



# EDUCATION FOR HEALTH

## ORIGINAL RESEARCH PAPER

# Continuing Medical Education and Evidence-Based Clinical Pathways. Training Emergency Health Workers in Latium, Italy

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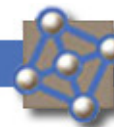
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## ABSTRACT

**Background:** In recent decades, studies that evaluate training programmes have shown that continuing education for physicians is not very effective in improving performance and behavioural changes. One of our goals was to create a Continuing Medical Education Programme (CMEP) that would result in changing the behaviour of health professionals. In early 2005, a new CMEP was offered to emergency medical services and emergency room professionals to introduce an Emergency Critical Pathway (ECP) for the management of acute stroke patients. This paper illustrates the main characteristics of the educational model and the strategies and activities adopted to realize it.

**Methods:** The training programme was planned and organized applying the concepts and tools of experiential learning. It was organised in three successive phases: 1) interviews with health professionals to identify their learning needs; 2) training the ECP coordinators/facilitators in a residential setting; and 3) on-site training in small groups of health professionals (6-8), led by a coordinator/facilitator.

**Results:** The CME involved 324 emergency health professionals. Participants positively evaluated both the educational programme and the clinical indications of the protocols. Over six months of the ECP training, health professionals treated 657 stroke patients: 153 (23.3%) were transferred to the stroke unit where 15 (9.8%) were thrombolysed. In the same period of the



previous year, the professionals treated 638 patients: 99 (15.5%) were transferred to the stroke unit and no patients were thrombolysed.

**Conclusion:** The application of the new educational methodology has contributed to improved management of stroke patients in Latium.

**Keywords:** Stroke, experiential learning process, clinical pathways, continuing medical education

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## Introduction

Cerebrovascular accidents (CVA) have great impact on social and health systems due to their high incidence and mortality rate. They are the third highest cause of death in industrialized countries, after cardiovascular disease and cancer, and 50% of those who survive have some form of disability (Warburton, 2004). Globally, cerebrovascular accidents are a major cause of disabilities in adults. Consequently, CVAs require considerable health service resources to resolve the medical emergencies during the acute stage, to reduce complications in the post-acute phase and provide rehabilitative care.

To address these issues, new training techniques need to be developed for health professionals to manage and treat stroke patients at all stages of the illness, from acute to rehabilitative care, emergency room physicians and nurses, emergency medical technicians, paramedics, neurologists, etc. (Behrens, 2002).

In recent decades, studies that evaluate training programmes have shown that continuing education for physicians is not very effective in improving performance (Thomson O'Brien et al., 2003; Davis et al., 1992; Davis et al., 1995). Traditional training methods, courses and other means of directly transmitting information do not produce behavioural change in professional practice (Cantillon & Jones, 1999).

Healthcare workers, even after being exposed to new interventions and knowledge, continue to operate according to their own established, habitual procedures, demonstrating the necessity of introducing new and more effective training methods (Crandall, 1990).

Results from the scientific literature in the field of education have reaffirmed that experience and self-evaluation have important roles in learning and developing professional abilities. The educational approaches adopted in this project are in line with the experiential learning tradition (Dewey, 1961; Kolb et al., 1984) and largely founded on the so-called "peer review" strategy for continuing education and quality improvement (Grol & Lawrence, 1995). On this basis, educational principles were established to guide the entire process that comprised of the following: a) connection between what is learned and daily practice, with reflection on personal experience as the point of departure to acquire new knowledge and abilities; b) continuous comparison and application of new information or recommendations to daily practice; c) focus on behaviour and attitude change, as well as on the acquisition of knowledge; d) contextual learning, adapted to the real life situations of the participants; e) development of a habit to evaluate oneself in clinical practice and the ability to analyse mistakes; f) emphasis on communication, to perfect and enrich the health professional-patient relationship; g) emphasis on group learning; and h) initiation of cultural change and renewal in professional practice. In particular, the specific learning needs of emergency personnel were studied regarding management of acute stroke patients, in order to plan a training course based on their current knowledge. The motivation for learning an innovative procedure



to use in clinical practice or for changing an individual's behaviour would originate, in this way, from the worker's evaluation of his or her own experience against a predetermined behavioural model (Adelson et al., 1997).

