
Access to Healthcare as a New Commons: Telemedicine as a Strategy for Providing Value-Based Healthcare Services in Rural Areas

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Abstract

Commons is a general term that refers to a resource shared by a group of people. Over the years scholars have identified two generations of commons. The first generation of commons was about sharing of physical things; the second one is about intangible commons pool resources such as science and culture. These generally can be recognized as "rights" (Hess 2008). Among the various New Commons sectors there is medical and health. In the perspective of guaranteeing the right of Health, the "Access to Healthcare" could be considered as a New Commons provided by worldwide National Healthcare Systems (NHS),

However, healthcare sector is characterised by plenty of stakeholders with myriad, often, conflicting goals. The value-based approach (Porte, 2010) attempts to introduce a new universal language in healthcare management around the value for the patient that reconcile all stakeholders' interest. The goal of this approach is to improve the outcome and increase the number of treatments. This aim is very difficult to be enriched for rural residents; when patients live in remote areas, providing them with valuable medical care can be considered a hard challenge for the NHS, which has to be addressed also by the employment of new healthcare strategies and technologies.

Defined as "a new healthcare delivery process provided when patient and professional are not physically in the same place" (Italian Ministry of Health, 2014), telemedicine could be seen as an answer to this challenge.

Accordingly, this study aims at discovering if telemedicine employment can be effectively considered as a successful strategy to improve healthcare in location far from specialized hospital, enhancing the New Commons "Access to care".

A statistical-based narrative review of the literature was conducted in the field of telemedicine, with the aim to understand which experiences of telemedicine applications have got successful results as support of healthcare delivering in rural locations.

With regards to rural and remote areas, several Authors recognized telemedicine-based strategies as a method to facilitate the access to healthcare in different medical disciplines. In particular, many studies highlight that telemedicine improves patient care by increasing the capacity of the rural clinician to manage patient locally, minimising time away to support networks and reducing unnecessary transfers. Telemedicine could also be considered a cost-effective method whose outcomes remain similar (if not better) in quality to "staffed" services, whose infrastructural costs could be easily paid-back.

Keywords – Commons, Access to Healthcare, Telemedicine, Value-based Healthcare, Rural Areas.

Paper type – Academic Research Paper

1 Introduction

Commons are recognized as the cultural and natural resources accessible to all members of society. From physical and social dimensions, categories of commons have expanded to immaterial objects such as knowledge, intellectual property and software, namely New Commons (NC) (Hess 2008), which generally can be recognized as "rights".

In this perspective, guaranteeing the right of "Access to Healthcare to the population could be considered as a NC provided by worldwide National Healthcare Systems (NHS), "In any field, improving performance and accountability depends on having a shared goal that unites the interest and activities of all stakeholders" (Porter 2010, p. 2477); coherently, the rise of New Public Governance emphasizes the relevance of service processes toward the achievement of ever better outcomes, based on the improvement of inter-organisational relationships and the governance of processes (Osborne, 2006). Therefore, public sector has been affected by a higher necessity to identify innovative managerial and operational models aimed at public Value Creation.

In Healthcare, value is defined as the health outcome achieved per dollar spent. The measure of value encompasses all services and activities that contribute to determine the capability to meet patients' needs; however, this is still often unmeasured and misunderstood. Thus, there is an ever-higher need for healthcare strategies that could support not only the provision of the service but also the assessment of its value around the patient.

The value created for patients is usually measured for group of people with similar needs (medical condition, epidemiology, comorbidity). Therefore, what happens when patients share the geographical condition of living in a rural area? Delivering valuable healthcare in rural areas (du Toit, 2017, Moffat and Eley, 2010) is one of the higher challenges of NHS, and to get this goal, a possible strategy is the employment of

telemedicine infrastructure. Telemedicine is defined as "a new healthcare delivery process provided when patient and professional are not physically in the same place" (Italian Ministry of Health 2014). Based on ICT infrastructure, "it brings a safe biomedical data & information transmission in the form of texts, sounds, images, or other forms necessary for prevention, diagnosis, treatment and follow-up of patients" (Italian Ministry of Health 2014).

Starting from these preconditions, the challenge of this paper is to understand how telemedicine approaches enhance the New Commons of "Access to Healthcare" in rural areas, in coherence with the creation of Value in Health principals.

