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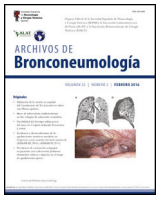

Special Article

Health outcomes: Towards the accreditation of respiratory medicine departments☆

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ABSTRACT

National health systems must ensure compliance with conditions such as equity, efficiency, quality, and transparency. Since it is the right of society to know the health outcomes of its healthcare system, our aim was to develop a proposal for the accreditation of respiratory medicine departments in terms of care, teaching, and research, measuring health outcomes using quality of care indicators. The management tools proposed in this article should be implemented to improve outcomes and help us achieve our objectives. Promoting accreditation can serve as a stimulus to improve clinical management and enable professionals to take on greater leadership roles and take action to improve outcomes in patient care.

Resultados de salud: hacia la acreditación de los servicios de neumología

Palabras clave:
Gestión clínica
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RESUMEN

Los sistemas nacionales de salud deben garantizar a los ciudadanos el cumplimiento de unas condiciones básicas como la equidad, la eficiencia, la calidad y la transparencia. En aras del derecho que tiene la sociedad a conocer los resultados de salud de su área sanitaria, el objetivo de este artículo es elaborar una propuesta de acreditación de los servicios de neumología desde el punto de vista asistencial, docente e investigador, midiendo sus resultados de salud a través de indicadores de calidad en la atención. Para mejorar estos, deberíamos utilizar unas herramientas de gestión (que se desarrollan en el artículo) y que, sin duda, nos ayudarían a conseguir los objetivos propuestos. La mejora del nivel de acreditación puede servir como estímulo para perfeccionar la gestión clínica y para que los profesionales ejerzan una capacidad de dirección cada vez mayor y adopten medidas para reforzar los resultados en la atención a sus pacientes.

Abbreviations: COPD, chronic obstructive pulmonary disease; ILD, interstitial lung disease; PE, pulmonary embolism; SEPAR, Spanish Society of Pulmonology and Thoracic Surgery.

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Introduction

National health systems must meet the basic needs of their citizens, including equity, efficiency, quality, and transparency[1]. As such, they must ensure universal access to quality medicine, regardless of economic level and social background; they must also resolve health problems at the appropriate level of care, avoiding medical interventions that do not improve health care processes. They must generate data on health activity and outcomes using indicators to identify dysfunctional areas[2] and provide citizens access to this information. Health systems must integrate new technological resources, exploit information systems, promote networking at different levels of care, and ensure the clinical implementation of diagnostic and therapeutic advances[3] in order to achieve maximum efficiency and the quality of care that they are obliged to provide.

The challenges facing health systems today mean that the health sector must be remodeled to improve quality and efficiency and boost sustainability[4]. If health outcomes are to be improved, strategies must be rethought, and processes for implementing and evaluating these strategies must advance. To address these challenges, respiratory medicine departments must be managed from a cross-sectional perspective; both inpatients and outpatients must be seen; chronic care must be guaranteed; different types of care processes must be coordinated; various care levels must be integrated; a plan for renewing and implementing technological resources must be in place; robust quality indicators must be developed; and teaching and research activities adapted to available resources must be implemented.

In Spain, the Quality of Care and Innovation Committee of the Spanish Society of Pulmonology and Thoracic Surgery (SEPAR) is responsible for the accreditation of healthcare units, but that does not mean that the different departments meet the same quality standards. To date, evaluation of the quality of care, teaching and research in respiratory medicine departments has not been addressed, and the indicators that should be used for this purpose remain undefined.

In the context of the organizational changes demanded by the COVID-19 crisis, we propose a new respiratory medicine care circuit model for Spain, based on a strategy aimed at maximizing quality by using indicators that measure health, teaching, and research outcomes, thus giving the general access to information on the health outcomes achieved in their health area. To this end, tools (process mapping, care processes, scorecard, etc.) should be used to identify opportunities to improve clinical practice and decision-making in health management.

Current overview of health systems (how we want to be)

To implement such a proposal, all professionals with management responsibilities should be trained and equipped to lead their respective teams and organizations[5] toward the required transformation of the system. We believe that to achieve this goal, we need 1) a health outcomes-oriented system, 2) capacity to create value and 3) new procedures for measuring and evaluating cost and outcomes.

The focus on health outcomes is here to say, and these outcomes must be achieved at the least complex level of care, thus combining two elements that are often neglected: efficacy and sustainability. To achieve this, we must take into account two critical factors: the culture change required by decision-makers (politicians, managers, and health professionals), and the definition of a clear strategy that can be applied in this setting.

In the current context of health, economic and social crises, doing a good job no longer suffices: we must maximise quality given that achieving good health outcomes is the fundamental mission of any health system. The approach should therefore be to generate not more volume ("do more"), but more quality ("do better")[6], because this concept cannot be dissociated from patient interests.

Some of the barriers we face in the current model are a suboptimal evaluative culture, due to the use of a model that is poorly adapted to measuring outcomes, and a lack of coordination and clinical integration between levels. We must therefore be able to incorporate a system that facilitates the documentation and analysis of the outcomes of our departments in order to obtain data on success and costs. Follow-up would also help adapt care processes, improve the quality of care and reduce expenditure, as has already been observed in several areas of respiratory medicine[7–10].

Management tools

One of the keys to the accreditation of respiratory medicine departments[11] would be to determine health outcomes using preestablished quality-of-care indicators. To improve these outcomes, we must apply management tools that can help us achieve our goals.

Process mapping Process mapping is the graphical representation of the procedures implemented by a given organization[12] (in this case, a respiratory medicine department). It consists of a diagram that contains strategic lines and care, operational and support processes; it provides a global view of the department and positions each factor in the value chain. This diagram should summarize all the processes and subprocesses of the department and how they interrelate (Fig. 1).

