

Patient safety in emergency medicine: report on 4 years' implementation of a program designed for the Spanish Society of Emergency Medicine (SEMES)

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Emergency departments (ED) and Emergency Medical Systems (EMS) are areas where there is high risk of adverse events and incidents that affect patient safety. In 2008 the Spanish Society of Emergency Medicine (SEMES) initiated a program to promote a patient safety culture in ED and EMS. The program included training in patient safety, the analysis of incidents with and without patient harm, and the development of proactive tools to detect risk during emergency interventions. Outcomes of this program include the establishment of a network of 176 instructors in emergency patient safety and the EVADUR and CULTURA studies to determine the types of incidents and adverse events in our ED and EMS, their causes and preventability, and the level of safety and safety culture within organizations. The results make it possible to draw an emergency service risk map. After 4 years the program has provided information on patient safety in Spanish ED and EMS and allows us to develop guidelines for devising risk reduction strategies for this setting. [Emergencias 2012;24:225-233]

Key words: Patient safety. Emergency health services. Emergency medicine. Patient Safety Program of the Spanish Society of Emergency Medicine (SEMES).

Introduction

Four years ago the Spanish Society of Accident and Emergency Medicine (SEMES) initiated a new strategy aimed at improving patient safety (PS) in health care, in general and specifically in emergency medicine. The program, dubbed SEMES Patient Safety Program, set out a plan of action that SEMES has been developing and recommending over the years to accident and emergency services (SUE in Spanish), to help create a culture of PS

through training and identification of leaders in organizations, to determine the current situation and to design and implement strategies for improvement. We are now beginning to reap the fruits of this work; happily, the activity generated by the SEMES PS Program has been recognized by different bodies and institutions and has become one of the reference plans for PS in Spain¹. The ongoing campaign to improve PS in emergency services supported by the MAPFRE Foundation and the Ministry of Health, Social Services

and Equality is an example. This article reviews the road travelled so far and the milestones passed during the last four years.

What is the SEMES Patient Safety Program?

The PS program for EDs^{2,3} arose in response to concerns about PS expressed by health care professionals. It defines a set of actions that can be grouped into 4 main areas:

1. PS culture and training by various activities and dissemination of information in SUE, as well as the all-important creation of a network of PS trainers which is the main priority of the program^{2,4}.

2. PS research, through projects to determine the status of PS in the emergency department (ED), the level of PS culture in ED professionals, type of incidents, causes, latent conditions and preventability of adverse events (AE) (EVADUR5 study, CULTURA4 study, future study EVADEM) and the promotion of research activities in the network of trainers^{2,6}.

3. Innovation in PS, by developing proactive tools that facilitate continuous improvement and quality of PS in Spanish EDs. In this regard, the design of a map of risks of adverse effects in emergency care is the main project, which has just been validated in a group of 23 Spanish hospitals and is to be presented at this year's SEMES National Congress.

4. Creation of a PS observatory as a reference for emergency professionals, which should come into effect this year.

Risks in the emergency department

It is well known that the ED, together with surgical and the intensive care unit, is probably the area of the hospital with the greatest risk of adverse events⁷. Our EDs attend over 26 million emergency visits per year according to statistics for 2008⁸, constituting the second most important activity in volume within the National Health System, after primary care. This kind of patient demand is not readily programmable – it ebbs and flows according to times of the year, week and day – and the complexity of each visit varies considerably; all this favors the appearance of incidents and increases the risk of adverse events. ED work is characterized by rapid, time-dependent decision-making with scarce information on patient history and characteristics, which implicitly

involves a high risk of error. Moreover, the work involves a high degree of interaction between different professionals, with different procedural practices, as well as the routine use of high-risk medicinal drugs, elements known to be the main latent conditions favoring the occurrence of adverse events^{9,10}. These conditions together with others inherent to the training of professionals and their skills (lack of formal specialist training in Spain, unlike other countries¹¹), portfolios and organization of departments, all contribute to the possibility of errors arising during the course of emergency care^{9,10} (Table 1). However, a common finding in studies analyzing PS in the ED is the high degree of theoretical preventability of the adverse events that do occur, estimated to be around 70%^{5,7,12,13}. This is an opportunity for improvement that should have a positive impact on the population served if the appropriate corrective measures are applied.

