

Impact of an On-duty Pulmonologist on the Activity of a Respiratory Medicine Department

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OBJECTIVE: To evaluate the impact on health care and clinical management of 24-hour coverage by an on-site pulmonologist in a respiratory medicine department.

METHODS: In February 2004, a new respiratory medicine 24-hour duty service was started in our hospital. The activity of the on-duty pulmonologist during the following 12 months was systematically and prospectively recorded. The results were put into perspective by comparing the number of monthly admissions and the mean length of stay during the study period with those of the previous 12-month period.

RESULTS: During the study period, the on-duty pulmonologist received a mean (SD) of 9.02 (5.27) emergency calls every day, performed 202 diagnostic or therapeutic interventions, and discharged 342 patients. During this period, 1305 patients were admitted to the department (mean length of stay, 8.1 days), whereas in the previous 12 months, with no on-site pulmonologist, 1680 patients were admitted (mean length of stay, 9.0 days). This represents a 22.3% reduction in the annual number of admissions and a reduction in the mean stay by almost 1 day (0.9 days).

CONCLUSIONS: The provision of an on-duty pulmonologist was efficient because it facilitated patient turnaround.

Impacto de la presencia de un neumólogo de guardia sobre la actividad de un servicio de neumología

OBJETIVO: Analizar qué impacto asistencial y de gestión clínica tiene la implantación de guardias de presencia física continuada en un servicio de neumología.

MÉTODOS: En febrero de 2004 se introdujeron las guardias de neumología en el Hospital Universitario Son Dureta. Durante un año, hasta enero de 2005, se recogió de forma prospectiva y sistemática la actividad realizada por el/la neumólogo/a de guardia. Con objeto de situar estos resultados en perspectiva, se ha comparado el número de ingresos mensuales y su estancia media durante los 12 meses en que se ha dispuesto de guardia de neumología y los 12 meses inmediatamente anteriores.

RESULTADOS: Durante los 12 meses evaluados, el/la neumólogo/a de guardia recibió una media \pm desviación estándar de 9,02 \pm 5,27 avisos urgentes cada día, realizó 202 técnicas diagnósticas/terapéuticas y dio de alta a 342 pacientes. Durante este período ingresaron en el servicio 1.305 pacientes (estancia media: 8,1 días), mientras que en los 12 meses previos, sin guardia de la especialidad, habían ingresado en el servicio 1.680 pacientes (estancia media: 9,0 días); esto supone una reducción del 22,3% del número anual de ingresos y una disminución de la estancia media de los pacientes ingresados de prácticamente un día (0,9 días).

CONCLUSIONES: La implantación de guardias de neumología ha sido una medida eficiente, que ha contribuido a agilizar la rotación de los pacientes ingresados.

Key words: Health care quality. Continuous care. Health care management.

Palabras clave: Calidad asistencial. Atención continuada. Gestión sanitaria.

Introduction

Hospital care takes up almost half of all health care resources.¹ Respiratory and cardiovascular diseases are

two of the main reasons for admission to hospital and, consequently, for health care spending.²⁻⁵ Adapting available resources to the ever-growing demand is a constant cause for concern in hospitals and health services everywhere. The solutions proposed involve several strategies, for example, reducing the number of incorrect admissions from the emergency department, minimizing the number of admissions to carry out diagnostic tests, avoiding inefficient procedures, and speeding up the performance of diagnostic tests indicated during hospitalization.⁶⁻⁷ The success of these strategies depends on the evaluation of patients by a specialist. In fact, in the field of respiratory medicine, there is evidence that medical care provided by

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a pulmonologist improves clinical outcome, avoids unnecessary procedures, and reduces the consumption of resources.⁸⁻¹⁰ Furthermore, in order to achieve optimal clinical efficacy, this specialist care should be continuous and not limited to the day shift. For example, studies carried out in intensive care units¹¹⁻¹³ have shown that having an on-duty specialist available is efficient, improving the quality of health care and reducing the mean stay both in the unit and in the hospital. However, most Spanish hospitals do not have 24-hour coverage with an on-site pulmonologist ready to respond to calls and no studies have evaluated the potential benefits of this type of uninterrupted specialist care in respiratory medicine.

This study evaluated the impact on health care and clinical management of 24-hour coverage by an on-site pulmonologist in the respiratory medicine department of Hospital Universitario Son Dureta in Palma de Mallorca, Spain.

