

The economic impact of rural healthcare on rural economies: A rapid review

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Abstract

Introduction: One critical component of any rural community is its healthcare system. Rural healthcare systems are essential as rural communities have worse health outcomes when compared to urban areas. Rural healthcare systems might also have a positive impact on rural economies. In some rural areas, these health services are threatened with a reduction or closure. This rapid review was carried out to examine the impact of rural healthcare systems' declines on rural economies.

Methods: We conducted a rapid review of peer-reviewed and grey literature sources on studies that examined the economic impact of rural healthcare on rural economies in Canada, Australia, Scandinavia and the United States of America (USA). We used a data extraction template adapted from the Centre for Reviews and Dissemination.

Results: We found 17 research papers between two databases and nine websites. Articles examined various health professions (dentist, physician assistant and pharmacist), the inclusion of family physicians, a physician with an increased scope of practice (obstetrics and surgery), the impact of a rural primary care hospital, telemedicine, a distributed medical education programme and the health care sector.

Conclusion: Rural healthcare seems to have a positive impact on jobs and labour-based wages in rural communities. There is a considerable need for research outside the USA.

Keywords: Economics, healthcare, review, rural

Résumé

Introduction: Un élément essentiel de toute communauté rurale est son système de soins de santé. Les systèmes de soins de santé ruraux sont essentiels car les communautés rurales présentent des résultats sanitaires moins bons que les zones urbaines. Ces systèmes pourraient également avoir un impact positif sur les économies rurales. Dans certaines zones rurales, ces services de santé sont menacés de réduction ou de fermeture. Cette revue rapide a été réalisée pour examiner l'impact du déclin des systèmes de soins de santé ruraux sur les économies rurales.

Méthodes: Nous avons procédé à un examen rapide de documentation évaluée par les pairs et de documentation parallèle sur les études qui ont examiné l'impact économique des soins de santé ruraux sur les économies rurales au Canada, en Australie, en Scandinavie et aux États-Unis. Nous avons utilisé un modèle d'extraction de données adapté du Centre for Reviews and Dissemination.

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Résultats: Nous avons trouvé 17 articles de recherche entre deux bases de données et neuf sites Web. Les articles portaient sur diverses professions de santé (dentiste, assistant(e) médical(e), pharmacien(ne)), l'inclusion des médecins de famille, un médecin ayant un champ d'exercice élargi (obstétrique et chirurgie), l'impact d'un hôpital rural de soins primaires, la télémédecine, un programme d'enseignement médical distribué et le secteur des soins de santé.

Conclusion: Les soins de santé en milieu rural semblent avoir un impact positif sur les emplois et les salaires basés sur le travail dans les communautés rurales. Il existe un besoin considérable de recherche en dehors des États-Unis.

Mots-clés: rural, soins de santé, économie, revue

INTRODUCTION

Many rural communities in industrialised nations are struggling to survive. They face a multitude of problems, including an ageing population, unstable economies and youth out-migration.^{1,2} As well-paying jobs leave, people retire and the population declines, the tax bases in these communities shrink, and eventually, municipalities become unable to fund essential services. Once a community loses its basic services, it is nearly impossible to recruit new community members or businesses, and in the worst-case scenario, the community eventually becomes a 'ghost town'.

One essential aspect of any rural community is their healthcare system. Rural healthcare systems are imperative as rural communities may be distant from other communities, often have ageing populations, and rural communities typically report worse health outcomes when compared to urban areas.³ The rural healthcare system impacts not only individual health but can have an economic ripple effect as quality health care is important for attracting business, industry, employees and retaining retirees.⁴ In rural locations in Canada, Australia and the United States of America (USA), hospitals are experiencing service decline or even being completely shutdown,⁵⁻⁷ with cost, quality and workforce needs being commonly cited for closures or reductions in services.⁸ Research has suggested that rural healthcare systems are less financially stable when compared to health systems in urban areas, but these studies rarely consider the economic impact of health services on the local region.^{9,10}

