

# Investing in Language Access to Optimize Health System Performance

## A Review of the Literature

This literature review was commissioned by Access Alliance Multicultural Health and Community Services to build upon the work first conducted in 2009: updating findings of the costs of not providing language support, and documenting recent research of the health and social benefits of investments in language access plans centred around coordinated access to professional interpreting services. Access Alliance hired Dr. Ilene Hyman and SN Management to conduct the literature review and write the report. Additional content and editing contributions made by Grace Eagan, Bopha Ong, Parul Sharma, Leo Sedevich, and Noa Benishai. The report was reviewed and published by Access Alliance in February 2021.



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# Executive Summary

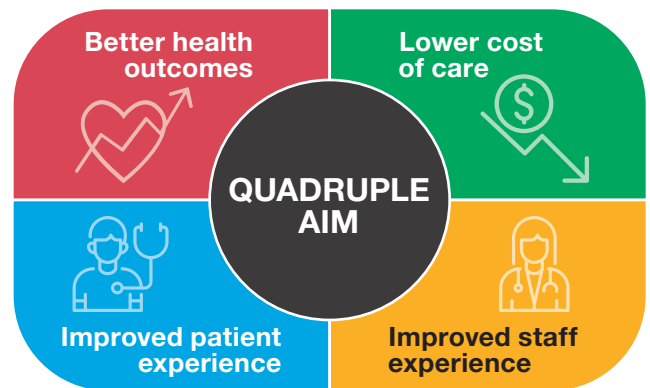
Equitable access to high-quality health care is one of the fundamental principles of our Canadian health care system. However, many Canadians who are not proficient in at least one of Canada's two official languages, English and French, face substantial health inequities due to language barriers.

Although addressing health inequities must be considered an ethical and legal obligation, the perceived cost of providing interpreting services combined with a lack of legislation, or legal impetus to act, represents a major health system-level challenge.

In 2009, a network of health care experts under the auspices of Access Alliance commissioned a literature review with the purpose of analyzing the impact of failing to provide language interpreting in health care. The present document provides an update on the previous research, making a compelling and evidence-based 'business case' for investing in professional interpreting services.

This new literature review explores findings from over **120 sources**, examining research done in Canada (including findings from British Columbia (BC), Manitoba, Ontario, Quebec, and Nunavut) and around the world, with more than 50 items published since 2010. It organizes the literature in alignment with the four goals of the **Quadruple Aim** Framework: Better Health Outcomes, Improved Patient Experience, Improved Staff Experience, and Lower Cost of Care. The result advances the argument that language interpreting services lead to a higher performing Canadian healthcare system.

**Better Health Outcomes** is discussed relative to patient safety, quality and appropriateness of care, hospital and physician utilization, inappropriate procedures, and medication errors. Here, it is demonstrated that patients with language barriers are less likely to receive effective, evidence-based treatment, and more likely to receive untimely care. In consideration of the aim of **Improved Patient Experience**, non-English speakers in Canada are reported to be less satisfied with their medical treatment than their English proficient counterparts. This indicates that language support plays an important role in the patient experience. Exploring the goal of **Improved Staff Experience**, the literature finds that provider satisfaction is overall higher when access to professional language services is available. The final section, **Lower Cost of Care**, examines how language



barriers decrease the efficiency of the health care system and increase health care costs. Professional language support is associated with increased savings due to factors such as reduced emergency department use and more efficient use of staff time.

Overall, findings from the literature highlight the **substantial social and economic benefits** resulting from effective use of professional interpreting support. When quantified, these **benefits outweigh the costs** of implementing such services. More importantly, there is a consensus in the literature that the provision of language access services within health care should not be viewed as a separate 'add-on' program. Rather, it must be understood as an **essential component of a strategy to meet broader health systems goals**.

Based on the findings presented in this document, the following recommendations are being made:

1. Mandate education for all health system employees – from leadership to front line – on the costs and risks of failing to address language barriers and the rationale for investing in interpreting services.
2. Integrate language access into the standards of practice and policies of Canadian health care institutions, and performance measures of the health system.
3. Establish core government funding for health care institutions to ensure that interpreting services are included in standard budget lines.
4. Call on research institutions to develop reliable ways to quantify the costs and benefits associated with investing in language support within the health care system.

# Introduction

Equitable access to high-quality health care for all is one of the fundamental principles of our Canadian health care system, yet many Canadians who are not proficient in at least one of Canada's two official languages experience significant health inequities because of language barriers.

Addressing health inequities, including those related to language access, must be considered an ethical and legal obligation.

In the United States, Title VI of the *Civil Rights Act* protects against discrimination based on national origin which, according to Perkins et al., incentivises medical institutions to provide interpreting and translation services<sup>1</sup>, and in California the Health Care Language Assistance Act requires health plans and health insurers to provide interpreting services and translated materials.<sup>2</sup>

A 2017 Wellesley Institute publication<sup>3</sup> asserts that *The Canadian Charter of Rights and Freedoms*<sup>4</sup> and the *Ontario Human Rights Code*<sup>5</sup> obligate service providers to deliver health care without discrimination, yet Canada lacks enforceable national standards for interpreting services in health care for people with limited English and/or French proficiency (LEP/LFP) and is well behind other jurisdictions such as the U.S., the U.K., and Australia in providing such services. The report described Canada's system for delivering medical interpreting as "haphazard and inconsistent", and asserted that health care providers receive little guidance or financial support for providing these essential services.

A recent petition to the Government of Canada seeks to federal action to address these concerns, calling for:

- An action plan for training and recruiting qualified medical interpreters;
- Federal-level policy enforcing the use of trained interpreters in health care settings; and
- Mandatory training for health care providers on how to effectively work with interpreters.<sup>6</sup>

In addition to the lack of legislation, or legal impetus to act, the perceived financial costs associated with providing interpreting services has been identified as a major health-system challenge in Canada and the U.S.<sup>7, 8, 9</sup> Further, at both the provider and institutional levels there is a need to build organizational capacity regarding interpreting. According to Schenker et al. this includes developing policies and practices to inform patients of their rights to professional interpreters and other language services they are entitled to receive.<sup>10</sup>

In 2009, a network of health care organizations, under the auspices of Access Alliance, commissioned a literature review on the costs of not providing interpreting in health care. The report, which reviewed over 75 studies, concluded that failing to address language barriers through the provision of professional interpreters had significant consequences in terms of health care quality, efficiency, and cost.<sup>11</sup>

This document presents an updated literature review and makes a compelling case for the benefits – in terms of health outcomes, patient and provider satisfaction, and cost savings to the system – obtained through the provision of professional interpreting services.

This review uses the Quadruple Aim framework (see **Conceptual Framework**, below) to assess the benefits associated with the implementation of professional interpreting services. In doing so, the study supports and advances the argument that the provision of professional interpreting services is critical to overcoming linguistic barriers in health care, thereby contributing to improving the health of patients, enhancing the experience of care for both service users and providers, and reducing the costs of health care.