Methods

Setting

Hospital Universitario Son Dureta belongs to the Balearic Islands health service (Ib-Salut) and is the reference hospital for a population of 955 045 people who live on the islands (data from January 1, 2004; source: www.ine.es). It has 910 beds, of which 23 are permanently allocated to the respiratory medicine department.

Shifts for an On-duty Pulmonologist

Emergency care was traditionally provided to hospitalized patients by physicians who are on call in the emergency department. In February 2004, as part of a general process to provide a specialist on call at our hospital, 24-hour coverage by an on-site pulmonologist was implemented. On workdays, the shift starts at 3 PM and finishes at 8 AM the following day; at the weekend and on nonworking days, it begins at 8 AM and finishes 24 hours later. The on-call pulmonologist has the following responsibilities: *a*) responding to calls from emergency department physicians to evaluate patients who present with a respiratory condition, in order to decide whether they should be admitted or discharged; *b*) selecting those patients who can receive medical care at home¹⁴ or who must be moved to a long-term care facility; *c*) prescribing any drugs the patient requires and requesting any additional tests considered necessary to reduce the time between admission and the first visit by regular staff physicians belonging to the respiratory medicine department; *d*) ordering the start of other respiratory treatments, such as oxygen therapy, aerosol therapy, and/or noninvasive mechanical ventilation, as soon as possible (in the emergency room or on the ward); *e*) performing urgent bronchoscopy or scheduling it for the following day when not urgent (although with the guarantee that the patient will fast until the following morning so as not to delay the examination another day); *f*) performing other diagnostic or therapeutic interventions (eg, thoracentesis) where required; *g*) discharging patients who are able to return home (often at the weekend or on other nonworking days); and *h*) responding to urgent requests for consultations from other specialists.

Study Design

This was a prospective observational study with historical control data for comparison. From the inception of the 24-hour duty service (February 2004) until 12 months later (January

TABLE 1
Clinical Activity of the On-duty Pulmonologist During the Study Period (12 Months)

	Total Number	Mean	Range	SD
Urgent calls	2905	9.02	0-35	5.27
Visits by a physician	3835	12.14	0-42	7.11
Discharges (emergency room)	267	0.73	0-5	1.07
Discharges (ward)	75	0.21	0-5	0.58
Techniques performed	202	0.55	0-4	0.77
Fiberoptic bronchoscopy	26	0.08	0-2	0.29
NIMV	129	0.4	0-4	0.65
Thoracentesis	29	0.09	0-2	0.3
Other	18	0.06	0-2	0.28
Earlier procedures	169	0.45	0-5	0.83
Computed tomography	79	0.24	0-3	0.51
Fiberoptic bronchoscopy	57	0.18	0-2	0.41
Lung function tests	9	0.03	0-1	0.16
Other	24	0.07	0-3	0.32

Abbreviation: NIMV, noninvasive mechanical ventilation.

2005), data on the activity of the on-duty pulmonologist were collected prospectively and systematically. These included the number of times per day the on-duty pulmonologist was called for any medical reason, the number of medical visits made (either to hospitalized patients or to the emergency room), the number of patients admitted and discharged during the shift, and the number of diagnostic or therapeutic procedures performed or scheduled during the shift.

These results were put into perspective by comparing the number of monthly admissions and the mean length of stay during the study period with the results of the previous year. The total number of admissions and mean length of stay during both periods were obtained from the hospital's annual report.¹⁵

Statistical Analysis

The results are presented as the mean (SD) or percentage change: [(initial value–final value)/initial value] × 100.

Results

The pulmonologist on duty received a mean (SD) of 9.02 (5.27) emergency calls every day and made 12.14 (5.27) visits. This clinical activity resulted in the performance of several diagnostic tests or early scheduling of others (Table 1).

During the prospective study period (12 months), this pulmonologist discharged 342 patients (267 from the emergency room and 75 from the ward, most of the latter during the weekend or on a nonworking day). A further 94 patients were transferred from the respiratory medicine department to the most appropriate area (for most patients this was internal medicine, cardiology, or oncology). During this period, 1305 patients were admitted to the respiratory medicine department and their average stay was 8.1 days. During the previous year, before the on-site pulmonologist was available to take calls, 1680 patients were admitted, with a mean stay of 9.0 days. Therefore, as Figure 1 shows, the presence of an on-duty pulmonologist was associated with a reduction in the number of hospital admissions (375 admissions were avoided, that is, a reduction of

