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REVIEW ARTICLE

Measurement and rural primary health care: a scoping review

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ABSTRACT:

Introduction: Primary health care (PHC) is the foundation of healthcare systems around the world, recognized for its ability to deliver cost-effective, equitable, and high-quality care. Measuring and reporting on PHC performance allows decision-makers to ensure accountability and quality improvement. Rural areas, where residents are few and widely dispersed across vast areas, present special challenges for PHC delivery, and performance measurement systems need to acknowledge the ways rural PHC is unique. The objective of this scoping review is to establish the features of PHC that should be measured and reported in a rural versus a non-rural context.

Methods: The electronic databases PubMed, Scopus, and CINAHL, as well as grey literature in the form of government reports and research institute publications, were searched for relevant studies. Identified articles were eligible for inclusion if they reported or described (1) rural primary health care; (2) healthcare practice characteristics or structures, provider scope of practice, provider practice patterns, or patient patterns of health care use; and (3) one of four 'pillars' of quality PHC outlined in the College of Family Physicians of Canada's 'Patient's Medical Home' model: accessibility, continuity, comprehensiveness, or electronic health records. Articles were excluded if they reported or described (1)

specific patient populations, health concerns, or health outcomes; or (2) patient preferences or experiences with PHC. Data were extracted and analyzed to determine unique aspects of rural PHC. Twenty-six articles met inclusion criteria.

Results: Results suggest important differences in aspects of rural PHC, particularly in how rural patients access such care and the types of services they receive from providers compared to non-rural patients.

Conclusion: These differences between rural and non-rural PHC will need to be considered in the design of performance measurement systems.

Key words: Canada, health reporting, performance measurement, primary health care.

FULL ARTICLE:

Introduction

Primary health care (PHC) is the foundation of healthcare systems around the world, recognized for its ability to deliver efficient, equitable, high-quality, patient-centered care[1]. Defined simply, PHC is 'the broad range of primary prevention (including public health) and primary care services within the community, including health promotion and disease prevention; the diagnosis, treatment, and management of chronic and episodic illness; rehabilitation support; and end of life care'[2]. In 2008, WHO called for the 'renewal' of PHC and, globally, many countries have undertaken major PHC reforms in the past 10–15 years[3,4].

In Canada, the College of Family Physicians envisioned a model of comprehensive PHC, the 'Patient's Medical Home' (PMH), as the 'central hub for the timely provision and coordination of a comprehensive menu of health and medical services patients need as well as a place where patients feel most comfortable discussing their health concerns'[5]. The PMH is supposed to be led by a team of clinicians (family physicians, nurses, and other health professionals) and patients who also hold some responsibility for taking an active role in their care. This model is an example of the kind of reimagining of PHC that has taken place in many jurisdictions over the past 15 years.

As innovative PHC models have developed, so has the need to evaluate their effectiveness. By measuring and reporting on PHC performance, decision-makers can ensure quality improvement and accountability at the practice, community, regional, and national levels[1]. This is no easy task, since the ideal performance measurement framework has to align the needs of the various levels of the healthcare system with local and community priorities so that there is buy-in from stakeholders – patients and the public, as well as clinicians, administrators, and governments[4].

Performance measurement and reporting in PHC need to ensure geographic context is taken into account. While the studies in this article's results define rurality in a variety of ways, our conception of rurality is aligned with Statistics Canada's 'rural and small town' designation: the areas including small towns and municipalities outside the commuting area of large urban centers (centers with populations exceeding 10 000[6]). These rural areas, where residents are fewer and widely dispersed across vast areas, present challenges for PHC delivery. For example, rural PHC clinicians offer care in their clinics during the day but may staff the emergency department (ED) during the evening and overnight, and may in fact tell their patients to come to the ED if they need care during these times. In more urban areas, not only do patients have other options (eg a walk-in clinic) for care, but they are unlikely to see their clinician if they were to go to the ED after hours. Understanding the ways in which rural PHC differs from non-rural PHC is therefore a crucial step in developing accurate performance systems for the rural setting.

This scoping review aims to answer the following question: 'What structural and organizational factors of primary healthcare performance should be measured and taken into account in a rural context?' Because PHC performance measurement and reporting for the rural context has not been well studied, a scoping review is a particularly appropriate research method. This review maps the existing literature and helps guide further research, a crucial next step to advancing PHC outcomes in rural communities.

Methods

This scoping review follows Arksey and O'Malley's[7] general five-stage approach and is informed by Levac et al's suggested refinements: (1) identify the research question;(2) identify relevant studies; (3) select studies for data extraction; (4) extract and chart data; and (5) summarize and report results[8].

Searches were limited to articles comparing rural with non-rural aspects of PHC, written in the English p, and published between 2003 and 2017. The year 2003 was chosen as a start date as this coincides with Canada's First Ministers' Accord on Health Care Renewal, a document that set out a new vision for a sustainable and accessible healthcare system[9].

All searches were conducted in June 2017. Initial limited searches in PubMed were conducted to identify relevant key words and medical subject headings (MeSH), and were used to identify appropriate measures of quality PHC (described below). Full searches were then conducted in the electronic databases PubMed, CINAHL, and Scopus. The grey literature was also searched, including Australian, Canadian, US, and UK government websites and research institutes, as well as the databases Canadian Electronic Library, OpenGrey, and Grey Literature Report. In PubMed, search terms included both key word and MeSH, while key words alone were used for searches in the other databases and websites (Table 1). Search strategies were left deliberately broad to ensure capture of relevant articles. Any published or unpublished literature (whether peer-reviewed or other) was considered.

