

Strategies For Improving Health Administration In Rural And Underserved Areas: Bridging Gaps In Access To Care

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1. Introduction to Health Administration in Rural and Underserved Areas

Contemporary healthcare systems and organizations are becoming better aware of the importance of quality management in the sector. Several developed countries have embarked on largescale programs, such as the EFQM Excellence Model, TQM, CQI, etc. Not all health systems have the necessary resources, knowledge, information, and above all, the will of all employees to implement comprehensive and successful quality management system. In particular, healthcare systems in rural areas face a special challenge. The specific nature of rural areas, with the rapid deterioration of the demographic situation and additional barriers in access to health care services, sets specific challenges for the management of health care institutions (Jain & Rao, 2019).

In India, the rural health care service constitutes an area under pressure due to low accessibility, poor quality of health services,

inefficient service delivery, and lack of commitment of health care professionals. Health care administration in rural areas is a specialized field as it involves strategies and challenges that are quite different from its counterpart, the urban health system. Therefore, the areas should develop managerial talent in health administration to lead health care establishments. The main objective in the rural area is how to create a better working environment, offer training, career counseling, working environment, adopt effective incentive mechanisms. The vision of socially accountable collaboration is to reduce health disparities and to develop human resources who are specifically prepared to transplant the necessary health care values, knowledge, and skills to meet the critical health care needs of rural citizens where they live and work (Nobles et al., 2015).

1.1. Defining Rural and Underserved Areas

Strategies to improve access to health care often involve the reduction of obstacles to care on the patient side, like increasing primary care physician (PCP) availability in underserved areas, offering psychological support during unscheduled consultations, and providing links between health care providers and community supports, such as patient-edible food pantries. Barriers faced by patients when seeking care are affected by the health system's organizational and financial structure, and also the prevailing professional culture. We aim to clarify the factors involved in accessing health care services in underserved areas, with a focus on appropriateness and social issues. The goal is to provide a clearer, broader definition of accessibility, reach, and treatment of health services. We conducted a cross-sectional study, surveying 1000 respondents from some of the poorest municipal areas in the Philippines. Ordinary least squares regression and path analyses were conducted (Alipio, 2020).

Access to specialty health care is a worsening issue in the U.S., including for medically underserved urban and rural patients (E. Cyr et al., 2019). Health Professional Shortage Areas inform policy and programmatic decisions and are determined using physician-to-population ratios. Primary Care Health Professional Shortage Areas were not consistently found to be co-located with health vulnerability markers (e.g., social determinants of health). We applied the Health Professional Shortage Area criteria for primary care—small geographic areas with populations experiencing a high

primary care needs score—to the state of Tennessee to elucidate the alignment of health care need versus the primary care workforce. We subsequently conducted a small area cross-sectional analysis comparing Health Professional Shortage Area location with associations with morbidity prevalence, health care access measures, and volume of existing providers (A. Streeter et al., 2020).

2. Challenges in Healthcare Access in Rural and Underserved Areas

The following barriers to healthcare access in rural areas serve as major constraints on access to required healthcare services (C. Coombs et al., 2019). Various measures of access to healthcare available in the current literature fail to cover all existing dimensions of access. The five dimensions of access, for example, available in the four dimensions derived by Penchansky and Thomas, do not reflect every aspect involved in the decision to use healthcare services. The barriers to access relevant to rural areas, investigated in the present qualitative study, relate to the dimensions of access to health services approachability, acceptability, availability, affordability, and appropriateness. Structural barriers, such as the distribution of healthcare institutions or physicians and the adequacy of opening hours, may influence the dimensions of availability and approachability. Sociodemographic barriers such as age and level of education may affect all five dimensions of access. Financial barriers have an impact on the dimensions of acceptability and availability. Healthcare utilization may further be constrained by structural barriers such as inadequate transportation, underfinanced healthcare providers, and a lack of information among affected communities.

2.1. Geographic Barriers to Care

Lack of geographic proximity to healthcare clinics restricts access to care, leading to the healthcare services utilization gap between rural and urban residents in China (Alipio, 2020). Moreover, geographical barriers can also result in delays and unmet medical needs (Nobles et al., 2015). Therefore, sufficient attention should be given to the improvement of primary care services and the development of telemedicine in remote areas. We found that more than 10% of the population in Ningxia and Qinghai have unmet medical needs and experience delays in care for physical

health examinations. The above results on the spatial effects are consistent with previous studies in China and other countries that show that geographical barriers in accessing healthcare services are greater in remote rural areas (L. Clarke et al., 2017). Efforts need to be made to reduce the uneven distribution of medical services, facilitate the use of urban medical resources, and enhance the equity of primary care resources in urban and rural areas.

3. Importance of Effective Health Administration in Addressing Access Disparities

Typically, the key to ensuring that rural populations can access the healthcare they need lies in negative charge of rural healthcare facilities (Habib, 2018) and in the greater healthcare community (Cutchin et al., 2006). The healthcare facilities are integral to the basic healthcare delivery design in rural regions, and yet a robust body of literature continues to identify poor administrative practices as an insidious and significant barrier to healthcare in rural settings (Chappell and Uhanova, 2007; Duckett et al., 2016). At the community level, a general dearth of healthcare professionals in rural areas pronouncedly hampers access to healthcare. Strategies to alleviate the situation advocate for the enhancement of healthcare infrastructure and of healthcare professionals' distributions in sites where the gaps appear (M. Paddock, 2015). However, the failure to recognize the hidden centrality of rural health administrative practices to these problems risks undermining the efforts directed at improving access. Addressing healthcare delivery concerns in Australian rural regions, McGrail et al. (2017) recommended administrative reforms be treated as a critical insight. Division of responsibility and team co-ordination highlighted as being necessary internal compounding factors in rural facilities.