Table 1. Latent conditions of risk in the accident and emergency department

| |
|---|
| Patients |
| • Influx |
| • Type and severity |
| • Clinical complexity: |
| – Comorbidity |
| – Aging |
| – Chronic diseases |
| – Clinical variability |
| Professionals |
| • Physicians and Nurses: |
| – Heterogeneous training |
| – Staff, shifts, temporary staff, residents etc. |
| – Lack of patient monitoring |
| • Motivation (burnout) |
| • Experience |
| Communication problems |
| • Professional-patient |
| • Professional-professional |
| • Change of shift |
| Medication errors |
| • Adverse drug reactions (ADRs) |
| • High-risk medication |
| • Communication: |
| – Verbal Orders |
| – Poor handwriting: medical orders, prescriptions |
| – Electronic prescription: "copy and paste" phenomena |
| – No pharmacist review |
| Working conditions |
| • Little information about the patient: |
| – Unknown patient |
| – Difficulty accessing medical records |
| • Interruptions and distractions |
| • Work shifts: |
| – Duty shifts: fatigue, sleep disruption |
| – Shifts: exchanges of information, better No interventions patient |
| • Pressure of work: |
| – Physician/Nurse:Patient ratio |
| – Work overload |
| • Moving the patient |
| • Portfolio of heterogeneous services |

Adapted from Campodarve⁹ and Bleetman¹⁰.

The status of patient safety in emergency care in Spain

The SEMES network of PS instructors

Determining the status of PS in emergency care in Spain has been central to the SEMES Patient Safety Program, and, in particular, the collaboration and different strategies employed by the network of instructors or trainers in PS.

The program started at a time when there was a lack of experts in emergency PS, as well as a diverse range of expertise in PS not necessarily focused on emergency attention. SEMES experience of network training in other areas (AHA Program, SET, ITLS etc.) was useful to design and develop a specific training model for instructors in the program¹⁻³. The instructors underwent a theoretical and practical intensive three-month course. Their mission was to transmit the PS culture to other emergency care professionals, through teaching and research activities in their respective EDs and other organisms at the regional and national level. They are the only professionals recognized by SEMES to provide PS training and advice in hospital and prehospital emergency services and their commitment is renewed periodically (every two years) according to level of activity¹⁻³.

The program has trained and created a network of 176 PS trainers, with another 60 currently in training, distributed among the 17 Autonomous Communities of Spain. Through training activities and research, they have been able to actively involve many more medical professionals working in emergency care (Table 2).

What is the patient safety culture in Spanish emergency services?

From the activities of the PS instructors we have been able to get an idea of the status of the safety culture in Spanish emergency services, reported in the article "Culture of patient safety in the emergency department: results of evaluation in 30 NHS hospitals" by Roqueta et al.⁴. The work, based on the Spanish version of the Hospital Survey on Patient Safety Culture (HSOPS) of the Agency for Healthcare Research and Quality (AHRQ), evaluated 30 EDs located in 13 Autonomous Communities and obtained a total of 1,388 valid responses. The average rating on the degree of safety expressed by ED professionals was 6.1 points. The highest scores were for "Teamwork in the department" and "expectations / actions of those in charge of PS" with 68% and

Table 2. Origin of SEMES Instructors: autonomous community of Spain or other countries. Situation in April 2012

| Origin | Total | Out-of hospital | Hospital |
|-----------------------------|------------|-----------------|-----------|
| Andalusia | 51 | 38 | 15 |
| Catalonia | 37 | 18 | 20 |
| Galicia | 17 | 16 | 1 |
| Comunidad Valenciana | 10 | 2 | 13 |
| Castilla Leon | 7 | 0 | 7 |
| Madrid | 6 | 4 | 2 |
| Castilla-La Mancha | 8 | 3 | 5 |
| Asturias | 6 | 3 | 3 |
| Basque country | 6 | 1 | 5 |
| Canary Islands | 4 | 0 | 4 |
| Aragon | 5 | 0 | 5 |
| Navarra | 4 | 0 | 4 |
| Extremadura | 4 | 3 | 1 |
| Murcia | 1 | 0 | 1 |
| Baleares | 1 | 0 | 1 |
| Total by Aut. Com. | 175 | 88 | 87 |
| Other countries** | 1 | 0 | 1 |
| Total nº Instructors | 176 | 88 | 88 |