Before the project, stroke patients in our region were frequently not referred to a stroke unit and there were no protocols regarding the management of these patients for the emergency medical system (EMS). For these reasons, the "Clinical Pathways for the management of critical CVA patients in the Emergency system (ECP)," designed by the Agency of Public Health of the Lazio region (APH), were presented to regional EMS personnel. The goal of the application of these protocols is early detection and referral to the most appropriate ward for treatment.

To evaluate a potential behaviour change in emergency health professionals after ECP training for the management of stroke patients, an experimental study was performed in some of the emergency facilities in the metropolitan area of Rome (centre and suburban districts) (AGENZIA DI SANITA PUBBLICA DELLA REGIONE LAZIO (2005) Ferri et al., 2005). The procedural training, which started in early 2005, was developed for the entire emergency management team, physicians and nurses from the emergency medical services (EMS) and emergency departments (ED) throughout the area. The training programme was based on the needs of the health professionals, and it combined both residential and on-site training. The APH coordinated the project and was responsible for managing, planning and conducting every step of the training.

This paper presents a new Continuing Medical Education Programme (CMEP), adopted for emergency health workers in the Lazio region of Italy to improve early diagnosis and referral of suspected stroke patients. It illustrates the objectives of the project, the main characteristics of the educational model, and the strategies and activities adopted to realize it.

## Methods

The training programme was preceded by an organizational phase, with the establishment of a central coordination team, composed by the authors of this article. Guided by the experiential learning perspective, the central team then organised three successive phases for the training programme, in a way that reflection on professionals' own practice could provide the starting point for learning. The training phases consisted of: 1) interviews with health professionals to identify their learning needs; 2) training the ECP coordinators/facilitators, in a residential setting; 3) on-site training, with small groups of health professionals (6-8), groups of continuing education professionals (GCEPs), led by a coordinator/facilitator.

### 1. Identifying learning needs

To determine the learning needs of the various professionals working in the emergency departments and ambulance services, 15 professionals were interviewed using a questionnaire specific to their role (see Figure 1). The interviews were conducted by an expert and audio-recorded. The interview was divided into three sections, with the following open-ended and multiple choice questions: 1) information about the health professional's training and years of experience in emergency medicine; 2) discussion of a personal experience with a stroke patient; and 3) general information about the management of emergency patients. The interviewees were asked to focus on any limitations they perceived in emergency stroke management related to clinical and general management aspects. The learning needs identified in this phase constituted the basis for planning the educational activities. All limitations that emerged in the professional knowledge and practice were addressed through the implementation of the ECP.