# Conceptual Framework

The Quadruple Aim framework is used in this study to organize and assess the benefits associated with the implementation of professional interpreting services. Building on the Institute for Healthcare Improvement’s (IHI) triple aim framework for the delivery of high-value health, the Quadruple Aim is centred on four goals: improving the health of populations, enhancing the experience of care for individuals, improving the experience of providing care, and reducing the cost of

health care.<sup>12, 13, 14, 15, 16</sup> It has been argued that if individual health care providers pursue and achieve these goals, the general performance of the health care system will improve.

This review of the literature analyzes the impact of language barriers and the benefits of providing professional interpreting against nine distinct indicators. Table 1 makes use of the Quadruple Aim to organize these indicators.

**Table 1 – Quadruple Aim Goals and Indicators**

Goal	Indicators
Better Health Outcomes	<ul style="list-style-type: none"> <li>• Patient Safety</li> <li>• Quality and Appropriateness of Care</li> <li>• Hospital Utilization</li> <li>• Physician Utilization</li> <li>• Inappropriate Procedures and Medication Use</li> <li>• Adverse Events</li> </ul>
Improved Patient Experience	Patient Satisfaction
Improved Staff Experience	Provider Satisfaction
Lower Cost of Care	Cost Savings

While the impact of language barriers and the benefits of providing professional interpreting are discussed relative to each indicator, it is recognized that the lines between indicators are often blurred. For example, compliance with treatment protocols directly impacts on, not only patient outcomes, but also the care experience and the cost of care.

Similarly, hospital utilization rates are frequently used as an indicator of cost but can also be considered a quality indicator. As noted by Bowen, in examining the benefits of language interpreting on health care it is important to be aware of the relationships between key constructs, and to critically analyze the strengths and limitations of the available evidence.<sup>17</sup>

# Research Findings

## Better Health Outcomes

### Patient Safety

Patients should not be harmed by health care that is intended to help them, and they should remain free from accidental injury, misdiagnosis, and inappropriate treatment. Ensuring patient safety requires that patients be informed and participate as fully as they choose to, and that patients and their families should not be excluded from learning about uncertainty, risks, and treatment choices.<sup>18</sup>

Effective communication is critical to the delivery of safe, high-quality care. Many studies suggest that language barriers limit the process of informed consent and contribute to preventable morbidity and mortality.<sup>19, 20, 21, 22</sup> As such, barriers in patient-provider communication are a common root cause of adverse events in health care,<sup>23</sup> as described in more detail under **Adverse Events**, below.

Risk management considerations and the potential for litigation also provide strong arguments for addressing language barriers, including the implementation of professional interpreting services.<sup>24</sup> A study by Goode et al. presents evidence that health care providers may be financially liable for damages as a result of treatment in the absence of informed consent or the failure to convey treatment instructions accurately.<sup>25</sup> Further support for this conclusion comes from a study of 1,373 malpractice claims, which found that one of every 40 claims was related, all or in part, to failure to provide appropriate language interpreting services.<sup>26</sup>

While less common in Canada, malpractice suits have occurred because of a failure to address language barriers. As documented by Bowen, the BC Supreme Court found a physician negligent and awarded a patient \$1.3 million because of misdiagnosis resulting in the amputation of a limb.<sup>27</sup> Language factors, specifically the absence of interpreting services during her first visit to a family doctor, were also identified as contributing to the death of a pregnant woman in Courtenay, BC<sup>27</sup>; and the importance of interpreter's role in obtaining consent was raised in the case of pediatric cardiac

deaths in Manitoba.<sup>28</sup> Research conducted in the Windsor-Essex region recommends that health care organizations should “develop practice standards for professional interpreters and translators to ensure consistency and enhance patient safety”.<sup>29</sup>

The risk of medical malpractice is reduced when competent medical interpreting is provided and should be considered because the costs of malpractice are high when an adverse event occurs.<sup>30</sup>

Research confirms that patient safety is improved with the use of professional interpreters. Downing's study of the impact of using untrained, non-professional (“ad hoc”) interpreters found that the error rate among untrained interpreters, including family and friends, was sufficiently high to make it more dangerous in some circumstances to use untrained interpreters than no interpreter at all.<sup>31</sup> More recent studies identified numerous problems associated with ad hoc interpreters, including issues of confidentiality and errors in interpreting such as false fluency, editorial comments, omissions, substitutions, and additions.<sup>32</sup>

### Quality and Appropriateness of Care

All patients should receive care that uses evidence-based guidelines to determine whether an intervention would produce better outcomes. Included in this principle is the integration of research evidence with clinical expertise and patient values, which relies on effective communication to identify each patient's unique health state and diagnosis, individual risks and benefits of interventions, as well as patient values, expectations, and preferences about clinical decisions.

Several studies indicate that patients with language barriers are less likely than those without language barriers to receive effective, evidence-based treatment and more likely to receive less timely care.<sup>33, 34</sup> For example, a study by Galbraith et al. of adult patients with LEP experienced longer waiting times to see a physician in the emergency department (ED) and delays in surgery, and were less likely to receive renal transplantation

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than patients without language barriers. Similar findings were reported for pediatric patients.<sup>35</sup>

Research also examines the impact of language barriers on quality care for specific practice groups. For example, a study of oncologists in a hospital setting by Granek et al. found that the quality of end-of-life care was affected by language barriers, primarily by making already difficult communication even more challenging.<sup>36</sup>

The impact of limited language proficiency on the quality of care in psychiatry has also been examined. A systematic review conducted by Bauer & Alegría found that psychiatric evaluation in a patient's non-primary language could lead to incomplete or distorted mental status assessment whereas assessments conducted via untrained interpreters may contain interpreting errors.<sup>37</sup> While the evidence is not conclusive, the use of professional interpreters may improve disclosure and attenuate some difficulties. The study concluded that clinicians should become aware of the types of quality problems that may occur when evaluating patients in a non-primary language or via an interpreter.<sup>38</sup>

Communication difficulties in health care services may potentially lead to a wide range of negative consequences, including misdiagnosis, inappropriate treatment, and the inadequate use of medication.<sup>39, 40</sup> Two studies conducted in the US demonstrated that ethnicity would have an influence on the amount of pain medication administered for long bone fracture in emergency departments, with Hispanic individuals being twice as likely not to receive it at all.<sup>41</sup> It is suggested by the authors that English language fluency may have played an important role here, which supports the need to consider language when examining disparities based on other socio-demographic factors such as race and ethnicity. Research has explicitly demonstrated that language barriers are associated with the poor management of acute and chronic conditions such as gallstones, asthma and diabetes,<sup>42, 43, 44, 45, 46</sup> as well as with a lower likelihood of patients receiving appropriate follow-up appointments.<sup>47, 48, 49, 50, 51, 52, 53</sup>