*Of a total of 234 students (75% pass rate) in 7 training cycles.

**Other countries: One instructor from Andorra. Aut. Com: autonomous community.

56% responding positively. The lowest scores were for "provision of human resources" and "Support from Hospital Management" with 57% and 47% responding negatively. A total of four dimensions were negatively rated by nearly 50% of the responders and these are clearly areas to prioritize for improvement. The HSOPS survey by AHRQ has also been administered in the prehospital setting, despite lack of validation for use in emergency medical services (EMS). Taking this and regional organizational differences into account, the data obtained (unpublished to date) provide an approximate idea of the degree of PS culture in this area of care. The results, based on 964 surveys, show that EMS professionals value PS more highly than those of EDs, with a mean score of 7.1 points. This is probably due to factors such as the continuous review and testing of materials and equipment, continuous communication between professionals and the central coordinators, and the need for teamwork to ensure member safety which is much more ingrained in EMS providers^{15,16}.

In the comparative analysis between ED and EMS professionals, we would highlight the problem of how errors are treated and how the professional feels like a "second victim" in the event of an error. Indeed, the most negative evaluations in the EMS setting were related to non-punitive response to errors, feedback and communication about errors (Figure 1). This point should be worked on at this level of healthcare and in general. Both media are similar in their type of strengths, but their weaknesses are different. Im-

provement of PS may require different strategies according to the professional setting involved.

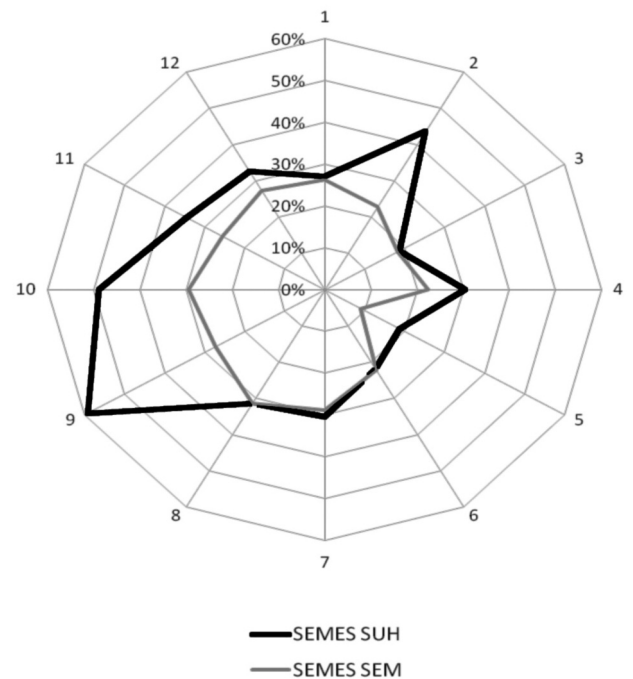
Finally, another aspect is to determine the motivations and interests of professionals regarding PS culture in the ED. A survey administered to emergency professionals (doctors, nurses and pharmacists) regarding the areas of greatest interest at the Second National Conference on Patient Safety in the ED, held in November 2011¹⁷, showed the following: training in PS, experiences and medication issues, ethical and legal aspects of PS, infection prevention and the role of simulation techniques in improving emergency PS (Table 3).

What type of incidents are detected in the ED and why do they occur?

