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The impact of improved access to after-hours primary care on emergency department and primary care utilization: A systematic review

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ABSTRACT

Access to after-hours primary care is problematic in many developed countries, leading patients to instead visit the emergency department for non-urgent conditions. However, emergency department utilization for conditions treatable in primary care settings may contribute to emergency department overcrowding and increased health system costs. This systematic review examines the impact of various initiatives by developed countries to improve access to after-hours primary care on emergency department and primary care utilization. We performed a systematic review on the impact of improved access to after-hours primary and searched CINAHL, EMBASE, MEDLINE, and Scopus. We identified 20 studies that examined the impact of improved access to after-hours primary care on ED utilization and 6 studies that examined the impact on primary care utilization. Improved access to after-hours primary care was associated with increased primary care utilization, but had a mixed effect on emergency department utilization, with limited evidence of a reduction in non-urgent and semi-urgent emergency department visits. Although our review suggests that improved access to after-hours primary care may limit emergency department utilization by shifting patient care from the emergency department back to primary care, rigorous research in a given institutional context is required before introducing any initiative to improve access to after-hours primary care.

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1. Introduction

Stronger primary health care systems, are associated with improved health outcomes, such as reduced morbidity and mortality [1]. In the United States (US), better access to primary care, measured through primary care physician supply, was associated with increased life expectancy and improved health status [2–5]. Furthermore, patients who had access to continuous and comprehensive primary care had improved health status compared to those without such access [1,6]. The relationship between strong primary care and health outcomes has been observed internationally [1,7–10]. For example, in Europe, countries with more comprehensive primary care were associated with improved overall population health, lower rates of unnecessary hospitalization, and a reduction in socioeconomic inequality [1,11].

Although provision of primary care to the population is crucial for better health outcomes, access to primary care is problematic in many developed countries. The 2015 Commonwealth Fund International Sur-

vey of eleven countries found that access to primary care for many countries was limited, with as many as 59% of patients in Canada without access to same-day or next-day appointments [12]. The survey also found that as few as 35% of the Swedish population had easy or somewhat-easy access to after-hours primary care. Globally, the prevalence of inappropriate emergency department (ED) visits ranges from 20% to 40% [13]. Utilization of the ED for health issues potentially treatable in primary care setting represents inappropriate ED utilization and may contribute to ED overcrowding [14]. ED overcrowding is associated with reduced patient satisfaction, longer time to treatment, and a greater probability of leaving the ED without receiving treatment [15,16]. Inappropriate ED utilization is associated with increased health care costs and lower continuity of care [17–21]. In fact, many patients who visit the ED could be treated in the primary care setting at a much lower cost compared to in the ED setting [22,23]. Moreover, lower continuity of care may be associated with subsequent increased health services utilization [24].

One potential solution to ED overcrowding is the diversion of patients from the ED to primary care settings through improved access to primary care services. This may be a feasible solution as areas with a lower density of primary care providers had higher odds of preventable ED utilization and similarly, patients living closer to their primary

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care provider were less likely to use the ED for health conditions treatable in primary care [25,26].

Improving access to after-hours primary care (i.e. weekday evenings, weekends, and holidays) is an important strategy implemented in many countries to reduce ED utilization and control ED overcrowding. A previous review paper on primary care interventions to limit non-urgent ED utilization, such as the implementation of general practitioner cooperatives (GPCs) providing after-hours primary care, found conflicting evidence [27]. GPCs were implemented in several European countries and aimed to provide better coverage of after-hours care by using larger physician cooperatives compared to the older rota model [28]. An updated review on the impact of improved after-hours primary care is warranted, as this review was published in 2013 and focused solely on GPC-related interventions. Thus, we undertake a systematic review of the published studies to understand the association between improved access to after-hours primary care and both ED and primary care utilization.

2. Methods

We conducted a literature search examining the association between improved access to after-hours primary care and ED and primary care utilization. We searched four databases: CINAHL, EMBASE, MEDLINE, and Scopus. Additional studies were identified by scanning the reference list of initial references included for review, and forward citation tracking of articles using Google Scholar. Database searches were conducted by combining keywords to describe after-hours services with keywords used to describe primary care. Keywords used to describe after-hours services in all databases were “after hour*”, and “out of hour*”. Keywords used to describe primary care were “primary care,” “primary health care,” “family physician*,” “family doctor*,” and “general practitioner*.” For searches conducted in EMBASE and MEDLINE, additional search term headings were used and detailed search strategies for each database are available in the electronic supplementary material (Appendix Table 1). The search was first conducted in May 2018 and an updated search was conducted in May 2020.