Identified articles were eligible for inclusion if they reported or described (1) practice characteristics or structures, physician scope

of practice, physician practice patterns, or patient patterns of health care use. Articles were excluded if they reported or described (1) specific patient populations, health concerns, or health outcomes; or (2) patient/clinician preferences or experiences with PHC. This second criterion was indicated in order to narrow the focus of selected studies to more structural and organizational level concerns. It was determined from initial, preliminary searches that studies focusing on patient and clinician preferences and experiences mostly included practice-level concerns (eg quality improvement measures, such as specific testing capabilities). This review was concerned first and foremost with what structural and organizational factors ought to be considered in performance measurement.

Database searches generated 7413 citations (t1). Reviewing titles and abstracts of these citations for relevancy and eliminating duplicates yielded 72 articles for further analysis. Grey literature searches resulted in two additional articles, and hand-searching the reference lists of these 74 articles generated another five articles, for a total of 79. As described above, date limitations were originally set at 2000–2017, but this was changed to 2003–2017, which excluded 10 further articles, leaving 69 for full-text review. Applying the preset inclusion and exclusion criteria to these 69 articles yielded 26 studies for full review, and it was these studies from which a data extraction table was generated.

Table 1: Database search results

Subject	MeSH terms	Key words
Rurality	Rural Health Urban Health Suburban Health Rural Population Urban Population Suburban Population Rural Health Services Urban Health Services Suburban Health Services	rural OR urban or suburban OR 'non-rural' OR 'non rural' OR 'non-urban' OR 'non urban' OR metropolitan OR 'non-metropolitan' OR nonmetropolitan OR remote OR 'rural-urban' OR 'urban-rural' OR 'rural/urban' OR 'urban/rural'
Primary health care	Primary Health Care Family Practice Community Health Services	'general practice*' OR 'general physician*' OR 'general practitioner*' OR 'GP' OR 'family practice' OR 'family physician*' OR 'family medicine' OR 'primary care' OR 'primary healthcare' OR 'primary health care'
Patient's Medical Home pillars	Patient Care Team Health Services Accessibility (Health Care Rationing and Health Equity) Comprehensive Health Care (Progressive Patient Care and Patient Care Planning) Electronic Health Records Guideline Adherence OR Outcome and Process Assessment (Health Care) OR Quality of Health Care Patient-Centered Care OR Patient Satisfaction Continuity of Patient Care	('team-based care' OR 'team-based health care' OR 'team-based healthcare') OR access* OR equity OR comprehensive OR ('electronic medical records' OR 'electronic health records') OR quality OR ('quality assurance' OR 'quality improvement') OR ('patient-centered' OR 'patient centered' OR 'patient-centred' OR 'patient centred') OR continuity
Differences/characteristics	Health Status Disparities Health Services Needs and Demand Practice Patterns, Physicians	differ OR differs OR difference* OR variation* OR disparit*

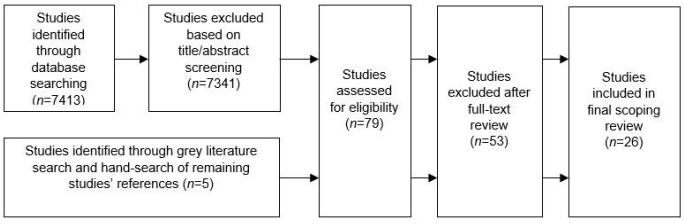

Figure 1: Flow diagram of included studies.

Analysis

Data extracted from all articles included title, authors, publication date, date of study, demographic characteristics of the study sample, as well as primary objectives. The main results and their implication for rural PHC performance measurement were also extracted. All data were entered in a Microsoft Excel spreadsheet (Table 2). From thematic grouping of the resulting studies found in the literature, the articles were organized into four of the nine pillars of the PMH model. The four were access, continuity, comprehensiveness, and EMR use. They are defined in the model as follows. 'Access' means timely access to appointments in the practice as well as ensuring/advocating for timely access for other specialist appointments. 'Continuity' means continuity of care, relationships, and information for all patients, including when being delivered in different settings (long-term care, office, hospital, etc.). The model defines 'comprehensiveness' as the full scope of family practice services, delivered in conjunction with other team members, as necessary, for patients of all ages. Finally, the 'EMR' pillar refers to full EMR functionality, including e-prescribing, clinical decision support, and e-referral functions.

