

# Importance of a computerised records system in observation units of Hospital Emergency Departments

ENRIQUE ALONSO FORMENTO, MARÍA JOSÉ CALPE GIL, CARMEN MARÍA ROS TRISTÁN, ANA GARZARÁN TEIJEIRO, JESÚS ÁNGEL MARTÍNEZ BURGUI, FERNANDO GALVE ROYO

Emergency Department. Hospital "Obispo Polanco". Teruel, Spain.

## CORRESPONDENCE:

Enrique Alonso Formento  
Plaza Playa de Aro nº 1,  
piso 10, puerta 3  
44002 Teruel, Spain  
E-mail:  
ealonsof@salud.aragon.es

## DATE RECEIVED:

18-5-2007

## DATE ACCEPTED:

29-10-2007

## CONFLICT OF INTERESTS:

None

## ACKNOWLEDGEMENTS:

The authors would like to thank nursing staff in the Emergency Department of Hospital Obispo Polanco in Teruel, Spain, and all the doctors in the Emergency Departments of the hospitals that collaborated in this study.

**Aims:** To assess the value of using an electronic medical record in the emergency department observation unit, and to describe the different types of data records in hospital emergency department observation units of Spain.

**Methods:** Retrospective observational study to review the activity data recorded in our hospital observation unit during the last three years. A telephone survey in 183 hospital emergency departments was also performed, and we obtained information on different types of data records for patients admitted in the observation unit.

**Results:** From 2004 to 2006 9536 patients (10,46% patients admitted) were transferred to our hospital observation unit. The most common diagnoses of these patients were respiratory disease, abdominal and chest pain. The average length of stay of these patients in this area was 9 hours and 20 minutes. Among the 183 hospital emergency departments surveyed, the observation unit was absent in 6,01%, there was a complete electronic data record in 10,47%, and data record lacked in 8,72%.

**Conclusions:** Currently, electronic data records are not widely used in Spanish emergency department observation units. Medical activity at the observation units must be recorded, assessed and evaluated periodically, in order to help to predict the need of medical resources and develop quality markers. [Emergencias 2008; 20: 35-40]

**Key words:** Observation units. Emergency. Informatics. Automatic data processing.

## Introduction

One of the great difficulties in the practice of emergency medicine is to decide, the diagnostic approach and the destination of the patient with a physical exploration and complementary tests. Very often, the clinical evolution of the patient is essential for this process, especially in patients presenting an uncertain initial diagnosis.

Observation units in hospital Emergency Departments (HED) are dedicated to resolving uncertainties in diagnosis or evolution, treating or stabilising acute conditions and assessing the indication for admission to hospital or discharge<sup>1</sup>. These areas must have exclusive trained staff, adequate equipment, and clearly written admission criteria<sup>2,3</sup>.

The usefulness of observation areas has been extensively proven. They reduce the number of

hospital admissions – and therefore the costs – and they improve medical attention<sup>2,4</sup>. These facts have made observation units more important in recent years, enabling a rational use of healthcare resources<sup>5</sup>.

In healthcare institutions, there is a growing interest in information systems, as they constitute a tool that facilitates improvements in healthcare quality and managing resources.

The development of automated data resources in observation units of HED would enable a periodical quantification of indicators, allowing monitoring of healthcare activities over time and ensuring that previously defined levels are accomplished. By doing this, we can introduce actions for continuous improvement.

In fact, some authors recommend establishing a series of quality indicators in observation units that are based in the number of admissions, the

average length of stay, the most frequent clinical diagnoses and average age<sup>2,6-9</sup>.

In the current literature, there are no data about the experience of applying a computerised information system in an observation unit of a HED or about the proliferation of these systems in the different hospitals of Spain.

## Material and method

First, a descriptive study was developed on healthcare activities during a 3-year period (2004-2006) in the observation unit of the Emergency Department (ED) in the Hospital Obispo Polanco in Teruel, in which a computerised records system was introduced.

The hospital is located in the provincial capital, with a reference population of 81,083 individuals. The age distribution of this population is the following: 0.7% of less than 1 year; 11.2% of 1 to 14 years; 61.6% of 15 to 64; 17.3% of 65 to 79 years; 9.1% older than 79 years.

