

# How applicable are clinical practice guidelines to elderly patients with comorbidities?

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## Abstract

**Objective** To examine the applicability of 10 common clinical practice guidelines (CPGs) to elderly patients with multiple comorbidities.

**Design** Content analysis of published Canadian CPGs for the following chronic diseases: diabetes, dyslipidemia, dementia, congestive heart failure, depression, osteoporosis, hypertension, gastroesophageal reflux disease, chronic obstructive pulmonary disease, and osteoarthritis.

**Main outcome measures** Presence or absence of 4 key indicators of applicability of CPGs to elderly patients with multiple comorbidities. These indicators include any mention of older adults or people with comorbidities, time needed to treat to benefit in the context of life expectancy, and barriers to implementation of the CPG.

**Results** Out of the 10 CPGs reviewed, 7 mentioned treatment of the elderly, 8 mentioned people with comorbidities, 4 indicated the time needed to treat to benefit in the context of life expectancy, 5 discussed barriers to implementation, and 7 discussed the quality of evidence.

**Conclusion** This study shows that although most CPGs discuss the elderly population, only a handful of them adequately address issues related to elderly patients with comorbidities. In order to make CPGs more patient centred rather than disease driven, guideline developers should include information on elderly patients with comorbidities.

### EDITOR'S KEY POINTS

- Family physicians, who are the primary users of clinical practice guidelines (CPGs), are increasingly providing care to elderly patients with multiple comorbidities.
- This article examines the applicability of common CPGs to elderly patients with comorbidities.
- This study shows that only a handful of CPGs adequately address important issues common in the care of the elderly. Guideline developers should include much more detailed information on management of elderly patients, with a particular emphasis on eliciting patient and caregiver concerns, setting clinical priorities, managing expectations (particularly around prognosis), and fostering optimum communication.
- This will aid in making CPGs more patient centred rather than disease driven.

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# Les directives de pratique clinique s'appliquent-elles vraiment aux patients âgés qui ont plusieurs problèmes de santé?

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## Résumé

**Objectif** Déterminer l'applicabilité aux patients âgés qui souffrent de multiples affections de 10 directives de pratique clinique (DPC) courantes.

**Type d'étude** Analyse de contenu des DPC canadiennes pour les maladies chroniques suivantes : diabète, dyslipidémie, démences, insuffisance cardiaque, dépression, ostéoporose, hypertension, reflux gastro-œsophagien, maladie pulmonaire obstructive chronique et arthrose.

**Principaux paramètres à l'étude** Présence ou absence de 4 indicateurs clés de l'applicabilité des DPC aux patients avec comorbidité. Ces indicateurs incluent toute mention d'adultes âgés ou de sujets avec comorbidité, durée du traitement nécessaire pour obtenir un avantage compte tenu de l'espérance de vie et obstacles à la mise en œuvre des DPC.

**Résultats** Sur les 10 DPC à l'étude, 7 parlaient du traitement des personnes âgées, 8 mentionnaient les patients avec comorbidité, 4 indiquaient le temps de traitement nécessaire pour obtenir un avantage compte tenu de l'espérance de vie, 5 discutaient des obstacles à l'application des DPC et 7 de la qualité des preuves.

**Conclusion** Cette étude montre que même si la plupart des DPC font mention de la population âgée, très peu discutent adéquatement des problèmes des patients âgés avec comorbidité. Afin que les DPC soient davantage centrées sur les patients plutôt que sur les maladies, les concepteurs des directives devraient inclure des informations sur les patients avec comorbidité.

### POINTS DE REPÈRE DU RÉDACTEUR

- Les médecins de famille, qui sont les principaux utilisateurs des directives de pratique clinique (DPC), soignent de plus en plus de patients âgés présentant plusieurs affections.
- Cet article cherche à savoir si les DPC générales s'appliquent aux patients âgés qui présentent des affections multiples.
- Cette étude montre que très peu de DPC correspondent adéquatement aux importants problèmes fréquemment rencontrés chez les personnes âgées. Les concepteurs des directives devraient inclure des informations beaucoup plus détaillées sur le traitement des personnes âgées, en insistant particulièrement sur la nécessité de s'enquérir des préoccupations des patients et des intervenants, d'établir les priorités cliniques, de gérer les attentes (notamment au sujet du pronostic) et d'améliorer les communications. De cette façon, les DPC devraient être davantage centrées sur les patients plutôt que sur les maladies.

