

Suitability assessment of a telespirometry service

Avaliação de adequabilidade de um serviço de telespirometria

Evaluación de la adecuación de un servicio de telespirometría

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Abstract

Introduction: Chronic respiratory diseases are among the main public health problems in the world. Despite being sensitive to treatment in Primary Health Care, they are the third leading cause of deaths in Brazil. Telemedicine services present themselves as important allies of health professionals regarding the management of respiratory diseases such as asthma and chronic obstructive pulmonary disease. **Objective:** to evaluate the adequacy of a telemedicine diagnostic service in spirometry considering the indicators of supply, use and population coverage in the state of Rio Grande do Sul. **Results:** In the studied period, the service offered 27,672 telespirometry tests to users of the Brazilian Unified Health System referred by Primary Health Care physicians; the use was under 50% in relation to the offer in all health macro-regions of the state. **Conclusions:** The study demonstrated that the capacity installed by the service was adequate to meet the demand of the population in Rio Grande do Sul. However, the low usage of the service may be associated with lack of knowledge about the service and the difficulty to recognize these diseases by health professionals in Primary Health Care.

Keywords: Telemedicine; Spirometry; Asthma; Pulmonary disease, chronic obstructive.

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Resumo

Introdução: As doenças respiratórias crônicas estão entre os principais problemas de saúde pública no mundo. Mesmo sendo sensíveis ao tratamento na Atenção Primária à Saúde, são a terceira principal causa de morte no Brasil. Os serviços de telemedicina apresentam-se como aliados importantes dos profissionais de saúde no que tange ao manejo de doenças respiratórias como a asma e a doença pulmonar obstrutiva crônica. **Objetivo:** Avaliar a adequabilidade de um serviço de telemedicina diagnóstica em espirometria considerando os indicadores de oferta, utilização e cobertura populacional no estado do Rio Grande do Sul. **Resultados:** No período estudado, o serviço ofertou 27.672 exames de teleespirometria aos usuários do Sistema Único de Saúde do Rio Grande do Sul encaminhados por médicos da Atenção Primária à Saúde. A utilização esteve abaixo de 50% da oferta em todas as macrorregiões de saúde do estado. **Conclusões:** O estudo demonstrou que a capacidade instalada pelo serviço esteve adequada para atender à demanda populacional do Rio Grande do Sul, no entanto a baixa utilização do serviço pode estar associada ao desconhecimento sobre ele e à dificuldade em reconhecer essas doenças por parte dos profissionais de saúde da Atenção Primária à Saúde.

Palavras-chave: Telemedicina; Espirometria; Asma; Doença pulmonar obstrutiva crônica.

Resumen

Introducción: Las enfermedades respiratorias crónicas están entre los principales problemas de salud pública en el mundo. Aunque son sensibles al tratamiento en la Atención Primaria de Salud, son la tercera principal causa de muerte en Brasil. Los servicios de telemedicina se presentan como aliados importantes de los profesionales de la salud en lo que respecta al manejo de enfermedades respiratorias como asma y Enfermedad Pulmonar Obstructiva Crónica. **Objetivo:** evaluar la adecuación de un servicio de telemedicina diagnóstica en espirometría considerando los indicadores de oferta, utilización y cobertura poblacional en el estado de Rio Grande do Sul. **Resultados:** En el período estudiado, el servicio ofertó 27.672 exámenes de teleespirometría a los usuarios del Sistema Único de Salud del RS encaminados por médicos de la atención primaria de salud, la utilización estuvo por debajo del 50% de la oferta en todas las macrorregiones de salud del Rio Grande do Sul. **Conclusiones:** El estudio demostró que la capacidad instalada por el servicio estuvo adecuada para atender la demanda poblacional de Rio Grande do Sul, sin embargo, la baja utilización del servicio puede estar asociada al desconocimiento del servicio y a la dificultad de reconocer estas enfermedades por parte de los profesionales de salud de la atención primaria de salud.

Descriptores: Telemedicina; Espirometría; Asma; Enfermedad pulmonar obstrutiva crónica.