The ED is divided into two well defined areas: bays area (with an average number of 83 patients seen per day and a percentage of admissions of 17%) and the observation area, with 7 beds and the possibility of an additional bed, fulfilling the recommendations of the American College of Emergency Physicians (ACEP)<sup>10</sup>. The department does not have a short stay unit.

In the computerised database, the following data from patients are recorded: name and surname, age, sex, city and province, number of medical record, doctor and nurse responsible for the patient, diagnosis and ICD-9 code, reason for stay, time of arrival, time of admission or discharge, destination, reason for delay and time leaving. These data are collected by nursing staff in the department. The data are later analysed according to the reasons for stay which are divided into four possible motives: a) therapeutic or stabilisation criteria; b) awaiting decision for destination; c) awaiting admission; d) awaiting discharge.

Secondly, a descriptive study of the different data recording systems in hospital observation areas was performed. This was done by carrying out a telephone survey during the months of March and April in 2007 in the civilian general hospitals that had an ED and that were property of the national healthcare system, the autonomous community or public entities in Spain. The hospitals included in the survey are shown in the hospitals list of the 2006 National Catalogue of Hospitals (Catálogo Nacional de Hospitales 2006)

of the Spanish Ministry of Healthcare and Consumer Affairs (Ministerio de Sanidad y Consumo) with the cooperation of Autonomous Communities and the Autonomous Cities Ceuta and Melilla. The catalogue was updated in 2007<sup>11</sup>. In the telephone survey, we asked an emergency physician in the HED if there was an observation area, if there was a data recording system and what type it was. The answers were classified into six groups: HEDs where all is computerised; HEDs with a complete computerised recording system of data; HEDs with an incomplete computerised records system (only the names of the patients are recorded in a computerised format); HEDs with a manual data recording system (generally in a book); HEDs with no recording system; HEDs with no observation unit.

The statistical analysis of data was carried out using SPSS, version 13.0 for Windows.

## Results

From 2004 to 2006, 91,190 patients were seen in the ED of Hospital Obispo Polanco, with 9,536 being admitted to the Observation Unit (10.46% with a mean of  $8.7 \pm 3.3$  patients/day). The mean age was  $64.4 \pm 20.2$  years with a prevalence of the 75 to 90 years of age group (34.1%) and of the male sex (55.2%). The morning shift had the highest percentage of admissions (42%). In terms of day of the week, the highest percentage of admissions took place on Mondays (15.9%) and in terms of months, it took place in August (10.4%). In relation to origin, 88% of patients came from the province itself and among these, 50.6% were from the capital.

The average length of stay in the observation unit was of 9 hours and 20 minutes, with 4.6% of patients staying for more than 24 hours.

In all cases, the person responsible for admission was a physician of the ED and in 8.5% of the cases the admission had been previously discussed with a specialist.

The reasons for stay in the Observation Unit were classified into four types: 61.6% (5873) were awaiting a decision for destination; 33.5% (3199) were awaiting admission; 3.7% (354) needed specific treatment or stabilisation; 1.2% (110) were waiting to be discharged.

Table 1 shows the most frequent types of pathologies leading to admission, the average length of stay, the percentage of people admitted for clinical stabilisation and the percentage of patients admitted to hospital according to the speciality.

**Table 1.** Most frequent specialties of pathologies causing admission to the observation unit of the Hospital Obispo Polanco between 2004 and 2006, average length of stay, patients admitted for clinical stabilisation, and percentages of admissions to hospital

Specialties	N (%)	Average length of stay (hours)	Clinical Stabilisation (%)	Admissions to hospital (%)
1. Internal Medicine	2438 (39.4%)	9.88	3.3%	41.7%
2. Respiratory Medicine	657 (10.6%)	9.64	10.1%	65.2%
3. Surgery	577 (9.3%)	8.13	3.4%	53.4%
4. Cardiology	572 (9.2%)	9.91	10.2%	46.8%
5. Gastrointestinal Medicine	524 (8.5%)	8.68	6.8%	45.9%
6. Trauma	448 (7.2%)	6.33	6.6%	45.3%
7. Urology	258 (4.2%)	8.22	7.4%	37.7%
8. Neurology	227 (3.7%)	8.42	10.6%	42.2%
9. Haematology	83 (1.3%)	11.02	20.9%	23.5%
10. Otolaryngology, head and neck surgery	74 (1.2%)	8	13.5%	35.1%