Overall, the literature review finds that the use of professional interpreters improves clinical outcomes

and reduces inequities in utilization of services.<sup>54, 55, 56</sup> In fact, many studies found that the use of professional interpreters raised the quality of care received by patients with language barriers to the same level as received by English-speaking patients.<sup>57, 58, 59</sup> A recent systematic review found that language-concordant care consistently improved outcomes, with minor exceptions.<sup>60</sup> In some medical areas, such as psychiatry, Bauer & Alegría found that professional interpreters facilitate the disclosure of sensitive material and help to minimize distortions and errors to over- or under-estimation of psychopathology.<sup>61</sup>

## Hospital Utilization

This section presents studies that examine three important measures of the efficiency of healthcare delivery: Emergency Department (ED) use; hospital re-admissions and hospital length of stay (LOS). Most studies reviewed suggest that the presence of a language barrier is associated with more frequent use of the ED<sup>62</sup> and higher hospital admissions.<sup>63, 64</sup> The presence of a language barrier is also associated with longer hospital stays for many medical conditions.<sup>65, 66</sup> Lion et al. reports a fivefold increase in LOS among paediatric patients whose parents faced language barriers.<sup>67</sup>

These findings were confirmed in two Canadian studies:

- John-Baptiste et al. investigated the effect of LEP on LOS and in-hospital mortality through a retrospective analysis of administrative data at three tertiary care teaching hospitals in Toronto, Canada between April 1993 and December 1999.<sup>68</sup> The study analyzed LOS differences, first by looking at 59,547 records and then by a meta-analysis comprised of 189,119 records. The study found that patients with LEP stayed in hospital longer for seven of 23 conditions (unstable coronary syndromes and chest pain, coronary artery bypass grafting, stroke, craniotomy procedures, diabetes mellitus, major intestinal and rectal procedures, and elective hip replacement), and 6% (approximately 0.5 days) longer overall than patients with



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English language proficiency. However, the study found that patients with LEP were not at increased risk of in-hospital death.

- Goldman et al. used computerized records of ED visits at the Hospital for Sick Children in Toronto over a one-year period to determine if children whose parents spoke a primary language other than English, specifically Cantonese, Mandarin, Spanish or Tamil, experienced a longer LOS compared to a random sample of English-speaking families.<sup>69</sup> After adjusting for other variables associated with LOS, non-English speakers experience a significantly longer LOS in the ED.

Patient discharge is identified as one of the five high-risk clinical scenarios where language barriers can seriously compromise health care results and therefore require the utilization of a qualified interpreter for LEP patients. The other four high-risk scenarios being emergency care, informed consent, surgical care, and medication reconciliation.<sup>70</sup>

<sup>71</sup> This recommendation is supported by Karliner et al., who conclude that language barriers in the hospital setting are associated with lower rates of understanding of discharge instructions, including diagnosis, type of follow-up appointments, medication category and purpose after discharge.<sup>72</sup>

Unplanned ED return visits and hospital re-admissions are widely accepted as indicators of quality of care. Patients with language barriers are more likely than those without language barriers to return to the ED within 72 hours<sup>73, 74</sup> or be readmitted to the hospital.<sup>75, 76</sup> In the US, hospitals exceeding certain number of avoidable readmissions are economically penalized according to the Hospital Readmission Reduction Program, which is a Medicare framework promoting improved communication and care coordination between patients and health care providers.<sup>77</sup>

One Canadian study used eight years of retrospective data from two academic hospitals to examine whether there was a difference in ED visits and re-admissions for patients with

and without language barriers for two acute conditions (pneumonia and hip fracture) and two chronic conditions (chronic obstructive pulmonary disease [COPD] and heart failure).<sup>78</sup> Patients with language barriers and heart failure were more likely to return to the ED after discharge than patients without language barriers, and patients with language barriers and heart failure or COPD were more likely to be readmitted. The authors speculate that chronic conditions are more communication sensitive and require patient focused strategies to improve discharge communication and post-discharge support.

The literature review found that the use of professional interpreters is associated with similar or lower rates of hospitalization.<sup>79, 80, 81</sup> For example, McNulty & Hampers found that pediatric patients whose family cannot speak English without an interpreter are more than twice as likely to be admitted if not utilizing professional interpreting services.<sup>82</sup>

The reviewed research found no differences in the LOS between patients who have access to professional interpreters and patients with English-language proficiency.<sup>83, 84, 85, 86, 87</sup> However, patients who do not receive professional interpreting at the time of admission, or both admission and discharge, have a significantly longer LOS compared to patients who have a professional interpreter on both days of admission and discharge.<sup>88</sup>

The use of professional interpreters is also associated with similar or lower rates of ED use among adults.<sup>89, 90, 91</sup> Lindholm et al. compared 30-day readmission rates between patients that had professional interpreting at admission or discharge and those who did not.<sup>92</sup> Patients provided with access to an interpreter at admission and/or discharge were less likely to be readmitted to the ED within 30 days than patients whose language barriers were not addressed.



### Physician Utilization

The level of physician utilization is determined by the number and length of visits of patients to physicians. This is a highly important indicator of “Better Health Care Outcomes”, as it reports on the efficiency in the utilization of one of the most important resources in the provision of healthcare: Physician’s time.

Few studies have examined unnecessary visits with health care providers or length of health care visits in terms of language barriers or interpreting. Fagan et al. examined the impact of mode of interpreting on the length of an outpatient visit using data from 441 non-interpreted and 172 interpreted visits to a Rhode Island teaching hospital-based primary care clinic.<sup>93</sup> Compared to patients who did not require an interpreter, patients who used an interpreter experienced significantly longer provider visits. When different interpreting methods were evaluated, telephone and patient-supplied interpreters were associated with significantly longer visit times, but hospital (or professional) interpreters were not. In this study, the authors suggested that the longer visit times associated with telephone interpreters was a result of the time needed to call the interpreting service, getting connected, repeating statements and missing nonverbal communication. This result for hospital interpreters was consistent with a previous study conducted by Tocher & Larson.<sup>94</sup> According to a review by Azarmina & Wallace, even when the costs of remote interpreting are higher, these may be offset by gains in efficiency by reducing the time spent on administrative or non-interpreting activities.<sup>95</sup>

### Inappropriate Procedures and Medication Use

Language barriers are associated with an increased reliance on diagnostic tests for conditions that may otherwise have been diagnosed during history-taking.<sup>96</sup> The literature is consistent in reporting that language barriers are frequently associated with unnecessary, hazardous or expensive tests and procedures (e.g., IV’s, intubation, CT scans) as well as the omission of other indicated tests.<sup>97, 98, 99, 100, 101</sup>

Notable studies:

- Garra et al., asserting that communication barriers “compromise the diagnostic power of the medical interview” (p. 681), conducted a prospective study measuring the impact of communication barriers on initial diagnosis and perceived reliance on ancillary testing in 417 encounters in the ED setting.<sup>102</sup> In this study, language was the most commonly reported communication barrier. Among encounters with patients with communication barriers, diagnostic confidence (based on the medical interview) was 27% lower and physician reliance on ancillary testing was 32% higher than encounters with patients without communication barriers.
- Waxman & Levitt conducted a prospective comparative study to examine whether patients arriving in the ED with language barriers received more diagnostic tests than their English-speaking counterparts.<sup>103</sup> Diagnostic testing was higher among patients with language barriers and may have been higher for certain conditions than for others. For example, three times as many abdominal CT scans were ordered for non-English-speaking patients presenting with abdominal pain, but no significant differences were observed for tests ordered for chest pain, probably because there are fewer diagnostic modalities available for this condition.
- Bard et al. conducted a nine-year retrospective review of the National Trauma Registry for the American College of Surgeons database to examine potentially preventable intubations among Spanish-speaking patients.<sup>104</sup> Spanish-speaking trauma patients were significantly more likely to be unnecessarily intubated on arrival at the trauma centre (49% of total intubations in this group) than their English-speaking counterparts (38% of total intubations in this group). This was also true among children presenting to the ED with asthma.

It is suggested that the implementation of interpreting services can reduce inappropriate testing and procedures associated with language barriers.<sup>105, 106</sup> As affirmed by Ku &

Flores, when treating patients with limited English skills, the clinician may face challenges to elicit their symptoms, which may lead to the utilization of unnecessary diagnostic resources or invasive procedures.<sup>107</sup> In other words, some physicians appear to adopt a more cautious, conservative style when they cannot fully understand the information provided by their patients, which results in more tests ordered and even more frequent hospital admissions.<sup>108</sup>

Studies comparing patients with language barriers to English-proficient patients reported that patients with language barriers were more likely to report problems understanding medication category and purpose, lack of knowledge of drug dosage and frequency,<sup>109, 110</sup> and were less likely to have side effects of medications explained.<sup>111</sup> Patients with language barriers were also less likely to be using their medications properly at proper doses.<sup>112, 113</sup> Shen et al., looking at 12 months of hospital admissions of acute stroke patients with atrial fibrillation, found that only 5% of non-English-speaking patients were taking the recommended medication for this condition; well below the 45% found in the group of English-speaking patients facing a similar diagnosis.<sup>114</sup>

A noteworthy study by Hampers & McNulty investigated the impact of interpreters on resource utilization.<sup>115</sup> The authors examined 4,146 pediatric visits to the ED in four cohorts defined by language and interpreter use: English-speaking children; children with a language barrier but treated by a bilingual provider; children with a language barrier who used a professional interpreter; and children who had a language barrier for whom a professional interpreter was unavailable. Compared to the English-speaking cohort, non-English speaking cases with a bilingual provider or an interpreter showed similar levels of resource utilization, while the cohort without access to a professional interpreter generated higher testing costs (35% higher than the English-speaking cohort) and longer visits (7.5% longer than the English-speaking cohort). The authors concluded that decision making is most cautious; therefore, the costs were higher in the absence of a bilingual provider or professional interpreter.

## Adverse Events

An adverse event is described as any “unintended harm to the patient by an act of commission or omission rather than by the underlying disease or condition of the patient.”<sup>116</sup> Adverse events typically include missed or delayed diagnosis, medication errors, or procedural mistakes.

According to the U.S. Joint Commission, language barriers were the root cause of 59% of serious adverse events between 2005 and 2012.<sup>117</sup> The Joint Commission states that “providing safe and high-quality patient care is dependent upon effective communication between health care professionals, patients and patients’ families.”<sup>118</sup>

Language barriers can inhibit a health care provider’s ability to elicit patient symptoms, often resulting in diagnostic errors, a treatment plan based on misinformation, and poor understanding on the part of the patient of their condition and the prescribed treatment.<sup>119, 120</sup> It is well-documented that patients with language barriers experience more medical errors, with greater clinical consequences, than their counterparts who share a language with their provider.<sup>121, 122, 123, 124, 125</sup>

Notable studies:

- Divi et al. used adverse event data from six U.S. hospitals over seven months in 2005 to examine differences in the characteristics of adverse events between English-speaking patients and LEP patients.<sup>126</sup> The study found that some degree of detectable physical harm occurred in 49.1% of reported adverse effects for patients with language barriers, compared to 29.5% of patients who spoke English fluently. As expected, more than half (52.4%) of the adverse events experienced by patients with language barriers were attributable to some failure in communication, compared with only about one third (35.9%) for English-speaking patients. Patients with language barriers also experienced more events attributable to questionable advice/interpretation (11.2% vs. 3.5%) and questionable

assessment of patient needs (14.7% vs 6.4%) than English-speaking patients.

- Bartlett et al. randomly selected 20 large hospitals in the province of Quebec to examine whether or not communication problems were associated with adverse events.<sup>127</sup> Of 145,672 admissions, they randomly selected 2,355 patient charts and abstract patient characteristics, and found 217 adverse events, 2.7% of which were judged to be preventable. Patients with preventable adverse events were three times more likely to have a communication problem than patients without communication problem.

Several studies compare rates of medical errors and misdiagnoses occurring when resorting to ad hoc interpreters with those cases in which professional interpreting services are used. There is general consensus in the literature that professional interpreters make fewer clinically significant errors than ad hoc interpreters.<sup>128, 129</sup> Flores et al. also found that ad hoc interpreters misinterpreted or omitted up to half of all the physicians' questions, were more likely to commit errors with potential clinical consequences and less likely to mention medication side effects.<sup>130</sup>

More recently published in 2012, Flores et al. used audiotaped ED visits to compare the number of errors made among patients using professional interpreters, ad hoc interpreters and no interpreters.<sup>131</sup> The proportion of errors of potential consequence was significantly lower among professional interpreters (12%), compared to ad hoc interpreters (22%) or no interpreter at all (20%). Furthermore, professional interpreters at least 100 hours of training produced significantly lower error rates than those with less training. The authors concluded that creating and implementing state-wide standards for medical interpreters could reduce potentially harmful clinical errors such as incorrect dosing of medications.

## Improved Patient Experience

### Patient Satisfaction

Good communication between patients and health care providers is a critical determinant of patient satisfaction. In turn, patient satisfaction is associated with fewer complaints and better continuity of care.<sup>132, 133</sup>

The negative impact of language barriers on patient satisfaction has been well established through individual research studies and systematic reviews.<sup>134, 135, 136</sup> Language barriers are associated not only with lower patient satisfaction but also with lower patient compliance with treatment and appointments.<sup>137, 138, 139, 140, 141</sup> Families with non-English proficient members are at an increased risk of receiving less information about their loved one's illness than those who are English proficient,<sup>142</sup> and non-English speakers report more problems with coordination of care, psychosocial care and access to care and information.<sup>143</sup>

Although limited research examines language disparities in patient satisfaction in Canada, one study conducted with the Chinese community found that speakers of Mandarin or Cantonese with limited English and recent Chinese immigrants were less satisfied than their Canadian-born Chinese counterparts.<sup>144</sup> The factors most cited were perceived clinical experience, clarity of physicians' communication, and time spent with the patient. Another study identified communication concerns among older Francophone patients living in Ontario.<sup>145</sup> These included concern that they would not be able to understand medical language, a feeling of being rushed during the time allocated for the physician-patient meeting, and the challenge of understanding and expressing themselves in English, including expressing emotion and pain.