Table 2: Full results of data extraction

Author(s)	Title	Study objectives	Measure of rurality	Key results
Carey TA, Wakerman J, Humphreys JS, Buykx P, Lindeman M	What primary health care services should residents of rural and remote Australia be able to access? A systematic review of 'core' primary health care services	To delineate those primary healthcare core services that should be readily available to all regardless of geography	Not described	The 19 articles demonstrated substantial variability in both the number and nature of core services. Given this variation, the specification or synthesis of a universal set of core services proved to be a complex and arguably contentious task.
Chan L, Hart LG, Goodman DC	Geographic access to health care for rural Medicare beneficiaries	To compare the travel times, distances, and physician specialty mix of all Medicare patients living in Alaska, Idaho, North Carolina, South Carolina, and Washington	Patient ZIP code linked to RUCA	1. Rural patients have increased travel distance and time to access health care compared to urban patients, especially for rural patients with specific diagnoses or undergoing specific procedures. 2. Most rural patients do not rely on urban areas for much of their care.
Dempsey P, Wilson D, Taylor A, Wilkinson D	Self-reported patterns of health services utilisation: an urban-rural comparison in South Australia	To compare self-reported patterns of health service utilisation among residents of urban and rural South Australia	1. Capital cities vs. rest of country; 2. RRMA classification; 3. ARIA	Self-reported use of a range of health services was broadly similar across urban and rural South Australia. Overall, rural residents had a higher than expected rate of moderate and high level of health service use.
Eckert KA, Taylor AW, Wilkinson D	Does health service utilisation vary by remoteness? South Australian population data and the Accessibility and Remoteness Index of Australia	To compare rates of self-reported use of health services between rural, remote and urban South Australians	ARIA	The self-reported frequency of use of health services was similar across regions. Use of primary care services was higher among residents of highly accessible areas and public hospital use increased with increasing remoteness. There is no evidence for systematic rural disadvantage.
Farmer J, West C, Whyte B, Maclean M	Primary health-care teams as adaptive organizations: exploring and explaining work variation using case studies in rural and urban Scotland	To determine how primary healthcare teams' work differs between rural and urban areas	Rural general practices assumed to be those in settlements of 3000 or fewer residents	Rural physicians and district nurses conducted more consultations per practice patient compared with their urban counterparts.
Haggerty JL, Roberge D, Lévesque JF, Pineault R, Larouche D, Touati N	Features of primary healthcare clinics associated with patients ' utilization of emergency rooms: urban–rural differences	To identify urban–rural differences in accessibility-related organizational features that predicted emergency room use	Transport zones (roughly equivalent to census subdivisions): more than 1 hour to nearest subspecialty hospital and with fewer than four primary care clinics located within a 15-minute radius of the zone's center	1. Patients from clinics offering a larger range of medical procedures on site have lower ED use (comprehensiveness). 2. Rural physicians tend to divide their time between hospital and primary care; doing in-patient care increases ED use (access).
Hanks H, Veitch, PC, Harris MF	A rural/urban comparison of the roles of the general practitioner in colorectal cancer management	To identify and compare the roles of urban, rural and remote GPs in colorectal cancer management	RRMA	1. Treatment of colorectal cancer patients was only performed by remote GPs. 2. Rural and remote GPs played greater roles in care coordination, clinical and psychosocial care. 3. Rural and remote GPs were more heavily involved throughout the entire illness progression when compared with their urban counterparts.
Hutten-Czaps P, Pitblado R, Slade S	Short report: scope of family practice in rural and urban settings	To determine whether geography is the predominant predictor of physician scope of practice	Geographic location of practices was determined using the postal codes provided by the 2981 respondents matched with 1996 census data and geography. Straight-line distances were computed between practice location and nearest hospitals and communities of various sizes	As geographic isolation increases, Canadian family physicians provide an increasingly broad spectrum of services. Geography is the predominant predictor of scope of practice.
Jaakkimainen RL, Sood PR, Schultz SE	Office-based procedures among urban and rural family physicians in Ontario	To compare FP and GP performance of office-based procedures between urban and rural practices.	Ontario Ministry of Health and Long-Term Care and Ontario Medical Association Rurality Index of Ontario (RIO)	For those procedures that are not dependent on specialist backup or access to more advanced technology, there were no substantial differences between rural and urban FPs and GPs.
Khoong EC, Gibbert WS, Garbutt JM, Sumner W, Brownson RC	Rural, suburban, and urban differences in factors that impact physician adherence to clinical preventive service guidelines	To identify factors that may cause differences in adherence to preventive service guidelines among rural, suburban, and urban primary care physicians	Rural clinics were those eligible for federal rural health grants from the Human Resources and Services Administration. Clinics located in St. Louis City were defined as urban; clinics in St Louis County as suburban	The rural, suburban, or urban context impacts whether a physician will adhere to clinical preventive service guidelines.
Kristjansson E, Hogg W, Dahrouge S, Tuna M, Mayo-Bruinsma L, Gebremichael G	Predictors of relational continuity in primary care: patient, provider and practice factors	To analyse practice, provider, and patient predictors of continuity of care in a large sample of primary care practices in Ontario, Canada. To assess the level of continuity of care under different primary healthcare models	Not described	Older patients and those with chronic disease reported higher continuity, while those who lived in rural areas had higher education, poorer mental health status, no regular provider, and who were employed reported lower continuity. Several practice factors predicted lower continuity: number of medical doctors, nurses, opening on weekends, and having 24 hours a week or less on-call.
Mack D, Zhang S, Douglas M, Sow C, Strothers H, Rust G	Disparities in primary care EMR adoption rates	To evaluate the adoption of EMR systems across various practices – solo or small group practices, those in underserved rural areas, and those serving predominantly Medicaid or uninsured patient populations	Based on the census data at ZIP code level	1. Large practices and community health centers were more likely to adopt electronic health records (>80%) than rural health clinics and other underserved settings (53%). 2. Rural health providers and those serving high-Medicaid populations seem to be at risk of lower functionality and integration even after initial implementation of EMR systems.
Menachemi N, Langley A, Brooks RG	The use of information technologies among rural and urban physicians in Florida	1. To determine rural–urban differences in computer and Internet availability, the presence of a practice website, the use of personal digital assistants and EMRs, and the use of e-mail between physicians and patients. 2. To determine potential factors associated with using these quality enhancing technologies in the rural setting. 3. To	1. 33 statutorily-designated rural counties in Florida, 2. rural areas of non-rural counties as designated by the RUCA codes 3. Health Resources and Services Administration list of defined Florida rural areas	1. Rural physicians were significantly less likely than urban doctors to indicate using e-mail with patients. 2. EMR differences between rural and urban physicians were not significant and were explained away by practice size and practice type. 3. Rural physicians more commonly cited barriers associated with temporary disruptions to productivity or disruptions in access to records when computers systems fail.