Training Background, Position	Personal experience of managing stroke case	Current management of emergency patients
<p>Physician <input type="checkbox"/></p> <p>Nurse <input type="checkbox"/></p> <p>Rescuer <input type="checkbox"/></p> <p>Driver <input type="checkbox"/></p> <p>How long have you worked in the emergency department or Emergency Ambulances System 118? _____</p> <p>Institution/Setting where you presently work _____</p> <p>Training courses completed _____</p>	<p>Have you ever treated a patient with suspected stroke? yes <input type="checkbox"/> no <input type="checkbox"/></p> <p>Describe what happened on one occasion in which you treated a patient with suspected acute stroke. (Organizational and treatment aspects).</p> <p>Things to keep in mind during the case story (Emergency Ambulances System personnel): Did you contact the emergency call center to inquire about the patient's destination? What were the organizational difficulties? Did you perform all procedures or therapies to stabilize the patient? Which ones? Did you collect all of the information useful for managing the case? Was this information correctly reported on the ambulance chart?</p> <p>Things to keep in mind during the case story (emergency department personnel): Were you notified of the patient's arrival (for ambulance arrivals)? Did you report the ambulance code (for ambulance arrivals)? Did you exchange information with the crew (for ambulance arrivals)? Did you triage the patient?</p> <p>Were appropriate diagnostic procedures and therapies performed on the patient? If yes, which ones? _____</p> <p>Did you record all of the information useful for management of the case (Case history, risk factors, current treatment, etc)? Was this information recorded on the computerized clinical chart? Was the complete case information reported on the special stroke section of the computerized clinical chart? Was the neurologist on-call consulted (if dictated by protocol)? Was immediate transfer to the Stroke Unit dictated by protocol (if the case in question required it)?</p>	<p>Emergency Ambulances System personnel</p> <p>Do you contact the emergency call center to inquire about the destination of the patient?</p> <p>What are the most common organizational difficulties?</p> <p>Do you perform all procedures or therapies to stabilize the patient? If so, which ones?</p> <p>Do you collect all the information useful for managing the case?</p> <p>Is the information always reported correctly on the ambulance chart?</p> <p>Are you notified of the arrival of a patient with acute stroke (for ambulance arrivals)?</p> <p>Emergency Department personnel</p> <p>Do you report the ambulance code (for ambulance arrivals)?</p> <p>Are appropriate diagnostic and therapeutic procedures performed on the patient?</p> <p>Do you collect all the information for managing the case (case history, risk factors, current treatment, etc)?</p> <p>Is this information reported on the computerized clinical chart?</p>

Figure 1: Assessing health needs of emergency health personnel



## 2. Residential training for the ECP group coordinators

The coordinators/facilitators of the ECP groups were selected based on experience in education, leadership abilities, and work experience, and trained by the central team during the residential course held at the APH.

In line with experiential learning and the peer review strategy, the residential ECP training started with a video case discussion (see Figure 2), based on issues gleaned from the interviews previously described. The starting point of learning was therefore, a reflection of a real case derived from participants' experiences. This constructed a link between new information to be acquired during the course and participants' daily practice, and favoured contextual, collaborative learning. In this way, the training programme could reflect the project's educational principles.

Following the initial case discussion, the ECP were presented in lecture format. This allowed the participants to organize the information, and compare it with the discussions from the initial group work. Then the participants were divided into groups, and were asked to apply the ECP tools, comparing the new methodology with their daily practice. A film was shown of the initial case managed according to ECP protocols, putting into action one of the key principles of experiential learning; the acquisition of new skills by reflecting on personal experience. Finally, the coordinators/facilitators participated in a teaching/learning session that taught them how to be group facilitators.

## 3. On-site training and monitoring of the ECP application on acute stroke patients (on-the-job continuous education)

Following the residential course, the on-site training was carried out in the EMS stations in the participating areas. As mentioned earlier in the introduction section, on-site training is based on the emphasis on group learning, the contextual learning of the ECP, and the development of the habit of evaluating professional behaviour. The methodology and the educational package used for the on-site training was adopted from the one already elaborated for the residential training. This phase lasted one month.

The coordinators of each EMS station were coached through all educational activities by some facilitators, selected and trained during the residential course. The coordinators were also supposed to provide the necessary administrative support for the organization of the training (personnel involvement, selection of records of patients, etc.).

Following the on-site training, on the job continuous education (monitoring) sessions were conducted monthly with groups composed of six to eight EMS personnel (GCEPs). The groups met to measure professional performance through discussion of the cases in terms of medical practice and appropriateness of the organizational choices. Feedback on each patient's outcome from the Stroke Unit was given to health professionals, to improve their performance and stimulate motivation. The monitoring sessions were facilitated by the facilitator and the residential coordinator.

During each monitoring session all information was collected regarding suspected stroke cases. This was useful to provide the basis for the technical discussion and to monitor the results of the educational activities. The continuous education sessions lasted six months.



**1) Emergency call to the Emergency Ambulances System (118 call center) arrives at 21.30**

A woman says: my father feels sick and he needs an ambulance.