To achieve its purpose, this paper follows this outline: after this brief introduction, the second section reports a background addressed to the issues of commons, new commons, and their relationship with telemedicine in the lens of value-based healthcare principles; the third section explains the methodology used in this study. The fourth presents findings of the inquiry. The last section discusses results obtained and provides some consideration about the employment of telemedicine as an effective strategy for enhancing access to healthcare in remote locations.

2 Background

Commons is a general term that refers to a resource shared by a group of people. In a common, the resource could be both small and serve a tiny group and it can be community-level or it can extend to international and global level (Hess, Ostrom 2007).

Accordingly, commons are recognized as the cultural and natural resources accessible to all members of society. Held in common and not owned privately, these resources could be managed for individual and collective benefit from groups of people (communities, user groups) (Ostrom 1999, Basu et al. 2017). Commons analysts have found it suitable to distinguish between a common as a resource or resource system and a commons as a property-rights regime (Hess Ostrom 2007) In particular, over the years scholars have identified two generations of commons. The first generation of commons was about sharing of physical things as natural resources (e.g. forester, fisheries, grazing pastures etc.). The second generation is about intangible commons pool resources such as science and culture. Particularly due to a second generation of commons studies the categories of commons have extended to immaterial object such as knowledge, intellectual property and software, namely New Commons (NC) (Hess 2008). These generally can be recognized as "rights". For these reasons, analysing the new commons it is more difficult because it means analysing commons based on intangible 'ideas' rather than commons of tangible 'things' (first generation of commons) (Allen et al 2016). However, the "new commons" alternative is interesting both because of its distributional implications and because of its potential for raising the rate of innovation and value creation. Moreover, the new commons pay specific attention to the right to "distribute" than the right to "exclude". However, the previous commons shared property rights and they do not create a problem of overuse (Evans 2005). There are many different ways that new commons evolve or come into being. Some of them evolve from new technologies that have enabled the capture of previously uncapturable public goods, such as the

Internet, genetic data, outer space, deep seas, and the electromagnetic spectrum (Hesse 2008). Hesse (2008) identified the various new commons sectors, sub-sectors, and representative collective-action communities involved in new commons. One of these sectors is medical and health. In this field, referring to commons and to the right to distribution means referring to the access to healthcare that is the right to access to all medical services and sanitation. Access to health care should be universal, guaranteed for all on an equitable basis.

Healthcare should be affordable and comprehensive for everyone, and physically accessible where and when needed. Accordingly, if the new commons are related to the right of distribution and not to the right of exclusion, improve access to healthcare means improve a new common. Therefore, in the perspective of guaranteeing the right of Health to the population by worldwide National Healthcare Systems (NHS), the “Access to Healthcare” could be considered as a New Commons.

In order to manage complexity of healthcare field, a deep analysis of stakeholder involvement within the different processes performed is requested. This sector, indeed, is characterised by plenty of stakeholders with countless and often conflicting goals. In particular, as underlined by Porter in 2010, the lack of clarity about shared goals was the main reason of slowing down the performance improvement process in healthcare; moreover, the constant growth of the population's health needs has requested a more “patient-oriented” healthcare management. Hence, both for public and private healthcare providers, the traditional approach focused on staff needs over users’ needs becomes no longer acceptable (Fulop et al. 2003).

Value based healthcare represents an advancement of the Total Quality Management (TQM). This is aimed to enhance performance by increasing the quality of services (Deming, 1994). In order to face limitations for patients about choice and access to care (Porter and Teisberg, 2004) caused by financial restrictions, value-based healthcare principles were introduced by Porter and Teisberg in 2006 in United States. Authors’ goal was to introduce an “universal language” for healthcare management, designed around the value for the patient.

Starting from previous theories (Porter, 1991; Porter, 1997), value-based logic has involved an intellectual change: shifting from a healthcare based on volume and intensity of services, to a “patient-centric” healthcare based on value created for the consumer of services. This logic has a two fold aim: improving the outcome and increasing the number of treatments. However, to be practically feasible, this approach implicates a radical modification of the traditional paradigm of healthcare: moving from a vertical “organizational-centric” approach in treating diseases, to a horizontal one tailored on the patient expectations. Thus, this implicates that management should move the attention on process of cares rather than on operational structure.