The healthcare sector can have a major effect on rural economies as healthcare is typically one of the three largest employer groups in a rural

community¹¹ and the doctors, nurses, pharmacists, dentists, medical administrators and other hospital employees buy goods and use services in the rural communities where they are employed.¹² For example, one study suggested that each additional job at a rural clinic leads to an additional 0.33 jobs in the community due to the clinic's and clinic employees' spending.¹² The economic impact of a physician in rural communities is estimated to be greater than a clinic employee. In one study in the USA, a rural physician is estimated to generate approximately 1.5 million in revenue, almost 1 million in payroll and over 20 jobs.¹³ These large impacts are created through clinic employment, inpatient services, outpatient activities and the multiplier effect of these contributions.¹³ With decreasing health workforce being seen post-pandemic in many settings,¹⁴ we consider it timely to review and collate both the published and grey literature on the economic impacts of the rural physician and rural healthcare system.

This study aimed to examine the impact of rural healthcare systems on rural economies.

METHODS

For this study, we undertook a rapid review of the peer-reviewed and grey literature. A rapid review is a systematic assessment of what is known about a specific topic by using a systematic review method.¹⁵ We decided to use a rapid review approach based on the expedited timelines proposed by the overarching research committee and the potential implications of policy in this area.

Search strategy

Our search strategy is presented using the Standards for Reporting Literature searches

Table 1: STARLITE framework for rapid review

Element	Explanatory notes
S: Sampling strategy	Research papers that examine the impact of rural health care on rural economies
T: Type of paper	Quantitative studies
A: Approaches	Consultation with a research librarian, reference list searchers, grey literature search
R: Range of years (start date: end date)	2000-2021
L: Limits	English language
I: Inclusions and exclusions	Inclusion: Rural health care or rural health care services Exclusions: Cost-benefit analysis
T: Terms used in search	Rural: Exp* rural health care, medically underserved Economics: econom**\$.ti. or health economics/or economics/ Healthcare: Rural health care Place: Canada, United States, Australia, Scandinavia
E: Electronic sources	Databases: Ovid Medline and EMBASE Website: The Rural Health Information Hub, National Center for Rural Health Works, America College of Physicians, and the Canadian, Australian, Danish, Norwegian, Finnish and Swedish Medical Associations

*Exploding a term to include all narrower search terms, **\$A truncation command. In this case, the database also retrieves 'economics, economies, economy, economically, etc.'

framework in Table 1.¹⁶ Database searches were supplemented by reviewing the reference list of included research papers. Since there is no generally agreed upon definition of 'rural', articles were included if the author described the community as rural. Economic impact was considered a financial or employment effect on a state, region, or locality and healthcare was deemed a service or procedure aimed to prevent, manage, or cure some sort of injury or illness. Both peer reviewed and non-peer reviewed articles will be referred to as research paper(s) throughout this research manuscript.

Study selection

After the search had been completed, all identified research papers were uploaded into Zotero (Corporation for Digital Scholarship and Roy Rosenzweig Centre for History and New Media, VA, USA) and duplicates removed. Next, two reviewers independently screened all

titles and abstracts against inclusion criteria. The reviewers erred on the side of inclusion, where there was any doubt. This strategy helped ensure that relevant retrieved studies were included. Two independent reviewers then reviewed the full-text research papers against the inclusion criteria. Throughout the process, any disagreement was resolved through a discussion or the inclusion of a third reviewer. Refer to Figure 1 for full PRISMA flow chart of the study selection.

Assessment of methodological quality

Two reviewers separately appraised each research paper for methodological quality using the Consensus on Health Economics Criteria list.¹⁸ Authors were not contacted for missing information. Any disagreements were resolved through a third reviewer.