Cet article a fait l'objet d'une révision par des pairs.  
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Clinical practice guidelines (CPGs) are defined as “systematically developed statements to assist practitioners’ and patients’ decisions about appropriate health care for specific clinical circumstances.”<sup>1</sup> Clinical practice guidelines are developed to assist clinicians in providing the best care using the most recent evidence. There have been debates among physicians about the usefulness of CPGs in improving the quality of care of patients.<sup>2-7</sup> Proponents of CPGs encourage the use of CPGs in order to reduce variation and arbitrariness in practice, as well as to improve the quality of care.<sup>4,5</sup> Opponents of CPGs cite a lack of improvement in the quality of care despite wide dissemination of guidelines; potential conflict of interest, especially in CPGs sponsored by industries; a lack of comprehensiveness of CPGs to all domains of medicine; and contradictory recommendations among multiple CPGs within the same disease category.<sup>2,3,6,8</sup> Recent studies have focused on various aspects of CPGs, such as incorporation of patients’ values and treatment preferences in therapeutic decision making<sup>9</sup> and adherence to established methodologic standards.<sup>10</sup>

Clinical practice guidelines have been criticized as being “disease driven rather than patient driven.”<sup>11,12</sup> Disease-specific CPGs are particularly challenging to apply to elderly patients with multiple comorbidities. Studies done in the United States<sup>13</sup> and Australia<sup>14</sup> have shown that about half of the reviewed CPGs addressed this population.

The Canadian population is aging. Between 1981 and 2005, the number of seniors ( $\geq 65$  years of age) in Canada increased from 2.4 to 4.2 million. It is projected that by 2036 seniors will account for more than a quarter of the Canadian population.<sup>15</sup> Up to 81% of seniors living in the community have at least 1 chronic condition, and 33% have 3 or more chronic conditions.<sup>16</sup> Primary care physicians, the primary users of CPGs, are increasingly providing care to elderly patients with multiple comorbidities. These providers require

improved CPGs with specific recommendations targeting elderly patients with multiple comorbidities. To the best of our knowledge, no Canadian studies have examined the applicability of CPGs to elderly patients with multiple comorbidities. Therefore, the purpose of this study was to examine the applicability of common CPGs to elderly patients with multiple comorbidities.

## METHODS

We conducted a content analysis of the most recently published Canadian CPGs. Two independent reviewers (D.R.M. and H.G.) conducted the analysis separately and then compared the results. Consensus was reached at the end of the review to finalize the results. Clinical practice guidelines were selected on 2 rationales: 1) most prevalent chronic conditions<sup>17</sup> in the elderly population, and 2) most common medications prescribed to the elderly population in Ontario during a 10-year period (1997 to 2006).<sup>18</sup> We mapped the top 10 prescription claims with the top 10 common chronic diseases managed by primary care physicians (Table 1<sup>17,18</sup>). Most CPGs were identified from the Canadian Medical Association Infobase website<sup>19</sup> and a few were obtained by using the Google search engine. We selected 10 CPGs that were most relevant to and most likely to be used by family physicians.

## Definitions of main outcome measures

The main outcome measures (ie, mention of older adults or people with comorbidities, time needed to treat in the context of life expectancy, and barriers to implementation) were selected from previous studies that examined applicability of CPGs to elderly patients.<sup>13,14</sup>

We defined *elderly* as people older than 65 years of age. When no specific age was indicated, we looked for words that signified older age in the CPGs (eg, *senior*, *older adults*, *frail elderly*).

**Table 1. Top 10 prescription-medication claims in Ontario between 1997 and 2006, mapped to common chronic conditions**

MEDICATIONS	CORRESPONDING CHRONIC DISEASES
Osteoporosis medications	Osteoporosis
Lipid-lowering agents	Dyslipidemia
Thyroid replacement therapy	Hypothyroidism
Psychotropic drugs	Depression or dementia
Cardiovascular medications	Hypertension, congestive heart failure
Diabetes medications	Diabetes
Gastrointestinal medications	Gastroesophageal reflux disease
Narcotics, analgesics, or NSAIDs	Osteoarthritis
Asthma or COPD therapies	COPD

COPD—chronic obstructive pulmonary disease, NSAIDs—nonsteroidal anti-inflammatory drugs.

Data from Statistics Canada<sup>17</sup> and Bajcar et al.<sup>18</sup>

The applicability of CPGs to people with comorbidities was determined by scanning CPG documents for any mention of people with 1 or more chronic conditions in addition to the primary disease that would affect treatment choices.