INTRODUCTION

Chronic respiratory diseases (CRDs) are considered as one of the main public health issues, affecting about 500 million people around the world.^{1,2} Globally, the estimation is that 344 million people have asthma and that other 65 million have chronic obstructive pulmonary disease (COPD).³ Despite being sensitive to treatment in Primary Health Care (PHC), these diseases are responsible for the death of 5.8% of the people with chronic noncommunicable diseases, being the third leading cause of death in Brazil.^{2,4,5}

Brazil ranks eighth in the world regarding the prevalence of asthma, and 8.1% are children. In the state of Rio Grande do Sul (RS), the prevalence is 23.5% for children aged 6 to 11 years; 24.7% for adolescents aged 12 to 18 years; and 6% for adults aged up to 39 years.^{1,6-8} As to COPD, the study *Proyecto Latinoamericano de Investigación en Obstrucción Pulmonar* (Projeto PLATINO), carried out with residents from the Metropolitan region of the city of São Paulo, showed a 15.8% prevalence for the adult population in the country (≥ 40 years), whereas a study carried out in the city of Pelotas showed that the estimated prevalence in RS was 12.7%.^{9,10}

The spirometry test is indicated to assess the air flow obstruction and for diagnostic confirmation, monitoring and assessment of the response to treatment of patients with CRD.^{1,11-13} The Ministry of Health recommends that patients with CRD undergo spirometry at least once a year to monitor pulmonary function; however it is difficult to access this test in Primary Health Care (PHC) services.¹² In this context, telediagnosis in spirometry (or teleespirometry) can be used to increase the offer and the access of the population to the test.

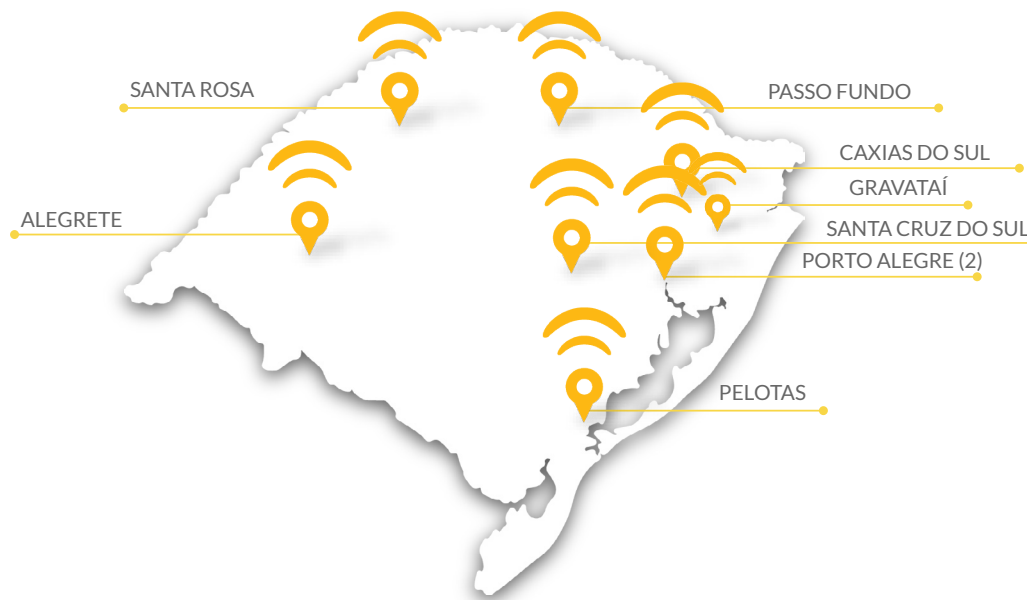
Spain, Italy and the Netherlands are examples of countries that use telespirometry programs/services aiming at increasing the access and reducing patient transport, besides reducing the cost of collection and increasing the quality regarding traditional spirometry services.¹⁴⁻¹⁶ In RS, the RespiraNet project, from the Telehealth Group at Universidade Federal do Rio Grande do Sul (TelessaúdeRS-UFRGS), considered as the first public project of telespirometry in the country, has offered, since 2013, spirometry tests to Unified Health Service users.^{16,17} In 2016, RespiraNet had nine telespirometry points distributed in the seven health macro-regions in RS.