Data extraction

One independent reviewer extracted data, and a second reviewer checked for correctness and completeness.¹⁹ A data extraction template was adapted from the Centre for Reviews and Dissemination guidelines for undertaking reviews in health care²⁰ and data extracted included author(s), year, country of origin, research question, methods (analytic approach), how economic impact was measured and outcomes of the analysis.

RESULTS

We identified 17 research papers among two databases and 9 websites. Summaries for the 17-research papers are included in Table 2.

In total, 5 were peer reviewed, 10 were from the National Centre for Rural Health Works and two grey literature research papers were retrieved. The economic analyses were from the USA ($n = 15$) and Canada ($n = 2$). The research papers used various analysis strategies, with input-output models being used most frequently, survey results and costs from certain procedures, and other strategies to model local economies. All research papers were at least moderate quality using the Consensus on Health Economics Criteria list.¹⁸ Of the research papers that were rejected; most were a cost analysis, a cost-benefit analysis or did not examine economic gains or losses to the community.

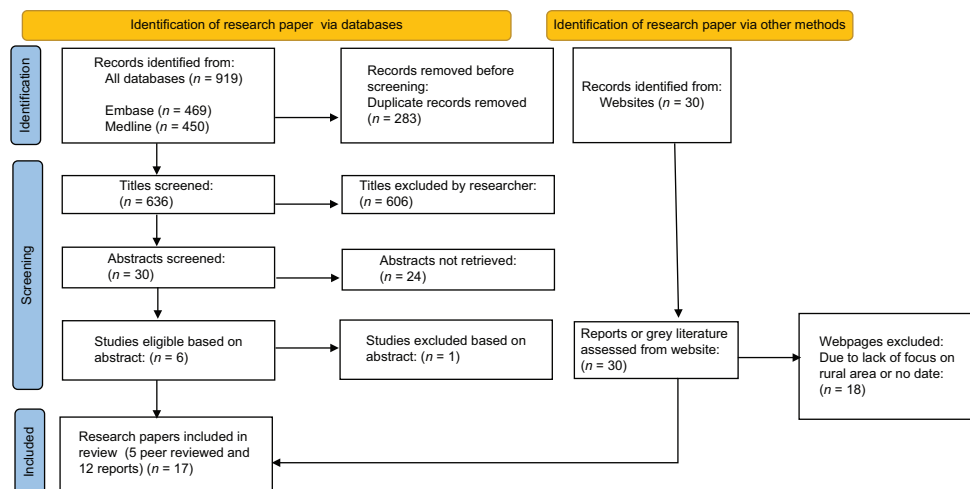


Figure 1: PRISMA flow diagram for inclusion of research papers.¹⁷

Research papers focused on a wide range of topics, including the inclusion of various health professionals practising in a community, the inclusion of family physicians, a physician with an increased scope of practice (obstetrics and surgery); the impact of a rural primary care hospital, telemedicine, a distributed medical education programme and the health care sector. All research papers focused on increased jobs and/or income generated/saved.

Primary care physicians

Two research papers examined the impact of primary care physicians. The results indicated that a physician creates between 22 and 26.3 local jobs, almost \$1.5 million (USD) in revenue and between \$0.9 million and \$1.4 million (USD) in labour income.^{13,21}

Specialist physicians

Two research papers examined the impact of medical doctors with specialties. For example, a rural general surgeon creates approximately \$2.7 million (USD) in revenue, \$1.4 million (USD) in payroll and creates 26 jobs, while a family physician practising obstetrics in a rural area adds an additional \$488,560 (USD) in economic benefit to the community in addition to the \$1 million (USD) from practising family medicine.^{22,23}

Healthcare professionals

Three research papers evaluated the economic impact of other health professionals on rural

economies. These positions included a physician assistant or nurse practitioner, a dentist and a community pharmacy. A rural physician assistant or nurse practitioner can have an employment effect of 4.4 local jobs and labour income of \$280,476 (USD) from the clinic.¹² The average rural dentist has direct impacts of 5 full-time equivalent local jobs and \$338,797 (USD) in labour income from the clinic.²⁴ For every \$1 in pharmacy income, an additional \$0.19 (USD) income is generated in other businesses/local economies.²⁵