		between physicians and patients. 2. To determine potential factors associated with using these quality enhancing technologies in the rural setting. 3. To examine barriers to EMR and adoption intentions among rural and urban physicians in Florida	Administration list of defined Florida rural areas	barriers associated with temporary disruptions to productivity or disruptions in access to records when computers systems fail.
Palmer E, Leblanc-Duchin D, Murray J, Atkinson P	Emergency department use: is frequent use associated with a lack of primary care provider?	To determine if having a primary care provider is an important factor in frequency of emergency department use	population-based (rural ED serves population of 30 000)	1. Frequent attenders (4 or more visits to an ED in 1 year) were significantly more likely to have listed primary care providers. 2. Most patients attending urban EDs or urgent care centers do not have primary care providers, a finding that is reversed in the rural setting.
Pong RW, Pitblado JR	Geographic distribution of physicians in Canada: beyond how many and where	1. To examine how physicians are distributed in Canada and how physicians in communities of different sizes differ with respect to several demographic characteristics. 2. To identify physician scope of practice and whether there are urban–rural differences	Urban: population size; rural: MIZs	1. Rural family physicians are more likely to have a broader scope of practice and perform a broader range of clinical procedures. 2. Family physicians, in both rural and urban areas, are more likely to reduce than to expand their scope of practice.
Pong RW, DesMeules M, Heng D, Lagace C, Guernsey JR, Kazanjian A, Manuel, D, Pitblado JR, Bollman, Ray D, Koren I, Dressler MP, Wang F, Luo W	Patterns of health services utilization in rural Canada	1. To explore whether patterns of utilization of medical and other health services, including in-patient hospital services, differ between rural and urban Canada, and within rural Canada. 2. To discover whether patterns of utilization by rural and urban Canadians are different for different disease categories. 3. To determine the geographic patterns of utilization of physician and hospital services at the provincial level in Nova Scotia, Ontario, and British Columbia. 4. To determine whether place of residence is a determinant of health services use	Statistics Canada definition of 'rural and small town (RST)' and MIZs	1. Rural residents tend to have lower physician consultation rates than their urban counterparts, on the other hand, they tend to have higher relative risks of hospitalization. These trends are particularly evident for people in the most rural areas. 2. Consultations with a nurse are more frequent among rural residents. 3. Hospitalization rates increase with increasing degree of rurality, but average lengths of hospital stay decrease. Greater proportions of rural residents report receiving care in emergency departments or outpatient clinics.
Sibley LM, Weiner JP	An evaluation of access to health care services along the rural-urban continuum in Canada	1. To compare access to health care services in Canada across the rural–urban continuum. 2. To determine how much of the variation in access across the rural–urban continuum remains once other determinants are accounted for	Statistical Area Classification (SAC), based on census subdivisions	Residents of small cities not adjacent to major centers had the highest reported utilization rates of influenza vaccines and family physician services, were most likely to have a regular medical doctor, and were most likely to report unmet need. Among the rural categories there was a gradient with the most rural being least likely to have had a flu shot, use specialist physician services, or have a regular medical doctor. Residents of the most urban centers were more likely to report using specialist physician services. Many of these differences are diminished or eliminated once other factors are accounted for. After adjusting for other factors those living in the most urban areas were more likely to have seen a specialist physician. Those in rural communities had a lower odds of receiving a flu shot and having a regular medical doctor. People residing in the most urban and most rural communities were less likely to have a regular medical doctor. Those in any of the rural categories were less likely to report unmet need.
Singh R, Lichter MI, Danzo A, Taylor J, Rosenthal, T	The adoption and use of health information technology in rural areas: results of a national survey	To conduct the first national assessment of health information technology in rural primary care offices, with particular attention to EMR adoption, range of capabilities in use, and plans for adoption	RUCA categories	EMR system use showed no significant difference by rurality. Large Rural and Small Rural offices were more likely than Urban offices to use a broader range of EMR capabilities. Among offices without EMRs, those in Isolated areas were less likely to have more immediate plans to adopt.
Turnbull J, Martin D, Lattimer V, Pope C, Culliford D	Does distance matter? Geographical variation in GP out-of-hours service use: an observational study	To examine the effects of distance and rurality on rates of out-of-hours GP use	Office for National Statistics Rural and Urban Classification	Patients from rural areas have lower call rates, but deprivation appears to be a greater determinant in urban areas.
Turnbull, Joanne, Pope, Catherine, Martin, David, Lattimer, Valerie	Management of out-of-hours calls by a general practice cooperative: a geographical analysis of telephone access and consultation	To examine the effect of distance and rurality on the doctor's decision to manage the call by telephone or face-to-face	Office for National Statistics Rural and Urban Classification	Patients who live furthest away are more likely to receive telephone advice rather than being seen face-to-face, but paradoxically, those who do get a home visit are more likely to live at a greater distance from the primary care center.
Unger CC, Warren N, Canway R, Manderson L, Grigg K	Type 2 diabetes, cardiovascular disease and the utilisation of primary care in urban and regional settings	To examine the geographic similarities and differences in primary care service usage among people with cardiovascular disease and/or type 2 diabetes mellitus residing in regional and urban Victoria, Australia	Australian Standard Geographical Classification (ASGC)	Rural respondents reported greater use of allied health practitioners, district or practice nurses, and community health centers. Conversely, use of hospital outpatient services was significantly higher among metropolitan respondents. Urban respondents visited their GPs more frequently.
Veugelers PJ, Yip AM, Elliott DC	Geographic variation in health services use in Nova Scotia	To quantify the geographic variation in health services use in Nova Scotia	Census consolidated subdivision	The use of specialist and hospital services was higher among residents of Metropolitan Halifax and the Cape Breton Regional Municipality, the two sites of the province's tertiary care facilities, which offer the full gamut of specialized health services. This volume of use was progressively reduced among residents of rural areas at an increasing distance from the tertiary care facilities. There was no systematic urban-rural gradient in the use of family physician services.
Whitacre BE	Rural EMR adoption rates overtake those in urban areas	To assess rural–urban differences in EMR adoption among office-based physician practices in the USA	Rural is defined as non-metropolitan (ie at the county level). Non-metropolitan counties do not contain a Metropolitan Statistical Area (typically with population greater than 50 000) and do not have >25% of their labor force commuting into a neighboring Metropolitan Statistical Area	EMR adoption rates were significantly higher for practices in rural areas versus those in urban areas. Twenty-nine states had statistically significantly different adoption rates between rural and urban areas, with only two states demonstrating higher rates in urban areas. State-level rural–urban differences in adoption are more pronounced for specialists.
Whitacre BE	Electronic medical record	To explore the relationship	Rural is defined as non-	Similar overall EMR adoption rates in