Strategic lines highlight the organization's relationship with its setting and how decisions on planning and institutional improvements are made. They are often established by management and show how the organization operates and creates value for the patient and the healthcare system. They establish the general guidelines, directives, and intervention levels for each department. Each department must integrate its strategic plan with those of general management and the health system. Operational processes are directly linked to the delivery of services to the patient. Finally, support processes, despite not being directly linked to meeting user needs, are those that complement the operational mechanisms; without them, it would be impossible to achieve objectives. This includes, for example, IT support for all departments.

Healthcare processes Care processes systematically define how clinical practice should be, based on available scientific evidence. They integrate the care that is received at different levels and facilitate coordination among professionals, improving the continuity of care, and offering the patient integral care. These processes, therefore, help define care circuits by enabling access to health resources and avoiding delays in diagnostic confirmation or treatment[13,14].

In a respiratory medicine department there are at least 6 healthcare processes that we could define as priority, given their high prevalence or their high impact or complexity: chronic obstructive pulmonary disease (COPD), bronchial asthma, lung cancer, diffuse interstitial lung disease (ILD), pulmonary embolism (PE), and sleep-disordered breathing. The aim of the care processes in these diseases would be reach a consensus in clinical practice to decrease clinical variability, to ensure continuity of care between levels, to improve control and health-related quality of life, to achieve early diagnoses with easy access to diagnostic techniques, to ensure early treatment and improve adherence, to reduce exacerbations, and to promote health education for patients and caregivers.

Fast track Fast-track care was developed by adapting certain documents used in quality management in industry (standard working procedures)[15] in order to maximise the use of resources by completing tasks within a set time. A fast track can be defined as

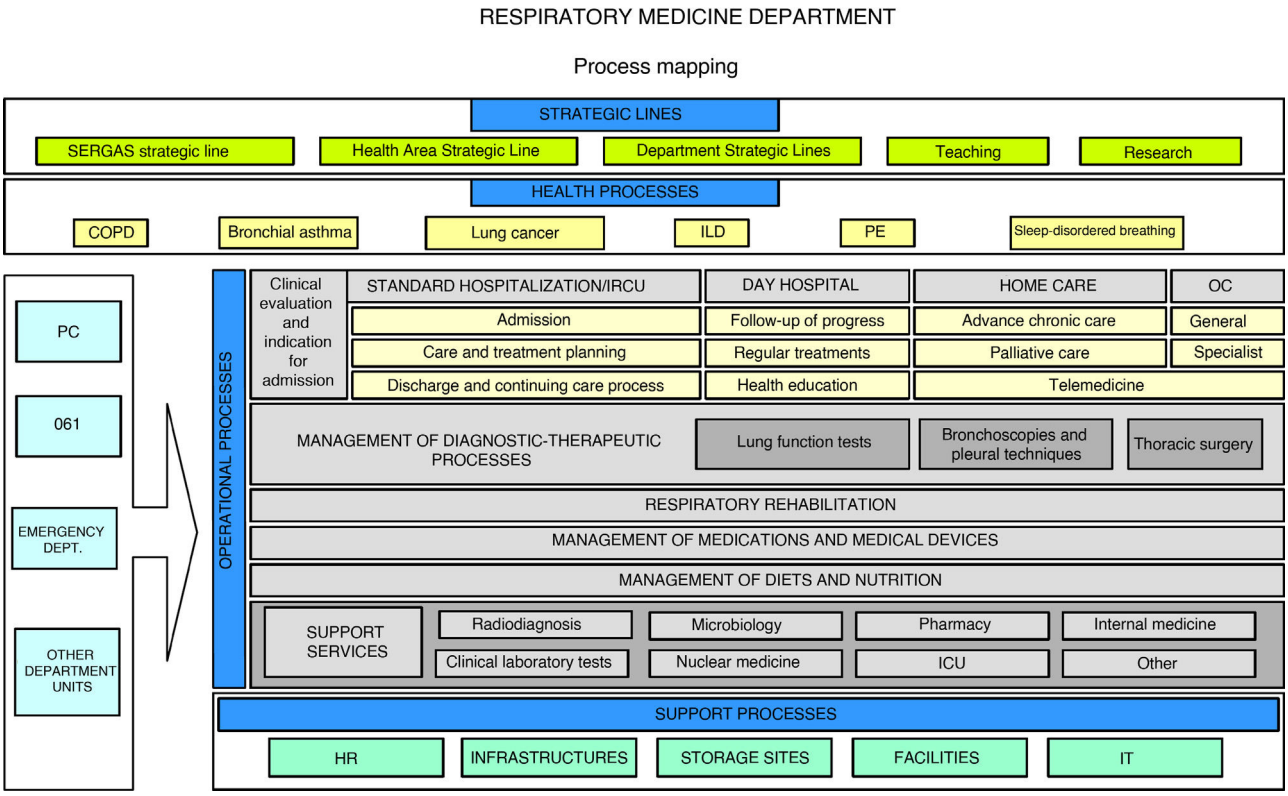

Figure 1. Process mapping of a respiratory medicine department.
COPD: chronic obstructive pulmonary disease; HR: human resources; ICU: intensive care unit; ILD: interstitial lung disease; IT: information technology; OC: outpatient clinics; PC: primary care; PE: pulmonary embolism; SERGAS: Galician Health Service.

an outpatient care plan that is suitable for a group of patients with a certain disease and a predictable clinical course. Implementing this strategy reduces time of care and diagnosis, but does not necessarily lead to an improvement in survival, as observed in lung cancer[16].

Its objectives are to reduce variability in clinical practice, assign responsibilities, provide legal support to professionals, speed up the organization's registration processes, promote clinical research, improve quality of care, especially with regard to "adverse events" and "complications", and adapt the available resources to the prevailing needs. A clinical pathway must be designed and developed according to certain criteria: the diseases treated must be common within the department/hospital, clearly defined, and must follow a predictable, largely consistent clinical course that allows for standardized care; it must be possible to reach a professional consensus in the department/hospital to help implement a multidisciplinary approach to the diseases; and the diseases must represent a significant risk to the patient and a significant cost to the institution. In our department, three fast tracks have been implemented: lung cancer, ILD (Fig. 2) and pleural effusions.