**Table 2.** Most frequent diagnoses among patients admitted to the observation unit of Hospital Obispo Polanco between 2004 and 2006, average length of stay, patients admitted for clinical stabilisation, and percentages of admissions to hospital

Specialties	N (%)	Average length of stay (hours)	Clinical Stabilisation (%)	Admissions to hospital (%)
1. Respiratory conditions	815 (8.5%)	10.27	2.7%	66.9%
2. Abdominal pain	804 (8.4%)	10.39	2.0%	29.3%
3. Chest pain	802 (8.4%)	8.96	1.5%	27.8%
4. Tachyarrhythmia	553 (5.8%)	12.05	7.2%	37.2%
5. Traumatic injuries	535 (5.6%)	6.64	2.6%	43.4%
6. Syncope	372 (3.9%)	11.28	4.6%	18.2%
7. Diarrhoea syndrome	368 (3.9%)	12.71	5.2%	23.1%
8. Cerebrovascular accident	260 (2.7%)	7.72	0.8%	68.9%
9. Ischaemic heart disease	246 (2.6%)	8.61	3.7%	79.0%
10. Anaemia	230 (2.4%)	12.95	10.9%	25.3%
11. Gastrointestinal haemorrhage	224 (2.3%)	7.99	1.3%	69.6%
12. Vertigo and dizziness	190 (2%)	9.63	5.3%	16.1%
13. Renal colic	183 (1.9%)	8.14	2.2%	33.3%
14. Head injury	164 (1.7%)	9.54	1.2%	13.6%
15. Urinary infection	133 (1.4%)	10.98	3.8%	41.8%
16. Poisoning	127 (1.3%)	10.61	5.5%	28.4%
17. Diabetes	115 (1.2%)	10.20	10.4%	32.5%
18. Biliary disease	112 (1.2%)	7.63	1.8%	77.3%
19. Epilepsy	112 (1.2%)	10.41	5.4%	20.5%
20. Heart failure	105 (1.1%)	8.59	2.9%	86.9%

Table 2 shows the most frequent diagnoses of patients admitted to the Observation Unit, their average length of stay, those admitted for clinical stabilisation and the percentage of patients admitted to hospital. Conditions causing the most prolonged stays in the observation unit were, in order of importance, anaemia followed by the diarrhoea syndrome.

The pathologies of the patients awaiting a clinical decision, in order of frequency, were: epilepsy, chest pain, urinary infection, renal colic, abdominal pain and diarrhoea syndrome. Among the patients that stayed in the unit for more than 24 hours, we found, in order of frequency: respiratory conditions, abdominal pain, tachyarrhythmia and diarrhoea syndrome.

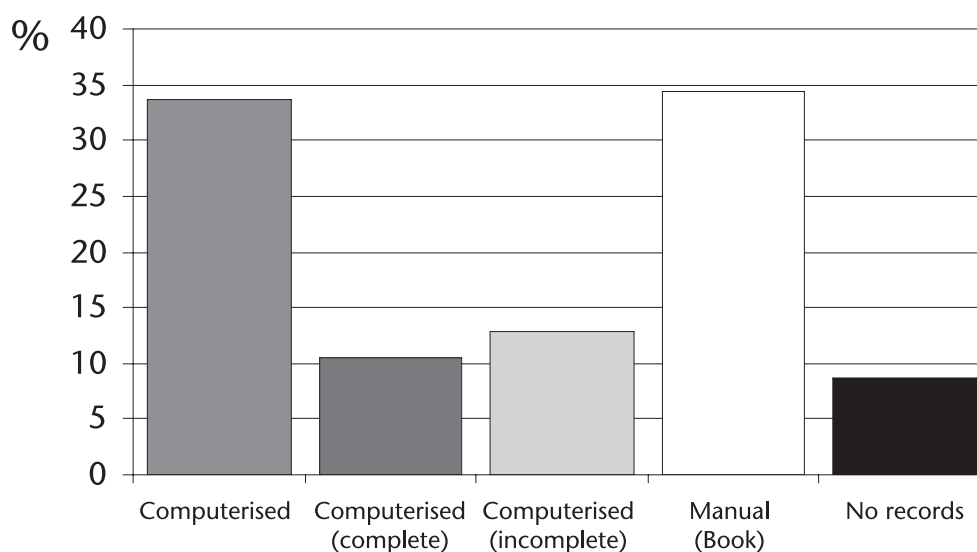
In relation to the patients awaiting admission to hospital, the most frequent pathologies were those belonging to the specialty of internal medicine.