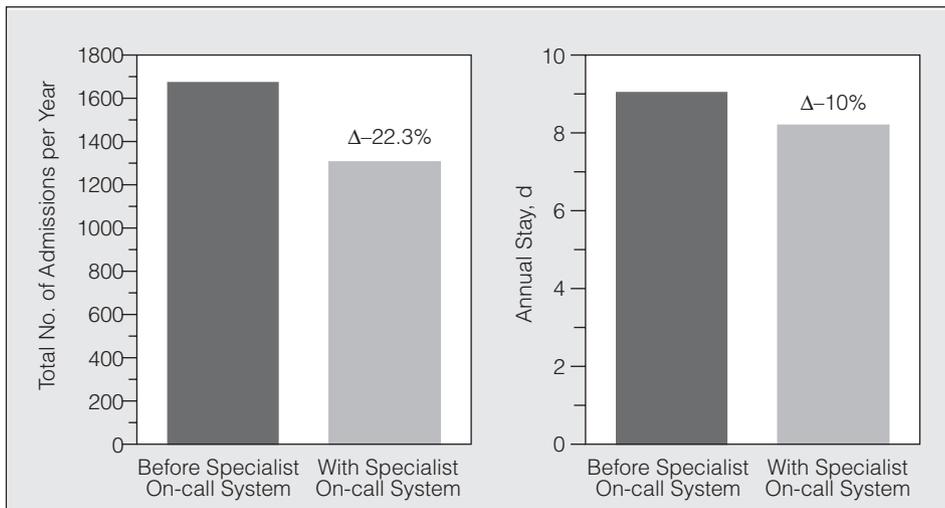


Figure 1. Absolute number (and percentage reduction) in the total number of annual admissions managed by the respiratory medicine department (and the corresponding mean stay) during the 12 months after implementation of 24-hour coverage by an on-site pulmonologist.

22.3%) and a reduction in the mean stay by almost 1 day (0.9 days, that is, a reduction of 10%). Figure 2 shows the monthly breakdown of the number of admissions from the respiratory medicine department registered before and after the 24-hour coverage started. There were no differences in hospital mortality between the 2 periods (< 1% in both cases).

Discussion

Most hospitals in the Spanish national health system have to cope with a huge demand for medical care, and some of the factors responsible for the overload are avoidable. The most notable are inappropriate admissions (between 8% and 15% of the total^{1,7}) and the delay in performing diagnostic tests.^{6,7,16,17} Both prolong hospital stays. Previous studies have shown that between 15% and 28% of inpatient bed-days are unnecessary,^{1,6} and efforts

at improvement have involved various strategies¹⁸: a) systems to rationalize hospital organization, computerization, and coordination with community health care services to streamline the running of the health system as a whole^{16,17}; b) specialized consultation services,^{19,20} early discharge programs,¹⁴ and home hospitalization²¹ to avoid admissions and reduce the mean stay of hospitalized patients; and c) improvements in specialist care (respiratory medicine and other specialties^{8-10,22}) and continuous care (intensive care units¹¹⁻¹³) to directly affect the quality of health care and length of hospital stay. However, in our literature search we were unable to find previous studies that evaluated how the availability of a pulmonologist on duty can affect patient care in a respiratory medicine department.

The present study shows that implementing 24-hour coverage by an on-site pulmonologist ready for calls in a university reference hospital is associated with a significant

