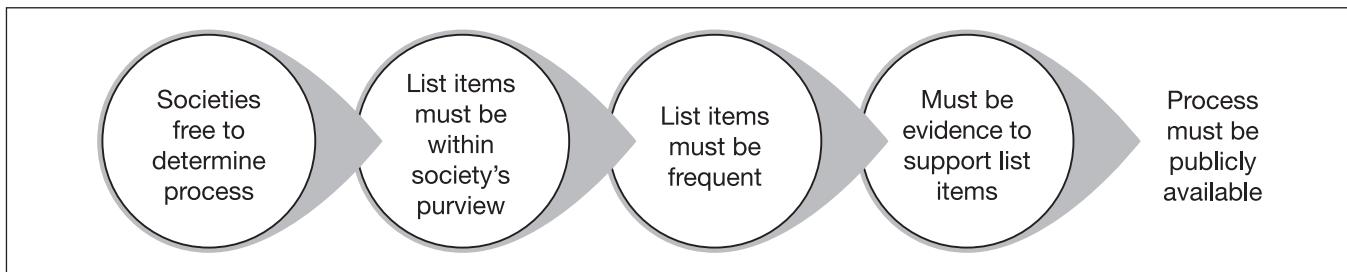
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**Figure 1)** Framework for physician list development put forth by Choosing Wisely Canada

potentially harmful. The present policy statement describes the initiative led by the Association of Medical Microbiology and Infectious Disease (AMMI) Canada to develop a *Choosing Wisely Canada* list of “Five Things that Physicians and Patients Should Question in Infectious Diseases”.

## METHODS

AMMI Canada established its *Choosing Wisely Canada* top five list of recommendations using the framework proposed by *Choosing Wisely Canada* (Figure 1). This section reviews the process used to develop this list.

### Initial survey of membership

The *Choosing Wisely Canada* framework was first introduced to the AMMI Canada membership through an e-mail communication that provided an overview of the campaign as well as a request to members to submit recommendations on tests, treatments or procedures that should be reduced or eliminated based on members’ opinions that they represent low-value care. A survey sent on December 15, 2014, was opened by 198 of 543 (36%) members, with 16 (8%) providing suggestions. The survey was repeated on January 5, 2015, and opened by 165 of 543 (30%) with five additional comments provided. In total, there were 51 statement suggestions received.

### AMMI Canada *Choosing Wisely* working group

In January 2015, a working group of 14 members was convened, representing a diverse group of infectious diseases specialists from several geographical regions, practice settings and institution types, including adult and pediatric infectious diseases physicians, with a broad range of clinical experiences. Over a four-month period, this working group conducted six teleconferences to develop a draft list of recommendations.

The working group began by reviewing the suggestions submitted through the survey of the AMMI Canada membership and also by adding additional statements to this list. In total, there were 10 statements incorporated from the membership survey and 13 new statements added by the working group members, for a total of 23 suggestions that were developed into formal statements and ranked by the working group. Statements related to practices that met the following four criteria received highest ranking: (i) within the purview of infectious diseases practice; (ii) frequently seen in practice; (iii) significant potential for uptake by other physicians and societies; and (iv) likely to have significant overall impact on the value of care provided by the members of our profession. Discussions were held until consensus was reached regarding the top five statements. All members contributed edits to both the five statements and their accompanying rationales.

### Vetting and endorsement of list by the AMMI Canada membership

The draft recommendations were shared electronically with the AMMI Canada membership on April 4, 2015, to provide an opportunity for feedback. Changes were made by the working group based on member suggestions and the revised recommendations were presented at an open forum held at the joint AMMI Canada – Canadian Association of Medical Microbiology and Infectious Diseases Annual

Conference in Charlottetown, Prince Edward Island, on April 18, 2015. During this forum, members were provided the opportunity to engage in open discussion to review the five highest ranked alternative statement ideas that did not meet the top five list. Real-time polling software was used to enable members to vote anonymously as to whether other lower-ranked statements should be selected above any of the statements in the top five list (4). Among those in attendance, none believed that the alternative statements should replace any of the statements in the top five list. On final voting, all agreed that the top five declarative statements should be endorsed and disseminated by both AMMI Canada and *Choosing Wisely Canada*.

