



Case Study

Virtual community medicine in sparsely populated regions: A case study from Northern Sweden

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Abstract

The short case study outlines the potential that Virtual Health Rooms (VHRs) can exhibit to mitigate a lack of public health services and community medicine infrastructure in sparsely populated and demographically ageing regions. Although the VHR idea has its strengths in surmounting a relatively low medical service environment, it is, nonetheless, a technologically driven approach to meet the needs of local residents in rural peripheries. Therefore, the VHR approach has been tested in some Northern Swedish villages and has been evaluated empirically in one of these villages (Storuman). Beyond a dedicated health-driven purpose, Virtual Health Rooms can comprehensively serve as a public meeting point to reduce local social isolation. In this respect, the regional Storuman Hospital functions as a Center for Rural Medicine in a broad sense and aims, among other things, to decentralize public health services to local communities in the rural periphery.

Introduction

Community medicine infrastructure and public health services are essential to sustain high quality-of-life standards and a sufficient well-being atmosphere at the local neighborhood level. The health sector nowadays is characterized by a dominant market-driven structure at national and global scales, with a clear demand orientation ranging from general practitioners to highly specialized medical departments. This situation is a critical challenge for regions with a relatively low population density, a high emigration, and a demographically ageing population with a declining socio-demographic diversity [1]. With respect to the case study region of Northern Sweden, all these indicators highlight a problematic amalgamation of demographic-related infrastructures to maintain a certain minimum level of health services [2] (Figures 1,2).

A virtual public health infrastructure, grounded on advanced information and communication technologies, can help mitigate deficits in provisioning local medical practices

and dispensaries, particularly in demographically ageing regions. Simultaneously, it contributes to enhancing the life satisfaction of communities in these socially demanding regions. The next chapter introduces the Virtual Health Rooms approach as one answer to the challenges outlined above.

The virtual health room – A public health initiative for sparsely populated regions

The Virtual Health Room (VHR) initiative in the municipality of Storuman is embedded into a comprehensive public health strategy of the Västerbotten province [3]. It is rooted in the establishment of a Centre for Rural Medicine (CRM) located at the Storuman Regional Hospital. “Initially, the focus of engagement was around health and medicine, but more and more CRM is assisting government, communities, and universities to work together on issues related to rural development more generally” [4].

Public health engagement in sparsely populated regions like Northern Sweden is meant to be an infrastructural

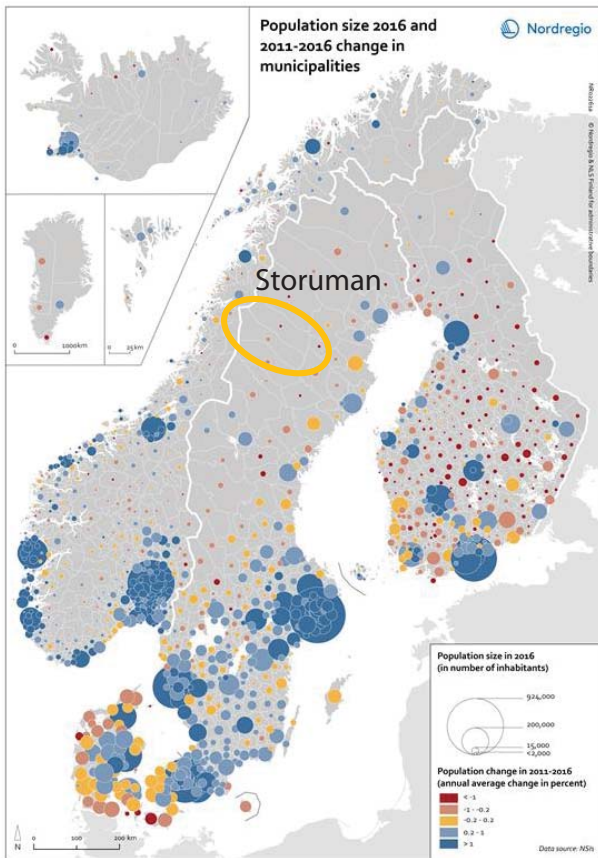


Figure 1: Population size 2016 and 2011-2016 change in municipalities [7].