Although no restrictions were placed on date of publication or study population, studies were required to be in English language. Studies were included if they were quantitative observational studies examining the impact of improved access to after-hours primary care on ED or primary care utilization or related associations. After-hours services were defined as services provided outside of the regular working hours, including weekday evenings, weekends, and holidays, and primary care was defined as first-contact health services provided by a physician. Primary care services delivered by nurse practitioners, physician assistants, or other health care providers, as well as services delivered in a walk-in clinic setting were not considered. Case studies, review articles, letters and editorials, descriptive studies, and observational studies where the exposure was unrelated to after-hours primary care access were excluded from full-text screening. Studies that did not examine either primary care or ED utilization as an outcome were excluded. The studies analyzed ED visits were either overall ED visits, or categorized the visits as non-urgent and urgent visits, or non-urgent, semi-urgent, and urgent visits. A non-urgent visit was typically defined as a visit for a condition of minor intensity, a potentially avoidable visit. This is also generally defined as a low-urgency visit on a triage scale. A semi-urgent ED visit was defined as a visit of moderate-intensity or through some mid-range on a triage scale. An urgent ED visit was defined as a visit for emergency conditions or high urgency on a triage scale.

Information extracted from studies included author, year published, country of study, study design, study population, intervention or exposure group, statistical methods, intensity and type of ED utilization, intensity of primary care visits, and associated health care costs, if available. Intensity of ED and primary care utilization were defined by

the number of visits over some period of time, while the type of ED visit was defined by urgency.

3. Results

Our literature search resulted in 1,795 articles after removal of duplicates (Fig. 1). Of those screened, 359 letters and editorials, 60 case studies, 57 review articles, and 798 descriptive studies, as well as, an additional 459 articles where the exposure was unrelated to access to after-hours primary care were excluded, leaving 63 articles for full-text screening. After full-text screening, 12 studies were included, with an additional 8 studies added after forward and backward citation checking of the 12 studies, resulting in a total of 20 studies included. All 20 studies examined the association between improved access to after-hours primary care and ED utilization, while 6 studies examined the association of such access on primary care utilization.

Although after-hours primary care is broadly defined as primary care services provided outside of the regular working hours, the exact measure of after-hours used in the literature varies by country and region. Articles that defined after-hours in their region defined it as weekday evenings, ranging from after 5:00 PM and before 9:00 AM, as well as any time during weekends and holidays. Included studies were: (i) cross-sectional studies comparing patients with and without access to after-hours primary care and (ii) pre-post design studies evaluating the impact of access to after-hours primary care before and after implementation of some initiative to improve access to after-hours primary care. Studies examining the association between improved access to after-hours primary care and ED or primary care utilization were conducted in the US ($n = 5$) [29–33], Australia ($n = 2$) [34,35], Belgium ($n = 2$) [36,37], England ($n = 2$) [38,39], Ireland ($n = 2$) [40,41], the Netherlands ($n = 2$) [42,43], Canada ($n = 3$) [44–46], Italy ($n = 1$) [47], and Scotland ($n = 1$) [48]. Although most studies used a general population, two studies examined pediatric patients. Detailed descriptions of the studies are presented in Appendix Table 2.