Professional language support is a critical component of patient satisfaction for those facing language barriers.<sup>146</sup> A recent systematic review found a strong association between the provision of professional language interpreting and patient satisfaction.<sup>147</sup> Compared to professional

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interpreters, the use of family members or ad hoc interpreters was associated with lower levels of patient satisfaction, particularly in terms of listening quality and the discussion of sensitive issues.<sup>148, 149</sup> Other studies showed that the provision of professional interpreters was associated with higher levels of patient satisfaction.<sup>150, 151</sup> Bagchi et al. found that the provision of professional interpreters was associated with higher levels of patient and provider satisfaction and improved patients' understanding of care and treatment and willingness to attend follow-up visits. It also reduced treatment errors and lawsuits due to mistreatment.<sup>152</sup>

Canadian research in this area, while limited, also finds the correlation between professional interpreting services and customer satisfaction. In this regard, a study by Moissac & Bowen presented several testimonials of francophone patients who were dissatisfied due to language barriers when receiving health care services in four different Canadian provinces:<sup>153</sup>

**“I can't function 100% in English. If I'm hurting somewhere and I can't describe my pain in English, it will be difficult for the doctor” (p. 27)**

**“The dermatologist had given me a medication that I was to apply in one spot, but I hadn't understood, I administered the medication the wrong way” (p. 27)**

**“I had to live it to understand it. I had never realized that I couldn't speak English when in pain. I'm perfectly bilingual, but when I'm in pain, I'm not” (p. 28)**

**“The hospital did not have an interpreter. A nurse who had taken some French courses did the interpretation” (p. 28)**

**“I'd write in French on Google Translate, and the psychologist would read the translation” (p. 28)**

**“If services were in my language, I wouldn't hesitate to [consult various providers]” (p. 27)**

From the analysis of a survey, the authors grouped the negative consequences of these communication barriers that caused discontent among these patients into different categories, including poor patient assessment, misdiagnosis, and delayed treatment; poor understanding of diagnosis or treatment; and low confidence in health-care encounters.

Among Canadian literature sources addressing this subject, it is worth mentioning an investigation report by the Office of the Languages Commissioner of Nunavut. The document emphasizes the impact of language barriers on patient satisfaction indicating that “...a patient who cannot, or has difficulty speaking in English, or who is not clearly understood, is at higher risk of receiving a misdiagnosis with all the resulting complications” (p. 39)<sup>154</sup>

Some studies examined patient satisfaction with different modes of interpreting, with mixed results. For example, a systematic review conducted by Joseph et al. did not find significant variations in patient satisfaction among different modalities (e.g. telephone, video, in-person).<sup>155</sup> There were, however, limited yet positive findings related to satisfaction with the use of video interpreting services. Patients cited visual communication as a positive aspect of in-person and video interpreting. Researchers generally agree that, regardless of the mode of delivery, professional interpreting positively contributes to patient satisfaction.<sup>156, 157</sup>

## Improved Staff Experience

### Provider Satisfaction

A newer area of study examines the impact of language barriers on quality of care from the perspective of health service providers.<sup>158</sup> In Canada, a study conducted by Koehn, assessing the barriers to care access for ethnic minority seniors, revealed that health care providers face language challenges when assisting members of these groups.<sup>159</sup> Namely, practitioners admitted they could not perform an accurate health assessment without the use of English and, therefore, interpreters are necessary: “Without an interpreter, you miss the

subtleties... everything else we can manage in sign language but really trying to explore somebody's pain... you're literally just on the surface, you're not exploring how they feel" (p.8). Another Canadian study, by Brisset et al., reported that 44% of primary-care providers experienced frequent difficulties communicating with non-English proficient patients, along with difficulties accessing interpreters.<sup>160</sup> In a report about interpreting services in the Champlain Region<sup>161</sup>, Moloney concludes that "There is strong international evidence of the negative impacts of language barriers, not just on clients, but also on providers and health care institutions in terms of health care accessibility, quality, efficiency and cost" (p.17).

Several studies examined why interpreters are underutilized by health care providers. The main barriers identified were the availability of trained medical interpreters and accessibility to the agencies that provide them.<sup>162</sup> While physicians cited time pressures and limited interpreter availability, research suggests that professional interpreters are underutilised even when they are readily available and/or provided at no cost.<sup>163, 164</sup> In a qualitative study conducted in two teaching hospitals with their own interpreting services, internal medicine resident physicians acknowledged that those services are underused despite the recognition that LEP were not receiving equal care.<sup>165</sup>

The study by Fagan et al.<sup>166</sup> observed that health care providers reported higher satisfaction with hospital (face-to-face professional) interpreters than telephone or patient-supplied interpreters and suggested that the higher satisfaction with hospital interpreters was due in part to perceived increased efficiency associated with their use. A qualitative study conducted with providers about their preferences when communicating with patients with language barriers revealed that decision-making processes were complex and involved both the provider and the practice environment.<sup>167</sup> Technological developments, such as videoconferencing, telephone call centres, and the internet, which allow resources to be shared across networks of providers and organizations, can contribute to overcoming provider-related barriers.<sup>168</sup> In their systematic review, Joseph et al. found that

providers expressed the same level of satisfaction with video and in-person interpreting services, but preferred video over telephone interpreting services, since visual communication and the use of non-verbal cues were critical to assessing body language and improving interpreting.<sup>169</sup>

## Lower Cost of Care

This section seeks to examine how language barriers decrease the efficiency of the health care system and increase health care costs by contributing to adverse effects, inappropriate testing and procedures, use of medication and increases in unnecessary or inappropriate hospital and health care provider utilization.<sup>170, 171, 172, 173</sup> The need for more research about the costs and benefits of providing interpreting services is well-recognized.<sup>174, 175, 176, 177, 178</sup> This type of research is challenging because it is difficult to identify, document, and quantify all possible costs and consequences of not providing interpreting services, some of which may be long-term. Furthermore, many institutions do not keep track of the costs of the interpreting services they provide. The costs of providing interpreting services vary widely in institutions and a combination of approaches may be used.<sup>179, 180</sup> Finally, some argue that this type of analysis masks fundamental issues of patients' rights and ethical care.<sup>181</sup>

As a result, few studies examine the direct impact of language barriers on financial outputs or efficiency inputs. Nevertheless, the literature review identifies some cost-benefit analyses, which used one of three approaches:

1. Comparing institutional costs before and after the implementation of interpreting services by calculating the costs of the intervention and estimating the cost savings of providing such services.
2. Estimating the financial savings that would be achieved post-implementation of professional interpreting services based on quality of care and efficiency indicators.
3. Calculating the relative costs of different modes of professional interpreting.