The outcome of time needed to treat in the context of life expectancy has also been used in previous literature.<sup>13,14</sup> It refers to specific recommendations on how to modify treatment for the elderly in the context of life expectancy. The recommendations must balance the risks and benefits to the patient; specifically, the guidelines should address the treatment within the context of life expectancy, prognosis, quality of life, or end-of-life care.

Finally, the outcome measure of barriers to implementation includes explicit statements that help clinicians to understand the limitations that might pose difficulty in executing the recommendations.

### Data collection and analysis

Relevant data were extracted using a data collection sheet. The data collection sheet was constructed from existing validated instruments, including the Appraisal of Guidelines for Research and Evaluation instrument<sup>20,21</sup> and a checklist for reporting CPGs developed by the Conference on Guideline Standardization,<sup>22</sup> and other published studies that focused on applicability of CPGs to elderly patients with multiple comorbidities.<sup>13,14</sup> The final data collection sheet included 4 key indicators: any mention of older adults, mention of people with comorbidities, time needed to treat to benefit in the context of life expectancy, and barriers to implementation of the CPG. Data were collected, summarized, and tabulated in an Excel spreadsheet.

exception of the osteoarthritis CPG (developed by British Columbia's Ministry of Health Services),<sup>23</sup> the CPGs were developed by various Canadian national organizations or societies. At the time of data collection, there were no CPGs for managing thyroid diseases.

**Table 3**<sup>23-28,30-38</sup> shows tabulation of each applicability indicator included in the CPGs. Out of 10 CPGs reviewed, 7 mentioned treatment of the elderly, 8 mentioned people with comorbidities, 4 indicated the time needed to treat to benefit in the context of life expectancy, 5 discussed barriers to implementation, and 7 discussed the quality of evidence.

### Recommendations specific to the elderly

**Table 4**<sup>24-28,31-38</sup> shows examples of statements and recommendations about issues related to the elderly in CPGs. With the exception of the dementia<sup>32-38</sup> and congestive heart failure<sup>28</sup> (CHF) CPGs, the rest of the CPGs specified the applicable age in their recommendations. Two CPGs (diabetes<sup>26</sup> and CHF<sup>28</sup>) used words such as *elderly* or *frail elderly*. The diabetes<sup>26</sup> and depression<sup>31</sup> CPGs provided evidence that treatment response was similar in older people and in the younger population. Three CPGs (diabetes,<sup>26</sup> hypertension,<sup>27</sup> and depression<sup>31</sup>) provided a list of suitable and unsuitable pharmacotherapy and non-pharmacologic therapies to be used in elderly patients.

### Recommendations for people with comorbidities

**Table 5**<sup>23,25-28,30-38</sup> provides a summary of CPGs that mentioned or addressed people with comorbidities. Two CPGs (CHF<sup>28</sup> and depression<sup>31</sup>) recommend multidisciplinary and interdisciplinary care of patients with multiple comorbidities. In addition, the diabetes<sup>26</sup> CPG recommends a multidisciplinary and interdisciplinary approach to all diabetes patients, regardless of age. The depression<sup>31</sup> CPG provides a list of medications with low potential for

## RESULTS

**Table 2**<sup>23-38</sup> is an overview of CPGs we reviewed. The CPGs were published between 2005 and 2009. With the

**Table 2. Clinical practice guidelines included in this study, by disease**

DISEASE	CLINICAL PRACTICE GUIDELINES
Osteoarthritis	Guidelines and Protocols Advisory Committee, <sup>23</sup> 2008
Osteoporosis	Brown et al, <sup>24</sup> 2006
Dyslipidemia	Genest et al, <sup>25</sup> 2009
Diabetes	Canadian Diabetes Association, <sup>26</sup> 2008
Hypertension	Canadian Hypertension Education Program, <sup>27</sup> 2009
Congestive heart failure	Arnold et al, <sup>28</sup> 2006
Gastroesophageal reflux disease	Armstrong et al, <sup>29</sup> 2005
Chronic obstructive pulmonary disease	O'Donnell et al, <sup>30</sup> 2008
Depression	Buchanan et al, <sup>31</sup> 2006
Dementia	Hogan et al, <sup>32,33</sup> 2008; Patterson et al, <sup>34</sup> 2008; Feldman et al, <sup>35</sup> 2008; Herrmann and Gauthier, <sup>36</sup> 2008; Chertkow et al, <sup>37</sup> 2008; Chertkow, <sup>38</sup> 2008

**Table 3. Clinical practice guidelines that include indicators of applicability to elderly patients with multiple comorbidities**