Therefore, distinguished by similar primary care needs (Kaplan and Porter, 2011), the patient population becomes the unit of analysis of healthcare policy. For the managerial assignments, this implicates the necessity to analyse the omni-comprehensive cycle of cares (Porter, 2010), rather than an individual phase, clinical episode, or single technology for treating diseases.

Accordingly, in the lens of this logic, the concept of Value in Health encompasses all the following variables:

- access to services,
- profitability,
- quality,
- cost,
- safety,
- patient-centeredness,
- patient-satisfaction.

Thus, the achievement of a high value for patients should be the purpose that drives the delivery of healthcare services. Patients, payers, providers, and suppliers can all benefit if the value improve while the economic sustainability of the healthcare system increases (Porter, 2010). Consequently, the achievement of this goal could be considered as the most effective way to gather the interests of all stakeholders involved.

In particular, the Value in Health equation can be expressed as the ratio between outcomes and costs: *outcomes* are multidimensional and related to specific-condition; *cost* refers to the total amount of resource employed for the full cycle of care for the patient's medical condition (and not for the mere individual service). Very often, cost reduction regardless of the outcomes obtained is dangerous and self-defeating; it could lead to false "savings" by limiting effective care for patients (Porter 2010). Accordingly, to reduce cost, the best approach is often to "spend on more service to reduce the need for others" (Porter 2010).

Healthcare delivery in rural and remote areas implicates a choice among two alternative strategies:

- 1) "moving" patients to hospital;
- 2) "moving" hospital to patients.

It is clear that this kind of choice is valid only for those "soft" healthcare services (e.g: diagnosis, monitoring, follow-up, specialized medical consultation, etc), but often the second strategy (patient-centric) is the most effective, also thanks to the availability of new technologies which foster new operational approaches.

Telemedicine is "the use of information and communication technology to provide health care services to individuals who are some distance from the health care provider" (Roine et al, 2001). Many experiences of telemedicine employment have shown improvement of outcomes for patients together with cost containment (Burri et al. 2011; Calò et al. 2013; Hasan and Paul, 2011). One of the major advantages of telemedicine over conventional care is the potential for increased access to medical care for population that experience at level of isolation (eg. prisoner, person working at sea or in war zone) (Norton et al, 1997). Accordingly, many Authors have demonstrated the positive impact of telemedicine strategies in healthcare delivery in remote areas, both for early diagnosis and follow-up. Moffat and Eley, in 2010, have provided literature background with evidences about four areas of benefit of telehealth service for Australian population who live in remote location: i) patients and family, ii) medical provider, iii) participating hospital, iv) society. In particular, this study emphasized that telemedicine strategy could

have a positive impact on two on-going issues: the poorer health status of rural areas, and crisis in the rural health force. In accordance with these endpoints, Du Tuit et al (2017) have showed that a HUB-SPOKES model to delivery healthcare in remote areas is cost-effective. Authors underlined, by a literature review, that the design of healthcare policy based on a clear separation of tasks between high specialized healthcare centre (HUB) and rural clinics (SPOKE), interconnected by telemedicine infrastructures, has excellent impact on the management of rural and remote emergency departments.

Therefore, on the basis of these examples, this study aims at discover if telemedicine employment can be effectively considered as a successful strategy to improve healthcare in location far from specialized hospital, enhancing the New Commons "Access to care".

3 Methodology

A literature review was conducted in the field of telemedicine in order to understand how this approach improve access to healthcare in rural areas creating value for the patients. Scopus was the database used for conducting the research. The keywords used for the whole inquire are contained in the following table 1.

Table 1 Table 1. Keywords used for the enquiry.

1st Keyword		2nd Keyword
"e-health" or "ehealth" or "telecare" or "telemedicine" or "telehealth" or "telemonitoring" or "telepractice" or "telenursing"	AND	"rural areas" or "rural communities" or "rural population"

Source: Authors' illustration

Keywords contained in the same column are alternative within them. Papers that containing at least one keyword belonging to each column within title and/or abstract and/or keywords was considered relevant for this study. Other search criteria used to define the selection of papers are the following:

- Language: were selected only studies published in English;
- Document type: were considered only peer-reviewed articles. The other categories of study from Scopus as Conference papers, editorials, book chapters, articles in press, conference proceedings and letters were excluded.