			50 000) and do not have >25% of their labor force commuting into a neighboring Metropolitan Statistical Area	more pronounced for specialists.
Whitacre BE, Williams RS	Electronic medical record adoption in Oklahoma practices: rural–urban differences and the role of broadband availability	To explore the relationship between the availability of broadband providers, or higher download speeds, on the likelihood a physician's office adopts an EMR system	Rural is defined as non-metropolitan (ie at the county level). Non-metropolitan counties do not contain a Metropolitan Statistical Area (typically with population greater than 50 000) and do not have >25% of their labor force commuting into a neighboring Metropolitan Statistical Area	Similar overall EMR adoption rates in rural and urban practices masked significant differences among specific subcategories. In particular, solo practices in rural areas are much more likely to adopt EMRs than are their urban counterparts (41% vs 33%, $p<0.01$); rural psychiatric practices also have measurably higher adoption rates (59% vs 25%, $p<0.01$). Determinants of adoption do vary between rural and urban practices. No statistical relationship between EMR adoption and measures of broadband availability was found.
Withy K, Davis J	Followup after an emergency department visit for asthma: urban/rural patterns	To examine the rate of office visits after emergency department treatment for asthma between rural and urban areas and pediatric and adult patients in Hawaii	Zip codes matched to US Census	Patients who had an office visit after their initial ED visit were 10% less likely to have a repeat ED visit within the month. Rural residents were significantly less likely to have both follow-up office and ED visits than were their urban counterparts when adjusted for age, sex, and morbidity. Only adults (not pediatric) demonstrated a significant difference in time to follow-up between rural and urban patients.
Wong E, Stewart M	Predicting the scope of practice of family physicians	To identify factors that are associated with the scope of practice of FPs and GPs who have office-based practices	Not described	Geographic factors of provincial division and whether or not the population served was rural explained 30.5% of the variation in the scope of practice score.

ARIA, Accessibility and Remoteness Index for Australia. ED, emergency department. EMR, electronic medical record. FP, family practitioner. GP, general practitioner. MIZ, Metropolitan Influenced Zone. RRMA, Rural, Remote and Metropolitan Area. RUCA, Rural Urban Commuting Area.

Results

Twenty-six studies were identified for analysis. Table 3 provides an overview of the search results. In brief, 10 of the studies were from Canada, eight from the USA, four from Australia, and three from the UK. The studies' publication dates ranged from 2003 to 2016, with a median publication date of 2009. Twenty-two of these studies could be considered to have a quantitative observational design. In terms of the PMH 'pillar' identified, 14 of the studies were concerned with access, six with comprehensiveness, five with electronic medical records, and one with continuity.

Table 2 shows the full results of data extraction. Key results are described below, organized by the four pillars of quality PHC (access, comprehensiveness, continuity, EMR use) chosen from the PMH model.

Table 3: Overview of search results for studies conducted 1995–2012, published 2003–2016 (median 2009) (*n*=26)

Variable	*n*
Country	
Australia	4
Canada	10
UK	3
USA	8
Study design	
Quantitative observational	22
Qualitative descriptive	2
Grounded theory	1
Case study	1
Systematic review	1
Primary health care area of focus	
Access	14
Comprehensiveness	6
Electronic medical records	5
Continuity	1

Access

Access was a frequently cited challenge for rural patients. As with the other three pillars of PMH, results were somewhat mixed across the studies identified, but some common themes did emerge.

First, rural patients travel greater distances and spend a greater amount of time accessing health care compared to urban patients[10]. Two studies concluded the frequency of use of health services and the types of services consulted were broadly similar between rural and urban patients[11,12]. This finding was challenged by two other studies that demonstrated a marked increase in the use of specialist services among urban residents and a greater likelihood of receiving care from allied health professionals, nursing, and community health centers among rural residents[13,14].

Several studies commented on the relationship between access to PHC and use of community EDs. Because rural physicians tend to divide their time between hospital and primary care, one study found that when physicians perform in-patient care at an emergency department, their patients tend to access care through the ED[15]. The behaviour is likely driven by clinicians' attempts to satisfy their patients' desire for continuity by making themselves available at EDs. A greater number of rural residents than urban described receiving care from an ED, another reflection of the structure of rural primary care, where EDs often double as primary care treatment centers[16]. Interestingly, most patients attending rural EDs or urgent care centers have primary care clinicians, but among urban patients attending an ED, this finding is completely

reversed (ie urban patients in the ED are less likely to have a PHC clinician), another indication of the rural ED as an extension of PHC[17].

One population-based study used a more complex method of determining rural–urban status, so that residents could be placed along a continuum. The study concluded that when such sophisticated measures of rural–urban are used, access to PHC declines among both the most rural and most urban residents[18]. Interestingly, however, as rurality increased, residents were less likely to report having unmet health care needs despite a decrease in access to PHC. The study's findings suggest potential differences in expectations between rural and urban patients.

In terms of other clinician and practice characteristics, rural physicians and district nurses conduct more consultations (i.e more visits to clinic) per practice patient compared with their urban counterparts[19]. Adult asthma patients in rural areas were significantly less likely to have follow-up care for an asthma diagnosis than urban adults[20]. This finding did not hold for children in rural areas with recent asthma diagnoses, suggesting that, for this group, barriers to access are overcome.

Comprehensiveness

The six studies that provided results about PHC comprehensiveness did so mainly through examining differences in physicians' scope of practice. Four of the six articles commented on the way increasing rurality is associated with an increase in primary care physicians' scope of practice, with two of those concluding geography is the main driver behind an individual physician's scope of practice.