3.1. After-Hours Primary Care and Emergency Department Utilization

Of the 19 studies that examined the association between improved access to after-hours primary care and ED utilization, five compared ED utilization between patients with access to after-hours primary care against those without such access [29–33]. The remaining studies examined the impact of improved access to after-hours primary care on ED utilization using pre-post study designs. Four studies examined the impact of opening an after-hours primary care clinic during evenings and/or weekends [34,35,44,48]. Two studies examined the impact of extension of primary care clinic hours in the UK, with one conducting a pilot seven-day primary care opening and the other comparing practices providing seven-day extended evening and weekend access with practices providing routine access [38,39]. Six studies examined the impact of reorganization of primary care from smaller groups to larger cooperatives in the Netherlands, Belgium, and Ireland, and the impact of opening these GPCs on ED utilization [36,37,40–43]. Reorganization into larger GPCs allows redistribution of physician hours to provide better coverage of after-hours services and these GPCs may be located in some central location between local EDs or within one local ED. Although GPCs were available to patients during both evenings and weekends in the Netherlands and Ireland, GPCs in Belgium were only available to patients on weekends. Additionally, one study examined reorganization of physicians into the patient-enrolment models in Canada, where they were required to provide after-hours services [45]. Finally, two studies examined the impact of financial incentives: one in Italy for physician groups available for at least ten hours per day during weekdays on ED utilization [47] and one in Canada for physicians who provided services during evenings, weekends, or holidays [46].

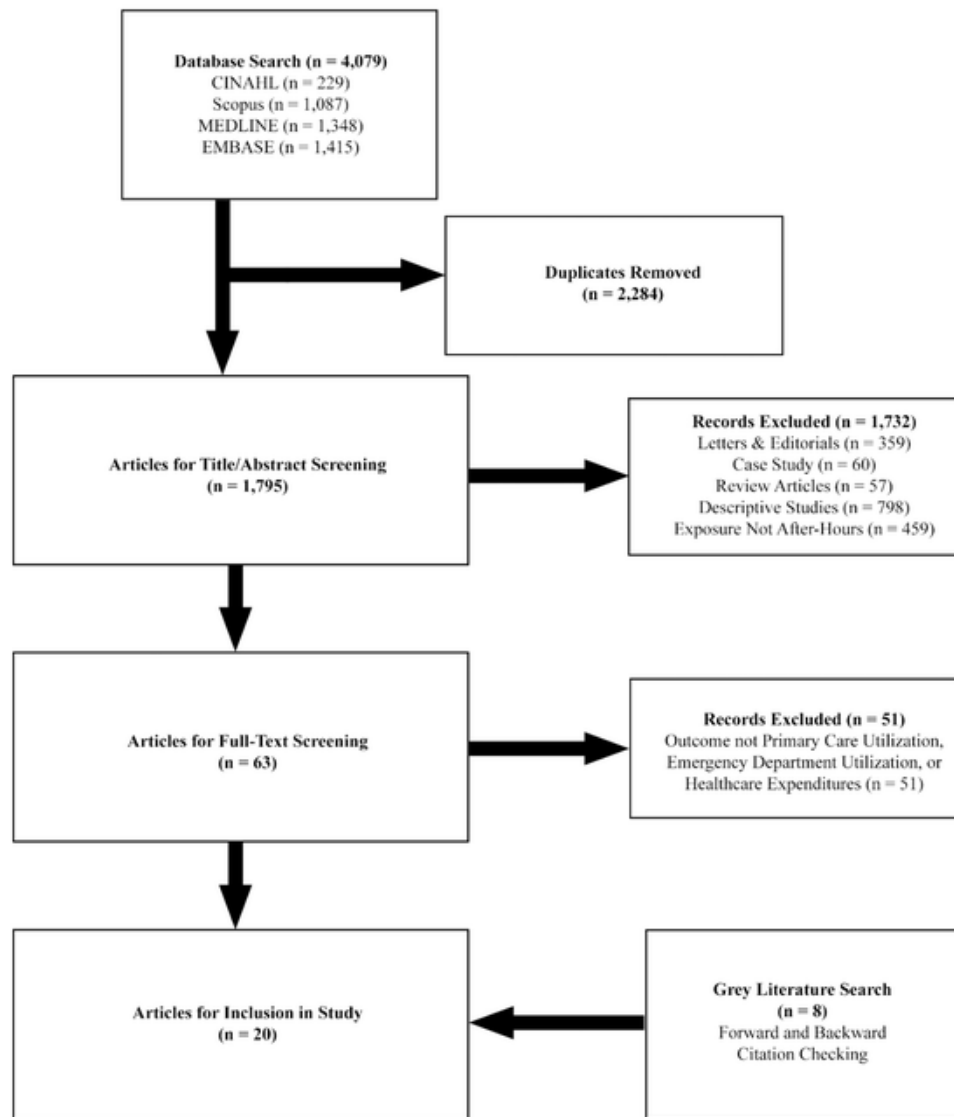


Fig. 1. Selection of relevant studies.