INDICATORS	NO. OF CPGs APPLICABLE	APPLICABLE CPGs, BY DISEASE
Treatment of elderly	7	Osteoporosis, <sup>24</sup> dyslipidemia, <sup>25</sup> diabetes, <sup>26</sup> HTN, <sup>27</sup> CHF, <sup>28</sup> depression, <sup>31</sup> dementia <sup>32-38</sup>
People with comorbidities	8	Osteoarthritis, <sup>23</sup> diabetes, <sup>26</sup> HTN, <sup>27</sup> CHF, <sup>28</sup> depression, <sup>31</sup> dementia, <sup>32-38</sup> COPD, <sup>30</sup> dyslipidemia <sup>25</sup>
Time needed to treat to benefit in the context of life expectancy	4	CHF, <sup>28</sup> COPD, <sup>30</sup> depression, <sup>31</sup> diabetes <sup>26</sup>
Barriers to implementation	5	Diabetes, <sup>26</sup> HTN, <sup>27</sup> CHF, <sup>28</sup> depression, <sup>31</sup> dementia <sup>32-38</sup>
Quality of evidence	7	Dyslipidemia, <sup>25</sup> HTN, <sup>27</sup> CHF, <sup>28</sup> depression, <sup>31</sup> diabetes, <sup>26</sup> dementia, <sup>32-38</sup> COPD <sup>30</sup>

CHF—congestive heart failure, COPD—chronic obstructive pulmonary disease, CPGs—clinical practice guidelines, HTN—hypertension.

**Table 4. Examples of statements and recommendations about issues related to the elderly in clinical practice guidelines**

CLINICAL PRACTICE GUIDELINE, BY DISEASE	SPECIFICATION OF AGE	STATEMENTS AND RECOMMENDATIONS ABOUT ISSUES RELATED TO THE ELDERLY (LEVELS OF EVIDENCE OR GRADES OF RECOMMENDATION*)
Congestive heart failure <sup>28</sup>	No (guideline uses the words <i>elderly</i> or <i>frail elderly</i> )	<ul style="list-style-type: none"> <li>• "Heart failure therapies in elderly patients should be similar to those in younger patients, although their use may depend primarily on concomitant conditions" (level I, class b)</li> <li>• "Frail elderly heart failure patients should be referred to a geriatrician for comprehensive geriatric assessment" (level I, class b)</li> </ul>
Dementia <sup>32-38</sup>	No	NA (involves elderly by default of natural history of disease)
Depression <sup>31</sup>	Yes	<ul style="list-style-type: none"> <li>• "Evidence based psychotherapies recommended for geriatric depression include: behaviour therapy; cognitive-behaviour therapy; problem-solving therapy; brief dynamic therapy; interpersonal therapy; and reminiscence therapy" (grade A)</li> <li>• "Older patients have a response rate similar to younger adults" (grade A)</li> <li>• "[R]ecommend that physicians and pharmacists consult up-to-date drug interaction data bases when a new antidepressant is prescribed to patients taking multiple medications" (grade C)</li> <li>• "[Check] sodium blood levels after one month of treatment with SSRIs, especially with patients taking other medications that can cause hyponatremia (e.g., diuretics)" (grade C)</li> <li>• "[R]ecommend targeted screening for those elderly at higher risk of depression" (eg, those who are socially isolated, have chronic disabling illness, have persistent sleep difficulties, refuse to eat, or neglect of personal care) (grade B)</li> <li>• "When choosing agents from a specific class, clinicians should select those found to be safer with the elderly (e.g., selecting drugs with the lowest anti-cholinergic properties amongst available antidepressants)" (grade D)</li> </ul>
Diabetes <sup>26</sup>	Yes (> 60 y)	<ul style="list-style-type: none"> <li>• "Otherwise healthy elderly people with diabetes should be treated to achieve the same glycemic, blood pressure and lipid targets as younger people with diabetes" (grade D, consensus)</li> <li>• Lifestyle modification recommended (grade A, level 1a)</li> <li>• "Elderly people living in community should be referred for interdisciplinary interventions involving education and support" (grade C, level 3)</li> <li>• "Aerobic exercise and/or resistance training may benefit elderly" (grade B, level 2)</li> <li>• "[S]ulfonylureas should be used with caution" (owing to risk of hypoglycemia) (grade D, level 4)</li> <li>• "[P]remixed insulins and prefilled insulin pens as alternatives to mixing insulins should be considered to reduce dose errors" (grade B, level 2)</li> </ul>
Dyslipidemia <sup>25</sup>	Yes (men ≥ 50 y, women ≥ 60 y)	<ul style="list-style-type: none"> <li>• Men &gt; 50 y and women &gt; 60 y of moderate risk with low-density lipoprotein cholesterol of &lt; 3.5 mmol/L can be tested for highly sensitive C-reactive protein</li> </ul>
Hypertension <sup>27</sup>	Yes (≥ 50 y, ≥ 60 y, ≥ 80 y)	<ul style="list-style-type: none"> <li>• "[B]eta-blockers are not recommended as first-line therapy for uncomplicated hypertension in patients 60 years of age or older" (grade A)</li> <li>• "Strong consideration should be given to the addition of low-dose ASA therapy in hypertensive patients" older than 50 y (grade A)</li> <li>• "Caution should be exercised if blood pressure is not controlled" (grade C)</li> </ul>
Osteoporosis <sup>24</sup>	Yes (> 50 y)	<ul style="list-style-type: none"> <li>• Lists age of &gt; 65 y as a substantial risk factor for osteoporosis</li> <li>• Treatment should be initiated according to the results of the 10-y absolute fracture risk assessment (level 1b). Treatment is recommended if the 10-y absolute risk for fracture is high (&gt;20%)</li> <li>• Provides a 10-y fracture risk for women aged 50-85 y</li> </ul>