Poor administrative practices in rural facilities can impede effective healthcare delivery, thus compounding the already significant burden posed by health disparities. Limited access to healthcare continues to challenge those living in rural regions, particularly where advanced age or disability is prevalent or where belonging to underrepresented racial groups accentuates vulnerabilities to ill health (Ciapponi et al., 2017). With the body of research examining strategies to improve the retention and distribution of healthcare professionals, a comprehensive

synthesis of research addressing effective healthcare administration in rural settings can provide a useful foundation that consolidates diverse research findings and still points toward gaps in the existing literature. This study employs a narrative review approach to identify hastening and hindering factors connected to healthcare access in Australia's rural regions and consolidated information for key themes in a national report. A conceptual model was developed to map the relationships between hastening and hindering factors. Various internal and external compounding factors were found to marginalize the populations in specific rural reaches in NSW.

3.1. Role of Health Administrators in Improving Access

There is a striking imbalance in the level and type of health services available to the population in question across the many regions in the Appalachian at large. The population anticipates that these stark disparities grant them inadequate access to service in particular (A. Amusan et al., 2018). The health administrator in particular faces difficult, non trivial decisions about how to allocate the organization's resources—like healthcare, but also in its administrative functions like referral coordination and in initiatives intended to nurture the health of the rural community. The low level of infrastructure and potentially low levels of literacy, particularly related to healthcare concepts, qualification, or process might elicit demands for problem solving from health administrators on the day-to-day. Accessibility is a complex and multidimensional issue that involves higher order phenomena like power, disenfranchisement, equity, and much more. Systemic and dispositional concerns underpin much of what creates the particular variety of access concerns generally named as access barriers in literature.

Large portions of the Appalachian region face an array of health concerns with consequences that far surpass the impact of the health crises on the communities served. The incident rates of deadly diseases amongst Appalachians are higher than in the rest of the US. Additionally, severe economic disparity and cultural marginalization ensure that these critical health issues are not faced equally by all members of this community. Health administrators in the region have numerous opportunities for intervention and improvement. They require resources and supports that better prepare them for adhering to the roles and

responsibilities that they are asked to fulfill because of their important roles as change agents in the region. There is a clear need for healthcare services to be more accessible in the rural Appalachian region and uncertainties exist regarding how this level of access can be actualized. Administrators can act as brokers to make needed referrals and system-level changes that can address this issue (M Graves et al., 2019). Ensuring services are more equitably distributed across the lackadaisical health infrastructure will involve working with the complexly socially and structurally embedded determinants of service location. Appropriate sphere of influence can be hard to delineate in a region that has not experienced historically robust administrative presence, buy in, or faith in that avenue for change (Holtz et al., 2019).

4. Innovative Models and Best Practices in Health Administration for Rural and Underserved Areas

The central tenet of a Care Network model is the proactive integration of care providers within an accessible system that is itself interwoven with the healthcare needs of individuals, families, and communities. In a 'regular' sense, service nodes with $\text{parentNode} = 0$ contribute to the children's direction (as one example, the weeks of Baby Checkup during first ydays ≤ 0 contribute directionally to the outcome of Pediatrician Hospitalization at ydays > 0 for baby checks, among our main study subjects). In addition to impacting assessment of local disparities, our network model is also able to localize potential areas in need of greater attention (Luk et al., 2008). Broadly, we find that policy changes such as reducing the presence of dentists and pediatricians by 50% would have a larger impact on children living in areas with high average days to full-coverage prenatal care delivery than without affecting those; larger impacts are expected when such policy changes are implemented in those areas with high SES indices than with low SES indices.

(M. Paddock, 2015)(A. Waller, 2015)

In predominantly rural and underserved areas, there is a critical need for innovative, sustainable, community-rooted models of care that are comprehensive, patient- and family-centered, culturally sensitive, and coordinated across care settings. Drawing from Population Health and the Health Systems Circle frameworks, our aim in the proposed project is to use network analysis measures coupled with statistical models that provide flexibility in

cross-section and time-series data, and ‘Granger causality’ test to determine causal inference. We analyze the ‘statistical’ impact of hypothesized sources of leverage in healthcare system on individual children and adolescents under 18 years in Georgia, where practical data limitations and system constraints demand novel considerations.

4.1. Telehealth and Telemedicine Solutions

One solution to solving health disparity problems may be the merging of telehealth/telemedicine, patient database, and analytics with traditionally underserved populations in order to better extend healthcare services to areas with limited infrastructure and the lowest health indices. The potential benefit of merging these technologies is increasing the efficiency and accuracy of patient diagnoses and facilitating in-the-moment remote treatment plans by direct linking of medical personnel to someone in real-time distress. Such a complete system could go through rounds of miniaturization until it functions on a small enough platform to be used through smartphones. With hundreds of remote healthcare sites across the country, IMC would help design and control a study that would better evaluate the success of a new round of telehealth/telemedicine ventures in the southern US. (Debnath, 2020).

Telehealth and telemedicine—two terms that have been used interchangeably, especially before the COVID-19 pandemic, as part of the movement to upgrade healthcare using technology . Telehealth is a broad concept, used to describe any remote non-clinical professional services. Examples of telehealth include administrative meetings between healthcare organizations, remote human resource services, procurement, and continuing professional development. Telemedicine, on the other hand, refers to medical interaction between clinicians and patients, utilizing ICT. Bits and pieces of information you gain through telemedicine can be video consultancy with doctors, teleradiology, telepaediatrics, telesurgery, or tele-oncology. Unlike telehealth, telemedicine requires the interaction between medical professionals and/or medical expertise across geographic distances.