Medical education

Two research papers calculated the impact of distributed medical education programmes. Both were from the Northern Ontario School of Medicine. The first suggested that total economic contribution to Northern Ontario was \$67.1 million (CAD) and the second suggested that the direct programme and learner spending equated to approximately \$64.6 (CAD) million in spending.^{26,27}

Hospitals

Three research papers explored the impact of hospitals on rural economies. Estimates varied depending on size and type of hospital but ranged from 26 jobs to 715 jobs and approximately \$902,033 million to \$45.4 million (USD) in labour impact.²⁸⁻³⁰

Healthcare sector

Two research papers examined the impact of the healthcare sector. One study, in South-eastern Oklahoma in a country with 13,879 people found

Table 2: Summary of research papers examining the impact of rural healthcare on rural economies. Currency in US dollars for US papers and in Canadian dollars for Canadian papers

Author(s)	Year	Country	Research objective/question	Primary care physician	Modelling techniques	Outcome
Eilrich <i>et al.</i> , National Center for Rural Health Works ²¹	2016	USA	'Estimate the economic contributions of a rural primary care physician to employment and labor income in the community and surrounding area including the local hospital'	Input-output model	Input-output model	'A rural primary care physician practicing in a community with a local hospital creates approximately 26.3 local jobs and nearly \$1.4 million in labor income (wages, salaries and benefits) from the clinic and the hospital'
Eilrich <i>et al.</i> , National Center for Rural Health Works ¹³	2007	USA	'Estimate the economic activity of a rural primary care physician on the local community'	Input-output model	Input-output model	'The physician generates approximately \$1.5 million in revenue, \$0.9 million in payroll and creates 23 jobs. The relatively large impact is created through clinic employment, inpatient services, outpatient activities and the multiplier effect of these contributions'
Increased scope physician						
National Center for Rural Health Works, Oklahoma State University, and Oklahoma Center for Rural Health, OSU Health Sciences Center, College of Osteopathic Medicine ²²	2010	USA	'Estimation of benefits generated by rural surgeon'	Needs-based approach	Needs-based approach	'A rural general surgeon generates approximately \$2.7 million in revenue, \$1.4 million in payroll (wages, salaries and benefits) and creates over 25 local jobs'
Avery <i>et al.</i> ²³	2014	USA	'This study examines the economic impact of family physicians practicing obstetrics in underserved, rural areas'	Questionnaires to participant in the study. 'The questions included the most common types and average annual numbers of obstetrics/gynecological procedures they performed'	Questionnaires to participant in the study. 'The questions included the most common types and average annual numbers of obstetrics/gynecological procedures they performed'	'A family physician practicing obstetrics in a rural area adds an additional \$488,560 in economic benefit to the community in addition to the \$1,000,000 from practicing family medicine'
Healthcare professionals						
Eilrich ¹²	2016	USA	'Estimate the total (direct and secondary) economic effects to full and part-time employment and labor income that rural physician assistants and nurse practitioners have upon the clinic/hospital and the community they serve'	Input/output model	Input/output model	'A rural physician assistant or nurse practitioner can have an employment effect of 4.4 local jobs and labor income of \$280,476 from the clinic. The total effect to a community with a hospital increased to 18.5 local jobs and \$940,892 of labor income'
Doeksen <i>et al.</i> ²⁴	2014	USA	Investigate the economic impact of a rural dentist	Input/output model	Input/output model	'The average rural dentist has direct impacts of 5 full-time equivalent local jobs and \$338,797 in labor income from the clinic' 'A rural dentist has a total average of employment impact of seven jobs'

Contd...

Table 2: Contd...