The results of cross-sectional studies were mixed. Patients with a primary care physician who offered extended services on weekends and evenings over two years were less likely to visit the ED by 1.9% (95% CI: 0.8, 3.7) [29]. Patients with access to after-hours primary care were less likely to use the ED compared to those without such access in both adult and pediatric practices [30,33]. The association between lower likelihood of ED utilization was greater for practices that were open for longer hours and more nights per week, significant reductions in ED utilization were found for adult practices that offered at least 12 hours of weekday evening services (Risk Ratio: 0.80; 95% CI: 0.67, 0.95) and for pediatric practices that offered weekday evening services at least five nights a week (Incidence Rate Ratio: 0.51; 95% CI: 0.28, 0.92). Although access to weekday evening hours was associated with lower likelihood of ED utilization, no association was found between weekend hours and ED utilization [30]. While several studies reported that improved access to after-hours primary care was associated with reduced ED utilization, this finding was not consistent across studies, with one reporting that patients who used the ED for non-emergency conditions had a similar likelihood of having a usual source of care that offered services on weekends or during evening hours as those who did not use the ED (35.1% vs. 38.5%) [32]. Another US study focused

on pediatric clinics found that access to after-hours primary care was not associated with non-urgent ED utilization [31]. Of the five cross-sectional studies, three found a significant reduction in ED utilization associated with having access to after-hours primary care, ranging from a small effect of 2% to as high as 50%.

Studies that used pre-post designs to examine the impact of introducing an after-hours primary care clinic on ED utilization were mixed. Two such studies were conducted in Australia, with one study finding that introducing an after-hours clinic available during weekends was associated with a reduction in non-urgent ED visits (245.5 non-urgent ED visits per month vs. 418.5 non-urgent ED visits per month), but no difference in semi-urgent ED visits [35]. The second study found a statistically significant reduction in non-urgent ED visits by 8.2% (95% CI: 6.2, 10.2) at any timing but an increase in urgent ED visits by 1.6% (95% CI: 0.4, 2.7) [34]. A Canadian study examining the impact of an evening after-hours clinic reported a 40% reduction in the number of semi-urgent ED visits per month but found no difference in non-urgent and urgent ED visits [44]. In Scotland, the introduction of primary care emergency centres, after-hours primary care walk-in clinics implemented to divert patients away from the ED, did not lead to a difference in ED utilization following three months or even one year af-

ter implementation; however, there was a reduction in the percentage of patients who classified their visit as non-urgent [48].

While standalone after-hours clinics were associated with mixed results, extension of primary care services in the UK outside of the regular hours was associated with a reduction in ED utilization, with a statistically significant reduction in semi-urgent ED visits between 5% and 19%, but no statistically significant reduction in non-urgent ED visits [38,39]. Based on a pilot study that expanded primary care services into the weekend, the largest reduction in ED utilization occurred in semi-urgent ED visits by 19.9% (95% CI: 13.0, 26.8); however, there was evidence of some spill-over effect during weekdays, with a significant yet smaller reduction in semi-urgent visits by 13.1% (95% CI: 5.7, 20.5) [38]. There was also a reduction in the number of hospitalizations and ambulance referrals. In the second study, in which primary care clinic hours were expanded to weekends and evenings, there was a statistically significant reduction in semi-urgent ED visits by 5.4% (95% CI: 0.9, 9.9) but no difference in non-urgent and urgent ED utilization were found [39].

Seven studies examined reorganization of primary care physician groups, six of which examined the impact of implementing GPCs in the Netherlands, Belgium, and Ireland [36,37,40–43], and one of which examined the impact of introducing mandatory after-hours services in the patient enrollment model in Canada [45]. Both studies in the Netherlands reported a reduction in ED utilization ranging from 8% during regular hours to 53% during after-hours [42,43]. In addition, the proportion of self-referrals to the ED dropped with hospital admissions. Although GPCs were effective in reducing ED utilization in the Netherlands, introduction of GPCs in Belgium was associated with no difference in ED utilization (Odds Ratio: 0.96; 95% CI: 0.87, 1.06) [36,37]. However, implementation of the GPC in Belgium where the GPC was located within the local ED was associated with fewer ambulance admissions and self-referrals. Two studies in Ireland on the impact of GPCs on ED utilization led to opposite conclusions: one study found no difference in unnecessary ED visits and another reported a reduction in non-urgent ED utilization and an increase in urgent ED visits [40,41]. In Canada, reorganization of primary care physicians into the patient enrollment model and enrollment of patients under these new models was associated with an increase in ED utilization [45].