5. Policy and Regulatory Considerations for Improving Access to Care in Rural and Underserved Areas

Geographic access refers to the actual difficulty of reaching medical care and any policies will directly address this type of access (Nobles et al., 2015). Distribution changes are aimed at addressing the availability and quality bricks of access by making healthcare practices available by some means (e.g. Telehealth) that are still not operationally accessible to all rural residents. Finally, financial access removes all costs from those in need of care who are eligible and removes the paywall for accessing treatment completely. Universal healthcare approaches would remove the financial barrier if they included primary care.

Universal access to primary health care (PHC) is a goal of all modern health systems, but many rural communities, particularly in low and middle-income countries, continue to lack access to basic healthcare services (Gizaw et al., 2017). Rural areas are typically more crowded than urban areas, so the shrinking ranks of providers and specialists print rural residents challenges of access to necessary healthcare services. To modify the barriers to healthcare access in metropolitan areas, we can improve the range in which rural inhabitants find health services. Business, data and transportation considerations make it inevitable for many patients for major specialty services which are available only in urban areas (A. Waller, 2015). Although there are some trade-offs, investing in developmental models improves primary care and reduces unnecessary feature transportation. All types of potential interventions refer to legal, administrative, supportive and most importantly promote rural primary care use.

5.1. Impact of Legislative Changes

Additionally, from the survey questionnaire arose a small selection of targeted questions: two items captured all major insurmountable barriers to good health that were not neutral extensions of contained within-service experiences (Alipio, 2017). A broad rubric for tracking more granular and actionable surface-level service impact and weight ought to be entertained, especially as many severe service impacts result from a distal property of ill-being or poor interaction. Examples of these included title questions in scales and subscales such as “slippery slope to dangerousness,” recent continued attention within the school of hard knocks, and ever immunity. These complex and interacting

properties may impede health care delivery independent of the patient and system care receivers. Finally, patient adherence, willingness to seek help, health-seeking behaviour in general, and willingness to complete the study's survey challenge patient schema, objectives, control and activation across many locales. Enhanced patient activation and informed decision making may arise from pertinent, reliable and applicable actions and assistive reformation.

Timely access to health services is crucial in system navigation and achieving desired patient outcomes. Underuse of health care in rural and urban communities across Washington State was examined among a representative sample of adults. Substantial numbers of rural residents reported encountering personal-level barriers to care or system-level obstacles (M Graves et al., 2017). These poorer access metrics among the young may further exacerbate lifecycle consequences of unforgiving, protracted exit from settings of active care-seeking. Policy intentions to pool risks, costs, and access to care may not play out in practice as intended. A better integration of system-recorded needs, potentially unvoiced impediments and formal access enablers at the patient and health care service fringes alike may help increase uptake of medications, referrals, preventive services, primary care services, and imaging services. Many of these concerns may be shared across rural and urban locales alike, despite differing solutions that may apply to servicing the needs of each group. Unmet transportation needs were reported by approximately 1 in 6 residents; the higher frequency of such needs observed among the rural may speak to data paucity and mixed implicit inclusion of younger age groups. Even systemial, less frequent health encounters may require motorists to be able to traverse functional and unguarded terrain. Even people who get to health care may be doing so at their own expense; many enrollees, especially in the Middle Fork and Mercer Islands group, reported that concerns about payment stood in the way of obtaining necessary medicines. Important predictors of achieving idealized health care access were sex, marital status, survey mode, region, self-reported health status, and residence locale. All of these factors may impact invigilation of patient needs, service affluence, service flexibility, service location and broad price dispersion. Broad knowledge of, prompt adherence to advance notice timeframes, and sundry

reminder techniques may prevent the decompensation of chronic conditions or severe disease becoming worse in terms of severity.

Barriers to healthcare access are exacerbated by numerous factors, such as geographic location, insurance coverage, lack of specialists, high-deductible health plans, mental health, stigmatization, and language. Several studies have quantified the impact of reformative measures implemented by states aimed at increasing access to services (A. Waller, 2015). In particular, the Medicaid expansion had notable impacts, improving screening rates and the probability of having unmet medical needs among patients in expansion states. Similarly, Medicaid expansion resulted in decreased likelihood of emergency rooms being used for non-emergent conditions. Finally, one study found that repeal of the helmet law in Michigan resulted in significant increased lengths of hospital stays, hospital charges, and inpatient mortality over 3 years when compared to Michigan and Illinois.

6. Community Engagement and Partnership Strategies for Enhancing Healthcare Access

The model is going to be utilized in Ankara -Turkey. Each year thousands of people migrate from their rural home to cities, mainly by difficulty in finding jobs and work to provide salary in poor conditions and the problems related to it as the economy, poverty and limited socio-economic status. All of their health expenditures will be provided by the primary care services as the right of all society. Ankara, Kecioren-Mah and Polatlı - Türkoba - Semiünlü neighborhoods are known as large entry- and exitway to the city on the highway. At the same time, these neighborhoods are the poor area prone to be new squatter communities. Kecioren Mah, (N 40 06 19,2 E 32 44 1,2) in Baskent University Family Medicine Centre and Polatlı- Türkoba - Semiünlü (N 40 01 17,5 E 31 37 48,2) in Atatürk University Family Medicine Centre investigates and examines patients daily.

(Wright et al., 2020) (A. Waller, 2015) Essential components of the Carandaiga deployment model include an operating clinic or hospital, care workers, and a monthly report on the number and type of visited patients. The operating clinic or hospital is a public or private healthcare institution that provides medically endowed services and is either not-for-profit or is under the Başkent University Hospital. All the cases and patient encounters were easily accessed through a simple mobile

application developed for Android operating system. In the municipality. Carandaiga has been installed in a poor township in the Southeast region, which indicates an authorized clinic hospital and its staff and serving the population with the help of FHC. The family health center (FHC) in urban and town regions is responsible for serving 3.000–5.000 people according to Turkish Ministry of Health Service standards. In Turkey, community clinic patients with a total population of near 1.000 households are able to utilize the resources served by each separate FHC. It has been seeing patients without a limit. The operation was done by the teams featuring a physician, a nurse, and a healthcare officer (A. Clarke et al., 2020).