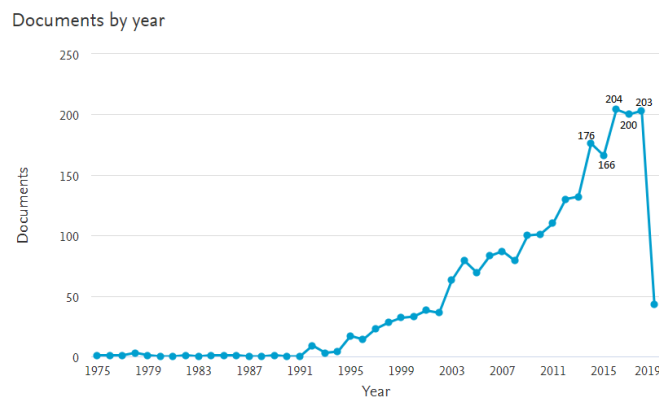
All articles published from 1976 to March 2019 were considered. After the selection of data set a descriptive analysis of final sample was conducted. In particular, there have

been analysed the following dimensions: i) papers/years; ii) journals; iii) countries; iv) research areas.

Moreover, another dataset was defined composed by the twenty most cited papers of the previous sample; then from the application of the snowballing technique, four articles were added. On all these studies, was conducted a conceptual analyses of the papers.

4 Results

At the beginning of the process, 2263 papers were identified; then, by following the search criteria the final sample is composed of 1624 studies. In particular, 1402 are article and 222 literature reviews. The following figure (figure 1) shows the number of Paper per Year, there is a growing interest in the last ten years.



Source: Authors' elaboration from Scopus

Figure 1: Document by years

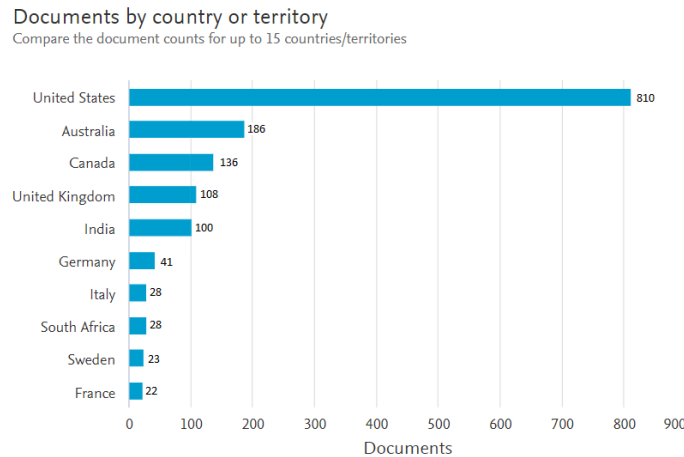
The journal that contained the most studies is Telemedicine and E Health Journal. The figure 2 shows the most relevant journal.

Australian Journal Of Rural Health	13	Telemedicine And E Health	125
Psychiatric Services	12	Journal Of Telemedicine And Telecare	108
Telemedicine Journal	12	Telemedicine Journal And E Health	42
Plos One	11	Journal Of Medical Internet Research	27
Stroke	11	Journal Of Rural Health	25
Internal Medicine Journal	10	Rural And Remote Health	25
International Journal Of Telemedicine And Applications	10	International Journal Of Medical Informatics	18
Journal Of Medical Systems	10	BMC Health Services Research	16
International Journal Of	9		

Source: Authors' elaboration from Scopus

Figure 2: Most productive journal

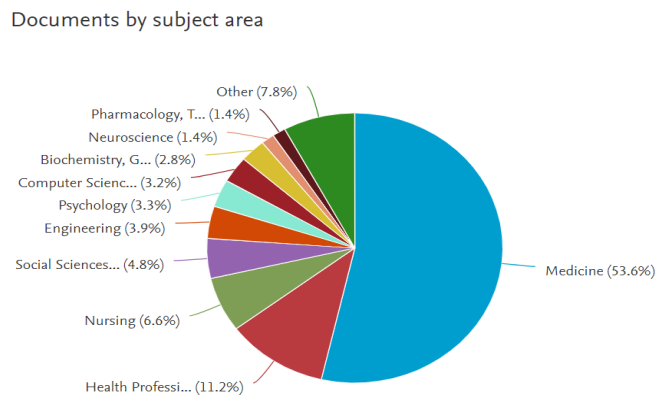
The most productive Countries are shown in Figure 3, the majority of articles are set in United States.