Two studies examined the impact of financial incentives for primary care physicians on ED utilization. In Italy, a financial incentive scheme was implemented to provide additional payments for physician groups who provided services for at least ten hours per day and up to twelve hours per day [47]. This financial incentive for GPs was effective in limiting ED utilization and resulted in a reduction of inappropriate admissions between 10–15%. Similarly, increases in the after-hours premium in Ontario, Canada, from 10% to 20% were associated with a small reduction in less-urgent ED visits [46].

Of the studies comparing patients with access to after-hours primary care versus those without such access, three of the five studies found significant reductions in ED utilization ranging from 2% to 50% when patients had greater primary care access during weekday evenings; however, no studies found significant effects for patients with access to primary care on weekends. Initiatives aimed to improve access to after-hours primary care were found to have a mixed impact on ED utilization, with limited evidence of a reduction in non-urgent and semi-urgent ED visits after implementation of an after-hours primary care clinic. Nine of the fourteen studies found significant evidence of a reduction in either non-urgent or semi-urgent ED visits ranging from 2% to 50%. Of the initiatives aimed to improve access to after-hours primary care, there was limited evidence for the effectiveness of opening of after-hours primary care clinics and reorganization of primary care groups, while the three studies on extension of hours for existing primary care clinics and the study on a financial incentive for after-

hours primary care found evidence demonstrating a reduction in non-urgent or semi-urgent ED utilization.

3.2. After-Hours Primary Care and Primary Care Utilization

Six studies examined the impact of improved access to after-hours primary care on utilization of primary care services [36,37,42,43,45,46]. Five studies examined the impact of reorganizing primary care physicians for delivery of after-hours primary care, with one study focused on the introduction of the patient enrollment model in Canada, two studies focused on GPCs in Belgium, and two studies focused on GPCs in the Netherlands, while the remaining study examined the impact of a financial incentive for primary care physicians to provide services during after-hours. The patient enrollment model in Canada was associated with a decrease in the primary care visit rate; however, there was an increase in the proportion of primary care visits provided on weekends. In Belgium, introduction of a GPC was associated with an increase in primary care utilization when placed either within a local ED (Odds Ratio: 1.38, 95% CI: 1.23, 1.54) or between the two local EDs (Odds Ratio: 1.37; 95% CI: 1.20, 1.56) [36,37]. Although introduction of GPCs was associated with an increase in walk-in visits, introduction of the GPC was only associated with an increase in home visits where the clinic was located between the two local EDs [36]. Reorganization of after-hours primary care in the Netherlands was associated with an increase in primary care utilization ranging from 10% to 25% [42,43]. These two studies also found a reduction in ED visits, suggesting a shift in the provision of care from the ED towards primary care following the introduction of GPCs. The final study examining the impact of the after-hours premium in Ontario, Canada, found that an increase in the value of the after-hours premium was associated with an increase in primary care visits during after-hours but a reduction in primary care visits during regular-hours [46]. Additionally, analyses demonstrated that an increase in primary care services during after-hours was associated with a small reduction in less-urgent ED visits, consistent with the two studies that suggested a shift in the provision of care from the ED towards primary care through the improvement in access to primary care during after-hours.

4. Discussion

To the best of our knowledge, this is the first systematic review to explicitly examine the link between improved access to after-hours primary care and ED utilization and primary care utilization. We identified 20 studies that examined the association between improved access to after-hours primary care and ED utilization, and 6 studies examined the association with primary care utilization. We found that improved access to after-hours primary care was typically associated with increased primary care utilization but had mixed results on ED utilization. A previous review paper looked at the impact of GPC on non-urgent ED utilization in the context of general primary care service interventions and while our review corroborates their findings that GPCs have a little to mixed effect on ED utilization [27], our study is more comprehensive on access to after-hours primary care.