Remote visits Moving some processes to outpatient care (fast tracks), as well as the use of certain resources to reduce the number of admissions (one-stop clinics, day hospital, etc.), has led to a progressive increase in the number of respiratory medicine outpatient visits. This has led to the launch of remote consultations (e-consultation) in some hospitals, in which primary care physicians, after recording all relevant clinical information, seek advice from the pulmonologist[17]. The latter decides which patients might benefit from hospital care and which ones should continue in primary care, and specifies the action to be taken. The outcomes of this system have been excellent.[18]

E-consultations provide a number of benefits to patients (reduced waiting time compared to the traditional pathway; more agile care; prioritization of waiting times based on defined clinical criteria; access to specialist opinion while avoiding travel to other centers; simple procedures in case of referral; care delivered at the patients' own health center; availability of a legible written report; primary care and hospital physicians working with the patient's medical history and using the same clinical guidelines). Physicians also benefit, whether they work in primary care (receiving hospital reports with advice on follow-up and indications whether referral is required; fluid communication; training and continuing professional development), or in the hospital (receiving requests that include patient history, current episode, diagnosis, treatment, and reason for inter-departmental consultation according to the criteria of the clinical guidelines; access to laboratory results and reports; fluid communication via a data system with secure access and transmission). Fig. 3 shows the referral procedure from primary care to respiratory medicine in our hospital. The pulmonologist responds in less than three days. The estimate is that approximately 40% of patients will be able to continue in primary care, and the rest should be seen in the respiratory medicine department within a maximum of 3 weeks, after performing the basic tests (chest X-ray, spirometry or respiratory polygraphy) as required.

Telemedicine One of the priority objectives in the treatment of patients with chronic respiratory conditions and advanced neuromuscular diseases, in addition to improving quality of life and life expectancy with the increasingly generalized use of ventilatory support[19], is to try to maintain stability and avoid exacerbations. This is to avoid the increased risk of death in these situations and to reduce emergency visits, prevent readmissions[20], decrease the demand for hospital beds for acute patients[21], and reduce the cost of care.

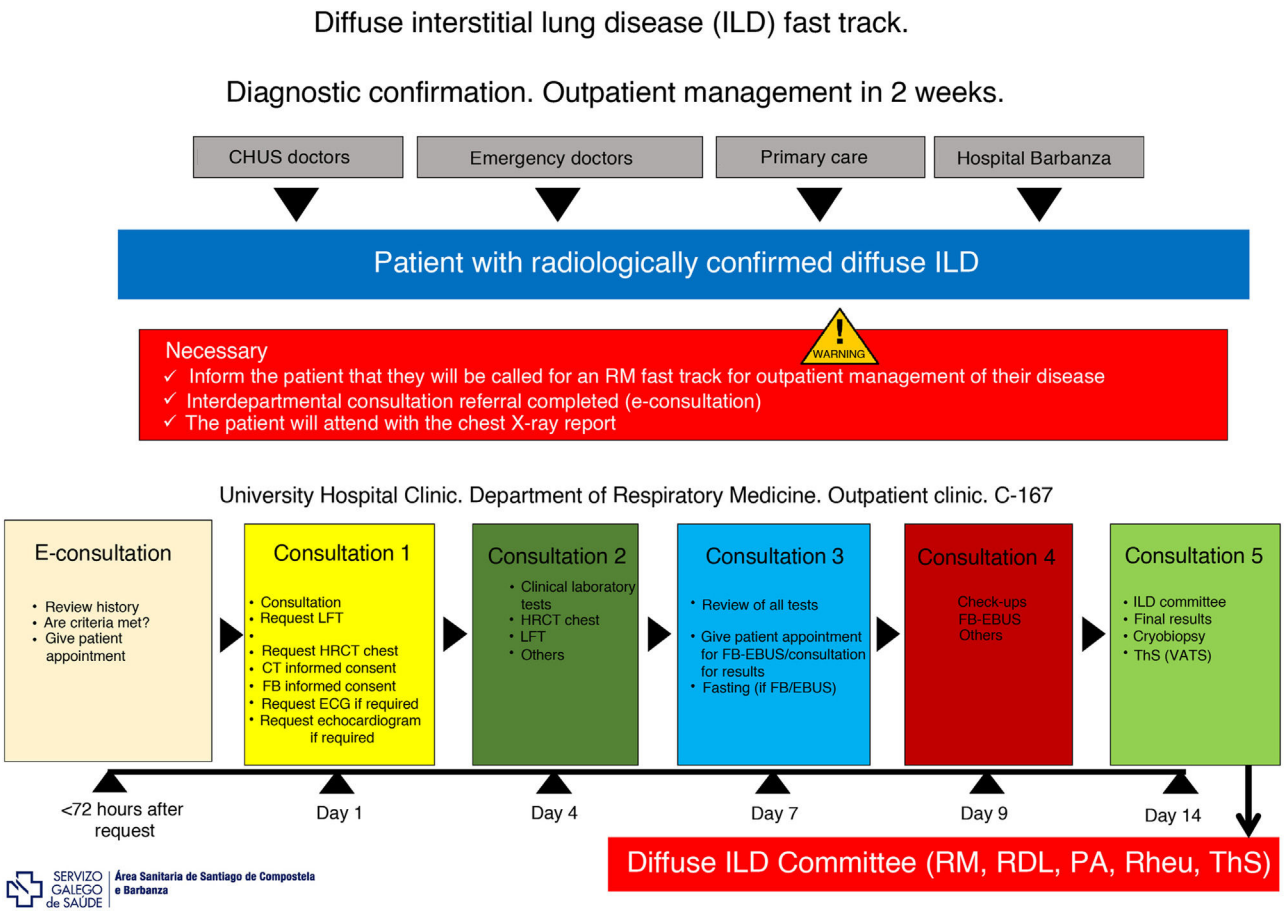

Figure 2. Fast track model for diffuse interstitial lung diseases.
CHUS: University Hospital Complex of Santiago; EBUS: endobronchial ultrasonography; ECG: electrocardiogram; FB: fiberoptic bronchoscopy; HRCT: high-resolution computed tomography; ILD: diffuse interstitial lung disease; LFT: lung function tests; PA: pathological anatomy; RDL: radiology; Rheu: rheumatology; RM: respiratory medicine; Rx: radiography; ThS: thoracic surgery; VATS: video-assisted thoracoscopic surgery.