Author (s)	Year	Country	Research objective/question	Modelling techniques	Outcome
Healthcare professionals					
St. Clair <i>et al.</i> , National Center for Rural Health Works ²⁵	2007	USA	Quantifying economic impact of rural pharmacies via Oklahoma rural pharmacy data, USA	Survey results summary (employment, income) x multiplier (average from last ten rural community economic impact studies in Oklahoma)	'For every \$1 in income in a typical rural community pharmacy, an additional \$0.19 in income is generated in other businesses and industries in the local economy. The direct income is \$296,268 and secondary income is \$56,291, for a total income impact of \$352,560'
Medical Education					
Hogenbirk <i>et al.</i> ²⁶	2021	Canada	Estimate the economic impact of 'total spending in community adjusted by an economic multiplier based on community population size, industry diversity, and propensity to spend locally'	Cash-flow local economic model	'Direct program and learner spending in Northern Ontario totaled \$64.6(million) Canadian Dollars'
Hogenbirk <i>et al.</i> ²⁷	2015	Canada	What are 'the economic contributions of the Northern Ontario School of Medicine to Northern Ontario communities who are participating in the Northern Ontario School of Medicine medical education programs?'	Local economic model based on economic base theory	'The total economic contribution to northern Ontario was \$67.1 million'
Hospitals					
Eilrich <i>et al.</i> , National Center for Rural Health Works ²⁸	2015	USA	'Estimate the economic impact of recent hospital closures in rural communities'	Input/output model	'The total potential economic impacts for the 19 selected hospitals in the sample ranged from 26 to 188 jobs and \$902,033-\$9.5 million in labor income'
Doeksen <i>et al.</i> , National Center for Rural Health Works ²⁹	2016	USA	What is the economic impact of the critical access hospitals in rural communities?	Input/output model	'The total annual impact includes 170 jobs and \$7.1 million in wages, salaries, and benefits from hospital operations'
Eilrich <i>et al.</i> ³⁰	2017	USA	'Estimate the economic contributions of a local hospital to employment and labor income in the community and surrounding area'	Input/output model	'The 26-50 bed PPS hospital sample has average total impact of 334 employees and \$21.2 million labor income' 'The 51-100 bed PPS hospital sample has average total impact of 715 employees and \$45.4 million labor income'

Contd...

Table 2: Contd...

Author (s)	Year	Country	Research objective/question	Health care sector	Modelling techniques	Outcome
Doeksen and Schott ³¹	2003	USA	'Determine the importance of the health sector to the economy of a rural community?'	Health care sector	Input/output model	'For each dollar created in that sector an additional \$0.47 is created through the area due to business (indirect) and household (induced) spending' 'The total employment impact represents 18.5% of the total non-farm employment'
Patry <i>et al.</i> ³²	2010	USA	What is the impact of the health care sector on rural communities?		Analysis technique to show spending and re-spending over multiple rounds until it is exhausted	'The total employment impact of the health services sector results in an estimated 338 jobs in the local economy' 'The total income impact of health services results in an estimated \$9,603,000 for the economy'
St. Clair <i>et al.</i> , National Center for Rural Health Works ³³	2017	USA	Examine 'the economic impact of rural nursing homes on local economies'	Nursing homes	Input/output model	Scenario 1: 50 beds, no skilled nursing: Total impact: 70 jobs, \$3,340,322 income Scenario 2: 100 beds, no skilled nursing: Total impact: 127 jobs, \$5,798,206 income Scenario 3: 200 beds, no skilled nursing: Total impact: 259 jobs, \$11,962,466 income Scenario 4: 100 beds with skilled nursing: 140 jobs, \$6,657,698 income Scenario 5: 200 beds with skilled nursing: 280 jobs, \$13,227,892 income
Whitacre <i>et al.</i> ³⁴	2009	USA	'Examine community-level impacts of telemedicine in a rural setting'	Telehealth	Five site visits to gather information	Four categories examined Hospital saved between \$13,700-200,000 for using telemedicine Transportation cost savings ranged from \$9600-168,000 for patients Communities obtained annual increase between \$4700-77,000 in 'improved productivity in telemedicine' An extra \$63,000-1,600,000 in lab and pharmacy work if procedures are kept local

Contd...