ASA—acetylsalicylic acid, CHEP—Canadian Hypertension Education Program, NA—not applicable, SSRI—selective serotonin reuptake inhibitor.

\*Levels of evidence and grades of recommendation are based on the categories used by individual articles.

**Table 5. Statements and recommendations in clinical practice guidelines that address patients with comorbidities**

CLINICAL PRACTICE GUIDELINE, BY DISEASE	COMORBIDITIES ADDRESSED	STATEMENTS AND RECOMMENDATIONS THAT ADDRESS PATIENTS WITH COMORBIDITIES (LEVELS OF EVIDENCE OR GRADES OF RECOMMENDATION*)
Congestive heart failure <sup>28</sup>	Hypotension, myocardial infarction, hypertension, atrial fibrillation, diabetes, dementia, cognitive impairment, depression	<ul style="list-style-type: none"> <li>• "The elderly patient with known or suspected heart failure should be assessed for relevant comorbid conditions ... that may affect treatment, adherence to therapy, follow-up or prognosis" (level I, class C)</li> <li>• "In hospitalized elderly heart failure patients, delirium should be considered when clinically appropriate" (level I, class C)</li> <li>• "Elderly heart failure patients who are frail and have a high comorbid disease burden should be followed up in a disease management setting" (level I, class A)</li> <li>• "The primary care physician or provider should be involved in the disease management plan of frail elderly heart failure patients" (level I, class C)</li> <li>• "Psychosocial issues (eg, depression, fear, isolation, home supports and need for respite care) should be re-evaluated routinely" (level I, grade C)</li> <li>• "Caregivers of patients with advanced heart failure should be evaluated for coping and degree of caregiver burden" (level I, grade C)</li> </ul>
Chronic obstructive pulmonary disease <sup>30</sup>	Ischemic heart disease, osteopenia, osteoporosis, glaucoma, cachexia, malnutrition, cancer, peripheral muscle dysfunction, ventricular arrhythmias	<ul style="list-style-type: none"> <li>• Recommends different antibiotic regimen for those with comorbidities such as ischemic heart disease</li> </ul>
Dementia <sup>32-38</sup>	Diabetes, stroke, delirium, depression, peptic ulcers, heart block	<ul style="list-style-type: none"> <li>• Discusses knowledge gaps</li> <li>• Advises doctors to stop cholinesterase inhibitors if patients have comorbidities that make using medications risky</li> <li>• Discusses warnings regarding using medications in patients with comorbidities</li> </ul>
Depression <sup>31</sup>	Postural hypotension, conduction disorders, hyponatremia, hypertension, congestive heart failure, bipolar disorder, dementia, bundle branch block, osteoporosis, myocardial infarction, HIV or AIDS, cancer, stroke, diabetes, Parkinson disease, seizure	<ul style="list-style-type: none"> <li>• "Older patients have a response rate with antidepressant therapy similar to younger adults. Clinicians should approach elderly depressed individuals with therapeutic optimism" (grade A)</li> <li>• "Antidepressants should be used when indicated, even in patients with multiple co-morbidities and serious illnesses, as they have similar efficacy rates compared with use in well elderly" (grade B)</li> <li>• "Adverse events in patients with multiple co-morbidities can be minimized by careful selection of drugs that are not likely to worsen or complicate patient-specific medical problems" (grade B)</li> <li>• "Clinicians should choose an antidepressant with the lowest risk of drug-drug interactions when patients are taking multiple medications. Good choices include citalopram, sertraline, venlafaxine, bupropion, and mirtazapine" (grade C)</li> <li>• "Tricyclic antidepressants (TCAs) should not be used in patients with conduction abnormalities on electrocardiogram (ECG) or postural hypotension" (grade B)</li> <li>• "Health care professionals and organizations should implement a model of care that addresses the physical/functional and the psychosocial needs of older depressed adults. Given the complex care needs of older adults, these are most likely to require interdisciplinary involvement in care, whether in primary care or specialized mental health settings" (grade B)</li> <li>• "Health care professionals and organizations should implement a model of care that promotes continuity of care as older adults appear to respond better to consistent primary care providers" (grade B)</li> </ul>
Diabetes <sup>26</sup>	Dyslipidemia, hypertension, acute coronary syndromes, congestive heart failure, chronic kidney disease	<ul style="list-style-type: none"> <li>• Glycemic targets should be less stringent to avoid hypoglycemia and hyperglycemia (grade D, consensus)</li> <li>• Acetylsalicylic acid therapy can be considered in patients with stable cardiovascular disease (grade D, consensus)</li> <li>• People with diabetes and hypertension should be treated to attain systolic BP of &lt; 130 mm Hg (grade C, level 3) and diastolic BP of &lt; 80 mm Hg (grade B, level 2). These target BP levels are the same as the BP treatment thresholds (grade D, consensus)</li> <li>• Specific recommendations for those with acute coronary syndromes, congestive heart failure, and chronic kidney diseases are also provided</li> </ul>