One study of colorectal cancer patients established that primary care physicians spent more time in care coordination and psychosocial care than urban counterparts; in general, these physicians were more involved, and for a longer duration, than urban primary care physicians[21]. Only the most remote primary care physicians were involved in active treatments for their colorectal cancer patients, findings that support the idea of increasing responsibility and scope of practice with increasing rurality.

EMR use

Results regarding EMR use in the studies reviewed were variable. One study found rural PHC clinicians were less likely than their urban counterparts to adopt electronic records – and if they did adopt, their EMR systems were more likely to have lower functionality and integration[22]. Another found that any rural–urban differences in EMR use were explained by adjusting for practice size and type, and that rates of use were roughly similar[23]. Still another found that EMR adoption rates were significantly higher among rural practices compared with urban ones[24].

Although one study reported roughly similar adoption rates between rural and urban practices, this similarity 'masked' significant differences when accounting for practice size[25]. For example, solo practices in rural areas were more likely to adopt EMRs than solo urban practices (41% vs 33%). This same study found that, among practices with EMR capabilities, the determinants of adoption varied. This finding was echoed in a second study, which found that, among practices that had not adopted, rural practices were more likely than urban ones to indicate temporary disruptions to productivity and access to records as being a barrier[23].

Continuity

In health care, continuity can have different meanings depending on context. For the purposes of this review, continuity is referring specifically to relational continuity, the 'ongoing therapeutic relationship between a patient and one or more providers'[26].

Only one study was concerned primarily with continuity of care, and its survey results described several factors, including rural setting, associated with lower reported continuity[27]. Other practice factors associated with lower reported patient continuity included a higher number of physicians in the practice, employing nurses as part of the practice staff, weekend appointments, and 24 hours or less per week of on-call services. Practice characteristics are therefore the likely contributor to the differences in continuity reported between geographical settings.

Discussion

This scoping review has identified a small but important set of studies that highlights differences between rural and urban PHC. These differences hold key messages for the development of PHC performance measurement and reporting systems in rural settings. Further research in this area should more directly address the notion of performance measurement and vulnerable populations, including rural patients.

Access

Rural and remote areas frequently describe barriers to accessing health services, including primary care, and so it is not surprising that, of the four 'pillars' of PHC selected for analysis, access was the most commonly discussed. Studies described how physicians in rural communities divide their time between hospital- and clinic-based practice[15]. This has implications for how access to PHC in rural areas is measured. For example, increased ED use among rural patients, a behavior often attributed to a poorly functioning healthcare system, may in fact reflect patient and clinician decision-making around efficient health system structure use. This scoping review did not consider patient decision-making – when and where a rural patient seeks care – but this aspect is certainly present in the literature and is worthy of further attention[28,29]; measures of PHC performance will need to acknowledge this divergence.

With the WHO's call for renewal of the PHC system has come innovations in delivery. As models of PHC delivery diversify, performance measures will need to consider how a given model might be encouraging (or discouraging) certain practices among clinicians. For example, PHC models that emphasize collaborative, interdisciplinary care will require a measure of access that can

include the work of the various health professionals involved – not just physicians. A model that expects physicians to perform more procedural care will need to be measured and reported on in such a way as to weight such activities appropriately. For rural areas, where healthcare resources are more often scarce, these innovations in PHC delivery are particularly important to measure and report.

Comprehensiveness

This review found consistent evidence for an increased comprehensiveness of care among rural PHC clinicians compared to non-rural clinicians. This wider scope of practice means rural PHC clinicians should be evaluated differently than their non-rural colleagues. One study concluded that geography was in fact the 'predominant predictor' of scope of practice[30]. Three main reasons were postulated for this increase in scope of practice among rural PHC clinicians. First, compensation models that reward a diversity of practice activities can certainly affect scope of practice. In some rural jurisdictions, alternative payment plans can incentivize physicians to provide a sought-after range of clinical services, in contrast to traditional fee-for-service arrangements. Second, the structure of rural PHC, where clinicians may be practicing in different settings (eg hospital and clinic), can explain the variation. Third, existing gaps in the larger healthcare system, whether primary or specialist, can influence clinician behavior. For example, one study in this review found that rural and remote primary care physicians play a larger role in managing colorectal cancer patients[21]. These patients face increased distances to major treatment centers, and primary care physicians can fill the gap in care when patients aren't able to access those centers as frequently. Understanding the connection between external pressures and the services provided by individual physicians and PHC clinicians will be crucial for measuring and reporting performance in rural areas.

EMR use

EMR use is the most problematic since keeping electronic records in general is not necessarily associated with better performing PHC. But the literature describes several differences in EMR use in rural and non-rural settings, and exploring these differences can help guide future measurement systems. First, practice size may be a better predictor of EMR use than rurality, likely because larger practices are better able to support implementation of such systems. This review suggests measuring and reporting intent to adopt among non-adopters, as well as comprehensiveness and functionality of EMR systems among adopting practices. Such measures may uncover important rural–urban differences that are not otherwise apparent. It is also worth pointing out that the conflicting conclusions that emerged from the studies identified may be attributed to the 2007–2016 publication dates. As EMRs became more mainstream and included better functionality over this date range, overall patterns of EMR use likely changed. Finally, it is worth considering the impact of increased EMR use in rural areas where clinicians may be more likely to work across multiple settings (clinic, hospital, long-term care facilities). Effective EMR functionality may therefore be a challenge for informational continuity in the rural environment.

Continuity

This review suggests that increasing access and comprehensiveness in a rural setting comes with the cost of lower relational continuity, and evaluating innovations to rural PHC should consider these trade-offs. PHC models that consist of practices with a larger number of physicians and include allied health professionals may wind up increasing access to care at the expense of continuity. Rural patients may be willing to make this trade-off, but further research and consideration of this aspect of PHC in is important.