Suitability studies are necessary in order to know if health programs are being properly offered and if they have reached the target audience.^{18,19} The objective of this study was to assess, through the optics of Santos and Victora,¹⁹ the adequacy of the RespiraNet project evaluating indicators of offer, usage and population coverage of telespirometry in RS.

METHODS

A descriptive, cross-sectional study carried out in the state of RS, from November 2015 to December 2016, using data regarding requests for telespirometry accumulated in the Telehealth Platform. The total number of tests performed in the nine collection points distributed in the following cities/ macro-regions of RS was considered for the study: Alegrete/Centro-Oeste, Santa Rosa/Missioneira, Passo Fundo/Norte, Caxias do Sul/Serra, Pelotas/Sul, Santa Cruz do Sul/Vales, Porto Alegre (two points) and Gravataí/Metropolitana (Figure 1).

The offer was estimated based on the workload of each collection point and on the capacity to perform one test every 30 minutes. The usage was obtained based on the monthly number of tests requested for each collection point, and discriminated by health macro-region and requesting physician. The number of requesting physicians per health macro-region was estimated based on health information of TABNET for



Source: Telessaúde RS-UFRGS, 2020.

Figure 1. State distribution of points of spirometry. Telessaúde RS-UFRGS, 2020.

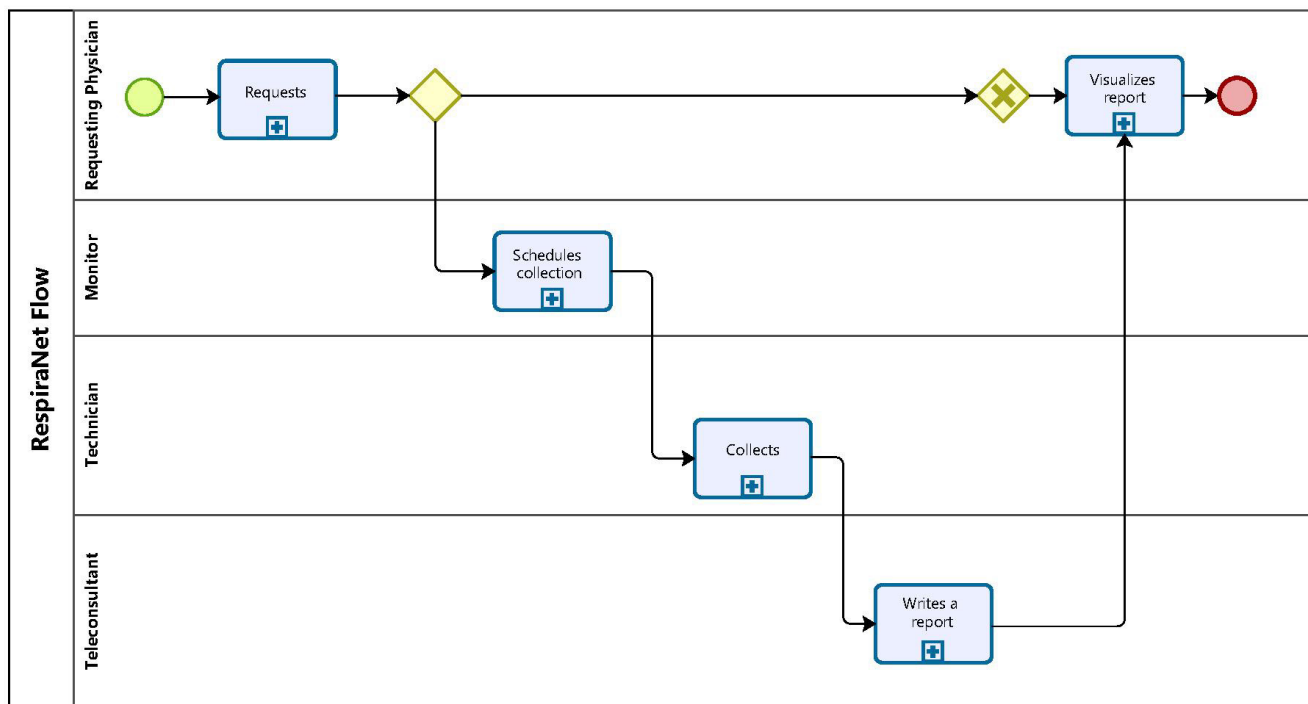
the care network — human/occupation resources of the Department of Informatics of SUS (DATASUS)²⁰ in July, 2016.