In chronic diseases, it is very important to determine the health status of patients and to anticipate possible episodes of exacerbation of their underlying disease. Telemonitoring at home could undoubtedly help in this area (Fig. 4). So far, most experience is available in COPD, probably because it is both a chronic and a highly prevalent condition. The results of home telemonitoring in COPD patients are good, but exceptions have been reported. Some studies showed fewer hospital admissions and lower mortality during a 1-year follow-up[22], a decrease in mortality or readmission rate at 12 months[23], and a reduction in hospitalization rates and emergency visits, although no effect on mortality was observed[24]. However, other authors found no significant differences in these variables[25].

Balanced scorecard The balanced scorecard is a document containing a set of previously established indicators that provide information on the attainment of the proposed objectives and targets - information that can also permit comparison with results obtained by other departments[26]. The application of this tool can serve as a stimulus to improve clinical management and encourage managers to use all kinds of resources to improve patient care[27,28]. This information can enable professionals to take on increasing leadership responsibilities and to take steps to improve outcomes in patient care[29].

Proposal for the control of care quality

Measuring the quality of health care is, in our view, one of the best methods of implementing a protective health policy. What is not measured does not exist and therefore cannot be improved. We must therefore select indicators that, when regularly measured, help determine the quality and efficiency of our care activity, identify the opportunities for improvement in our departments, and compare our outcomes with those of the reference centers in our specialty. These indicators can also highlight any significant differences relative to the outcomes obtained in other areas, even those that have the same resources, allowing managers to immediately remedy shortcomings and identify unjustified duplication of tasks, and compelling us to implement integrated healthcare networks.

We propose below a series of indicators that will reflect the efficiency of our systems and, based on health outcomes obtained, will lead to the accreditation of respiratory medicine departments. Our proposal aims merely to stimulate reflection and discussion, and it must be the SEPAR Quality of Care and Innovation Committee, guided by external experts in the organization, evaluation, and audit of clinical management, who have the last word in selecting the indicators that best assess the quality of the healthcare provided within each health area.

Table 1 shows the proposed indicators, in absolute numbers and measurement intervals. It is intended for tertiary hospitals, but a more appropriate approach may be to express the numbers by proportions adapted to each organization to avoid placing departments with a smaller volume of patients at a disadvantage. We leave the final selection to the evaluation committee, who must also determine accreditation levels (e.g., 1, 2, and 3) based on the degree of compliance with the set of indicators agreed upon by the authors of this article and grouped according to the different care areas of a respiratory medicine department.

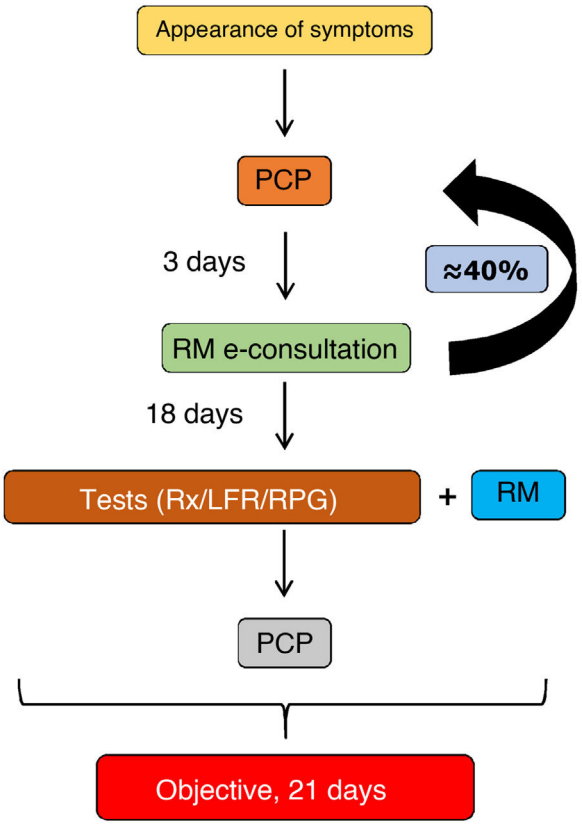

Figure 3. General procedure for referral from primary care to respiratory outpatient clinics.
LFR: lung function tests; PCP: primary care physician; RM: respiratory medicine; RPG: respiratory polygraphy; Rx: chest X-ray.

Teaching

Respiratory medicine departments should also be evaluated from a teaching perspective, since, under the provisions of article 104 of the General Health Law, "the entire healthcare structure of the health system must be at the disposal of undergraduate and post-graduate teaching and continuing professional development".

The areas that the authors of this article believe should be evaluated include the participation of respiratory medicine departments in the training of medical students; teaching clinical internships throughout different courses (undergraduate teaching); National Commission of Teaching accreditation of the training of specialists in respiratory medicine (postgraduate teaching); the number of annual doctoral theses directed (continuing training); and the number of associate lecturers, permanent lecturers and professors in each department. This, of course, is a proposal and, as mentioned above, it must be SEPAR and the evaluation committee who decide on the criteria to be included. In this regard, the European HERMES initiative seeks to ensure that all respiratory medicine training networks have the opportunity to obtain accredited certification for their educational programs[30].