Source: Authors' elaboration from Scopus

Figure 3: Documents by country

Several subject areas are involved. The following figure (figure 4) represents the documents divided by subject area involved.



Source: Authors' elaboration from Scopus

Figure 4: Documents by subject area

After reading of the twenty most cited papers four papers were excluded as they were not considered consistent with the research question of this work. In table 2 all documents considered relevant have been reported. Number of citations lists them. The timeline of papers selected for conceptual analysis is very huge; they are published from 1992 (Preston et al.) to 2017 (du Toit et al.).

Table 2: Most cited papers

PAPER	DISCIPLINE	COUNTRY	TOPIC
1. Wotton et al.	Dermatology	United Kingdom	<i>Comparison of real time teledermatology with outpatient dermatology.</i>
2. Audeberg et al.	Neurology	Germany	<i>The effects of a stroke network (implemented in rural areas) with telemedical support in Germany on quality of care.</i>
3. Burdea G.	Rehabilitation	USA	<i>Review the benefits brought by virtual reality-enhanced and virtual reality based rehabilitation to groups of patients.</i>
4. Korenke et al.	Psychiatry	USA	<i>Determine whether centralized telephone based care management coupled with automated symptom monitoring can improve depression and pain in patient with cancer in rural and urban areas</i>
5. Morland et al.	Psychiatry	USA	<i>Demonstrate the non-inferiority of telemedicine modality compared to traditional in person service for rural combat veterans with posttraumatic stress disorder.</i>
6. Wang et al.	Neurology	USA	<i>The use of remote evaluation for acute ischemic stroke and the comparison between values of bedside and remote evaluators.</i>
7. Ricketts T.C.	Health policy	USA	<i>The characteristic of rural health care system in America.</i>
8. Wade et al.	Economics	Australia	<i>The economic evaluation of synchronous or real-time video communication in telehealth delivery.</i>
9. Hess et al.	Neurology	USA	<i>The development of stroke network to bringing guide line driven stroke care to rural, unserved areas.</i>
10. Griffiths et al.	Psychiatry	Australia	<i>Discuss the potential utility of internet-based depression information and automated therapy programs in rural regions.</i>
11. Arora et al.	Health policy	USA	<i>The use of Extension for Community Healthcare Outcomes model to deliver complex speciality medical care in rural areas.</i>
12. Wiborg et al.	Neurology	Germany	<i>The opportunity to improve stroke care in rural areas by using a conventional videoconference system.</i>
13. Sorensen et al.	Cardiology	Denmark	<i>Evaluate the impact of pre-hospital diagnosis on time from emergency medical services in cohort of patients with STEMI.</i>
14. Kleindorfer et al.	Neurology	USA	<i>Describe the US geographic distribution of hospital using rt-PA for acute ischemic stroke.</i>
15. Preston et al.	Health policy	USA	<i>Cost of telemedicine and the improvement of health care in rural areas using telemedicine.</i>
16. Moffatt et al.	Health policy	Australia	<i>Identify the report benefits attributed to telehealth for people living and professional working in rural and remote areas of Australia,</i>

Source: Author's illustration

The four papers obtained from the application of the snowballing technique are in Table 3.

Table 3: Papers from snowballing technique

PAPERS	DISCIPLINE	COUNTRY	TOPIC
1. du Toit et al.	Emergency care	Australia	<i>Identify how telehealth has been used to assist in the management of non-critical presentations in rural and remote emergency departments and the outcomes.</i>
2. Kyle et al.	Emergency care	Australia	<i>Examinee the utility of telehealth in assisting the decision-making process of aeromedical coordinators.</i>
3. Mathews et al.	Emergency care	Australia	<i>The effect of telemedicine compared with traditional telephone conversation when evaluating patients for aeromedical retrieval.</i>
4. Muller et al.	Emergency care	USA	<i>Identify tele-emergency models and outcomes.</i>

Source: Author's illustration

4 Discussion and conclusion

The analysis of the sample by the publication year discloses an even-higher interest about the topic from 2009 until now. The increasing number of studies might be caused by the scientific advancement and the subsequent increasing of new technologies availability. The three most relevant journals are in the field of telemedicine. Probably this is due to the complexity and the extent of the topic or for the specific target of audience. The most productive Country is the USA, followed by Australia and Canada.