One purported mechanism of reducing ED utilization involves improving access to primary care to divert patients with primary care-treatable conditions away from the ED back to the primary care setting. Of the five studies that found improved access to primary care during after-hours to be associated with increased primary care utilization [36,37,42,43], three found a reduction in non-urgent ED utilization [42,43,46]. Only one study found that improved access to after-hours primary care was associated with a decline in primary care utilization; however, the study also found improved access to after-hours primary care was associated with increased ED utilization [45]. This may

be due to a lack of primary care availability, failing to divert patients away from the ED setting.

Although there is no literature to suggest the amount of time required for an intervention to improve access to after-hours primary care to be effective, studies found a reduction in ED visits associated with improved access as short as several months [38]. No relationship was found between the study's follow-up time and finding a significant reduction in ED utilization, with mixed results found even among studies with a follow-up of over 6 years [35,44,45,47]. Previous research has demonstrated that patients opt to use the ED as they do not have prior knowledge of the availability of after-hours primary care [49]. For many included studies, the uptake of the intervention is unknown and it is possible that patients who used the ED were simply unaware of after-hours primary care availability and that increased uptake of after-hours primary care services would be required to divert patients from the ED to primary care. Additionally, the heterogeneous results suggest that the study follow-up time is not the most important factor, but rather that improved access to after-hours primary care has a differential effect depending on the nature of the intervention and the underlying contextual factors.

Our review found that the effects of opening an after-hours primary care practice available to any patient were mixed [34,35,44,48], but that extension of clinic hours for existing primary care clinics was effective in reducing ED utilization [38,39], which may be related to patient preference for their primary care physician. Patients may prefer to see only their primary care provider in the primary care setting and view the ED as more convenient during after-hours. Indeed, some literature suggests that primary care provider availability and ease of access to the ED were the two most influential factors in non-urgent ED utilization [50]. Apart from access issues, other factors in the relationship between a patient and their usual source of care may be related to ED utilization for conditions potentially treatable in the primary care setting, including dissatisfaction with their primary care provider and a lack of confidence in their ability [51]. Recent evidence from Switzerland demonstrated that 39% of patients treated in the ED were more confident in their local ED than their primary care provider [52]. Most adults prefer to be seen by their primary care physician; however, almost half would seek care elsewhere if same-day appointments were available, such as in the ED, opting for convenience over the continuous relationship with their primary care physician [53].

Perceptions of wait times may also be a reason for choosing the ED over the primary care setting [49,54]. Patients may also prefer the ED because of greater trust, convenience, familiarity, and satisfaction with previous ED experience [55–58]. In the US, shorter waiting times and greater accessibility are common reasons for using the ED instead of primary care; however, these reasons were not as important in European countries [55]. Additionally, the ED may be viewed as convenient due to being open round the clock, being able to carry out comprehensive evaluation of patients in a single visit, that patients will not be refused an appointment in the ED setting, and the possibility of receiving all specialist tests in one location [59–61]. The most important factor tends to be the availability of the ED, with patients generally satisfied with their experience in that setting as long as the treatment provided was delivered sufficiently rapidly [62].

Other reasons for using the ED are related to urgency. Improved access to after-hours primary care may be more strongly linked to a reduction in visits for conditions treatable in primary care settings during after-hours. Many studies did not separate ED utilization by timing or severity of the visit, which may have masked a reduction in non-urgent and semi-urgent ED visits found in other studies. Reductions in ED utilization are more likely to become apparent in studies explicitly focused on non-urgent and semi-urgent ED visits outside of the regular working hours. The perception of need to receive immediate care may be related to seeking care in the ED, and while many patients may rec-

ognize that their health concern is not urgent, they visit the ED for reassurance [60,63]. Other patients have strong beliefs that emergency or urgent care was required for their health concern, typically stemming from the belief that their condition required resources in the hospital setting or that their health condition was too complex to be treated by a primary care provider [60,64,65]. There is some disconnect between patient perceptions and urgency, with 24% of patients triaged as non-urgent in the ED attending the ED because they believed they needed to be admitted to the hospital [66]. Improved access to after-hours primary care may be one way of reducing non-urgent and semi-urgent ED utilization and addressing ED overcrowding.