To calculate demand, we used data from DATASUS about the population estimation in 2016²¹. The need to conduct at least one spirometry per person with CRD, with life expectancy of 77 years, was considered. Microsoft Excel® 2016 was used to analyze the data. The study was approved by the Ethics Committee of Hospital de Clínicas de Porto Alegre, number 1.030.461.

RESULTS

Figure 2 shows the flow of request, collection and report of spirometry tests in the Telehealth Platform. From November 2015 to December 2016, 7,366 spirometry tests were locally collected and remotely reported. The absence rate found in this study was 7%. Table 1 discriminates, per health macro-region, the estimated demand through the target population, the offer of tests by the RespiraNet Project, and their use by physicians in PHC. Only 2.7% of the patients had more than one request for spirometry, which makes it possible to consider the coverage to be equivalent to the use.

The public health service demand was calculated based on the estimated population of 11,286,500 residents in 2016 in RS. In total, the 24% of the population who had private health insurance plans that year, according to the Supplementary National Health Agency, was not considered.²² The target population was estimated (based on the prevalence of asthma and COPD per age groups in RS) in 1,398,315 people, with higher concentration in the Metropolitan macro-region (578,427, or 42.74%). The other macro-regions accumulate between 8 and 10% of the target population each. For absenteeism, all requests that were canceled with the reason “did not attend the test” were considered.



Source: TelessaúdeRS-UFRGS, 2020.

Figure 2. Flow of request, collection, and report of spirometry.

Table 1. Demand, use and offer of tests per point of spirometry collection/macro-regions of health in Rio Grande do Sul, from November 2015 to December 2016. RespiraNet Project, TelessaúdeRS-UFRGS. Porto Alegre, 2020.

Collection Points (Health Macro-regions)	Estimated demand - SUS	RespiraNet Offer	PHC Use	Usage/Demand (%)	Usage/Offer (%)
Alegrete (Midwest)	2,277	2,376	406	17.83	17.09
Caxias do Sul (Serra)	2,360	1,584	705	29.87	44.51
Passo Fundo (North)	2,730	3,696	529	19.38	14.31
Pelotas (South)	2,340	3,696	394	16.84	10.66
Porto Alegre (Metropolitan region)	10,121	10,248	3,351	33.11	32.70
Santa Cruz do Sul (Valley)	1,949	2,640	989	50.74	37.46
Santa Rosa (Missioneira)	2,045	3,432	992	48.51	28.90
Rio Grande do Sul	23,822	27,672	7,366	30.92	26.62

SUS: Unified Health System; PHC: Primary Health Care.

Bold used to highlight the values of the State of Rio Grande do Sul.

In the period, the RespiraNet Project had an installed capacity of 27,672 telespirometry tests for the demand of 23,822 tests in the State (positive balance of 3,850, or 16.16%). In the ratio between use and offer, the percentage remained below 50% of the offer (of the installed capacity) in all points, and below 30% of the total offer.

The test requests came from 974 physicians in PHC of the state of RS (21.84% of the 4,252 working physicians — Table 2), of whom 241 (24.14%) made only one request. The mean, mode, median,

Table 2. Distribution of requesting physicians and requests per points of telespirometry collection/macro-regions of health in Rio Grande do Sul. RespiraNet, TelessaúdeRS-UFRGS. Porto Alegre, 2020.