The EVADUR study⁵ represents a watershed in knowledge about PS in the ED. This was a descriptive, prospective, multicenter study carried out in 21 hospitals, with 3,854 patients. The main finding was that at least 12% of patients treated in the ED experienced some sort of incident, of which 54.8% were harmful. Importantly, a significant proportion of the incidents or adverse events (AE) (43%) were only detected after discharge (i.e. late AE), a phenomenon which is ignored in other studies where AE incidence rates are lower. If we consider that about 80-90% of patients attending the ED are discharged⁸, the possibility of the AE being detected and treated at in another level of care is high. One of the most important aspects of the study was assessment of causal factors: about 80% of AE can be grouped into three sections: education, medication and communication. As argued in this study, strategies to improve PS in the ED should take these into consideration (Table 4)^{4,5,12,16}.

Extrapolating the EVADUR study⁵ finding (mortality directly related to AE in the ED: 0.05%) to more than 26 million ED visits in Spain (year 2008)⁸ could mean a total of 12,650 deaths attributable to AE after ED attention. The degree of preventability (about 70% of cases) and evidence of performance failure (evidence in more than 50% of incidents detected) are such that in the ED there is much room for improvement. This can be done if corrective actions are taken in the ED directed toward the causal factors and latent conditions detected.

Although the EVADUR study is probably the main source of information on AE in the ED, there are other tools such as AE notification (for detection and subsequent analysis) that can help define the causes. However, the low reporting rate and,



1. Frequency of adverse events reported / 2. Perception of safety / 3. Expectations-actions of those responsible for the service or unit / 4. Learning organization - continuous improvement / 5. Teamwork in the unit / 6. Frankness and ease of communication / 7. Feed-back and communication about errors / 8. Non-punitive response to errors / 9. Staffing, Human Resources / 10. Management support, leadership regarding patient safety / 11. Teamwork between units / 12. Problems with shift changes and transitions in care.

Figure 1. Safety culture: percentage of negative responses according to hospital (ED) or prehospital emergency services (EMS) for each of the 12 dimensions studied.

above all, poor recording of AE in medical records (according to the EVADUR study, only 17% were noted in medical records) make this system ineffective. While not abandoning this tool, other methods such as briefings¹⁸ can be used in the ED.

The incidence and characteristics of AE occurring in the prehospital emergency setting in Spain are largely unknown and have not been studied. Despite this, we can use data from studies on prehospital emergency care performed in the United Kingdom or USA, although these are based on the performance of "paramedics", so their applicability to our setting is only relative. In this regard, the SEMES program is finalizing a study of AE in the ED (EVADDEM), which will give us a better picture of the situation in Spain.

Actions to improve patient safety in the emergency department

Since the last decade, and before current PS initiatives, EDs have progressively introduced work

Table 3. Survey on areas of interest in patient safety (PS)

| Please rate your interest from 1 to 10 in the following topics | Score |
|--|-------|
| Training and PS in emergency care | 8.2 |
| Experiences in PS and medication | 7.9 |
| Legal and ethical issues in PS in emergency care | 7.7 |
| Prevention of infection in emergency care | 7.7 |
| Simulation in emergency care and PS | 7.6 |
| Experiences in PS and procedures and emergency care | 7.4 |
| Risk Management | 7.3 |
| Reporting and analysis of cases | 7.2 |
| Experiences in PS and communication | 7.0 |
| PS culture in emergency care | 7.0 |
| Quality indicators, accreditation and safety in emergency care | 7.0 |
| Modal analysis of failure and effects | 6.9 |
| Patient participation in PS in emergency care | 6.9 |
| Information and communication technology in PS | 6.8 |

SEMES Survey May-July 2011. N° surveyed: 389.

and management tools that have directly or indirectly contributed to improved PS culture. The implementation of structured triage in the ED19 (with validated protocols) and policies to improve quality (by tracking indicators²⁰) and ED accreditation models²¹ (including safety and risk assessment) have been the most significant developments, promoted especially by emergency medicine scientific societies. There has therefore been a growing awareness and safety culture among the professionals involved²².