## Research Findings

A seminal study by Hampers et al. examined the cost of language barriers in terms of diagnostic testing and hospital LOS. Standard hospital charges were applied for each patient visit to a pediatric ED between September and December 1997. The overall mean charge for tests was significantly higher for patients with a language barrier compared to those without (US\$145 vs. US\$104). The authors calculated that language barriers accounted for a US\$38 increase in charges for tests and a 20-minute longer ED stay. Since this study included some patients who used an interpreter, the results were likely underestimated.<sup>182, 183</sup>

Jacobs et al. compared the cost of utilization of primary care and ED services in a Massachusetts health system before and after the introduction of professional interpreting services in four health centres serving more than 122,000 patients from 1995 to 1997. The authors first calculated the average costs of interpreting in a large-scale, round-the-clock interpreting services program in the primary care setting at US\$79 per interpreted encounter. In terms of efficiency outputs, the patients served by this program experienced increased hospital utilization, measured by the receipt of preventive services, physician visits and drug prescriptions. These translated into a net increase in service utilization costs of US\$45 per patient. The authors reasoned that the provision of interpreting services may be more cost effective over the long-term as a result of improved patient physician communication, utilization of preventive services and reduced complications and adverse events, and noted that the financial consequences of providing professional interpreting services warrants further investigation. Based on their findings of a positive relationship between affordability of interpreting services and the amount of preventive care received, and on the assumption that preventive care is a cost-effective way of improving the quality of health care services, the authors concluded that providing interpreting services was a financially viable method for enhancing delivery of health care to patients with LEP.<sup>184</sup>

Another study by Jacobs et al. investigated the impact of an enhanced interpreting service on hospital costs measured by hospital LOS,

inpatient consultation, radiology tests, follow-up appointments, use of ED, and patient satisfaction.<sup>185</sup> The study participants included 323 Internal Medicine inpatients, 124 whose physicians had access to the enhanced interpreter intervention (two trained interpreters assigned to work with patients throughout their stay), 99 whose physicians had access to the usual interpreting services (no interpreter, ad hoc or standard hospital interpreter) and 100 matched English-speaking participants. The study found that the enhanced interpreter intervention did not have a significant impact on any of the measured outcomes or their associated costs but noted that the cost of the enhanced program was small (1.5% of overall patient care).

A U.S. study by Lindholm, et al.<sup>186</sup> found that professional interpreting services at both admission and discharge reduced a patient's LOS by 0.75 days to 1.45 days, representing a 34% reduction. In Ontario, in 2021, the cost of an inpatient bed in an acute care hospital is, on average, \$1,150.<sup>187</sup> A similar 0.75 day reduction in LOS would result in a savings of over \$860 per patient which is significantly greater than the total cost of an interpreter at both admission and discharge.

Promising examples were also identified in the 13 business case studies, carried out by the Alliance of Community Health Plans Foundation, for projects that address one or more of the National Culturally and Linguistically Appropriate Services (CLAS) Standards.<sup>188</sup> In 2000 (updated to 15 in 2013), the Office of Minority Health in the U.S. issued 14 standards for CLAS as a means to correct inequities that existed in the provision of health services, including culturally competent care, language access services, and organizational supports for cultural competence. The cost benefits achieved by diverse health care organizations (ranging from large integrated hospitals to small satellite clinics) that implemented the CLAS standards included:

- Substantial reductions in outsourced language interpreting services and subsequent savings in related costs. For example, the Contra Costa Health Services Project partnership, a shared interpreting services model that utilized advanced video and voice-over internet protocol



## Research Findings

technologies, achieved a cost savings of \$0.75/minute, for a total savings of US\$25,000 US.

- More efficient use of staff time by reducing communication delays between patients and providers. For example, Contra Costa Health Services Project increased the number of patients served per day at considerable cost savings. Gany et al. found that remote simultaneous interpreting is faster and more accurate than proximate simultaneous, remote consecutive, and proximate ad hoc interpreting.<sup>189</sup>
- Cost savings resulting from investing in building a linguistically diverse workforce. For example, Telesalud Molina Healthcare implemented a program providing permanent and direct access to bilingual registered nurses for medical advice, which achieved a cost-savings of US\$2,448 per month during the pilot phase (end of 2004) and US\$750,000 per year in the calendar year 2005-2006 across eight states.<sup>190</sup>

Nazreen examined whether providing interpreting services as an input variable saved health system costs by reducing hospital utilization, laboratory tests, and physician time, before and after interpreting services were implemented.<sup>191</sup> She calculated that following the implementation of interpreting services, there were substantial savings due to improved patient compliance and a reduction of cancellations and no shows. Nazreen's paper also included a physician survey, in which 78% of physicians reported that the use of an interpreter reduced total care time, enabling them to see more patients and thus increased their revenue.

Bernstein et al. calculated that the cost to the health care system of patients using an interpreter was lower than that of English-speaking patients and higher than that of patients without an interpreter.<sup>192</sup> However, the use of professional interpreters was associated with a lower ED return rate and increased out-patient clinic utilization, making patients with interpreters more like English-speaking patients, without any simultaneous increases in LOS or cost-of-visit.

Karliner et al. demonstrated that a systems intervention aimed at increasing access to telephone interpreters decreased readmission rates and estimated hospital expenditures.<sup>193</sup> The intervention consisted of providing in-patients with dual-handset telephones with a direct connection to interpreting services at each hospital bedside. During the eight-month intervention, the estimated net savings equaled US\$1,291,233, for an estimated monthly health care expenditure savings of US\$161,404.

### Interpreting Service Modes

- **In-person Interpreters:** Usually the costliest option, often ranging from \$45-\$150 an hour.
- **Telephone Interpreting:** One of the most widely used forms of interpreting. Advantages include affordability and access to many languages.
- **Centralized Telephonic Language Services:** Beneficial to small institutions who can share administrative costs and benefits by contracting services from organizations that already have professional interpreting expertise. Can also function as an effective pooling system for translating materials and community resources.
- **Video Remote Interpreting (VRI):** A service that uses web cameras or videophones to access an offsite interpreter. The costs of VRI include expenses for equipment and for the interpreting service.
- **Shared Interpreter Network:** Health care staff at participating hospitals use interpreters located at their own hospitals or at their partner hospitals via a mobile videoconferencing unit, creating a pool of interpreters in various languages.