Collection points (Health macro-regions)	PHC physicians (n)	PHC physicians/10K residents	Requests (n)	Active PHC physicians (n)*	Active PHC physicians (%)*	PHC physicians/ requests	PHC physicians/ requests
Alegrete (Midwest)	405	3.89	406	58	14.32	1.00	7.00
Caxias do Sul (Serra)	479	4.09	705	82	17.12	1.47	8.60
Passo Fundo (North)	743	5.91	529	83	11.17	0.71	6.37
Pelotas (South)	409	3.81	394	52	12.71	0.96	7.58
Porto Alegre (Metropolitan region)	1,514	3.07	3,351	472	31.18	2.21	7.10
Santa Cruz do Sul (Vales)	482	5.35	989	125	25.93	2.05	7.91
Santa Rosa (Missioneira)	428	4.69	992	102	23.83	2.32	9.73
Rio Grande do Sul	4,460	4.40	7,366	974	21.84	1.65	7.56

PHC: Primary Health Care.

*Active physicians are those who requested at least once in the studied period.

Bold used to highlight the values in the state of Rio Grande do Sul.

maximum and minimum value of request per physician were, respectively: 1.02; 1.00; 1.00; 3.00; and 1.00, considering the study period. The monthly mean of requests per physician ranged from 0.08 to 0.25.

DISCUSSION

This study showed that the number of tests offered by the RespiraNet project is adequate to include the entire population of Rio Grande do Sul (with positive balance of 16.16% of the installed capacity), according to the calculation methodology of demand, which considers the prevalence of CRD in the State. Usage was below 30% of the offered tests, which can be associated with the lack of knowledge about the service, as well as the difficulty of physicians to recognize CRD in patients.

In this sense, the National Review of Asthma, conducted in the United Kingdom, mentioned the clinical error as one of the problems for diagnosis²³, and the study by Lenney et al., performed in several countries, related the low quality of diagnosis of asthma to the low control of the condition.²⁴ In the same direction, Vanjare et al. state that the little use of spirometry to diagnose CRD probably leads to a high rate of underdiagnosed patients.¹³

Even though the percentage of active physicians in the request for spirometry by the Telehealth Platform (21.84%) is higher than that in a study conducted in the United States with family physicians, which showed that only 15% of these professionals reported using a telehealth tool in 2014,²⁵ the mean number of requests per physician is still low (0.08–0.25 requests/physician/month). The low use becomes clearer when the mean number of requests is compared to the study by Schmitz et al.,²⁶ in which the mean ranged from 0.01 to 0.39 request of telespirometry/physician/month. Likewise, there are strong inter-regional differences both in usage/offer as to the percentage of active physicians, which requires further investigation.

As a positive aspect, the 7% absenteeism found in this study is below expectation for specialized services in SUS, which can range between 25 and 50%.^{27,28} Even though this is a commonly known problem in the services of SUS, absenteeism is associated with several factors, such as geographic barriers, lack of free transport, lack of clarifications about the test by the health care staff, patient's demotivation and airway infection.^{27,29-31} The low absence rates found in this study can be related with the centralized telephone scheduling strategy, which also provides the patients with the necessary clarifications about the test (Figure 2).

This analysis presents limitations because it is a prevalence study, which prevents us from understanding the causal reasons for the low use of the telespirometry service.

CONCLUSION

The secondary services in SUS are a demographic limbo, in which only 5% of the national medical contingent is located, according to the medical demography study of the Federal Council of Medicine.³² In this sense, telemedicine services, such as RespiraNet, end up being not only an addition, but also a replacement, since it reaches locations without access and/or with low market interest for specialized care suppliers. Other access barriers are overcome, since the collection points are strategically distributed in order to facilitate the organization of the transport to patients as a municipal provision. Therefore, tediagnosis is an action to be increased both in terms of geographic coverage and in terms of types of tests, also for being supported by Resolution 2,107/2014 of the Federal Council of Medicine.³³

CONFLICT OF INTERESTS

Nothing to declare.

AUTHORS' CONTRIBUTIONS

AGF: Concept, Data Curatorship, Formal Analysis, Writing – First Draft, Writing – Revision and Editing. CGMB: Concept, Formal Analysis, Writing – First Draft, Writing – Revision and Editing. MRG: Concept, Writing – First Draft. CAAS: Concept, Data Curatorship, Formal Analysis, Writing – First Draft, Writing – Revision and Editing.

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