Author (s)	Year	Country	Research objective/question	Modelling techniques	Outcome
Eilrich <i>et al.</i> , National Center for Rural Health Works ³⁵	2016	USA	'Estimate the average direct and secondary employment and labor income impacts on a rural community from an independent rural health clinic'	Health care clinic Input/output model	'The total estimated annual economic impact of an independent rural health clinic was 12.6 local jobs and \$1,009,299 in wages, salaries, and benefits' 'Smaller rural health services often contract physician services. The total estimated impact of an independent rural health clinic without a full-time equivalent employed physician was 6.3 local jobs and \$454,871'

PPS: Prospective pay system

that almost 20% of non-farming employment came from the health care sector.³¹ The second study, in a country with an estimated population of 3,887 people found the total employment impact (direct and indirect) on the health sector resulted in an estimated 338 jobs and \$9,603,000 (USD) for the local economy.^{31,32}

Telehealth/nursing home/health care clinic

One research paper examined the financial impact of Teleradiology and Telepsychiatry on the hospital, local labs and pharmacies, travel savings for community members and labour productivity. The largest financial increase was for local labs and pharmacies, as the study suggested that if patients were able to stay in their home community, they would be more likely to have tests done at the local hospital and have their prescriptions filled at the local pharmacy. Keeping this additional work local would lead to an increase of \$63,000 to \$1.6 million dollars (USD).³⁴ One research paper looked at the impact of rural nursing homes and depending on how many beds and if skilled nurses were employed, estimates ranged from 70 jobs and \$3,340,322 (USD) in income to 280 jobs and \$13,227,892 (USD) in income.³⁵ Finally, one research paper used data from 414 rural counties and estimated annual economic impact of an independent rural health clinic was 12.6 local jobs and \$1,009,299 (USD) in wages, salaries, and benefits.³⁵

DISCUSSION

Our review aimed to collate and examine the available evidence on the impact of rural healthcare on rural economies.

The results suggest that rural health care services can positively impact rural economies through direct jobs, indirect jobs, and labour-based wages. For example, a rural physician can order tests to be completed by local X-ray or lab technicians, prescribe medication to be dispensed at the local pharmacy, and work with nurses to provide inpatient and outpatient care-the more services provided, the greater the employment opportunities. Outside of health care, there will also be induced jobs when these employees go out and support local businesses. In Canada, for every physician employed in an office setting, almost two

jobs were needed to support their office. Nearly 289,000 jobs (direct, indirect, and induced) can be tracked back to the physician's office.³⁶ These findings underscore the importance of recruitment and retention efforts for both rural healthcare and communities, where physicians support care not just in the office setting, but are necessary for hospital care also, which expands the local jobs beyond those related to the office setting.

In addition to the studies presented in this research paper, a position paper by the Society of Rural Physicians of Canada found that in one small community, when doctors retired or relocated and were not replaced, nurses and lab technicians began looking for work elsewhere. With this rapid out-migration, there was little to attract new physicians to the area, and between 2005 and 2007, one particular community consumed 10%–15% of the province's locum fund.³⁷ These combined findings reiterate the importance of recruiting and retaining rural physicians and other healthcare professionals. One approach that some communities have used is the hiring of a specialized recruiter. Although the evidence for recruiter effectiveness is mixed, even if they can recruit and help retain a small number of physicians, nurse practitioners, or physician assistants over their career, that effort could lead to a net economic benefit for the community.^{38,39} That benefit likely makes the cost of the recruiter—which is often borne by the local municipality—worthwhile.