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Dyslipidemia <sup>25</sup>	Hypertension, obesity, rheumatoid arthritis, systemic lupus erythematosus, psoriasis, chronic kidney disease, HIV	<ul style="list-style-type: none"> <li>• A list of comorbidities that require a screening lipid profile is included</li> <li>• Recommendations on when to initiate treatment are provided</li> </ul>
Hypertension <sup>27</sup>	Diabetes, renal disease, heart failure, peripheral vascular disease, transient ischemic attack, dyslipidemia, myocardial infarction	<ul style="list-style-type: none"> <li>• Recommends treating systolic BP to &lt;130 mm Hg and diastolic BP of &lt;80 mm Hg for patients with diabetes</li> <li>• Specific therapy is provided for patients with the following: diabetes, diabetes with nephropathy, angina, previous myocardial infarction, heart failure, left ventricular hypertrophy, past stroke, chronic kidney disease, renovascular disease, peripheral vascular diseases, or dyslipidemia</li> </ul>
Osteoarthritis <sup>23</sup>	Gastrointestinal problems (eg, ulcers, bleeds, liver disease), cardiovascular diseases (eg, hypertension, ischemic heart disease, stroke, congestive heart failure), renal impairment, asthma, depression	<ul style="list-style-type: none"> <li>• Advises physicians to be aware of coexistence of relevant comorbidities, as they might affect treatment choice</li> </ul>

BP—blood pressure.  
\*Levels of evidence and grades of recommendation are based on the categories used by individual articles.

drug-drug interactions. On the other hand, the osteoarthritis<sup>23</sup> CPG leaves it to a physician's discretion for how to handle comorbidities. The chronic obstructive pulmonary disease<sup>30</sup> (COPD) CPG provides different treatment regimens for those with and those without comorbidities. Finally, the diabetes<sup>26</sup> CPG recommends modification of glycemic targets among elderly patients with comorbidities. In addition, some CPGs provide recommendations on modification of treatment targets (diabetes<sup>26</sup> CPG), comorbidities that warrant screening for lipid profiles (dyslipidemia<sup>25</sup> CPG) or comorbidity-specific treatment recommendations (hypertension<sup>27</sup> CPG).

### Time to benefit in the context of life expectancy

**Table 6**<sup>26,28,30,31</sup> shows how several CPGs addressed issues related to treatment in the context of life expectancy. Four CPGs (CHF,<sup>28</sup> COPD,<sup>30</sup> diabetes,<sup>26</sup> and depression<sup>31</sup>) discuss issues related to end-of-life care. The CHF,<sup>28</sup> COPD,<sup>30</sup> and diabetes<sup>26</sup> CPGs recommend modification of treatment goals in accordance with prognosis and patient choice. The depression<sup>31</sup> CPG recommends indefinite treatment of elderly patients with partial resolution of symptoms.