Given some evidence of reduced semi-urgent and non-urgent ED utilization following improved access to after-hours primary care, the important policy question is whether this change leads to health system cost savings. To date, four studies looked at the impact of access to after-hours primary care on some measure of cost [29,39,46,67]. These studies found a reduction in ED-related costs, with reduction primarily attributed to diversion of patients from the ED towards primary care rather than a difference in the cost of each ED visit, with health care systems savings ranging from 10% to 26%. By diverting patients to the primary care setting where possible, these findings suggest that policy-makers may find health care system savings.

Surveys of staff and primary care patients found both the perceived and actual absence of access to primary care to be associated with increased ED visits [68,69]. However, a previous systematic review found mixed conclusions on the effectiveness of telephone triage system, in- or out-of-hours primary care provision and GP cooperatives, community health centres, walk-in clinics, minor injuries units, and urgent care centres in reducing ED utilization [27]. A review of after-hours primary care in the Netherlands found that reorganization of physicians into larger GPCs to treat self-referred patients by primary care physicians in primary care cooperatives located within the hospital was a safe and cost-effective alternative to emergency medicine [70]. Although reorganization of primary care in the Netherlands led to a reduction in ED utilization ranging from 9% to 53% [42,43], conflicting evidence was found for the effectiveness of GPCs in Belgium and Ireland [36,37,40,41], and further research is required before adopting the GPC structure of after-hours program within a specific institutional context. Comparisons between patients with access to after-hours primary care and those without such access [29–33], as well as studies examining reorganization to GPCs were mixed, indicating effectiveness may differ for specific patient populations or under specific institutional settings. The institutional context is likely to be an important factor as patients without access to primary care services, such as those in the US without insurance coverage, may be more inclined to use ED services whereas the lack of access to primary care services was not of significant relevance for use of the ED in countries with universal health insurance [56,60,71–73].

4.1. Limitations

There were several limitations in the quality of evidence found in the literature, with most evidence being lower-quality evidence from cross-sectional studies and non-controlled pre-post design studies. This is especially troublesome for studies examining policy interventions as it may be difficult to isolate the effect of improved access to after-hours primary care from other interventions. No randomized controlled trials of the comparative effectiveness of access to after-hours primary care have been conducted. In several studies, additional policy interventions were enacted that may have influenced patient use of the ED, such as changes in organization of the ED. Furthermore, some of the included pre-post design studies fail to account for seasonal variations influencing ED utilization. This is an important consideration as several studies focused only on a short period following the introduction of after-

hours access to primary care. Another issue is that many patients might not have known about the availability of primary care outside of the regular working hours. Studies did not comment on the knowledge of the availability of after-hours primary care for patients and only five of the nineteen studies commented on the use of primary care services after implementing a policy to improve access to after-hours primary care. The evidence on the impact of improved access to after-hours primary care on primary care utilization is limited by the small number of studies conducted to date. Moreover, these studies examined the impact of these interventions on a short-term basis, and the evidence for the long-term effects of these interventions is unknown. Another limitation of this review is that all studies included were required to be in English resulting in inclusion of studies from developed countries only, and studies related to improved after-hours primary care in developing countries may have potentially been missed. The underlying contextual and institutional differences in primary care and emergency care as well as the variation in the definition of the concept of primary care and emergency care across the studies should be taken into consideration when interpreting the results.

As the current conclusions were dependent on the quality of research, future research in the form of controlled pre-post design studies or quasi-experimental studies is needed to establish the impact of improved access to after-hours primary care on primary care and emergency care utilization. Future research should place greater focus on the severity of conditions for ED visits and the timing of utilization for primary care and ED-related outcomes. Additionally, future research should also explore the potential cost-savings related to improved access to after-hours primary care.

5. Conclusions

This systematic review focused on the impact of improved access to after-hours primary care on ED utilization and primary care utilization. Although better access to after-hours primary care may lead to increased primary care utilization, the impact of such access on ED utilization was mixed. Improved access to after-hours primary care may potentially shift patient care from the ED toward primary care in some institutional settings; however stronger evidence of the effectiveness of improved access to after-hours primary care is required. Policymakers must recognize that prior to implementing policies or changes to after-hours primary care provision, the organization of the primary care and ED systems within the environment must be considered.

Declaration of Competing Interest

The authors declare no conflicts of interest.

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Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:<https://doi.org/10.1016/j.healthpol.2020.05.015>.

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