Most consultations carried out before admitting patients to the observation unit were related to surgery and most specifically to biliary pathology (21.3%) and abdominal pain (15.4%).

In relation to the destination of patients, 45.67% of patients admitted to the observation unit were finally admitted to a hospital: 42.14% in the Hospital Obispo Polanco itself; 1.86% in the Geriatrics Hospital; 1.65% was transferred to hospitals with higher care level. Among the rest, 0.6% chose to self-discharge, 2.03% was referred to the outpatients department in the hospital and 51.65% was referred to their general practitioner.

During the three years of the study only 3 patients died during their stay in the observation unit, all of whom were elderly patients presenting complications that could be expected of their pathologies and who were waiting to be admitted to hospital.

Of all the patients admitted to the observation unit during the three years of the study, 7.5% ex-



**Figure 1.** Type of data recording system in observation units of hospital Emergency Departments.

perienced a delay for discharge or for admission of more than 3 hours, after their destination was decided.

Of the 183 HEDs consulted in the survey 11 (6.01%) did not have an observation area. The types of data recording systems of the 172 hospitals with an observation area are shown in Figure 1. Among the HEDs surveyed, 33.72% (58) used computerised medical records. It is of note that among the hospitals that did not have computerised systems for the ED, only 15.79% (18) had a computerised complete register of patients in the Observation Unit. More than half (51.75%) (59) used a manual recording system (book) and 13.1% (15) did not record any data. To sum up, 47.09% of the HEDs consulted had a manual or incomplete computerised records system.

## Discussion

Observation Units of EDs of Spanish hospitals have a variable structure depending on the healthcare complex<sup>3</sup>, but all carry out remarkable work with a high level of performance<sup>2,12</sup>. Our study shows that a significant management of cases is carried out in these areas, which must be recorded in information systems in order to predict the needs for healthcare resources and to carry out a control of the quality of care.

An annual assessment was done in our study. In terms of control, Roig et al<sup>2</sup> recommend an annual analysis of the healthcare activities developed in the area to establish quality controls including length of stay of patients.

The activity developed in this area is a true reflection of the general activity in the ED. The percentage of patients that are admitted to our unit is of about 10% (10.46%), which is the percentage recommended by the Spanish Society of Emergency Medicine<sup>1</sup>. In the Department, there is a higher number of attendances in the mornings and on Mondays, due to a higher rate of referral from Primary care and to more frequent problems to find available beds for admission to hospital. August is the month with the highest rates of attendance due to an increase in tourism activities in the province.

The mean age of the sample was somewhat higher to that described in the articles reviewed in the literature, in which the mean age is of 45 to 70 years, depending on the hospital in question<sup>6,8,13</sup>. This is due to the advanced age of the population treated in our ED. Most of these patients also come from a rural environment (49.4% live in other towns of the province), which conditions the decision of discharge, especially at night time.

In relation to the average length of stay, the figures in the different studies reviewed vary greatly, ranging from 5 hours and 50 minutes<sup>9</sup> to 23 hours and 48 minutes<sup>14</sup>. Our results (9 hours and 20 minutes) are within this interval. In the observation unit, there is a considerable percentage of patients (61.1%) awaiting a decision regarding their destination, especially those with pathologies whose admission or discharge depend on the clinical evolution or on the response to the initial treatment.