One of the common arguments for closing local hospitals is cost. Larger hospitals can achieve economies of scale as research has shown that hospitals between 200 and 300 beds are most efficient.⁴⁰ However, this study fails to consider smaller hospitals' net effect on the local economy. For example, one study found that hospitals of 26–50 beds have a total impact of 334 employees and 21.2 million dollars (USD) in labour income.⁵⁰ Additionally, the closure of hospitals forces rural residents to travel for medical services, which takes away related services such as lab testing, medical imaging, and pharmaceutical services from the local community, with associated job loss.⁵⁴ Therefore, rural hospitals cannot be compared to their urban counterparts or simply measured in terms of efficiency at the hospital level, and policies need to be responsive to, and understand the importance of, rural healthcare

services beyond efficiency and dollars spent at the hospital level.

It is well documented that improved access to care will lead to improved health.⁴¹ For example, having a regular health care provider was associated with increased odds of receiving preventative care, including flu shots, colon cancer screening, Papanicolaou tests, and mammograms.⁴² A lack of access to care is one of the reasons why people in rural areas may carry a higher burden of illness, reduced life expectancy, and tend to be sicker than their urban counterparts.⁴⁵ Improving access to care in rural communities, as well as access to acute care for urgent issues, may also have economic benefits as most rural Canadians work in physically demanding jobs, including farming, fishing, mining, or oil and gas. If rural Canadians are kept in better health, and have better access to health care locally, they would potentially lose fewer days to sickness or health-related travel; a paper from the Conference Board of Canada suggested that sick days cost the Canadian economy \$16.6B.⁴⁴ Keeping Canadians in good health allows them to work better, be more efficient, and make larger contributions to the Canadian economy.⁴⁵

Our study found that the majority of the research on the impact of rural healthcare on rural economies is from the USA, which has a different healthcare model compared to Canada. Some of the major differences between the American and Canadian healthcare systems include health care insurance, the role of private industry, types of care provided by health care, and delivery of primary care.⁴⁶ Some of these variations can lead to major differences in the costs associated with healthcare. For example, administrative costs in the USA are approximately \$324 (USD) dollars per capita, while in Canada it is \$107 (USD) per capita.⁴⁷ Similar large differences were found for hospitals, nursing homes, and home care administration. Another major difference is the amount physicians make in the USA. For example, orthopedic surgeons make approximately \$442,450 (USD) while they make approximately half that amount in Canada.⁴⁸ The reduced costs and earnings in Canada would lead to fewer indirect and induced jobs. Therefore, when using this research to make conclusions about the impact of healthcare on rural economies in countries outside of the USA, it must be done with caution.

Beyond the hospital, rural health care workers are also a valuable part of rural communities. Some rural health care professionals feel their duty extends outside the hospital and take part in community development, local councils, and volunteer in community-based activities.⁴⁹ Therefore, when contemplating closures of rural hospitals, more than the effect on individual health care access must be considered.

Limitations

The compressed timeline potentially adds error to the project as the appraisal quality and search strategy are limited in this type of review.¹⁵ To prevent missing relevant research papers, the research team did decide to review the reference list of all included research papers. However, there is still a chance that some relevant ones were missed. Another limitation of this study is that some research papers were based on full-time employment. Some rural areas would not be able to support a full-time physician, but it might be beneficial to compensate the physician at a full-time level because of the net effects on health care, the rural economy, and the capital they provide. Some of the research needs to be interpreted with caution. Results were extracted using a standardized form that did not leave room for contextualization of specific results, i.e., size of the community, specifics on type of practice, or how the impact might change if more than one healthcare professional is hired.

CONCLUSION

The evidence from this rapid review highlights the importance of keeping healthcare local as it positively impacts not only individual health, but also local jobs and payroll wages. It is imperative that more collaborative efforts are made across local, provincial and federal levels of government to support rural health care as local care delivery can also have positive economic effects on rural communities. Future research on the economic impact of rural health care delivery must be done in a Canadian context for relevance to Canadian policy-makers and administrators.

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