### Cost Savings by Mode of Interpreting

There has been some research to date examining the different modes of providing interpreting services. The evidence on which mode is best differs across studies and depends on multiple factors, including the health care setting context and type of outcome. Some studies have attempted to calculate the relative costs and benefits among different modes of professional interpreting, including bilingual health care providers, in-person interpreters, telephone interpreting, video interpreting, and shared-care networks.<sup>194, 195</sup>

Fagan et al. estimated the potential amount of physician time that could be saved by providing hospital interpreters for all Spanish-speaking patients.<sup>196</sup> Assuming that 18% of all interpreted visits used a telephone interpreter with a mean visit time 36.3 minutes, they calculated the cost of telephone interpreting in a year to be US\$68,154 (29,632 minutes at US\$2.30 each). With an approximate annual cost of a full-time interpreter estimated at US\$30,000, two additional full-time interpreters could be hired, with a small cost saving from eliminating telephone interpreter use.

Lion et al. conducted a randomized clinical trial in the Seattle Children's Hospital ED to determine the effect of telephone versus video interpreting on parent comprehension (ability to name the child's diagnosis), parent-reported quality of communication and interpreting, and frequency of lapses in the use of professional interpreters.<sup>197</sup> Parents in the video group were more likely to be able to correctly name their child's diagnosis (74.6% vs. 59.8% for those in the telephone group) and less likely to report lapses in interpreter use. The LOS in the ED for admitted and discharged patients, and the charges and minutes of remote interpreting received did not differ between groups. Mean charges per patient for video interpreting were significantly higher than for telephone interpreting. The authors concluded

that video interpreting may be a good investment to improve parent comprehension and lower the risk of communication-related adverse events.

Jacobs et al. calculated the average per-minute and per-encounter cost of providing interpreting services via a shared network for various languages.<sup>198</sup> They found that the estimated encounter cost for in-person interpreting services varied widely, depending on whether the interpreter was on staff or under contract. For the former, the estimated average cost was US\$2.65 and for the latter, US\$15.02. The authors concluded that a shared video and telephone network would enhance the efficient provision and use of these services and reduce health inequities.

The literature review identified only one Canadian study comparing the cost and benefits of two modes of interpreting. Dowbor et al. conducted a mixed-methods evaluation to compare the impact of Language Services Toronto (LST)\* to over-the-phone interpreting (OPI) on patients' and providers' experiences across a regional health division that included both hospital and community-based health agencies.<sup>199</sup> After the LST program was introduced, there was a decrease in the use of face-to-face interpreters, from 37% to 24%. Overall, most providers found OPI to be appropriate, with some variation by type of care. Most providers believed OPI services were appropriate for supportive care (90%), followed by acute care (88%), chronic care (86%) and mental health care (73%). The program also had a strong positive impact on service processes (e.g. improved patient-provider relationship, increased comfort and privacy levels) and interim outcomes (e.g. increased ability to schedule follow-up appointments and follow health care providers' instructions, increased likelihood to disclose information and ask questions).

\* LST provides real-time, over-the-phone interpreting (OPI) services in over 170 languages, 24 hours a day, seven days a week to clients utilizing health care services in participating organizations. Services are accessed through one central telephone number.

# Summary of the Research

The table below summarizes the findings that demonstrate how investments in language access in general, and professional interpreting in particular, contribute to a higher performing health system.

Goal	The Impact of Not Addressing Language Barriers	The Benefits of Addressing Language Barriers
<b>Better Health Outcomes</b>	<ul style="list-style-type: none"> <li>• less likely to receive effective, evidence-based treatment</li> <li>• less timely care</li> <li>• poor management of acute and chronic conditions</li> <li>• contribute to preventable morbidity and mortality</li> <li>• may contribute to malpractice claims</li> <li>• increased likelihood of adverse events</li> <li>• increased diagnostic and other medical errors, with greater clinical consequences</li> <li>• unnecessary, hazardous or expensive tests and procedures, omission of other indicated tests</li> <li>• lower diagnostic confidence</li> <li>• ineffective treatment plans</li> <li>• more frequent use of the ED, more likely to return to the ED</li> <li>• higher hospital admissions and increased LOS</li> <li>• less likely to be using medications properly at proper dosages</li> </ul>	<ul style="list-style-type: none"> <li>• improved patient safety</li> <li>• improved clinical outcomes</li> <li>• significantly fewer errors of potential consequence</li> <li>• reduction in inappropriate testing and procedures</li> <li>• more appropriate resource allocation</li> <li>• shorter LOS</li> <li>• lower rates of ED use and readmission</li> </ul>
<b>Improved Patient Experience</b>	<ul style="list-style-type: none"> <li>• lower patient satisfaction and compliance</li> <li>• problems with access to and coordination of care</li> </ul>	<ul style="list-style-type: none"> <li>• higher levels of patient satisfaction</li> <li>• greater patient understanding of care and treatment</li> <li>• more willingness to attend follow-up visits</li> </ul>
<b>Improved Staff Experience</b>	<ul style="list-style-type: none"> <li>• frequent difficulties communicating with patients</li> <li>• underutilization of professional interpreters; reliance on ad-hoc interpreters</li> </ul>	<ul style="list-style-type: none"> <li>• higher levels of staff satisfaction</li> <li>• improved adherence to treatment plans</li> </ul>
<b>Cost Savings</b>	<ul style="list-style-type: none"> <li>• significantly higher overall mean charge for tests</li> <li>• additional costs associated with an increased LOS</li> </ul>	<ul style="list-style-type: none"> <li>• more efficient use of staff time</li> <li>• savings due to improved patient compliance</li> <li>• reduction in total care time</li> <li>• cost savings resulting from reduced use of the ED</li> <li>• lower ED return rate and increased out-patient clinic utilization</li> <li>• reductions in outsourced language interpreting services and subsequent savings in related costs</li> <li>• strong positive impact on service processes</li> <li>• more cost effective over the long-term</li> </ul>

# Conclusions, Considerations and Recommendations

The literature review provides strong international evidence of the negative impacts of language barriers on health care outcomes, patient and provider satisfaction, and health care costs. There is also ample evidence describing the benefits of providing professional interpreting relative the Quadruple Aim, although the absolute financial costs of failing to address language barriers, and conversely the financial cost savings, are not always well-documented. Nonetheless, it appears that the cost of providing professional interpreting services is quite low relative to other health care costs.<sup>200, 201</sup> While less Canadian research has been undertaken, the research conducted to date is consistent with these international findings.<sup>202</sup>

Gaps in the research point to some future research directions:

- Further qualitative and quantitative analysis of costs savings and return on investment that result when providing interpreting services, and their link to Quadruple Aim goals such as patient satisfaction. This could be done by exploring research performed in other industries, such as a survey of Fortune 500 companies undertaken by the Common Sense Advisory in 2011, which showed that companies that invested in translation were 1.5 times more likely to experience an increase in total revenue.<sup>203</sup> Alternatively, industry-specific measurement tools, such as Health Care Quality Costs<sup>204</sup>, could be implemented in practice through action research. This kind of methodology would quantify the additional profits associated with the utilization of interpreting services, by comparing the cost of providing such services with the economic benefits they generate through failure reduction and increased patient satisfaction.
- The impact of language proficiency and interpreting in specific clinical areas. For example, current research is insufficient to inform evidence-based guidelines for improving psychiatric quality of care among patients with LEP.<sup>205</sup>