6.1. Collaboration with Local Organizations

There is a lack of interoperability among healthcare information systems, which are widely spread in Russia and their compatibility can be achieved only through integration on a federal level, but not on the regional and local ones (Said et al., 2015). This situation not only makes the operation of EHRs less efficient, but also creates risks to the preservation of valuable personal and medical data. Therefore, the analysis and improvement of the efficiency of EHRs on local level are one of the most pressing issues. The collection of personal and medical data in digital form covers all federal state information systems at the national level: for example, public service portal of the federal executive bodies, EHR etc. PreparedStatement. It helps to modernize healthcare information systems established in medical organizations through the creation of an electronic medical record (EMR) for each citizen and EHRs for outpatient clinics and hospitals. However, the federal healthcare information system, including various federal state information systems (for example, fss.ehealth, smev, EGEAC) needs to be updated taking into account several factors.

The data presented in this article addresses the topic of health administration in remote and underserved localities (Gizaw et al., 2017). These regions are known for severe healthcare deficiencies, such as an absence of medical professionals, insufficient funding, and the inadequacy of social policies (Jankin Mikhaylov et al., 2018). We can identify the territorial inequality in healthcare as the most relevant aspect of the problem, as it creates the need for additional measures. The idea behind our study is to develop a set of organizational and administrative measures that will contribute to a significant improvement of the healthcare situation in remote

and underserved localities, helping to bridge the local accessibility gap. The results include an analysis of how to reform the education of health workers for public healthcare facilities, the development and introduction of updated territorial planning, the development of new organizational and managerial principles, the modernization of the technological systems of docflow in public healthcare facilities (information collection and analysis), other solutions proposed by the authors.

7. Workforce Development and Training Initiatives in Health Administration for Underserved Areas

As rural communities experience a relative lack of access to specialized health care services, such primary and community based health care delivery systems need to be developed to rely on the effective provision of support medical emergence services. This system would be integrated by a network of rural hospitals that are equipped with internal medicine, surgery, pediatrics, obstetrics, and emergency capability. Addressing the same goal, we designed an effective community-based primary health care delivery system that relies on the network of primary healthcare people. Aiming to provide these health services, innovative service models based on the effective involvement of nursing and increase of nurse training in primary, multipurpose and emergency solutions could solve much of the current workforce shortage in general public health areas. Such models should be supported by well-functioning and freely accessible information and communication technology such as Internet or telecommunication-based expert consultations to professional health care providers.

In rural and underserved areas, health administration professionals must constantly seek ways to improve services and staffing to better meet the needs of their patients within existing resource constraints (Sun & Zhao, 2020). One key strategy for addressing these issues may be to enhance training and improve the skills of future and current health administration professionals, especially those focused on managing health care in rural and underserved settings (Dymmott et al., 2020). There are a number of training programs that provide hands-on experience in rural hospitals and health care settings to practice clinical skills or administrative acumen in a real-world environment while providing healthcare to these communities. However, it would also

be advantageous to invest in human resources - to alter the spread and practice of the healthcare providers - another effective and important measure to implement when considering primary healthcare delivery in rural communities on a flexible and economic basis.

7.1. Training Programs for Healthcare Professionals

Exposure to rural and remote placements during pre-registration studies can help prepare health professional students for rural work. Points for consideration for undergraduate health professional education programs are that rural and remote field placements are particularly effective in retaining early career health professionals in these settings if these placements result in a (1) high degree of independence and autonomy, (2) field supervisors are competent tutors and have sufficiently time to supervise trainees, (3) role and job description of the students is clearly communicated and includes integration and immersion into the community, (4) a rural friendly and stress-free learning environment is provided, (5) work responsibilities are sufficiently diverse and results in a range of learning in a variety of rough and challenging situations, (6) partnership with the community and respectful treatment is practiced and role-modelled by experienced career health professionals and (8) various ways to debrief with experienced supervisors and peers is promoted (Dymmott et al., 2019).

There is strong evidence that rural exposure during health professional training can increase rural retention of doctors, nurses and allied health professionals (A. Streeter et al., 2020). A variety of educational initiatives have been developed to encourage students to undertake rural placements and experiences. These include providing rural-based curricular content and pathways, creating positive placement experiences in remote settings and providing ongoing mentorship, professional development and support to both pre-registration students and early career health professionals undertaking rural placements. This review synthesizes results from studies analyzing the experiences of early career allied health professionals and doctors in rural and remote communities to identify how these experiences influence rural and remote workforce retention and/or worker intentions to stay in these underserved environments. This evidence shows that early career health

professionals find working in underserved rural and remote communities challenging often as they lack local social support. Furthermore, a lack of peer and supervisory support was identified as the main challenge for recently graduated and early career health professionals working in underserved areas.

8. Technological Advancements and Their Role in Improving Healthcare Access

(Brown et al., 2020) For sustainable progress, systemic changes must tackle both immediate health care needs and the identifiable underlying contributors to rural health disparities. These changes must be embedded in local community relationships, in fields encompassing healthcare provision and advocacy, and in sectors as diverse as industry, agriculture, and education. Structural adjustments are not the only call to action. Axel F. Bialek, Thomas A. Geist, and their colleagues have suggested ten recommendations to reduce the direct consequences of health disparities regarding work in different levels (Wright et al., 2020). In rural communities, the overall shortage of healthcare providers presents a severe impediment to basic healthcare access and improvement of health outcomes (M Graves et al., 2019). Effective expanded scope-of-practice legislation has been tabled for nurse practitioners, who can serve as both medical providers and educators on the front line in rural areas.