The data in our study about individuals awaiting to be assigned a hospitalisation bed show a

figure that is higher than that described in the study by Caballero et al<sup>15</sup> (22%), as many discharges in the hospital take place in the afternoon due to patients living outside the city and also because there is no pre-hospitalisation or discharge lounge. The Internal Medicine Department is the most overcrowded in the hospital and it is also where it takes the longest for patients to be admitted. However, and in accordance with other authors, dividing the observation unit in areas for clinical decision, fast response and pre-hospitalisation is less profitable, and it also interferes in the healthcare dynamics of the HED<sup>3,16,17</sup>.

In terms of most frequent clinical diagnoses, our results are in agreement with those of other studies in that the first three (and those who are going to take more advantage from their stay in the observation unit) are respiratory conditions, abdominal pain and chest pain. The order depends on the hospital in question<sup>13,18,19</sup>. In the first case, it is an admission for a short term treatment and in the last two cases the admission is for diagnostic assessment<sup>2</sup>. Diagnoses that require clinical stabilisation in a high number of cases are, in order of frequency, anaemia, complications of diabetes and tachyarrhythmia. The pathologies that most frequently lead to hospital admission are heart failure not responding to treatment, ischaemic heart disease after determination of cardiac enzymes and complicated biliary disease.

In relation to specialties, Internal Medicine conditions lead to the most frequent admissions to the observation area. Haematology conditions showed the longest average stay and are most frequently admitted for clinical stabilisation. Respiratory conditions are the cause of most admissions to hospital, especially in COPD patients.

Surgical pathologies originate the highest number of consultations to specialists, as the admission to hospital depends on these physicians.

The percentage of admissions in the observation area (45.67%) is similar to that found in American hospitals<sup>6-8</sup> (close to 50%) and lower than that reported in a study carried out in Terrasa (62%)<sup>13</sup>.

Patients who stayed for more than 24 hours are mainly those with respiratory infections, abdominal pain, atrial fibrillation or diarrhoea that respond to treatment more slowly than expected.

As a bias for the present study, we would like to point out that, being a General Hospital with a prevalence of hospital beds dedicated to Internal Medicine, there is a higher percentage of patients that are classified into this group.

In our survey about the type of records, there

was a high percentage of HEDs with a manual recording system (book) or an incomplete computerised format (only the names of the patients). Together they constitute a 47% of all the hospitals with ED that were surveyed. Computerised medical records are used in 34% of HEDs but most do not have a specific, exclusive and personal register of the patients.

## References

- 1 Roig Osca MA. Propuestas para el manejo de las Unidades de observación. *Emergencias* 1998;10:240-4.
- 2 Montero Pérez FJ, Calderón de la Barca Gázquez JM, Jiménez Murillo L, Berlango Jiménez A, Pérez Torres I, Pérula de Torres L. Situación actual de los Servicios de Urgencias Hospitalarios en España (y IV): Áreas de observación. *Emergencias* 2000;12:259-68.
- 3 Muiño Mínguez A, Gil Gómez J, Gabarro N, Segado Soriano A, López Glez-Cobos C, Villalba García MV. Unidad de observación y corta estancia de Medicina en el Servicio de Urgencias. *An Med Intern (Madrid)* 1998;15:138-41.
- 4 Roberts R, Graff LG 4th. Economic issues in observation unit medicine. *Emerg Med Clin North Am* 2001;19:19-33.
- 5 Manual de organización y funcionamiento de los Servicios de Urgencias hospitalarias. 2006. Departamento de Salud y Consumo del Gobierno de Aragón.
- 6 Graff LG. Utilization review. Emergency medicine implications. *Emerg Med Clin North Am* 1992;10:583-96.
- 7 Crenshaw LA, Lindsell CJ, Storrow AB, Lyons MS. An evaluation of emergency physician selection of observation unit patients. *Am J Emerg Med* 2006;24:271-9.
- 8 Burkhardt J, Peacock WF, Emerman CL. Predictors of emergency department observation unit outcomes. *Acad Emerg Med* 2005;12:869-74.
- 9 Gallinas Victoriano F, Herranz Aguirre M, Gonzalez Villar M, Viguria Sanchez N, Clerigue Arrieta N, Olivera Olmedo JE. Activity of a short-stay observation unit in an emergency department of a tertiary Hospital. A two-year experience. *An Pediatr (Barc)* 2005;62:252-7.
- 10 Del Prado Martínez MF, Bravo Salamanca I, Hijano Mir A, Fernández Fernández A, Crespillo Gómez C, Garzón Blanco J. Asistencia en el área de observación de un Servicio de Urgencias del paciente postoperado. *Emergencias* 1998;10:167-72.
- 11 Keeler ML, Donovan MR. Observation areas. En: Riggs LM (ed). *Emergency department design*. Dallas, Texas: American College of Emergency Physicians 1993;185:197.
- 12 Catálogo Nacional de Hospitales 2006, actualizado a 31 de diciembre de 2005. Ministerio de Sanidad y Consumo.
- 13 Ross MA, Compton S, Richardson D, Jones R, Nittis T, Wilson A. The use and effectiveness of an emergency department observation unit for elderly patients. *Ann Emerg Med* 2003;41:668-77.
- 14 Hostetler B, Leikin JB, Timmons JA, Hanashiro PK, Kissane K. Patterns of use of an emergency department-based observation unit. *Am J Ther* 2002;9:499-502.
- 15 Graff LG, Hoseph T. Hospital sie of service. En: Graff LG. *Observation medicine*. Boston: Andover Medical Publishers, Inc. 1993;83-8.
- 16 Keeler ML, Donovan MR. Observations areas. En: Riggs LM (ed). *Emergency department design*. Dallas, Texas: American College of emergency physicians 1993;185-97.