### Dissemination by AMMI Canada and *Choosing Wisely Canada*

Following the annual meeting, minor refinements to the declarative statements were made by the working group based on feedback from the session. The AMMI Canada Executive Council and Guidelines Committee provided full endorsement of the final list that was disseminated.

## RESULTS

The final top five declarative statements of infectious diseases practices that physicians and patients should question are listed in Table 1. Each statement is supported by a brief paragraph that provides its rationale. In this section, we provide the reasoning behind the selection of each recommendation and how the statement may ultimately be incorporated into infectious diseases practice to improve the value of care provided.

### Statement #1:

Do not routinely prescribe intravenous forms of highly bioavailable antimicrobial agents for patients who can reliably take and absorb oral medications

This statement was the most highly ranked. Members of both the working group and those surveyed believed that routine intravenous prescription of these antimicrobials is highly prevalent within infectious diseases practice, and that there was the potential for significant uptake of this recommendation by other physicians and societies. Antimicrobials, such as fluoroquinolones, trimethoprim-sulfamethoxazole, clindamycin, linezolid, metronidazole and fluconazole, have excellent oral bioavailability and only rarely need to be administered intravenously; yet, the parenteral route is often considered the default route of administration for these agents in hospitalized patients (5). Use of oral formulations of these medications will reduce the need for placement and maintenance of venous access devices and their associated complications. The associated direct and indirect costs of oral administration are significantly lower when compared with intravenous administration and up front use of oral medications may facilitate more rapid discharge from hospital (6).

While the working group acknowledged that there are clinical circumstances that warrant prescription of intravenous formulations of these agents (vomiting, malabsorption, coadministration of fluoroquinolones when enteral feeding cannot be interrupted), the oral route of administration should be the preferred route rather than the exception. Moreover, the statement assumes these agents are being chosen

for clinically appropriate indications. For example, oral therapy would generally not be acceptable for treatment of cases of infective endocarditis or hemodynamically unstable patients. The inclusion of the word 'routinely' was selected to respect these circumstances.

**Statement #2:**

**Do not prescribe alternative second-line antimicrobials to patients reporting nonsevere reactions to penicillin when beta-lactams are the recommended first-line therapy**

This statement was ranked highly because it addresses a common problem, is highly relevant to infectious diseases practice and has significant potential for uptake by other specialties. Reported penicillin reactions, even when nonsevere, frequently result in the use of alternative second-line agents that may be clinically inferior, or may pose increased risks for adverse events, resulting in longer lengths of stay and increased costs of care (7-10). Alternative broad-spectrum agents may also result in selection of antimicrobial resistance (9).

This statement emphasizes the importance of obtaining a detailed history of a patient's reported previous reaction to penicillin to determine whether beta-lactam therapy can be safely administered (7). In patients reporting severe reactions to beta-lactams, the working group agreed that this statement should not apply because history alone is insufficiently sensitive to determine the onset of the reaction in relation to the time of administration for possible type I reactions. Furthermore, in the case of severe idiopathic adverse events, such as drug-induced vasculitis or Steven-Johnson syndrome, beta-lactam therapy should generally be avoided pending expert consultation from an allergy specialist (9).

**Statement #3:**

**Do not routinely repeat CD4 measurements in patients with HIV infection with HIV-1 RNA suppression for >2 years and CD4 counts >500/ $\mu$ L, unless virological failure occurs or intercurrent opportunistic infection develops**

The 2014 recommendations of the International Antiviral Society – US Panel state that measurement of CD4 count is optional among patients with suppressed HIV viral loads for >2 years and CD4 counts >500/ $\mu$ L (11). CD4 measurement in these patients is of low value and may create unnecessary patient concern in response to normal variation of CD4 counts. In prospective studies involving patients who have responded to antiretroviral therapy with HIV-1 RNA suppression and rises in CD4 cell count >200 cells/ $\mu$ L, there was little clinical benefit from continued routine measurement of CD4 counts (12,13). This evidence supports the decision to forego repeat CD4 measurement among stable patients with chronic HIV infection and should empower care providers to engage in conversations with their patients regarding this practice.