Research

Research in a respiratory medicine department must be recognized as an essential part of professional development, as it clearly contributes to improving the quality of care provided not only by the pulmonologist, but also the department and the hospital. This is because research generates new knowledge, promotes continuing training and professional stimulus, can attract new economic resources, and contributes to improving the image of the institution and, consequently, to the pride of belonging to a prestigious center[31]. To perform research, we pulmonologists should subscribe to networking structures, such as SEPAR projects or the CIBER centers for biomedical research for respiratory diseases of the Instituto de Salud Carlos III. It is also important for hospitals to have the backing of a health research foundation, ideally with university support, that promotes research, and for the different research units of the hospital, health institutions and university to coordinate their efforts and encourage research careers. Furthermore, foundations can work together to improve their competitive edge when bidding for publicly funded research grants, and to reduce the cost of projects by making their structure or their own funds available to researchers and by making the necessary investments (Fig. 5).

Conclusions

Society's demand for high-quality health services and the right to know the health outcomes of its health area will continue to grow. All departments will be required to objectively demonstrate

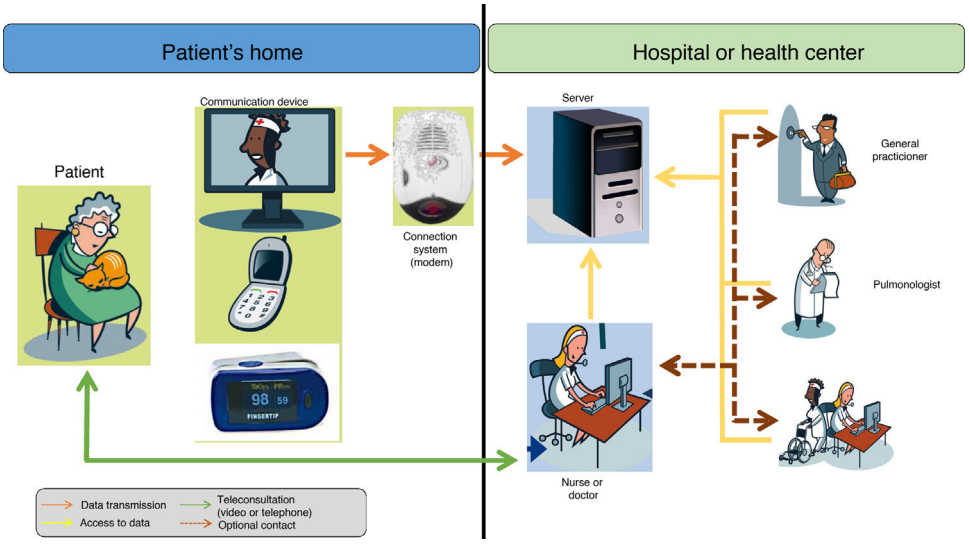

Figure 4. Architecture of home telemonitoring of patients from the hospital or health center.

Table 1
Proposed quality indicators for a respiratory medicine department.

Indicator	Standard	Measurement frequency	
Conventional hospitalization			
1	Number of admissions	>1300	Quarterly
2	Frequency (no. admissions/1000 inhabitants)	<6	Yearly
3	Number of programmed admissions	<10%	Quarterly
4	Mean stay	<9 days	Quarterly
5	Readmissions within 8 days	<5%	Yearly
6	Readmissions within 30 days	<10%	Yearly
7	Death	<5%	Six monthly
8	Complaint rate (no. complaints/no. admissions)	<1%	Yearly
Intermediate respiratory care			
9	Number of admissions	>200	Quarterly
10	Mean stay	<7 days	Quarterly
11	Death	<8%	Yearly
12	Available standardized procedures/protocols adapted to the IRCU	Yes	Yearly
13	Skin ulcers derived from interface use	<10%	Quarterly
14	Pressure ulcers in patients receiving non-invasive ventilation	<10%	Quarterly
Intensive respiratory care			
15	Number of admissions	>100	Yearly
16	Mean stay	<10 days	Yearly
17	Death	<10%	Yearly
18	Available standardized procedures/protocols adapted to the ICU	Yes	Yearly
19	Pneumonia associated with invasive ventilation	<7 episodes/1000 days of ventilation	Quarterly
20	Bacteremia associated with central venous catheter	<4 episodes/1000 days of central venous catheter	Quarterly
General consultations			
21	Number of annual e-consultations	>3500	Quarterly
22	Average waiting time for e-consultation	<4 days	Quarterly
23	Percentage of e-consultations referred to primary care	<30%	Quarterly
24	Number of first face-to-face consultations per year	>2000	Quarterly
25	Number of total consultations	>10,000	Quarterly
26	Ratio successive/first	<4	Quarterly
27	Mean waiting time for first face-to-face consultation	25 days	Quarterly
28	Mean waiting time to first consultation (single visit)	15 days	Quarterly
29	Complaint rate (no. complaints/total no. consultations)	<1.5%	Yearly
Pulmonary embolism			
30	Number of patients admitted to RM per year due to PET scan	>50	Yearly
31	Mean annual hospital stay	<8 days	Yearly
32	Existence of specific intervention protocols	Yes	Yearly
33	Number of patients with PESI/simplified PESI	<75%	Yearly
34	In-hospital deaths; n (%)	<10 %	Yearly
35	Readmissions within 30 days	<8%	Yearly
36	Number of new patients per year in outpatient visits	>50	Yearly
37	Patients followed in specialist clinics	>75% admitted	Yearly
38	Non-fatal major bleeding at 30 days	<4%	Yearly
39	All-cause mortality at 30 days	<10%	Yearly
Pulmonary hypertension			
40	Accredited pulmonologist	Yes	Yearly
41	Specialist clinic	Yes	Yearly
42	Multidisciplinary hospital unit	Yes	Yearly
43	Mean delay for first consultation	<21 days	Yearly
44	Number of patients seen per year (new/total)	10/50	Yearly
45	Availability of echocardiography	Yes	Yearly
46	Availability of right heart catheterization	Yes	Yearly
47	Availability of medication administration on an outpatient basis	Yes	Yearly
COPD			
48	Pulmonologist with accredited training in COPD	Yes	Yearly
49	Number of patients admitted to RM per year for COPD	>350	Yearly
50	Mean annual hospital stay	<9 days	Yearly
51	Existence of specific intervention protocols	Yes	Yearly
52	Specialist clinic	Yes	Yearly
53	Number of patients seen per year (new/total)	>100/>1000	Yearly
54	Availability of a nurse case manager (coordination with other units, management of procedures and appointments, etc.)	Yes	Yearly