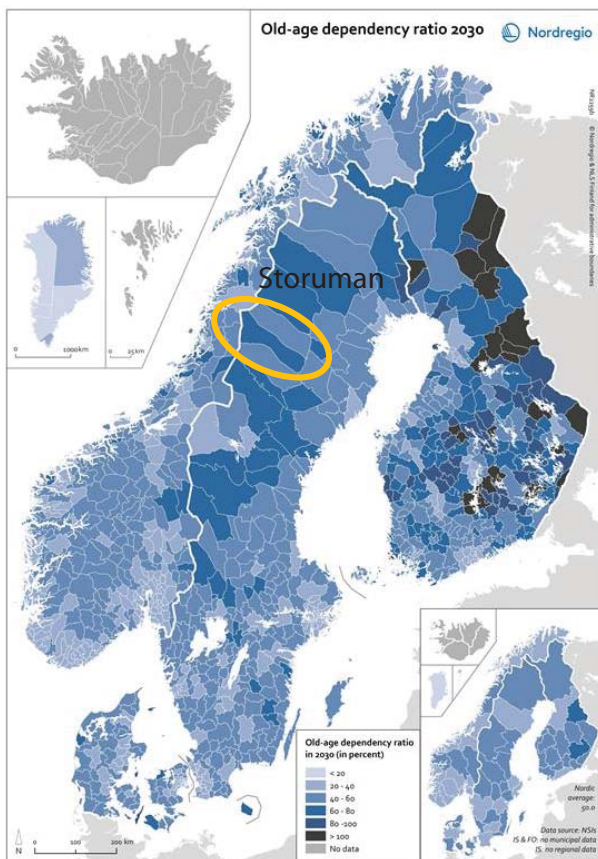


Figure 2: Old-age dependency ratio 2030 [8].

commitment to the remaining population, making a decent and high-quality life in these regions possible. The VHR is one option, offering an easy-accessible medical treatment where a lack of local medical practitioners and nurses is given. The VHR service is open to all residents of a small rural village, but it is mainly dedicated to older people and their needs. The available infrastructure varies between the VHRs, according to tailored local needs, even though the essential equipment rests upon virtual technologies: “The Virtual Health Room (VHR) concept uses Internet and medical technologies to provide some basic primary health services in locations where there is no or limited local access to a general practitioner. The VHR includes facilities for teleconsultation, self-administered blood testing, and health checks (blood pressure, heart rate, etc.). In theory, patients can use these facilities without assistance, but in practice, a district nurse, health assistant, friend or family member usually accompanies users, particularly new users” [4].

The first VHR has been established in the small village of Slussfors in 2013. The initial planning by the CRM started in 2011 with the first discussions with municipalities, health care centers, and community representatives. Slussfors, with its 120 inhabitants, is located 60 km northwest of Storuman. The residents’ average age is 46 years. Travel time to the university hospital in Umeå is approx. three hours and a half. Public buses go three to four times to Umeå. The Slussfors VHR has been introduced as a tele-medical pilot project to test the technical and technological requirements and evaluate the residents’ social needs and concerns. Meanwhile, two more VHRs have been inaugurated, one in Adak (Malå municipality, 120 inhabitants) and one in Bastuträsk (Norsjö municipality, 400 inhabitants), Figure 3. The VHRs’ services are partly accompanied by retired nurses of this region or by well-trained laypersons.

A qualitative, interview-based survey was performed in 2014 and 2015 among the total population of 25 unique users of the VHR Slussfors about the technological and social needs and wants in relation to their own health attitudes and demographic attributes (no comparative survey has been conducted at the other locations so far). 19 out of 25 VHR users of Slussfors who used the offers for more than six months responded to the interview survey. The study revealed, among other things, a high reputation for these virtual services and local personal assistance. The dimensions used to qualify the virtual capacities and capabilities were “usability”, “performance”, “impact”, “costs”, and “innovation improvement” (Figure 4). The indicators “security” and “trust” in the VHR technologies have been evaluated as 2.95 (with 4 as a maximum and 0 as a minimum value). However, older respondents “were less happy with its implications for the overall provision of health care in Slussfors” [5]. The distance to the VHR had no statistically significant impact on the frequency of visits.