The interest of these countries might be due to their land morphology. Regarding the extent of subject areas involved it is very heterogeneous due to different fields of studies that telemedicine embraces for his delivery (e.g. medical, social science, engineering etc.).

However, economic aspects of telemedicine in rural areas are still understudied. The analysis of subjects covered by the sample highlighted a prevalence of neurological and emergency disciplines: telemedicine allows a fast exchange of information that can be critical in emergencies and neurological emergencies like a stroke.

Regarding the condition of rural residences, distance to healthcare provider was recognized as a significant barrier to healthcare access in the U.S. in the 19th century (Guiagliardo 2004). Accordingly, the people who live in remote areas are more disadvantaged to get the healthcare they need. Rural residents often experience what Hess (2005) calls "rural penalty". Indeed, in his study, about a rural telestroke network, he stressed the condition of urban and suburban hospitals that are lacking for acute stroke care (Hess 2005). As solution to this problem of access to healthcare for rural residents, Ricketts identified telemedicine. This has been described as the single most important tool aimed at flattening the difference in available resources between rural and urban areas (Ricketts 2000). Several Authors, in different medical disciplines, recognized telemedicine strategies as a tool to facilitate the access to healthcare, especially in rural and remote areas. For example, Griffiths (2007) observed their function in delivery of

mental health assistance; in this case, telehealth represented an efficient alternative for the delivery of help for depression in rural regions and for exceeding of a strong culture of self-reliance of rural residents. Burdea (2003) identified teleconsultation as a provider of expertise from specialist centre such as university hospital in rehabilitation program. In this case, telemedicine allows the access to a better care and improve the outcome. This also happens in neurology field; all Authors underlined how telehealth improves stroke care in rural areas and bring stroke expertise to rural community hospitals (Wiborg 2003; Wang 2003; Kleindorfer 2009). In accordance, the same results came from the literature reviews analysed (Moffatt 2010; Wade 2010). In particular, the Authors stated that telemedicine is utilised in order to improve accessibility or timeliness of service delivery and it may contribute to decreasing the urban–rural health disparities.

Moreover, based on "hub and spokes" model (Mueller 2014), telemedicine improves patient care by increasing the capacity of the rural clinician to manage patient locally, minimising time away to support networks and reducing unnecessary retrievals (Matheus 2008, Kyle 2012).

Fore sure this contribution has some limitations related with the methodology, which restrict generalization of its findings. First of all, the review of the literature is not systematic, but narrative on statistical basis. Second, results on which we based our discussions come from a limited sample made by the 16 most cited papers on Scopus Database, together with 4 paper arisen by the "snowballing" technique. To make reliable our findings probably we should enlarge the sample of papers included in the literature review, also by considering others Database, such as Ebsco – Business Source Complete and Web of Science.

Notwithstanding these limitations, the study shows that telemedicine can significantly improve healthcare provision of both emergency and non-emergency department in rural and remote areas. In this sense, the contribution fosters the debate about the role of information technology and new organisation models in healthcare service providing in remote locations.

In particular, we can surely affirm that telemedicine allows for simplified access to specialist consultation via one port of call (or transmission): this provides remote diagnosis and, when required, it might assist in managing patients locally, by also reducing unnecessary transfers. It can be considered a cost-effective method whose outcomes remain similar (if not better) in quality to "staffed" services, whose infrastructural costs could be easily paid-back. These endpoints completely coherent with the value-based healthcare principles. In fact, "telemedicine-based" healthcare takes into consideration "real-life" patients' needs and not only those clinical.

This contributes to create higher value for patient on the whole process of cares, from patient first engagement with the Healthcare System to patient follow-up after cares (Porter, 2010).

Finally, answering to the research question, we can surely conclude that telemedicine approaches enhance the New Commons of "Access to Healthcare" in rural and remote areas, guaranteeing also more affordable, fair and reliable levels of cares.

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