Table 1 (*Continued*)

Indicator	Standard	Measurement frequency	
55	Possibility of urgent care in the Unit for an exacerbation	Yes	Yearly
56	Availability of immediate spirometry	Yes	Yearly
57	Availability of immediate chest X-ray	Yes	Yearly
Asthma			
58	Number of patients seen per year	>500	Yearly
59	Possibility of urgent care for an exacerbation	Yes	Yearly
60	Number of exacerbations seen per year	>50	Yearly
61	Multidisciplinary hospital unit	Yes	Yearly
62	Specialist clinic for difficult-to-control asthma	Yes	Yearly
63	Immediate spirometry	Yes	Yearly
64	Nonspecific bronchial challenge test	Yes	Yearly
65	Specific bronchial challenge test	Yes	Yearly
66	Exhaled nitric oxide	Yes	Yearly
67	Induced sputum with inflammatory cell count	Yes	Yearly
68	Availability of skin prick test in the Unit	Yes	Yearly
69	Administration of biologics for asthma in the Unit	Yes	Yearly
Respiratory rehabilitation			
70	Number of new patients per year	>75	Yearly
71	Days between discharge and first consultation	<30 days	Yearly
72	Admitted COPD patients referred to an RR program	>80%	Yearly
73	Ability to treat exacerbations after RR session	Yes	Yearly
74	Protocol for respiratory rehabilitation in COPD patients	Yes	Yearly
Non-invasive ventilation at home			
75	Accredited training in non-invasive ventilation	Yes	Yearly
76	Home ventilation specialist clinic	Yes	Yearly
77	Number of patients per year (new/total)	>0/>200	Yearly
78	Possibility of urgent outpatient care	<15 days	Yearly
79	Possibility of starting of home ventilation on an outpatient basis	Yes	Yearly
80	Availability of home ventilation care protocols	Yes	Yearly
Smoking			
81	Accredited training in smoking cessation	Yes	Yearly
82	Number of patients per year (new/total)	≥200/≥600	Yearly
83	Number of co-oximetries per year	≥600	Yearly
84	Number of cotinine determinations	≥40	Yearly
85	Availability of nurse in the Unit	Yes	Yearly
86	Availability of psychologist in the Unit	Yes	Yearly
Oxygen therapy			
87	Availability of nurse case manager for oxygen treatment cases	Yes	Yearly
88	Patients with revision of oxygen therapy prescription after provisional prescription	>80%	Yearly
89	Patients with oxygen titration at rest	>90%	Yearly
Diffuse interstitial lung disease			
90	Accredited training in diffuse ILD	Yes	Yearly
91	Specialist clinic	Yes	Yearly
92	Number of patients per year (new/total)	>40/>200	Yearly
93	Number of bronchoalveolar lavages/transbronchial biopsies per year	>30	Yearly
94	Number of cryobiopsies per year	>25	Yearly
95	Number of VATS per year	>7	Yearly
96	Availability of echocardiography	Yes	Yearly
97	Availability of right heart catheterization	Yes	Yearly
Bronchiectasis and cystic fibrosis			
98	Accredited pulmonologist	Yes	Yearly
99	Multidisciplinary CF unit in the hospital	Yes	Yearly
100	Number of new patients per year (Bronchiectasis/CF)	>75/>10	Yearly
101	Day hospital to treat exacerbations	Yes	Yearly
102	Test of tolerance to antibiotics and hypertonic serum	Yes	Yearly
103	Possibility of administering IV antibiotics in outpatient clinic	Yes	Yearly
104	Ability to perform spirometry the same day	Yes	Yearly
105	Physiotherapist	Yes	Yearly
Sleep-disordered breathing			
106	CEAMS-accredited sleep pulmonologist	Yes	Yearly
107	Specialist clinic	Yes	Yearly
108	Multidisciplinary sleep unit in the hospital	Yes	Yearly
109	Number of polysomnographs per year	>150	Yearly
110	Number of respiratory polygraphs per year	>300	Yearly
111	Delay in non-urgent cases	<90 days	Yearly
112	Delay in urgent cases	<15 days	Yearly
113	Standardized education program	Yes	Yearly

Table 1 (*Continued*)