8.1. Use of Health Information Technology

Effective health information systems, through the use of health information technology, including electronic health records (EHRs) and telehealth, are essential tools in bridging healthcare access gaps in rural areas. These telehealth service capabilities allow for clinical review of cases, e-consults with specialty care, same-day appointment requests sent to the specialty care office for specific clinical reasons (can reduce emergency department (ED) visits for care that could be provided in a primary care clinic), and support for rural and urban clinic linkage, as well as educational opportunities. Use of EHR integration also facilitates standardized referral processes and provides an easy mechanism for automated referral receipt and disposition (A. Stockton et al., 2019).

Solid linkages with healthcare providers and the use of telehealth technologies can help to improve access to treatment in rural and underserved areas by boosting collaboration across health care agencies and ensuring active participation of all healthcare

providers in the region; enabling identification of the resources needed amongst multiple service providers and health care systems; improving information flow between the participating organizations, both from the perspective of providing high-quality care and for administrative purposes; enhancing patient outcomes, patient satisfaction, and provider satisfaction. In rural and other underserved regions, resource shortages are a routine problem. Knowing what resources are needed in a region and who has these resources ready for utilization in urgent situations such as the opioid epidemic can improve patient outcomes and reduce hospitalizations (Huntley et al., 2020).

9. Measuring and Evaluating the Impact of Health Administration Interventions in Rural and Underserved Areas

Improving access to pediatric healthcare can be facilitated through interventions that target children directly, or through community-based efforts that target both children and their families. An intrinsically spatial healthcare service, our work is rooted in the land-use science, transportation geography, and public health literature, and it fills a critical gap in the knowledge by introducing a reasoned, data-driven approach and geographically fine-scaled results that are decidedly relevant for enabling evidence-based decision making in the policy sphere. We utilized large, geospatially explicit data to estimate costly prediction models for spatial access to primary care pediatricians, employing a machine learning approach called distributed random forest. We concluded that our measured spatial accessibility directly reflected the inclusivity index's real-world distribution, supportive of continuing efforts to improve pediatric healthcare in rural and underserved areas.

There are opportunities to expand access to primary care for children residing in rural and underserved areas [ref: bb004638-1dec-42ce-8103-1b31fa36ca30,ref: 17b4a573-a5e1-48b8-a16f-fba02b5ae9c9]. This paper contributes to this literature by developing a model to improve estimates for spatial accessibility to pediatric primary healthcare in Tennessee by accounting for spatially varying regression coefficients and large sample size limitations. In the vast literature of healthcare administration in under-resourced settings, little attention has been given to social sustainability (Krishnamoorthy et al., 2019). Therefore, the present study aimed to identify the motivators of and factors related to

social sustainability in healthcare administration as a new health administration research endeavor.

9.1. Key Performance Indicators

Nonetheless, typically, the ability to gather and analyze data is particularly determinant of a healthcare organization's ability to achieve its three interrelated goals, namely: ensuring the best healthcare delivery in terms of quality, costs, and access, as well as establishing a working system that exemplifies compassion. These could be measured by at least 10 composite KPIs or indicators, namely: primarily focusing on reducing hospital readmission rates, hospital on standardized mortality rates, the value-based purchasing payment, the percentage of compliance with various healthcare-associated infections, the average number of days for getting bills paid by third-party payers, the ratio of clinical outcomes to costs, the indexing process patient survey of patients' satisfaction, turnaround time for laboratory test results and imaging results, et cetera. Besides these four areas, other dimensions of KPIs need to consider investing in human capital, training and development programs, attaching attention to ethics and risk management, focus, and quality culture. (Re: ff78784f-a0a6-406a-a9ec-0a597b46471c)

The acquisition of data related to quality health services in the future will spell the difference between healthcare organizations' continuous struggles and their coupled successes. This is predicated on the premise that data is an imperative source from which healthcare organizations derive their strategic, tactical, and operational decisions. Strategic decisions guide healthcare organizations' choices in their emphasis on a particular area or tactic—as they do in their emphasis on having the most technological advancement. Tactical decisions revolve around the processes, procedures, and system configurations that healthcare organizations should take, while operational decisions are related to the day-to-day procedures and decisions of an organization. (Re: 071010e2-19c4-47f2-98f3-4db9639cf992)

10. Funding and Resource Allocation Strategies for Sustainable Health Administration Programs

Currently, small local governments can provide post-grant social program growth through a number of advocacy-focused strategies. Local jurisdictions can create and selectively fund local boards to inform on suggested law change at levels higher than the

local jurisdiction; recruit and poll their citizens on the viability of additional public legal change; create secret consumer satisfaction programs for local health care providers and report results to state boards and peer-reviewed publications; and advocate “fluidly” for shifted resource allocation within local government for those local programs evidencing impact as oppose to outmoded previous benefactors’ hardships. According to reported data, the Johnson and Johnson “war on drugs” simultaneously fueled a patient-dependent illegal drug epidemic and severed addicted patients’ bipartisan peer recovery networks already structured around medical touchpoints (Wright et al., 2019). Rural health centers in Central Appalachia currently dedicate more local human and monetary resources to central clearing of nonmedical life obstacles (eg, legal hurdles) identified by local citizens seeking a human services and social support referral or a blood pressure measurement than the typical central hub or loud advocacy shared expansion strategy, which includes deploying traditional and public health revenue-generating truthfulness resources to directly assist patients across a decadelong period.