Limitations

This review has some limitations. The studies identified come from only four countries, all in resource-rich parts of the world: Canada, the USA, Australia, and the UK. This is likely a result of limiting searches to English-language articles. Subjective physician and patient experiences of PHC were excluded from the search, and this decision rendered many qualitative studies ineligible, as described in the methods section.

The studies in this review defined rurality in various ways. Several methods were proposed: population size, often mapped to zip/postal code; specific indices of rurality, such as the Accessibility and Remoteness Index for Australia (ARIA) or the Rurality Index of Ontario (RIO); or official government designations, such as the UK's Office for National Statistics Rural and Urban Classification or Florida's Health Resources and Services Administration list of defined rural areas. Whether or not these varying definitions of rurality impact the conclusions that can be drawn is unclear, but it would be wise to consider this limitation in any further research.

The PMH was a useful model for conceptualizing quality PHC, and helped organize the literature search, although it must be acknowledged that using a different way of conceptualizing PHC may have produced different conclusions. Preliminary searches suggested access, comprehensiveness, EMR use, and continuity would be the most useful and frequently discussed PMH pillars in the literature. The model's pillars not used in the literature search are, for the most part, not explicitly discussed in the literature. Nevertheless, limiting the search strategy to four pillars may have excluded other relevant studies. Finally, it became clear during the literature search that the EMR pillar was unique in the way its studies were identified. A useful way of thinking about this is through the Hogg et al. primary care framework[31]. In the Hogg framework, PHC is organized into 'domains.' In this model, access, comprehensiveness, and continuity are considered 'performance domains' concerned with the manner in which services are delivered, whereas EMR use is considered a 'structural domain,' a practice-level process[31]. The conclusions drawn from the 'EMR use' studies may therefore need to be considered distinctly from the others.

Associating each of the resulting twenty-six studies with one of the

four measures of quality PHC was not without difficulty. For example, comprehensiveness and continuity are closely linked (since comprehensive care often means an increase in continuity of care), and for many of the studies with the 'comprehensiveness' label, continuity was a related aspect.

Finally, the 26 studies identified through this review seemed to define clinicians as physicians only, and there was little about the kinds of interdisciplinary and team-based care that might be expected with rural PHC. It was expected that the review process would find studies that commented on the enhanced role of nurse practitioners and other clinical staff in rural areas, but this was not the case. Future study should be done to clarify the role of other clinicians and professionals in rural PHC.

Conclusion

This scoping review mapped the existing literature that describes differences between rural and non-rural PHC across four predetermined pillars of the PMH: access, comprehensiveness, continuity, and EMR use. The 26 identified studies offer valuable evidence that should be considered when developing performance measurement systems for rural PHC. While the PMH model used to organize the results is a North American one, its components are internationally recognized as being significant in designing and delivering comprehensive primary care in all health systems.

This review found that rural residents had a greater likelihood of receiving care from allied health professionals, nursing, and community health centers, and similarly that rural patients reported lower levels of relational continuity overall. The likely explanation is that rural residents are generally underserved by PHC providers, and so are often forced to seek care from whomever is 'on call' at that particular time. The use of collaborative practice models in rural areas may also contribute to this phenomenon, and further research should continue to examine the ways such models affect patients' perceived continuity of care.

Studies in this review describe an increased use of the ED among rural residents compared with non-rural residents. Interestingly, most patients attending EDs or urgent care centers in rural areas have primary care providers, a finding reversed for urban EDs (ie urban patients in the ED are less likely to have a primary care provider). It may be that rural residents are seeking primary care from EDs not only because it is the only option available to them, but also because their PHC provider may be accessible through the ED during off-hours. Further research should clarify this dynamic as it has implications for how PHC performance is evaluated.

Finally, the studies selected for this review were clear that rurality is associated with an increased scope of practice among primary care physicians. There was evidence that urban residents use more specialist services than non-urban residents do. Measuring the performance of rural PHC physicians, then, will need to account for their apparent increased scope of practice compared with their non-rural colleagues.

REFERENCES:

1 Aggarwal M, Hutchison B. *Toward a primary care strategy for Canada.* 2012. Available: http://www.cfhi-fcass.ca/Libraries/Reports/Primary-Care-Strategy-EN.sflb.ashx (Accessed 31 August 2017).

2 Canadian Institutes of Health Research. *CBPHC overview.* 2015. Available: http://www.cihr-irsc.gc.ca/e/44079.html (Accessed 22 January 2018).

3 World Health Organization. *The World Health Report 2008. Primary health care: now more than ever.* 2008. Available: http://www.who.int/whr/2008/whr08_en.pdf (Accessed June 2017).

4 Health Council of Canada. *Measuring and reporting on health system performance in Canada: opportunities for improvement.* Toronto, ON: Health Council of Canada, 2012.

5 College of Family Physicians of Canada. *A vision for Canada. Family practice: The Patient's Medical Home.* 2011. Toronto: College of Family Physicians of Canada.

6 du Plessis V, Beshiri R, Bollman RD, Clemenson H. *Definitions of 'rural'.* Agriculture and Rural Working Paper Series. 2002. Statistics Canada AD. Available: http://www.statcan.gc.ca/pub/21-601-m/2002061/4224867-eng.pdf (Accessed June 2017).

7 Arksey H, O'Malley L. Scoping studies: towards a methodological framework. *International Journal of Social Research Methodology* 2005; **8(1):** 19-32. https://doi.org/10.1080/1364557032000119616

8 Levac D, Colquhoun H, O'Brien KK. Scoping studies: advancing the methodology. *Implementation Science* 2010; **5:** 69. https://doi.org/10.1186/1748-5908-5-69 PMid:20854677

9 Government of Canada. *2003 First Ministers' Accord on Health Care Renewal.* 2003. Available: http://www.hc-sc.gc.ca/hcs-sss/delivery-prestation/fptcollab/2003accord/index_e.html (Accessed June 2017).