Indicator	Standard	Measurement frequency	
114	New CPAP indications per year	>25% of patients studied for suspected SAHS	Yearly
115	Objective monitoring of hours of CPAP compliance	Yes	Yearly
116	Time between performing the diagnostic test and starting CPAP	<60 days	Yearly
117	Patients who use CPAP prescribed for SAHS at least 4 h of per day	>70%	Yearly
Pneumonia			
118	Evaluation of PSI and CURB-65 on admission	>90%	Yearly
119	Percentage of patients admitted with PSI I and II.	<10%	Yearly
120	Time between arrival in the emergency room and starting antibiotic	<8 h	Yearly
121	Blood cultures available in the first 72 h	100%	Yearly
122	Existence of an antimicrobial use optimization program (AUOP) in the hospital	Yes	Yearly
123	Sequential antibiotic therapy (switch to oral)	90%	Yearly
124	Mean hospital stay	<7 days	Quarterly
125	Specialist clinic	Yes	Yearly
126	First outpatient consultation delay <72 h	90 %	Yearly
Tuberculosis			
127	Ability to quickly access clinic	≤2 days	Yearly
128	Multidisciplinary unit in the hospital	Yes	Yearly
129	Specialist clinic	Yes	Yearly
130	Number of new patients per year	>30	Yearly
131	Rapid diagnostic capability (<3 h)	Yes	Yearly
132	Nurse case manager	Yes	Yearly
133	Accredited mycobacteria laboratory (bacilli, solid-liquid media cultures, MTB and some non-TB identification, MTB molecular tests, rapid molecular test for rifampicin resistance, antibiotic resistance testing for first-line drugs, genetic resistance tests)	Yes	Yearly
Day hospital			
134	Number of patients per year	>800	Yearly
135	Ability to deliver outpatient treatment according to established protocols	Yes	Yearly
136	Possibility of treating exacerbations in readmitted patients	Yes	Yearly
137	On-demand telephone visits for patients included in the program		
Fast track lung cancer			
138	Number of new patients per year	250	Six monthly
139	Time to first consultation	<15 days	Six monthly
140	Time to diagnosis (from first consultation)	<15 days	Six monthly
141	Time to complete staging (from first consultation)	<25 days	Six monthly
142	Multidisciplinary Tumor Committee	Weekly meeting	Yearly
Fast track for diffuse interstitial lung disease			
143	Number of patients/year (new/total)	50/200	Yearly
144	Time to first consultation	2 weeks	Six monthly
145	Waiting list time for cryobiopsy	<30 days	Six monthly
146	Time to diagnosis	<45 days	Six monthly
147	Diffuse ILD Committee Meeting	Monthly meeting	Yearly
Fast track for pleural effusion			
148	Number of patients/year (new/total)	>125/>400	Yearly
149	Time to first consultation	≤ 3 days	Yearly
150	Interdepartmental consultation response time	≤ 2 days	Yearly
151	Time to diagnosis	≤15 days	Yearly
152	Pleura Committee Meeting	Monthly	Yearly
Integrated care processes (developed at the hospital/AC) and implemented			
153	COPD	Yes	Yearly
154	Bronchial asthma	Yes	Yearly
155	Lung cancer	Yes	Yearly
156	Diffuse interstitial lung disease	Yes	Yearly
157	Pulmonary thromboembolism	Yes	Yearly
158	Sleep-disordered breathing	Yes	Yearly
Bronchiectasis and cystic fibrosis			
159	Accredited pulmonologist	Yes	Yearly
160	Multidisciplinary CF unit in the hospital	Yes	Yearly
161	Number of new patients per year (Bronchiectasis/CF)	>75/>10	Yearly
162	Day hospital to treat exacerbations	Yes	Yearly
163	Test of tolerance to antibiotics and hypertonic serum	Yes	Yearly
164	Possibility of administering IV antibiotics in outpatient clinic	Yes	Yearly
165	Ability to perform spirometry the same day	Yes	Yearly

Table 1 (*Continued*)

Indicator	Standard	Measurement frequency	
166	Physiotherapist	Yes	Yearly
Palliative respiratory care			
167	Structure of the composition of the interdisciplinary team	100%	Yearly
168	Coordination protocol between hospitalization and home care in accordance with area resources	100%	Yearly
169	Initial assessment of patient needs	100%	Yearly
170	Define how to access the Unit in case of emergency	100%	Yearly
171	The patient must have a defined drug treatment plan	>90%	Yearly
Home care			
172	Number of patients seen per year	>50	Yearly
173	Number of home visits	1 a month	Quarterly
174	Possibility of specialized emergency home care	Yes	Six monthly
175	Possibility of urgent care in the department (non-emergency)	Yes	Six monthly
176	The patient must have a defined drug treatment plan	>90%	Six monthly
177	The unit must have written patient admission criteria	100%	Yearly
Medical duty rosters			
178	Respiratory medicine duty rosters	Yes	Yearly
179	Medical area duty rosters with pulmonologist 24 h a day	Yes	Yearly
Lung function tests			
180	Number of forced spirometries per year	≥2000	Yearly
181	Number of diffusion tests per year	≥500	Yearly
182	Number of plethysomographies per year	≥100	Yearly
183	Number of FeNOs per year	≥1000	Yearly
184	Number of 6-minute walk tests per year	≥200	Yearly
185	Number of cardiopulmonary stress tests per year	≥100	Yearly
186	Number of nonspecific bronchial challenge tests per year	≥100	Yearly
187	Number of specific bronchial challenge tests per year	≥20	Yearly
188	Number of oscillometries per year	≥20	Yearly
189	Number of PIP/PEP determinations per year	≥30	Yearly
Bronchoscopy techniques			
190	Number of flexible bronchoscopy procedures per year	≥500	Yearly
191	Number of ultrasound-guided bronchoscopy procedures per year	≥200	Yearly
192	Number of therapeutic endobronchial procedures per year	≥10	Yearly
193	Number of rigid bronchoscopies per year	≥10	Yearly
194	Number of cryobiopsies per year	≥30	Yearly
195	Written explanatory information on arrival	100%	Yearly
196	Written information specific to the procedure to be performed	100%	Yearly
197	Written instructions and recommendations	100%	Yearly
198	Different rooms for different procedures	Yes	Yearly
199	Lead-lined room	Yes	Yearly
200	Operating room availability	Yes	Yearly
201	Deaths	<0.05%	Yearly
Pleural techniques			
202	Number of diagnostic thoracenteses per year	≥250	Yearly
203	Number of therapeutic thoracenteses per year	≥100	Yearly
204	Number of closed pleural biopsies per year	≥30	Yearly
205	Number of chest drains per year	≥50	Yearly
206	Number of tunneled pleural catheters per year	≥15	Yearly
207	Number of pleurodesis with talc	≥20	Yearly
208	Number of transthoracic ultrasounds per year	≥400	Yearly
209	Number of annual medical pleuroscopies	≥10	Yearly
210	Written **welcome** information	Yes	Yearly
211	Written information specific to the procedure to be performed	Yes	Yearly
212	Written instructions and recommendations	Yes	Yearly
213	Different rooms for different procedures	Yes	Yearly
214	Operating room availability	Yes	Yearly
215	Deaths	<0.05%	Yearly
Lung transplantation			
216	Lung transplant in the hospital	Yes	Yearly
Teaching indicators			
217	Resident training	Yes	Yearly
218	Undergraduate clinical internships	Yes	Yearly
219	Satisfaction surveys for internship students	Yes	Yearly
220	Development of health protocols for patients, caregivers, etc.	Yes	Yearly
221	Pulmonologists with SEPAR membership-professional development certification	≥2	Yearly
222	Medical doctors in the department	≥4	Yearly
223	Post-graduate courses	Yes	Yearly
224	Annual doctoral thesis management (5 years)	≥2	Yearly
225	Associate lecturers in the department	≥1	Yearly
226	Department pulmonologists accredited as associate lecturer, doctor, permanent lecturer or professor	≥2	Yearly