### Barriers to implementation

**Table 7**<sup>26-28,31-38</sup> provides a summary of CPGs that list or discuss barriers to implementation. Most of the listed CPGs acknowledge gaps and a lack of good evidence for recommendations pertaining to the elderly population with or without comorbidities. Barriers to

implementation are discussed in terms of adherence, polypharmacy, and difficulty in achieving treatment targets.

### Evidence levels of recommendations

Recommendations in each guideline were generated by using different evidence grading systems. We list the available evidence level of the recommendations targeting elderly with comorbidities in **Tables 3**<sup>23-28,30-38</sup> to **7**.<sup>26-28,31-38</sup> The recommendations varied from grade A to grade D.

## DISCUSSION

### Elderly with or without comorbidities

We reviewed CPGs for 10 common chronic conditions managed by primary care physicians in elderly patients. This study has shown that most of these CPGs do mention the elderly population (7 out of the 10 CPGs, which is comparable to US<sup>13</sup> and Australian<sup>14</sup> studies). However, while most of the CPGs mention elderly patients, few of them adequately discuss issues related to elderly patients with comorbidities. Only 3 CPGs (CHF,<sup>28</sup> diabetes,<sup>26</sup> and depression<sup>31</sup>) have dedicated sections addressing elderly patients with comorbidities. The osteoarthritis<sup>23</sup> and osteoporosis<sup>24</sup> CPGs provide recommendations specific to elderly patients, but the recommendations are broad and nonspecific. The osteoarthritis<sup>23</sup> and dementia<sup>32-38</sup> CPGs have minimal discussions on issues pertaining to elderly patients with comorbidities. The dementia<sup>32-38</sup>

**Table 6. How clinical practice guidelines addressed time needed to treat elderly patients to benefit in the context of life expectancy**

CLINICAL PRACTICE GUIDELINE, BY DISEASE	HOW TIME NEEDED TO TREAT ELDERLY PATIENTS TO BENEFIT IN THE CONTEXT OF LIFE EXPECTANCY WAS ADDRESSED (LEVELS OF EVIDENCE OR GRADES OF RECOMMENDATION*)
Congestive heart failure <sup>28</sup>	<ul style="list-style-type: none"> <li>• "Patients with heart failure should be approached early in the heart failure disease process regarding their prognosis, advanced medical directives and wishes for resuscitative care. These decisions should be reviewed regularly and specifically after any change in the patient's condition" (level I, grade C)</li> <li>• "A substitute decision-maker (proxy) should be identified" (level I, grade C)</li> <li>• "Where possible, a living will should be discussed with patients to clarify wishes for end-of-life care" (level I, grade C)</li> <li>• "As patients near the end of life, physicians should readdress goals of therapy—balancing quantity and quality of life, with a shift of focus to quality of life. Palliative care consultation should be considered" (level I, grade C)</li> </ul>
Chronic obstructive pulmonary disease <sup>30</sup>	<ul style="list-style-type: none"> <li>• Patients are encouraged to discuss their disease, prognosis, circumstances of their deaths, and other end-of-life issues (grade 2A)</li> </ul>
Diabetes <sup>26</sup>	<ul style="list-style-type: none"> <li>• "Modify glycemic goals and choice of drugs in patients with multiple co-morbidities, functional dependency or limited life expectancy" (grade D, consensus)</li> </ul>
Depression <sup>31</sup>	<ul style="list-style-type: none"> <li>• "Elderly patients should continue maintenance pharmacotherapy for at least 2 years" (level 2)</li> <li>• "Older patients with partial resolution of symptoms should receive indefinite maintenance therapy and ongoing efforts at a complete resolution of symptoms through the use of augmentation or combination strategies, as well as consideration for electroconvulsive therapy" (grade B)</li> </ul>

\*Levels of evidence and grades of recommendation are based on the categories used by individual articles.