- 17 Caballero A, Garrido I, Montero E, Montilla MA, Herrera J, Navarro A. ¿Por qué ingresan los pacientes en una unidad de observación de un Hospital general? *Emergencias* 1996;8:184.
- 18 Lateef F, Anantharaman V. The short-stay emergency observation ward is here to stay. *Am J Emerg Med* 2000; 18:629-34.
- 19 Tomas Vecina S, Duaso Magana E, Ferrer Tarres JM, Rodriguez Carballeira M, Porta Castejon R, Epelde Gonzalo F. Assessment of the appropriate utilization of an emergency department observation unit with the Appropriateness Evaluation Protocol: analysis of 4,700 cases. *An Med Interna* 2000;17:229-37.
- 

## Importancia de un sistema informático de registro en las unidades de observación de los Servicios de Urgencias

Alonso Formento E, Calpe Gil MJ, Ros Tristán CM, Garzarán Teijeiro A, Martínez Burgui JA, Galve Royo F

**Objetivos:** Evaluar la importancia de un registro informático de los datos en la sala de observación de un Servicio de Urgencias, así como la descripción de los diferentes tipos de registros implementados actualmente en los diferentes Servicios de Urgencias hospitalarios (SUH) en España.

**Método:** Estudio observacional descriptivo retrospectivo que analiza los datos registrados de la actividad del área de observación de nuestro hospital durante los tres últimos años. También realizamos una encuesta telefónica a 183 Servicios de Urgencias hospitalarios. Se recogió información acerca de la forma de registro de los datos de los pacientes ingresados en el área de observación.

**Resultados:** Entre los años 2004 y 2006, 9.536 pacientes (10,46% de los pacientes atendidos) fueron ingresados en la unidad de observación de nuestro hospital. Los tres diagnósticos clínicos más frecuentes de estos pacientes fueron las patologías respiratorias, el dolor abdominal y el dolor torácico. El tiempo de estancia medio de los pacientes en esta unidad fue de 9 horas y 20 minutos. De los 183 SUH consultados encontramos que el 6,01% no disponían de área de observación. De los que sí disponían, el 10,47% tenían un registro informático completo de la unidad de observación y el 8,72% no realizaban ningún registro de datos.

**Conclusiones:** En la actualidad, los registros informáticos están poco difundidos en los SUH españoles. La actividad asistencial llevada a cabo en las unidades de observación debe quedar reflejada de forma que pueda ser posteriormente analizada y evaluada periódicamente, con el fin de prever la necesidad de recursos asistenciales, así como para el desarrollo de indicadores de calidad. [*Emergencias* 2008; 20: 35-40]

**Palabras clave:** Unidades de observación. Urgencias. Informático. Proceso de datos automático.