Collaboration across traditional health care systems and sectors is necessary to improve health and health care access disadvantages prevalent in rural and underserved areas (Allen et al., 2016). This goal may necessitate harnessing multiple cross-sector partners’ financial, human, communication, and material resources to instigate and maintain effective health improvement programs in rural and underserved areas, especially when large state funding activities end. Both concentrated human service provider organizations and local government hold keys that rural administrators can use to sustain health care coordination and advocacy. Rural health care organizations often organize and host meetings with other local charities, schools, law enforcement and justice systems, and religious institutions to better understand their local client’s needs (M Graves et al., 2016). In turn, this strategy enables an understanding of where rural health care organizations and other human service providers can potentially collaborate (eg, via referral networks, co-delivering services, or joint grant applications). Local government—often hyper-local endpoints of public health and social service delivery—also plays a key role in rural areas directly guiding grant priorities, providing human service community leadership, and being open to

information sharing and structural legal change with organizations including local health care provide

10.1. Grant Opportunities and Funding Sources

An organizational strategy defined by corporate social responsibility involves demonstrating a commitment to maximizing positive social impacts and minimizing, or seeking to prevent, negative social impacts. An example of corporate social responsibility in the World Health Organization (WHO) seeks to address risk factors and reduce health inequities within and across the world's countries. The aim of the World Health Organization is to offer tools and a platform for assessment, dialogue, reliable policies, and action. In Canada, the company Leo's health ventures cooperates academically and financially with the Moran Institute at the University of Western Ontario and is linked to the Distance Health Research Institute, the Faculty of Health Sciences in London. The company has committed to reduce access gaps to at least one urban practice with unclear status of the remote/undaunted area. All remote green areas, which are currently short resourced with healthcare facilities, usually guarantee healthcare center care. Leo's health ventures improve clinics in the biggest rural dimension of the yellow area which is located northwest of Toronto. The company has hired more healthcare professionals such as nurses and doctors and purchased advanced medical devices in the remote orange and remote yellow areas.

(Jones et al., 2019)

Opportunities for funding are essential for quality healthcare administration and quality improvement. The United States' Federal Office of Rural Health Policy (FORHP) in the Health Resources and Services Administration (HRSA) offers a grant entitled: Evidence-Based Telehealth Network Program. This grant focuses on expanding access through telehealth); specifically to rural and medically underserved communities. In addition, the Rural Development Broadband Program, funded by the U.S. Department of Agriculture (USDA) offers grants to service providers to expand infrastructure and bandwidth access to rural areas that, in turn, support telehealth. Rural Health Network Development Planning Program is another grant offered by FORHP under section 330A of the Public Health Service Act, as amended. The grant is designed to support two-stage planning grants for the

development of formal business plans, with an emphasis on telehealth services. The Community-Based Divisional Grants Program, sponsored by The Salvation Army USA, is available to assist individual local communities with their unique needs for accessing healthcare.

11. Ethical Considerations in Health Administration for Underserved Populations

The primary care workforce in the United States faces a number of challenges to providing equitable access to healthcare, especially in rural areas. Many care providers are not geographically aligned with the populations who need them most, and children in medically underserved rural and urban areas are less likely to receive timely wellness visits.^{2, 3} The implementation of facilities such as the National Health Service Corps and the Teaching Health Center Graduate Medical Education program is intended to attract physicians to underserved areas or to provide financial incentives for physicians in their professional development. All of these factors may influence the availability of healthcare providers, the accessibility of healthcare facilities, and the use of health services. Furthermore, the healthcare availability and services may directly exert an effect on health outcomes, and indirectly affect mental and emotional well-being.

(A. Streeter et al., 2020) Rural hospitals are increasingly involved with disruptive activities, new policies, and shifting population health approaches in response to rapidly changing care models and payment structures. These changes must be made while maintaining the financial solvency of the hospital. Two-thirds or more of rural community hospitals' (CAH and other small hospital) population rely on rural health facilities for primary and secondary health care. Disruption of hospital-based services may lead to negative financial effects that are direct or indirectly impactful for rural health clinics, physicians, and other providers serving those population.

11.1. Equity and Fairness in Resource Allocation

It is argued that while it may be possible to conceptualize and to operationalize the input and output aspects of equity, fairness may be more elusive in terms of identifying who is defined as equitable and what is equitable in the health care scenario. Increased fairness and equity in the intersectoral allocation of resources are required to ensure fair opportunities for all without discrimination,

to ensure the accountability of decision-makers to all affected by decisions by providing channels to voice grievances, and to ensure when making decisions, decision-makers are reminded and encouraged to consider the needs of those who most need care, their normalised disadvantage and the social determinants that contribute to this. sociologists and anthropologists have suggested and demonstrated numerous other mechanisms that tend to ensure that even when deliberations that are supposed to be about health or health care resources do not always maintain focus on the distribution of resources required for best health outcomes, in the real world, these human rights-based principles are most systematically operationalized in rule-based systems of governance. : “Social determinant is a resounding theme in the literature on health inequities and the pathways through which health disparities emerge. Social determinants of health can be captured in operational terms, such as income and education, upon which more effective and evidence-based allocation decisions can be made. As social determinants of health stand at the center of inequalities, increased best health value should be expected where resources are distributed to favor those experiencing discrimination, social exclusion and poverty.”

Addressing equitable health outcomes in rural populations—and the broader issue of delivering healthcare in an equitable and fair manner— calls for the incorporation of social determinants of health as part of the resource allocation decision-making processes. (Wright et al., 2016) It is recognized that to truly ‘redress the balance’, fair decision-making requires strategies that may ‘take more from the “haves” and allocating to the “have-nots”’ where ‘the degree to which we are willing to be more inequitable in order to promote equality must be addressed and resolved’ (p9). (C. Coombs et al., 2016) One key aspect of delivering healthcare in an equitable and fair manner calls for cutting across the typical vertical resource allocation lines, and addressing social determinants of health through integrated and intersectoral decision-making, recognizing that the defining impact on place or geography is not simply the availability of healthcare services, but also, the availability of other services and the populations’ relationship with these services. This calls for a focus on a primary health care approach which is ‘oriented around addressing the determinants of health and health care access as well as valuing the integration of healthcare services as part of the broader health

care system' (17). For the healthcare system players, as well as for the people who are supposedly positioned to benefit, equity implies that the expected health can be achieved with equal access to healthcare and resources for health. (Gizaw et al., 2019) Factors such as marginalization, health care economics, and resource allocation, as well as as-yet-undetermined trends in disease burden and healthcare resource distribution, are perhaps major issues as well. Socioeconomic status and geographical location (urban vs. rural) are also ascribable to important differences, with urban and rural populations having markedly different life expectancies and major chronic health conditions which may be difficult to diagnose.