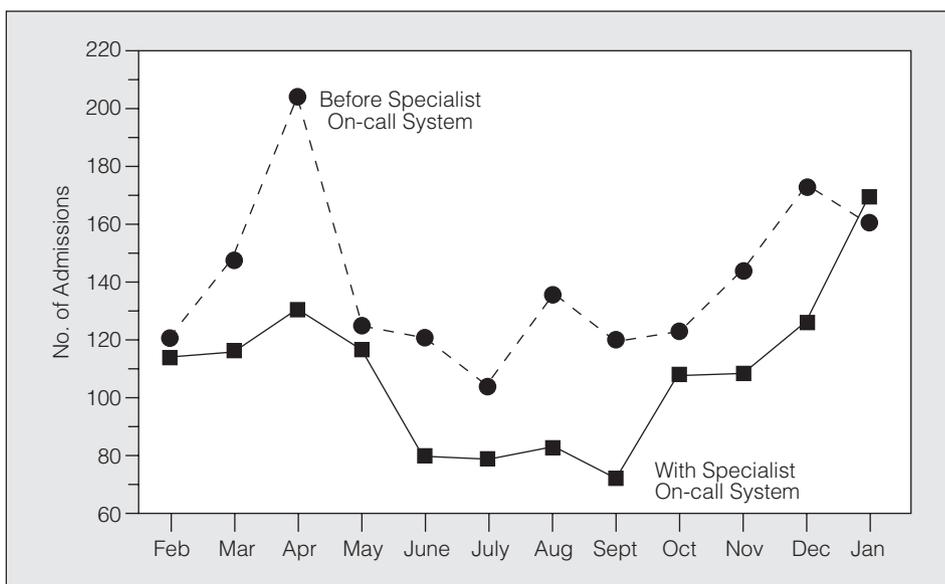


Figure 2. Number of admissions per month. Circles (broken line) correspond to data obtained for the year before implementation of 24-hour coverage by an on-site pulmonologist; squares (continuous line) correspond to those recorded afterwards.

reduction in the number of hospital admissions. It also facilitates the performance (or scheduling) of therapeutic and diagnostic procedures that would not be possible without the presence of a pulmonologist. This all helps to improve the health care received and to reduce mean length of stay. Therefore, considered as a whole, these data provide an objective justification for 24-hour coverage by an on-site pulmonologist in reference hospitals such as ours.

Most hospitals in Spain do not have a pulmonologist on duty 24 hours a day, and the main hurdle to overcome before this system can be implemented is usually the financial cost with no clear clinical return. Our results provide evidence against this argument. First, 24-hour coverage by an on-duty pulmonologist prevented 22.3% of admissions per year (31.25 admissions per month), partly as a result of direct discharges, but also because the presence of the pulmonologist makes it possible to streamline the running of specific programs such as the early discharge program¹⁴ or consultations for the rapid diagnosis of lung cancer. Second, 24-hour coverage in the respiratory department was associated with a reduction in mean stay of 0.9 days (that is, a 10% reduction compared with the previous year). This improvement may be due to the following: *a*) performance of the necessary tests (such as bronchoscopy or thoracentesis) during the duty or early scheduling of other tests (imaging tests, polysomnography, spirometry), thus speeding up the diagnostic process (Table 2), and *b*) the early start of the most suitable treatment (drugs, oxygen therapy, noninvasive ventilation), which speeds up recovery, minimizes the risk of complications, and renders intubation unnecessary.²³⁻²⁵ Finally, extending respiratory care beyond the daytime shift can itself improve the quality of health care, since severely ill patients can present at any time and an early start to appropriate treatment is essential for their subsequent progress.²⁴ The availability of trained personnel to ensure continuity of care reduces morbidity and mortality, makes it possible to identify complications early, and reduces the need for admission to intensive care units.^{22,26} Other advantages of 24-hour availability for taking calls are as follows: *a*) it can help to increase the quality of nursing care by reducing the number of patients who are admitted to the wrong department only to be attended by staff with limited expertise in managing these patients and applying respiratory techniques; *b*) it is indispensable for the creation of intermediate care units; *c*) it can favor the development and implementation of telemedicine as a complement or alternative to 24-hour on-site coverage; and *d*) it improves

the training of pulmonology residents in the management of semicritical patients and in the techniques used in intermediate care units.

The main limitation of our study is that it is observational and its results do not allow us to establish causal relationships between the study variables.²⁷ We must also remember that our results could potentially be affected by external confounders, such as seasonal variations or changes in the medical criteria applied.

In conclusion, implementation of 24-hour coverage by an on-duty pulmonologist in our hospital has proven to be an efficient measure that has helped streamline patient turnover. It has also improved the transfer of patients to outpatient diagnosis and care programs that are already running in the respiratory medicine department. Table 2 summarizes the arguments that we feel justify the need for 24-hour coverage by a pulmonologist available to answer calls in a tertiary level reference hospital. Other potential advantages of this type of coverage that have not been evaluated here are the reduction in complications arising from invasive respiratory procedures, the creation of intermediate care units, better training of residents, and the development of telemedicine.

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TABLE 2
Potential Improvements in Health Care Brought About by an On-duty Pulmonologist

<p>Homogeneous admission and discharge criteria Reduction in the number of admissions Reduction in the length of hospital stay Early start for specific respiratory treatments Early scheduling/performance of diagnostic tests Availability for expert opinion Improved transfer of patients to outpatient programs and clinics Reduction in the number of patients admitted to the wrong department</p>
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