The 118 operator asks: what happened (trauma/illness)? Your father can talk, breathe? How old is he?

The woman answers: my father is speaking badly, he's 64, come quick!

The 118 operator asks: where do you live?

The woman answers: I live Via on Roma 14 in Monterotondo.

The operator says: I'm sending an ambulance now.

The operator: defines the code (yellow for illness at home) and decides to send the closest ambulance (Advanced Life Support –ALS- or Basic Life Support –BLS-).

**2) On the scene**

The BLS ambulance arrives.

Nurse: follows the ABCs and gives triage code (yellow), takes vital signs, observes that the patient speaks badly and is not moving well, has a BP of 160/90, the cardiac frequency is rhythmic, a pulse of 100 bpm;, notifies the 118 call center that they are taking the patient to the Monterotondo closest hospital.

**3) Transportation to the hospital**

During the ambulance ride the nurse does nothing.

Arrives at the closest hospital (with a first aid ward).

Hour 22.20 the BLS nurse leaves the patient and exchanges information with the nurse on-call at the first aid.

**4) At the hospital**

In the first aid ward the nurse performs: ABC, triage, takes vital signs.

The physician assisting the patient performs: an ECG, a clinical exam, general medical history, blood coagulation tests, hemachrome, neurologic exam (possibly performing the National Institute Health-Stroke Scale-NIHSS), does not conduct a computerized tomography –CT- because the service is closed at that hour.

The patient has yellow triage, glycemia 120 mg/dl, BP 140/85, NIHSS not available, or neurologic exam, dysarthria, complete left-side hemiplegia, blood coagulation at 23.15: International Normalized Ratio INR 0.90, Platelets (PLT) 350.000; ECG: hour 23.00: sinus rhythm.

The emergency physician, based on the information, believes that the patient was affected by a suspected stroke and gives him the ICD-9 diagnosis code of cm 435!

The physician sends the patient to the another hospital (with an Emergency Department but without a Stroke Unit), by shuttle (without notifying the 118 emergency call center), to conduct a CT.

**5) Transport to a facility with CT**

During the transportation in the shuttle the nurse does nothing.

**6) At the second hospital**

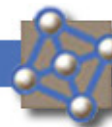
Hour 00.30 The patient arrives at the hospital in Tivoli.

The emergency department physician performs a CT.

Hour 01.30 The CT does not show evidence of cerebral haemorrhage and the emergency department physician decides to admit him to the ward of internal medicine of the hospital.

**Instructions: analyse this case with colleagues and identify the criticisms.**

**Figure 2: Case example: 64 year old patient with suspected ischemic stroke and onset symptom < 6 hours at home at 21.00**



Continuous behavioural self-assessment resulting from group case discussion led to implementation of effective stroke management skills. Indeed, innovative models of continuing education, as the one applied in this project, are based upon continuous monitoring of practice. The success of the implementation of the ECP depended also on the cooperation and support from the local health authorities in providing the necessary resources.

To evaluate potential behaviour change of emergency health professionals involved in the CMEP, the study was designed as a pre-post observational study, in which the cohort stroke patients assisted by health professionals after the training programme were compared with a cohort of stroke patients assisted by the health professionals in the same period of the previous year.

## Results

### *1. Learning needs observed*

The interviews with the emergency personnel (Figure 1), in addition to preparing the best possible training, served to highlight potential difficulties or complexities in the emergency system that might be faced during the implementation of the ECP. The following limitations emerged: a) data were collected by Emergency Ambulance System personnel on paper, and were not regularly computerized; b) coordinating the actions of the emergency team was often difficult; c) many emergency medical technicians did not have sufficient training for managing stroke patients; d) communication between hospital emergency departments, the dispatcher, and emergency medical technicians, regarding the most appropriate mode of patient transportation was difficult and sometimes absent altogether; e) the emergency department triage code often disagreed with the triage code given by the operators; f) there were no universal, standardized procedures shared by the emergency network for managing acute stroke patients. All these limitations emerging during the assessment were addressed through the implementation of the ECP, by introducing improvements in terms of the management of stroke patients through standardized procedures, coordination within the emergency team and communication between hospitals and emergency systems.