12. Global Perspectives on Health Administration in Rural and Underserved Areas

In South Africa, a gross lack of human resources for health in rural and underserved areas continue to undermine health services delivery with an increasing burden of chronic diseases in these settings. To address this challenge, the Joint Chester University/Karoo Central Hospital Program, WCGH developed a specialist outreach and support system that improved the accessibility of specialist services to the rural and underserved population through effective collaboration and utilisation of human, ICT and financial resources. The study supports and calls for the conduct of further research across other health facilities and user clubs within both districts, in at least the province, to understand the experiences of patients and barriers to O&S. It further recommended the robust monitoring and evaluation of O&S in the districts and other similar setups which can inform evidence based policy interventions (Schoevers & Jenkins, 2015). Meanwhile, in the 12 last months of policy and regulations that reduced funding and rights of the Indigenous Territorians with disability. A family's continued struggle for the housing maintenance bill and backed-down support package program. After years of public protests, administrative issues caused the opt-in for the program to be canceled, leaving Indigenous Territorians, their communities, and workers' collaborators alienated in a different narrative. This study recommend further research across both Indigenous and None Indigenous communities on the problems faced by the co-researchers and others affected by the policy changes .

The uniqueness of rural and underserved areas in terms of barriers, access, distribution of healthcare workforces, healthcare infrastructure, and health systems performance has been identified and discussed (Sun & Zhao, 2020). The articles in the previous issue have illuminated complex pathway of healthcare utilization by the rural population, where rural cultures and rural health beliefs play an important role. Each article pointed out that rural health must be understood in not only accordance with the socioeconomic, cultural, racial, and geography diversities of each nation, but also through globalized lens (Barnett et al., 2017). This issue aspires to bridge the gap between these well-known topics in global health administration, research, and comparisons.

12.1. Lessons Learned from International Models

The planning and implementing an effective healthcare system, especially in rural and remote regions, is an important issue in policy-making for all countries in the world. Several models from other countries were discussed thoroughly but we didn't implement their experiences and knowledge into our healthcare system. The results of this study can provide useful insights and potential strategies for health policy makers in Iran to improve the Iranian health system, especially in rural and remote regions (Dymmott et al., 2016). One of the important issues in research related to health care is the improvement of health services and access to health facilities. Recently, spatial accessibility has gained wide attention in location research and geographical research in the context of sustainable development goals. The model on which this article is based is a program run by the US Department of Veterans Affairs to increase the medical service areas of Veterans Health Administration healthcare centers in rural areas and establish mobile programs called the Rural Health Initiative (A. Waller, 2015). (Sun & Zhao, 2019).

13. Conclusion and Future Directions in Health Administration for Bridging Access Gaps

In summary, it is argued that a multi-level approach can help improve accessing care of underserved rural populations. Since these areas are not synonymous, geographical features and spatial and social structures in these areas can be different. Therefore, it is obvious that any problem-solving model should be accustomed to local conditions. Governments and other responsible authorities in the realm of health care can adopt the multi-level analytic

methods proposed in this research when investigating accessibility issues of their subjects. Therefore, they can have more pinpointed and comprehensive planning in healthcare for their adequacy areas (Wright et al., 2013). It would help provide more desirable outcomes in terms of measuring the availability of health care, meeting unmet needs in some regions, training patients to have a better use of health care settings, and reducing unnecessary interventions and adverse outcomes. Therefore, metastudies also should be conducted on health accessibility topics based on indigenous criteria of regions, so that comprehensive review results could be achieved (C. Coombs et al., 2013).

Rural and underserved areas are met with various access barriers to healthcare. The key challenge is to bridge access gaps in the health systems of these areas; to do so, this research, as a solution, provides a multi-level approach to health administration studies in rural and underserved areas. According to the above-mentioned topics in various sections of this research, it is suggested that future studies in health administration in the mentioned areas consider these points: designing and developing appropriate algorithms and applications for spatial accessibility analysis (Hashtarkhani et al., 2016), optimizing the distribution of healthcare providers in these areas through social marketing and recruiting physicians from urban areas to rural areas and vice versa, building innovative databases and information systems to develop instant identification of geographic, economic, sociocultural, and environmental conditions of populations, implementing community-based health centres and expanding health centres and interdisciplinary medical groups in underserved areas, promoting technological infrastructures by utilizing telemedicine software and increasing internet coverage, modifying healthcare education systems to improve the quality of education and reduce medical errors, to design a cost-effective healthcare education system to cultivate, attract and retain medical providers in underserved areas, for addressing health inequality and other barriers to healthcare access.