10 Chan L, Hart LG, Goodman DC. Geographic access to health care for rural Medicare beneficiaries. *Journal of Rural Health* 2006; **22(2):** 140-146. https://doi.org/10.1111/j.1748-0361.2006.00022.x PMid:16606425

11 Dempsey P, Wilson D, Taylor A, Wilkinson D. Self-reported patterns of health services utilisation: an urban-rural comparison in South Australia. *Australian Journal of Rural Health* 2003; **11(2):** 81-88. https://doi.org/10.1046/j.1440-1584.2003.00493.x PMid:12780498

12 Eckert KA, Taylor AW, Wilkinson D. Does health service utilisation vary by remoteness? South Australian population data and the Accessibility and Remoteness Index of Australia. *Australian and New Zealand Journal of Public Health* 2004; **28(5):** 426-432. https://doi.org/10.1111/j.1467-842X.2004.tb00024.x PMid:15707184

13 Unger CC, Warren N, Canway R, Manderson L, Grigg K. Type 2 diabetes, cardiovascular disease and the utilisation of primary care in urban and regional settings. *Rural and Remote Health* 2011;

11(4): 1795. Available: http://www.rrh.org.au/journal/article/1795 (Accessed June 2017).

14 Veugelers PJ, Yip AM, Elliott DC. Geographic variation in health services use in Nova Scotia. *Chronic Diseases in Canada* 2003; **24:** 116-123.

15 Haggerty JL, Roberge D, Pineault R, Larouche D, Touati N. Features of primary healthcare clinics associated with patients' utilization of emergency rooms: urban-rural differences. *Health Policy* 2007; **3(2):** 72-85. https://doi.org/10.12927/hcpol.2007.19394

16 Pong RW, DesMeules M, Heng D, Lagace C, Guernsey JR, Kazanjian A, et al. Patterns of health services utilization in rural Canada. *Chronic Diseases and Injuries in Canada* 2011; **31 Suppl 1(1):** 1-36.

17 Palmer E, Leblanc-Duchin D, Murray J, Atkinson P. Emergency department use: is frequent use associated with a lack of primary care provider? *Canadian Family Physician* 2014; **60(4):** e223-229.

18 Sibley LM, Weiner JP. An evaluation of access to health care services along the rural-urban continuum in Canada. *BMC Health Services Research* 2011; **11(1):** 20. Available: http://bmchealthservres.biomedcentral.com/articles/10.1186/1472-6963-11-20 (Accessed June 2017). https://doi.org/10.1186/1472-6963-11-20 PMid:21281470

19 Farmer J, West C, Whyte B, Maclean M. Primary health-care teams as adaptive organizations: exploring and explaining work variation using case studies in rural and urban Scotland. *Health Services Management Research* 2005; **18:** 151-164. https://doi.org/10.1258/0951484054572501 PMid:16102244

20 Withy K, Davis J. Followup after an emergency department visit for asthma: urban/rural patterns. *Ethnicity & Disease* 2008; **18(Supp 2):** S247-251.

21 Hanks H, Veitch PC, Harris MF. A rural/urban comparison of the roles of the general practitioner in colorectal cancer management. *Australian Journal of Rural Health* 2008; **16(6):** 376-382. https://doi.org/10.1111/j.1440-1584.2008.01019.x PMid:19032211

22 Mack D, Zhang S, Douglas M, Sow C, Strothers H, Rust G. Disparities in primary care EHR adoption rates. *Journal of Health Care for the Poor and Underserved* 2016; **27(1):** 327-338. https://doi.org/10.1353/hpu.2016.0016 PMid:27587942

23 Menachemi N, Langley A, Brooks RG. The use of information technologies among rural and urban physicians in Florida. *Journal of Medical Systems* 2007; **31(6):** 483-488. https://doi.org/10.1007/s10916-007-9088-6 PMid:18041281

24 Whitacre BE. Rural EMR adoption rates overtake those in urban areas. *Journal of American Medical Informatics Association* 2015; **22(2):** 399-408. https://doi.org/10.1093/jamia/ocu035 PMid:25665701

25 Whitacre BE, Williams RS. Electronic Medical Record adoption in Oklahoma practices: rural-urban differences and the role of broadband availability. *Journal of Rural Health* 2015; **31(1):** 47-57. https://doi.org/10.1111/jrh.12086 PMid:25124874

26 Reid R, Haggerty JL, McKendry R. *Defusing the confusion: concepts and measures of continuity of healthcare.* Ottawa, ONT: Canadian Health Services Research Foundation, 2002.

27 Kristjansson E, Hogg W, Dahrouge S, Tuna M, Mayo-Bruinsma L, Gebremichael G. Predictors of relational continuity in primary care: patient, provider and practice factors. *BMC Family Practice* 2013; **14:** 72. https://doi.org/10.1186/1471-2296-14-72 PMid:23725212

28 Farmer J, Iversen L, Campbell NC, Guest C, Chesson R, Deans G, et al. Rural/urban differences in accounts of patients' initial decisions to consult primary care. *Health & Place* 2006; **12(2):** 210-221. https://doi.org/10.1016/j.healthplace.2004.11.007 PMid:16338636

29 Haggerty JL, Roberge D, Lévesque J-F, Gauthier J, Loignon C. An exploration of rural-urban differences in healthcare-seeking trajectories: implications for measures of accessibility. *Health & Place* 2014; **28:** 92-98. https://doi.org/10.1016/j.healthplace.2014.03.005 PMid:24793139

30 Hutten-Czapski P, Pitblado R, Slade S. Short report: scope of family practice in rural and urban settings. *Canadian Family Physician* 2004; **50:** 1548-1550.

31 Hogg W, Rowan M, Russell G, Geneau R, Muldoon L. Framework for primary care organizations: the importance of a structural domain. *International Journal of Quality in Health Care* 2008; **20(5):** 308-313. https://doi.org/10.1093/intqhc/mzm054 PMid:18055502