The SEMES Program objectives include the development of a safety culture, training and research, specifically in emergency care. This is aimed at improving results and risk prevention, especially once the main problems are known^{1-3,22,23}. Figure 2 shows the relevant presentations at the Second National Conference on Patient Safety in the ED, held in Toledo in November 2011. A total of 80 papers were presented there⁶. Three areas encompass 50% of all these initiatives: analysis of PS culture, PS and medication, and PS procedures, all reflecting the main problems identified in the ED.

The accumulated experience has led to a set of recommendations on strategic actions in the ED aimed at improving PS (Table 5):

1. Continue creating and maintaining the culture of PS in the ED, through dissemination activities and training of professionals. The role of the SEMES network of instructors in the ED is essential to achieve this goal. Periodic evaluation of the safety culture allows knowledge about the degree of progress in this regard⁴. It is noteworthy how all the parameters improve in response to specific actions, except the perception of safety, possibly because ED professionals are more acutely aware of the problems. In some studies, nursing groups have been more critical than other professionals,

Table 4. Causal factors responsible for incidents in emergency care, from the EVADUR* study

| Causes | Frequency (%) |
|-------------------------------------|---------------|
| Improper management of patient | 17.43 |
| Delayed diagnosis | 14.85 |
| Adverse drug reaction | 13.47 |
| Improper application of a technique | 13.27 |
| Diagnostic error | 9.31 |
| Omission of dose or medication | 8.91 |
| Physician-patient communication | 7.92 |
| Improper response to warning signs | 5.74 |
| Physician-nurse communication | 5.35 |
| Poor catheter maintenance | 4.95 |
| Incorrect dose | 4.75 |
| Delay in specialist consultation | 4.55 |
| Nurse-patient communication | 4.16 |

*Adapted from Thomas S et al5. An incident may have had more than one causal factor.

probably because their work involves more hours in contact with the patient^{6,24}.

2. Measure what is happening. It is necessary to continue analyzing and measuring how safe our activity really is, using indicators, as proposed by SEMES²⁰ (about 40% are related with PS), or studies such as EVADUR (including multicenter prevalence) and the ongoing EVADEM study, as well as new activities.

3. Describe, report and analyze incidents that occur. Notification rates are very low and the reasons for this have been analyzed^{25,26}. Despite the development of notification models that seek to homogenize AE reporting to facilitate analysis, such as the notification and learning system for patient safety (SINAPS)²⁷, better results have not been achieved. As an alternative to notification, briefings can provide even more information on daily situations than notifications^{18,23}, and are included in the recommendations of the SEMES Program. However, all these models are of little value if case analysis is not performed. The SEMES program has opted for the method of case analysis described by the London Protocol, by Taylor Adams and Vicent^{28,29}, which allows for a more systemic analysis of causal factors and latent conditions, already being implemented in many hospitals. In this regard, the SEMES program has a database of 350 analyses reported in courses by PS instructors, which is a source of information for the development of strategic improvements.

4. Design and implement proactive risk identification tools in the ED. These tools are designed to detect risks and develop strategies for improvement before AE occur. In this regard, the future map of risks in emergency care, which the SEMES program is developing in collaboration with 23 EDs, will be a key element for this objective. A risk

map using AMFE methodology, based on processes already designed or under construction, is basic for the development of strategic plans to improve PS in the ED³⁰.

5. Promote strategies or programs based on already identified risks. The SEMES Program recommends the development of strategies for the proper management of procedures, care of the patient, communication and medication. Strategies based on simulation can be very useful, particularly in handling procedures and care, as well as communication. The assessment of competencies in the prehospital setting¹⁶ has interesting repercussions for PS.

One of the strategies that has grown in the last two years is PS and medication management. This involves introducing pharmacists in the ED, to deal with pharmaco-therapeutic discrepancies in patient medical records and to reduce medication risks in the ED³¹⁻³⁵. The SEMES program on PS works closely with the group FASTER of the Hospital Pharmacy Society to improve PS, with joint training and research activities in this field³⁶.