- Intersectional examination of the interpreting needs within patient groups characterized by social identities such as gender, age, race, and immigration status, etc. to promote more interpersonal processes of care.<sup>206</sup>
- Evaluation of interpreting strategies to reduce racial and ethnic health inequities.<sup>207</sup>

Language barriers continue to contribute to inequities in health outcomes.<sup>208</sup> As our society grows increasingly linguistically diverse, health care organizations will need to respond to the changing demographics of their patient populations. There is consensus in the literature that the provision of language access services should not be viewed as a separate ‘add-on’ program, but as an essential component of a strategy to meet organizational goals e.g., to manage risk, improve quality, reduce health inequities, and establish partnerships with equity-seeking communities. Language access services appear to be most efficient and cost effective when organized at a regional, rather than an institutional, level.<sup>209</sup>

This echoes and supports the claim by Brandl et al. that, independently of cost, providing patients with the opportunity to communicate in a language they can speak and understand, must be considered a standard of care.<sup>210</sup> Many jurisdictions have not put in place standards to guide health care organizations with the provision of interpreting for patients with LEP. Nor is access to interpreting or language services integrated into health quality management systems or improvement frameworks. For example, in 2018, language access was not addressed among the 39 different measures used by Health Quality Ontario to assess the health system’s performance.<sup>211</sup> Moving forward, there is a need to share and promote evidence-based findings and information with health care providers and managers regarding the opportunity cost of not addressing language barriers and how interpreting services can contribute to a high performing organization and health system.

## Conclusions, Considerations and Recommendations

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Based on the findings and considerations presented in the literature review, the following recommendations are being made:

1. Pursue additional lines of inquiry to strengthen the evidence base regarding the opportunity costs – and their effects on return on investment – that can be attributed to language barriers.
2. Expand and integrate professional interpreting services within Canadian health care organizations and the health system as a strategy for not just overcoming language barriers but for promoting accessible, equitable, and high quality health care services to all Canadians regardless of ethnicity, race, class, gender and linguistic/cultural background.
3. Establish and extend government funding to health care institutions to ensure that interpreting services are incorporated as standard budget lines.
4. Provide training for health system managers and providers regarding the opportunity cost of not addressing language barriers and rationale for investing in providing interpreting services to optimize health service delivery at the organizational and health systems levels.

# Appendices

## Appendix 1 - Methods

The original parameters for the literature review included the following:

1. Compile evidence that supports the business case that not providing interpreting results in increased overall costs to the health care system.
2. Focus on hospitals and specialist care.
3. Focus on system costs (and not individual costs).
4. Search primarily Canadian and U.S. literature (only 10% international).
5. Search recent literature and include literature produced since the original literature review.
6. Focus on primarily peer-reviewed literature (include approx. 10% grey literature from well reputed sources that have used sound methodology).

The methodology for the literature review included both a literature search and an environmental scan. The databases used for the literature search included PubMed/Medline and PsychInfo for the years 1997-2009. The main (primary) search was conducted using the following keywords: interpreters AND cost/cost analysis (N=35) and language barriers AND cost/cost analysis (N = 219).

Three secondary searches were conducted.

- The first used the following keywords: language barriers AND health care efficiency (N = 8), language barriers AND safety (N = 37), language barriers AND adverse events (N = 9), language barriers AND hospital admission/utilization (N =19), language barriers AND physician time (N = 79), language barriers AND timeliness (N = 5), language barriers AND health equity (N = 12), language barriers AND quality of care (N = 279), language barriers AND patient satisfaction (N = 111).

- The second used the following keywords: interpreters AND health care efficiency (N = 3), interpreters AND safety (N = 9), interpreters AND adverse events (N = 0), interpreters AND hospital admission/utilization (N = 11), interpreters AND physician time (N = 35), interpreters AND timeliness (N = 3), interpreters AND health equity (N = 3), interpreters AND quality of care (N = 82), interpreters AND patient satisfaction (N = 51).
- The third search used the keywords language barriers OR interpreters AND Canada (N = 17).

Other peer-reviewed articles were identified using the related links and citations function in PubMed. Only articles that were relevant to the parameters of this review were included. There was substantial overlap with the literature on ethnic/racial disparities.

The 2009 literature review identified several review articles citing additional peer-reviewed journal articles identified through their own systematic searches of PubMed, PsychInfo, and Sociological abstracts (Goode et al., 2006; Bowen, 2004; Jacobs et al., 2006; Jacobs et al., 2003; Karliner et al., 2005; Ramirez et al., 2008; Azarmina & Wallace, 2005; Flores, 2005).

The environmental scan was conducted to identify grey literature such as government and institutional reports and demonstration projects. The scan also included interviews with relevant health care providers and administrators across Canada to document existing models of professional interpreting services. It included the use of professional contacts, a search of relevant websites (e.g. National Council on Interpreting in Health Care; Speaking Together, Hablamos Juntos) and requests for information from SDOH listserv.

In 2021, the literature was updated to incorporate:

- A 2015 report by Sarah Bowen for the Société Santé en français (Bowen, 2015).
- Systematic reviews conducted since 2009 examining the impact of language barriers and interpreting services on indicators such as health care quality, efficiency and cost.



- Recent research by key authors cited in the 2009 literature review and recent researchers who have cited their work.
- Recent research examining the impact of various modes of interpreting services.
- Emerging Canadian research and initiatives related to the provision of interpreting services.
- Communication and consultation with leaders and agencies in the field (e.g. Joint Commission, IMIA, The Interpreter's Lab).

## Appendix 2 - Glossary

<b>ASL</b>	American Sign Language
<b>CLAS</b>	Culturally and Linguistically Appropriate Services
<b>COPD</b>	Chronic Obstructive Pulmonary Disease
<b>CT</b>	Computed Tomography
<b>ED</b>	Emergency Department
<b>FU</b>	Follow-Up
<b>IHI</b>	Institute of Healthcare Improvement
<b>IMIA</b>	International Medical Interpreters Association
<b>LE(F)P</b>	Limited English (French) Proficiency
<b>LOS</b>	Length of Stay
<b>LST</b>	Language Services Toronto
<b>OPI</b>	Over the Phone Interpreting
<b>ROI</b>	Return on Investment
<b>RVVMI</b>	Remote Video/Voice Medical Interpreting
<b>SDOH</b>	Social Determinants of Health
<b>SROI</b>	Social Return on Investment
<b>TC LHIN</b>	Toronto Central Local Health Integration Network
<b>VRI</b>	Video Remote Interpreting

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