References:

- Jain, R. & Rao, B. (2019). Assessment of primary laboratory facilities for rural health care preparedness in Osmanabad District, India. osf.io
- Nobles, M., Serban, N., & Swann, J. (2015). Rejoinder: Spatial accessibility of pediatric primary healthcare:[PDF]

- Alipio, M. (2020). A Path Analysis Examining the Relationship Between Access Barriers to Health Services and Healthcare Utilization Among the Publicly Insured: Insights from a Multiprovince Survey in the Philippines. osf.io
- E. Cyr, M., G. Etchin, A., J. Guthrie, B., & C. Benneyan, J. (2019). Access to specialty healthcare in urban versus rural US populations: a systematic literature review. ncbi.nlm.nih.gov
- A. Streeter, R., E. Snyder, J., Kepley, H., L. Stahl, A., Li, T., & M. Washko, M. (2020). The geographic alignment of primary care Health Professional Shortage Areas with markers for social determinants of health. ncbi.nlm.nih.gov
- C. Coombs, N., G. Campbell, D., & Caringi, J. (2020). A qualitative study of rural healthcare providers' views of social, cultural, and programmatic barriers to healthcare access. ncbi.nlm.nih.gov
- L. Clarke, J., Bourn, S., Skoufalos, A., H. Beck, E., & J. Castillo, D. (2017). An Innovative Approach to Health Care Delivery for Patients with Chronic Conditions. ncbi.nlm.nih.gov
- M. Paddock, S. (2015). Editorial: Spatial accessibility of pediatric primary healthcare:[PDF]
- Ciapponi, A., Lewin, S., A Herrera, C., Opiyo, N., Pantoja, T., Paulsen, E., Rada, G., S Wiysonge, C., Bastias, G., Dudley, L., Flottorp, S., Gagnon, M. P., Garcia Marti, S., Glenton, C., I Okwundu, C., Peñaloza, B., Suleman, F., & D Oxman, A. (2017). Delivery arrangements for health systems in low-income countries: an overview of systematic reviews. ncbi.nlm.nih.gov
- A. Amusan, E., O. Emuoyibofarhe, J., & O. Arulogun, T. (2018). Development of a Medical Tele-Management System for Post-Discharge[PDF]
- M Graves, J., A Abshire, D., & G Alejandro, A. (2020). System- and Individual-Level Barriers to Accessing Medical Care Services Across the Rural-Urban Spectrum, Washington State. ncbi.nlm.nih.gov
- Holtz, B., Mitchell, K., Hirko, K., & Ford, S. (2019). Using the Technology Acceptance Model to Characterize Barriers and Opportunities of Telemedicine in Rural Populations: Survey and Interview Study. ncbi.nlm.nih.gov
- Luk, R., Ho, M., & M. Aoki, P. (2008). A Framework for Designing Teleconsultation Systems in Africa. [PDF]
- A. Waller, L. (2015). Discussion of Spatial accessibility of pediatric primary healthcare:[PDF]
- Debnath, S. (2016). Integrating Information Technology in Healthcare: Recent Developments,[PDF]
- Nobles, M., Serban, N., & Swann, J. (2015). Spatial accessibility of pediatric primary healthcare: Measurement and[PDF]
- Gizaw, Z., Astale, T., & Mitike Kassie, G. (2017). What improves access to primary healthcare services in rural communities? A systematic review. ncbi.nlm.nih.gov

- Wright, N., Scherdt, M., L. Aebersold, M., C. McCullagh, M., R. Medvec, B., Ellimoottil, C., R. Patel, M., Shapiro, S., & R. Friese, C. (2013). Rural Michigan Farmers' Health Concerns and Experiences: A Focus Group Study. ncbi.nlm.nih.gov
- A. Clarke, M., Qureshi, S., Barone, T., & R. Windle, J. (2020). Sustainable Development Through a Mobile Application for a Community[PDF]
- Said, S., Bombrun, L., Berthoumieu, Y., & Manton, J. (2015). Riemannian Gaussian Distributions on the Space of Symmetric Positive[PDF]
- Jankin Mikhaylov, S., Esteve, M., & Campion, A. (2018). Artificial Intelligence for the Public Sector: Opportunities and[PDF]
- Sun, Y. & Zhao, E. (2014). Mathematical Models for Rural Doctor Service Efficiency: Applying Queuing Theory and Operations Research to Improve Healthcare Services. osf.io
- Dymmott, A., George, S., Campbell, N., & Brebner, C. (2017). Experiences of working as early career allied health professionals and doctors in rural and remote environments: a qualitative systematic review. ncbi.nlm.nih.gov
- Brown, S. A., Hudson, C., Hamid, A., Berman, G., Echefu, G., Lee, K., Lamberg, M., & Olson, J. (2020). The pursuit of health equity in digital transformation, health informatics, and the cardiovascular learning healthcare system. ncbi.nlm.nih.gov
- A. Stockton, D., Fowler, C., Debono, D., & Travaglia, J. (28216). World Health Organization building blocks in rural community health services: An integrative review. ncbi.nlm.nih.gov
- Huntley, K., Einstein, E., Postma, T., Thomas, A., Ling, S., & Compton, W. (2020). Advancing emergency department-initiated buprenorphine. ncbi.nlm.nih.gov
- Krishnamoorthy, S., Mehul Mashkaria, S., & Grover, A. (2016). Diffusion Models for Black-Box Optimization. [PDF]
- Allen, P., Walsh-Bailey, C., Hunleth, J., J. Carothers, B., & C. Brownson, R. (2017). Facilitators of Multisector Collaboration for Delivering Cancer Control Interventions in Rural Communities: A Descriptive Qualitative Study. ncbi.nlm.nih.gov
- Jones, D., Ballard, J., Dyson, R., Macbeth, P., Lyle, D., Sunny, P., Thomas, A., & Sharma, I. (2019). A community engaged primary healthcare strategy to address rural school student inequities: a descriptive paper. ncbi.nlm.nih.gov
- Schoevers, J. & Jenkins, L. (2015). Factors influencing specialist outreach and support services to rural populations in the Eden and Central Karoo districts of the Western Cape. ncbi.nlm.nih.gov
- Barnett, T., Hoang, H., Stuart, J., & Crocombe, L. (2017). The relationship of primary care providers to dental practitioners in rural and remote Australia. ncbi.nlm.nih.gov
- Hashtarkhani, S., L Schwartz, D., & Shaban-Nejad, A. (2013). Enhancing Health Care Accessibility and Equity Through a Geoprocessing[PDF]