The development of the EVADEM project in the prehospital setting, PS training of health emergency technicians (their training is regulated by Royal Decree 1397/2007 and includes quality criteria for service delivery and quality factors such as safety), the development of improvement strategies with patient participation (recently started by certain ED groups⁶) or the treatment of

“second victims” (the professionals themselves) are some of the areas pending attention in the SEMES program of the next 4-year period.

About the campaign: "In the ED, patient safety is in our hands"

Given the importance of actions aimed at improving PS in emergency care, and consequently the work done, SEMES and the MAPFRE Foundation, in collaboration with the Ministry of Health, Social Services and Equality, have established a collaboration agreement for the design and dissemination of a PS campaign entitled "In the ED, patient safety is in our hands". The campaign goal is to convey to ED professionals ten recommendations to reduce risks in urgent health care. Messages are based on the causes of at least 80% of AE in the ED, according to scientific evidence, and an analysis of the safety culture in the ED^{4,5,12}. The messages, listed in Table 6, are aimed at ED professionals and will be disseminated through posters and leaflets, and through the media of the participating institutions.

Conclusions

The SEMES Patient Safety Program is helping to spread the culture of safety among ED profes-

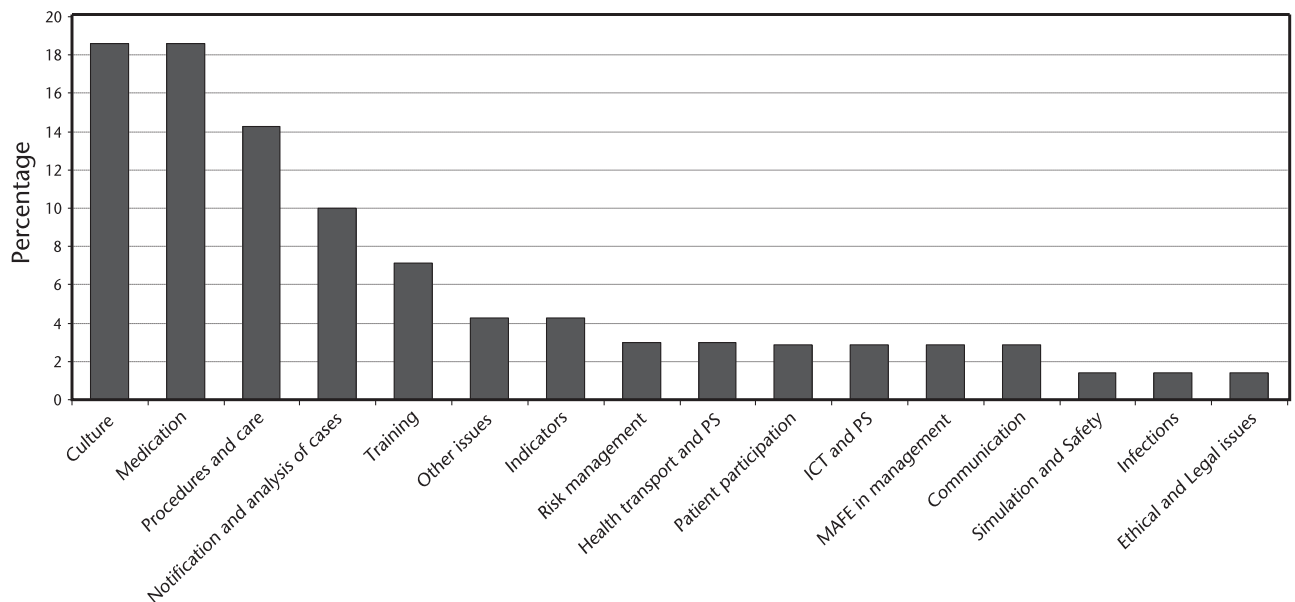


Figure 2. Thematic areas of the papers presented at the Second National Conference on Patient Safety in Emergency Services (Toledo, November 2011). Results in percentages of a total of 80 presentations⁶. ICT: Information and communication technology; PS: patient safety, MAFE: modal analysis of failure and effects.