Currently, expanding the project to other locations is stagnating, partly due to a lack of public investment and partly due to a change in the management of Storuman Hospital. Peter Berggren, the initiator of the VHR approach, acted as a role

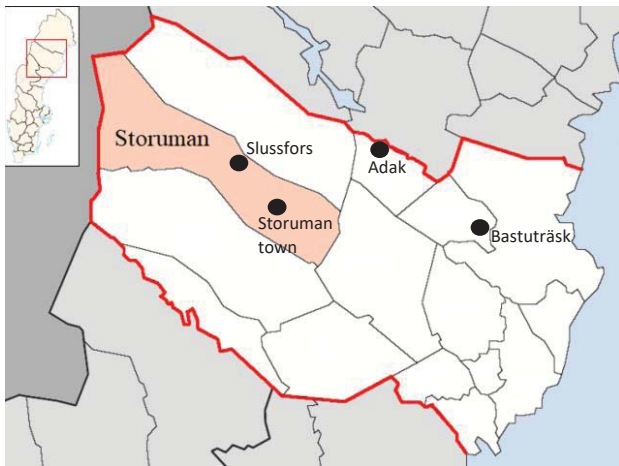


Figure 3: Survey Map of Storuman municipality and locations of Virtual Health Rooms (Slussfors, Adak, Bastuträsk) (source map: Wikipedia, 2024, modified by Andreas Koch).

Conclusion

Virtual community medicine and public health services offer solutions to complement or even substitute a lack of health infrastructure in sparsely populated and ageing regions at a local scale. However, they are not supposed to be self-evident instruments to surmount existing service bottlenecks. Besides an advanced technological and technical infrastructure (networks, devices, software, etc.), social acceptance and local personal support are needed to make ideas such as the VHRs a sustainable success story. As Hurtig [6] highlighted in a presentation at the 5th Global Symposium on Health Systems Research at Umeå University: “The challenges faced by e-health innovations, however, are not just their technical design, but also their ability to engender trust and cooperation among communities and health care staff”. Residents in the Storuman region can partly rely on retired nurses as volunteers of VHRs, and acceptance of the technologies used in VHRs is given by and large.

The interview survey results showed two further interesting insights: “Neither level of education nor distance from the VHR and alternative primary care facilities were found to influence perceptions of the VHR. [...] In this context, the VHR is very much a local piece of infrastructure, with a limited regional catchment” [5].

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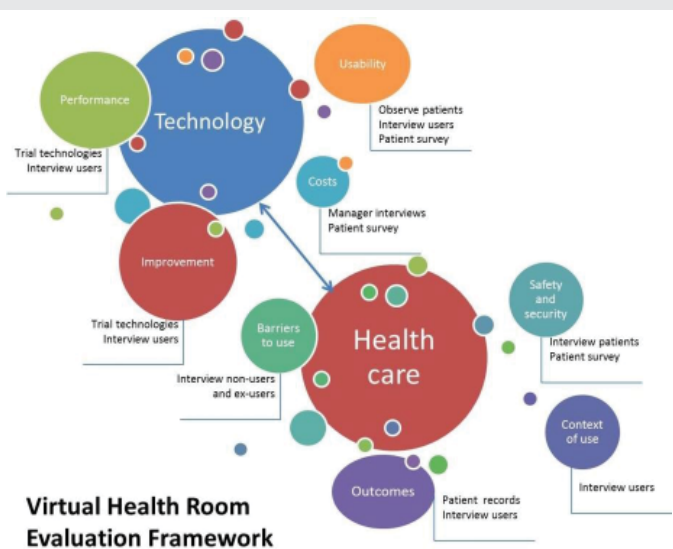


Figure 4: Virtual Health Room Evaluation Framework [4].

model to the local communities of small villages by appreciating a sufficiently high standard of medical infrastructure in rural peripheries. As he left the hospital, keeping up with the high pace of technological development in the public health sector was somewhat challenging. Nevertheless, the success of this institution rests upon a comprehensive approach to the services' supply, the integration into a more extensive network of public health institutions (at an international scale), and the open-minded attitude of the villages' residents. “The ambition is to exploit the strengths of the CRM in its fields of interest (distance bridging technologies, remote area service design and delivery, economic and demographic modelling, and Sami health and well-being) and its expertise in engaging universities, the government, and industry in research and development projects” [4].