This statement was ranked highly because this practice is prevalent among those providing HIV care, and represents a unique and important opportunity for creating discussions around resource stewardship between patients and their care providers. Because many patients with chronic HIV infection are cared for by non-infectious diseases specialists, including primary care physicians, this statement has the potential for broader uptake and impact including reduction of costs related to HIV care. In a study involving 1280 HIV-infected patients with virological suppression in Australia, it was estimated that USD\$67,700 could be saved annually per 1000 HIV-infected patients by reducing the frequency of CD4 testing from every six months to even once per year, and may reduce patient concerns related to clinically insignificant variations in CD4 counts (14).

**Statement #4:**

**Do not routinely repeat radiologic imaging in patients with osteomyelitis demonstrating clinical improvement following adequate antimicrobial therapy**

**Table 1**

**Association of Medical Microbiology and Infectious Diseases (AMMI) Canada – Choosing Wisely Canada Physician Recommendations for Infectious Diseases**

- 1. Do not routinely prescribe intravenous forms of highly bioavailable antimicrobial agents for patients who can reliably take and absorb oral medications.**

Antimicrobials such as fluoroquinolones, trimethoprim-sulfamethoxazole, clindamycin, linezolid, metronidazole and fluconazole have excellent bioavailability and only rarely need to be administered intravenously. Use of oral formulations of these medications reduces the need for placement and maintenance of venous access devices and their associated complications.

- 2. Do not prescribe alternate second-line antimicrobials to patients reporting nonsevere reactions to penicillin when beta-lactams are the recommended first-line therapy.**

Reported penicillin reactions frequently results in the use of alternate second-line agents that may be clinically inferior or may pose increased risks to patients resulting in longer lengths of stay and increased costs of care. Alternate broad-spectrum agents may also result in increased rates of adverse events and selection for antimicrobial resistance. Therefore, it is important to obtain a detailed history of a patient's reported prior reaction to penicillin to determine whether beta-lactam therapy can be safely administered.

- 3. Do not routinely repeat CD4 measurements in patients with HIV infection with HIV-1 RNA suppression for >2 years and CD4 counts >500/ $\mu$ L, unless virological failure occurs or intercurrent opportunistic infection develops.**

The 2014 recommendations of the International Antiviral Society – US Panel state that measurement of CD4 count is optional among patients with suppressed viral loads for >2 years and CD4 counts >500/ $\mu$ L. CD4 measurement in these patients is of low-value and may create unnecessary patient concern in response to normal variation of CD4 counts. In prospective studies of patients who have responded to antiretroviral therapy with HIV-1 RNA suppression and rises in CD4 cell count >200 cells/ $\mu$ L, there was little clinical benefit from continued routine measurement of CD4 counts.

- 4. Do not routinely repeat radiologic imaging in patients with osteomyelitis demonstrating clinical improvement following adequate antimicrobial therapy.**

There is poor correlation between clinical response and resolution of findings on magnetic resonance imaging, computed tomography and nuclear studies in patients with osteomyelitis. Because radiologic resolution may lag behind clinical improvement, repeat imaging may lead to unnecessary prolongation of antimicrobial therapy. Repeat imaging is indicated in cases where there is a lack of clinical response, progression of clinical findings, or the presence of an undrained abscess on the initial scan.

- 5. Do not prescribe aminoglycosides for synergy to patients with bacteremia or native valve infective endocarditis caused by *Staphylococcus aureus*.**

The addition of an aminoglycoside such as gentamicin to beta-lactam therapy or vancomycin for treatment of bacteremia or native valve infective endocarditis caused by *Staphylococcus aureus* has not been demonstrated to improve clinical outcomes. This practice may result in adverse effects including acute kidney injury and ototoxicity. The addition of gentamicin is still recommended in cases of prosthetic valve endocarditis caused by *Staphylococcus aureus*.

There is poor correlation between clinical response and resolution of radiologic findings of osteomyelitis on magnetic resonance imaging, computed tomography and nuclear studies in patients with osteomyelitis (15-17). Due to the frequent observation that radiologic resolution lags behind clinical improvement, repeat imaging may lead to unnecessary prolongation of antimicrobial therapy (17).