Table 5. Strategies for improving patient safety (PS) in the emergency department (ED)

| Strategies | Recommendations |
|------------------------------------|---|
| Create a culture of safety | Disseminate a culture of safety Training in PS Information campaigns |
| Measure what happens | Indicators of safety Incidence studies (EVADUR/EVADEM) PS culture evolution |
| Detect and analyze | Notification of adverse events Briefings Triggers Case analysis |
| Proactive tools for risk detection | Risk maps |
| Specific improvement programs | Pharmacist in the ED Training in management of procedures and care processes Simulation Communication systems Patient participation strategies Treatment of «second victims» |

sionals and has allowed us to gain a better understanding of the status of PS to be able to establish specific strategies for improvement. All of these strategies may be developed in different ways, but the continuous evaluation of each one is essential to determine their effectiveness and whether they help achieve the objectives of continuous improvement of safety and quality of care.

And these specific strategies in the ED can be combined with institutional strategies and campaigns, such as hand washing, surgical verification list, the identification of patients, prevention of infection related to health care or others that may influence PS in the ED. All are complementary and help achieve a common goal: to reduce risks in health care.

Table 6. Campaign message: "In the ED, patient safety is in our hands"

- Clean hands.** Perform hand hygiene with alcohol-based preparations in the 5 moments recommended by WHO. This will reduce the risk of infection.
- Know the patient like the palm of your hand.** Always check his/her identity and verify the medical history. This will help avoid confusion.
- A firm hand with medication.** Make sure the prescription is right, check for allergies, identify the drug, adjust the dose and administer it correctly. This will reduce medication risks.
- Check it out firsthand.** Verify that biological samples and tests correspond to the patient. This will help avoid erroneous decisions
- A firm hand with the tests and procedures.** Avoid ordering unnecessary tests, X-rays, vascular access, etc. This will help reduce risks and ensure better use of resources.
- Shake hands with our patient.** Explain clearly what you propose to do and the alternatives, answer their questions and get them involved in decision making. This will minimize communication errors.
- Work with your hand on your heart.** Recognize errors, report incidents, assist in their analysis and promote measures to prevent repeat incidences. We will win all if all do better.
- Lend your colleagues a hand.** All indications should be clearly written and personally delivered. Transmit the relevant patient information at shift changes and transfers. This will facilitate safer patient care.
- Leave it in other hands.** Get help when you need it and avoid ordering any test or procedure if you have doubts. This will help eliminate unnecessary risks.
- In good hands.** Rate the patient's pain and identify warning signs during your stay in the ED. Adequately protect the frail and those at risk of falling. This will favor wellbeing and safety: the patient will thank you.

*Campaign promoted by the SEMES, the MAPFRE Foundation and the Ministry of Health.

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La seguridad del paciente en urgencias y emergencias: balance de cuatro años del Programa SEMES-Seguridad Paciente

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Los servicios de urgencias y emergencias (SUE) son áreas asistenciales donde existe un alto riesgo de incidentes y eventos adversos, que afectan, por tanto, a la seguridad del paciente (SP). El Programa SEMES-Seguridad Paciente inició una estrategia hace cuatro años (2008) en los SUE enfocada a la difusión de la cultura de seguridad, la formación en SP de los profesionales, el análisis de los incidentes con o sin daño en los SUE y el desarrollo de herramientas proactivas para la detección de riesgos durante la atención urgente. Como fruto de ello se ha generado una red de instructores de SP para SUE, compuesta actualmente por 176 profesionales; se ha desarrollado el estudio EVADUR y CULTURA, que han permitido conocer tanto la incidencia de sucesos adversos en dichos servicios, sus causas y evitabilidad, como el grado de seguridad y cultura de las organizaciones; y finalmente se ha elaborado un mapa de riesgos de la atención urgente. Todo ello ha permitido, no sólo conocer la situación en SP de los SUE, sino recomendar y desarrollar estrategias específicas enfocadas a la reducción de riesgos para el paciente derivados de la asistencia en los SUE. [Emergencias 2012;24:225-233]

Palabras clave: Seguridad paciente. Urgencias. Emergencias. Programa SEMES-Seguridad Paciente.