**Table 7. How clinical practice guidelines addressed barriers to implementation**

CLINICAL PRACTICE GUIDELINE, BY DISEASE	HOW BARRIERS TO IMPLEMENTATION WERE ADDRESSED
Diabetes <sup>26</sup>	<ul style="list-style-type: none"> <li>• "Glycemic targets may be difficult to achieve in elderly"</li> <li>• "Co-morbidity may prevent physical activities—known to improve glycemic control"</li> <li>• Have caution with drugs (eg, sulfonylureas), as risk of hypoglycemia increases with age</li> <li>• "Conventional insulin syringes may increase dose errors"</li> </ul>
Hypertension <sup>27</sup>	<ul style="list-style-type: none"> <li>• Includes discussions on adherence issues and how to reduce them</li> <li>• Advises caution to be exercised in patients, such as the elderly, who cannot tolerate diabetes target blood pressure measurements</li> </ul>
Congestive heart failure <sup>28</sup>	<ul style="list-style-type: none"> <li>• Includes discussion on polypharmacy and adherence issues</li> </ul>
Depression <sup>31</sup>	<ul style="list-style-type: none"> <li>• Acknowledges lack of levels of evidence I-IIa* for most recommendations pertaining to elderly</li> </ul>
Dementia <sup>32-38</sup>	<ul style="list-style-type: none"> <li>• Includes discussions on knowledge gaps</li> <li>• Advises providers to stop cholinesterase inhibitors if patients have comorbidities that make use of medications risky</li> <li>• Includes warnings regarding the use of medications in patients with comorbidities</li> </ul>

\*Levels of evidence are based on the categories used by the individual article.

CPGs recommend that physicians stop medication if there is high risk of drug-to-drug interaction, although they did not specify common comorbidities that providers should be aware of.

### Time needed to treat in the context of life expectancy

Only the CPGs for CHF,<sup>28</sup> diabetes,<sup>26</sup> and COPD<sup>30</sup> specifically recommend modification of treatment in the context of life expectancy and patients' preferences and prognoses. The other CPGs do not address issues related to time needed to treat to benefit in the context of life expectancy. This finding might be partly explained by the fact that primary studies often focus on evaluation of benefits rather than harms, which requires much more expensive

longitudinal studies.<sup>39</sup> Recently, one study focused on developing a payoff time framework, which might identify patients for whom particular clinical guidelines are unlikely to confer benefit; however, this framework has not been validated in a clinical setting.<sup>40</sup>

### Barriers to implementation

Only half of the reviewed CPGs provide explicit statements on when or under what circumstances CPGs might be difficult to implement. Such statements address issues like treatment targets in the elderly, warnings about polypharmacy or drug-drug interactions, and the lack of evidence for some recommendations. Acknowledgment of barriers to implementation is an important component of continuous quality improvement of CPGs. By



identifying and explicitly stating areas where it might be difficult to implement CPGs, strategies can then be developed to address the shortcomings and therefore improve the quality of CPGs or develop strategies to overcome the barriers.

### Evidence level of recommendations


We found that very few recommendations for elderly with comorbidities were based on clinical trials (ie, grade A recommendations). This is not surprising, as most randomized trials exclude the elderly, especially those of advanced age or with comorbidities.<sup>39</sup> It is estimated that only 5% of trials are designed specifically for elderly patients 65 years of age and older, and 15% of trials exclude elderly participants without any justification.<sup>41</sup>

### Limitations

This is the first Canadian study that has attempted to study applicability of CPGs to elderly patients with comorbidities. Our study has several limitations. This study evaluated only 10 CPGs. The conditions discussed are the most common chronic conditions seen in the elderly and are managed largely by primary care physicians. Other diseases such as cancer and thyroid problems were not included but would likely be in the realm of both specialist and primary care providers. Second, there is no validated instrument to evaluate applicability of CPGs to elderly patients with comorbidities. We constructed our data collection sheet from different sources. We covered only 4 items that we believed were specific to the elderly and those with comorbidities. It is likely that there are other important domains that were not evaluated in this study. Future studies should develop and validate an instrument for assessing applicability of CPGs to elderly patients with comorbidities.

### Conclusion

This study shows that only a handful of CPGs adequately address important issues common in the care of elderly patients. Given the demographic transition occurring in Canada, this is of urgent importance. Clearly, there is considerable room for improvement in these CPGs. There is a pressing need to improve the evidence base that undergirds the care of people of advanced age and with multiple concurrent chronic diseases.<sup>42</sup> Guideline developers should include much more detailed information on management of elderly patients, with a particular emphasis on eliciting patient and caregiver concerns, setting clinical priorities, managing expectations (particularly around prognosis), and fostering optimum communication. This will aid in making CPGs more patient centred rather than disease driven. Based on this research, we propose that an ideal guideline should consider an open discussion about patients' preferences, benefits of intervention in advanced age, time to benefit

from treatment, trade-offs for function over disease control, as well as acknowledgment of uncertainty. 

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#### Contributors

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#### Competing interests

None declared

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