Although the evidence supporting this statement is based solely on observational studies, the working group included this statement in

the top five list because of shared observations that repeat imaging is a highly prevalent practice that is often used to determine duration of antibiotic therapy rather than to support and enhance clinical assessment. While routine use of imaging modalities in this manner is a low-value practice, the working group agreed that it may be indicated on a case-by-case basis where there is a lack of clinical response, progression of clinical findings or the presence of an undrained abscess on the initial imaging study.

#### Statement #5:

**Do not prescribe aminoglycosides for synergy to patients with bacteremia or native valve infective endocarditis caused by *Staphylococcus aureus***

The addition of an aminoglycoside, such as gentamicin, to beta-lactam therapy or vancomycin for treatment of bacteremia or native valve infective endocarditis caused by *Staphylococcus aureus* has not been demonstrated to improve clinical outcomes (18,19). This practice may result in adverse effects including acute kidney injury and ototoxicity (18).

Although this statement was ranked lower in overall impact due to the lower incidence of this infection, it was ranked in the top five list because this practice was reported to be prevalent in infectious diseases practice despite strong evidence showing lack of benefit and potential harm (18). The working group agreed that the addition of gentamicin is still recommended in cases of prosthetic valve endocarditis caused by *Staphylococcus aureus* (20).

## DISCUSSION

Infectious diseases physicians currently play an active role as stewards of our health care system through leadership in antimicrobial stewardship, and infection prevention and control programs. Over the past year, the *Choosing Wisely Canada* campaign has stimulated even further discussion within our specialty and challenged AMMI Canada members to identify further opportunities for resource stewardship that are within our purview of practice. The AMMI Canada – *Choosing Wisely Canada* Top Five List in Infectious Diseases is not a guideline document, but is meant to facilitate conversations between physicians and patients, and between physicians and other health care providers related to low-value practices.

There are several important strengths of the *Choosing Wisely Canada* statements developed by AMMI Canada. First, this list was developed through broad consultation and engagement of AMMI Canada members throughout the process with ample opportunity for contribution from members at large. Consensus was reached on the final top five list by the working group as well as by members of AMMI Canada who were present at the open forum at our annual meeting. Second, the process created by the working group involved the application of objective criteria to rank each declarative statement. Third, all statements relate to practices within the purview of infectious diseases physicians. This is of great importance because it allows for immediate action by AMMI Canada members in effecting change in these areas, and teaching and modelling of these practices for other health care providers who provide care to patients with infectious diseases. The creation of the final top five list also carries significant limitations. First, it does not represent a comprehensive list of low-value practices within infectious diseases. Additional practices could have been included; however, we limited the list to five statements to adhere to the *Choosing Wisely Canada* format. Second, some of the recommendations may be of lower overall impact than others that may have been included. However, such recommendations were explicitly included because they fall within the purview of infectious diseases specialists and are immediately actionable. An example of a practice that was not included – but has the potential of broad impact – is the avoidance of treatment of asymptomatic bacteriuria in nonpregnant adults. While the treatment of asymptomatic bacteriuria remains a prevalent cause of overuse of antimicrobial therapy, it is not generally practiced by infectious diseases specialists. Because this

practice has already been addressed by other societies (<http://www.choosingwiselycanada.org/recommendations/geriatrics/>), the working group made a conscious effort to challenge its members to focus on treatments and investigations that are overutilized by infectious diseases physicians. Finally, this list focuses on practices relevant to clinical infectious diseases and has not addressed the many areas of overuse that relate to the practice of microbiology. A separate *Choosing Wisely Canada* campaign to focus on microbiology practices is planned by AMMI Canada for the coming year.

The *Choosing Wisely Canada* statements in infectious diseases endorsed by AMMI Canada represent a starting point to engage AMMI Canada members in broader discussions related to resource stewardship within infectious diseases practice and to take action. The next step will include evaluation of the impact of these statements both at the local and national levels, which represents a tremendous opportunity for research and collaboration among AMMI Canada members.

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