Table 1 (*Continued*)

Indicator	Standard	Measurement frequency	
227	Permanent lecturers in the department	≥1	Yearly
228	Professors in the department	≥1	Yearly
Research indicators			
229	Communications at national/international conferences	≥30	5 years
230	Scientific publications in journals with IF	≥30	5 years
231	Competitive research projects	≥3	5 years
232	Participation in networks (PII, CIBERES)	Yes	5 years
233	Research contracts	≥1	5 years
234	Clinical trials	≥5	5 years
235	Technological innovation/patents	≥1	5 years

AC: autonomous community; CEAMS: Spanish Committee for Accreditation of Sleep Medicine; CF: cystic fibrosis; CIBERES: biomedical research network in respiratory diseases; COPD: chronic obstructive pulmonary disease; CPAP: continuous positive airway pressure; CURB-65: confusion, urea, respiratory rate, blood pressure and age (>65 years); FeNO: exhaled fraction of nitric oxide; IF: impact factor; ICU: intensive care unit; ILD: interstitial lung disease; IRCU: intermediate respiratory care unit; MTB: *Mycobacterium tuberculosis*; PE: pulmonary embolism; PESI: Pulmonary Embolism Severity Index; PIP/PEP: Peak inspiratory and expiratory pressure; PSI: Pneumonia Severity Index; RM: respiratory medicine; RR: respiratory rehabilitation; SAHS: sleep apnea-hypopnea syndrome; SEPAR: Spanish Society of Pulmonology and Thoracic Surgery; TB: tuberculosis; VATS: video-assisted thoracoscopic surgery.

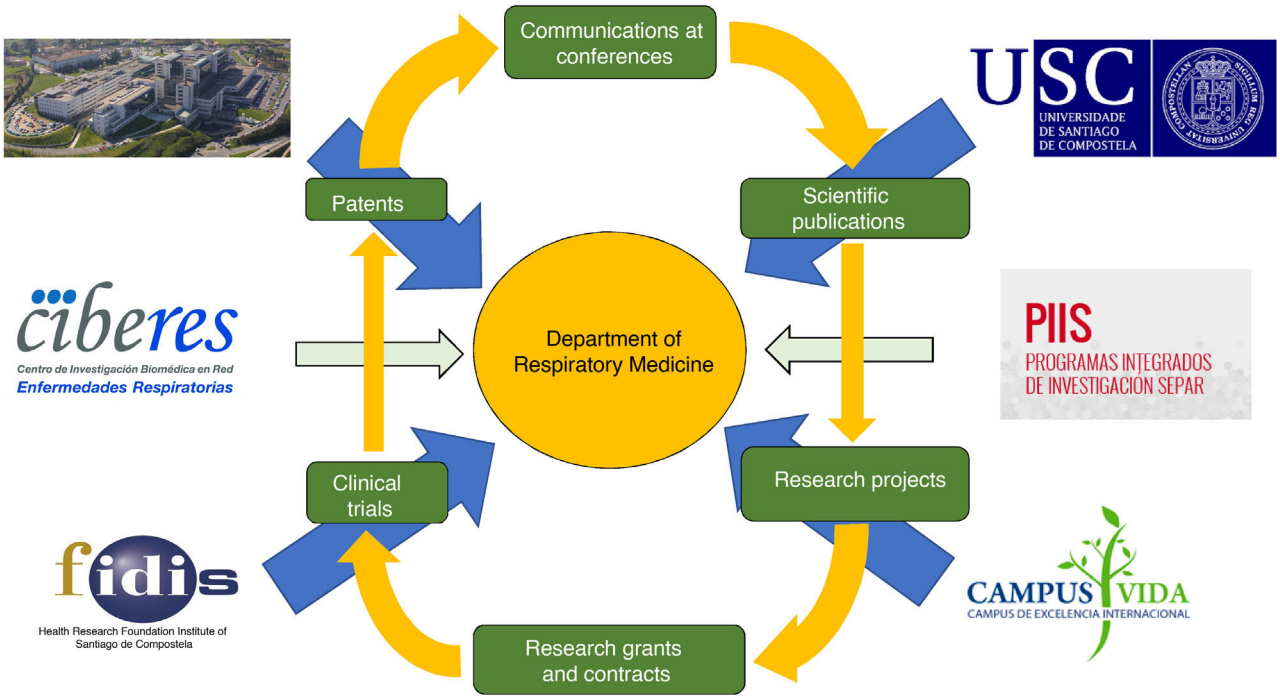

Figure 5. Research in a respiratory medicine department supported by the hospital, university, foundation, research consortium (Campus Vida) and networking structures (CIBERES and PIIs).
Fidis: Health Research Foundation Institute of Santiago de Compostela; USC: Universidad de Santiago de Compostela.

their competences, and, as such, will most likely have to be globally accredited. At present, one of the weaknesses of the health system is its failure to monitor existing indicators, thus generating unacceptable variability in our clinical practice. The demands of society may prompt the health system to respond to the need to measure outcomes using quality-of-care indicators, improve clinical management, and encourage professionals to strengthen their leadership roles.

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Conflict of interests

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