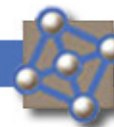
### *2. Residential training*

The residential course for the coordinators was repeated three times, involving a total of 63 emergency health operators, 17 physicians and 46 nurses from the emergency network. Course evaluations completed at the end of training by all participants, were very positive. More than 70% of emergency personnel evaluate as good or excellent the efficacy of the programme, the educational quality of the training and the relevance of the subjects addressed with regard to their learning needs.

### *3. On-site training and monitoring the ECP application*

The on-site training involved 163 physicians and nurses, as well as 98 drivers and technicians employed by emergency departments and the Regional Emergency Ambulance. The course evaluations of the on-site training showed that the participants were highly satisfied. Sixty percent of participants evaluated as good or excellent the efficacy of the programme, the educational quality of the training and the relevance of the subjects addressed with regard to their learning needs.

The continuous education sessions increased interest from the EMS personnel, who, by discussing the cases in terms of clinical and organizational aspects and being aware of the patient's final outcome, felt more involved and motivated to achieve positive results. They also expressed willingness to apply the same training methodology for the management of other diseases.



#### 4. Overall results

Overall, 324 people participated in the two types of training, about 75% of all the eligible health personnel involved in the CME. The positive effects of the experiential learning process were demonstrated in the pre-post observational study results. In fact, over six months of the ECP training, health professionals treated 657 stroke patients: 153 (23.3%) were transferred to the stroke unit where 15 (9.8%) were thrombolysed. In the same period of the previous year, the professionals treated 638 patients: 99 (15.5%) were transferred to the stroke unit and no patients were thrombolysed.

## Discussion

The ECP training follows the peer review model and targets the management of stroke patients according to evidence-based protocols. The number of health professionals who participated in the training was high (75%), although continuous turnover of personnel prevented complete participation. Other factors that may have interfered with participation were the distance between facilities, some communication problems within the system and lack of professional incentives.

Despite the difficulties addressed, the participants were enthusiastic about both residential and on-site training, as demonstrated by the results of the course evaluation and by observational study feedback. The personnel involved evaluated the training course positively, both for having acquired new therapies for stroke treatment and for having learned an innovative treatment model for these patients.

The case simulations were considered useful by the participants to determine how well current patient management reflects reality. These prompted classroom discussions about what occurs in the field, allowed the participants to work in groups, and to compare current practice with what is dictated by ECP stroke protocols.

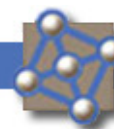
The on-site training, conducted at the emergency department and the various regional emergency facilities, was found to be particularly useful. This was most true for the emergency operators, because the training sessions were offered at the workplace and because they gave the emergency personnel the chance to exchange opinions, and to talk about the problems they encounter daily, in terms of clinical procedures, training and organizational needs. The continuous education sessions increased interest from the EMS personnel, who, consequently, felt more involved and motivated to achieve positive results.

The educational programme helped to overcome some of the critical points identified in the emergency system during the interviews. Overall, relevant improvements were found with respect to the following: coordination mechanisms within the emergency system, skills for managing stroke patients, communication among the emergency health professionals on the mode of patient transportation, and utilization of standardized procedures.

## Conclusions

Our experience suggests that managing stroke patients according to standardized procedures increases the likelihood that they are taken to the most appropriate facility. Increased referrals to the Stroke Unit for stroke patients treated by professionals after the CMEP is a good indicator of the success of the training, which is certainly a benefit for those patients who successfully underwent thrombolysis. The positive results reinforced how successful the programme was in overcoming the limitations in professional





practice and in fulfilling the educational needs identified by the assessment prior to the training. The application of the ECP method for patients with acute stroke helped standardize behaviours in an environment characterized by great professional heterogeneity, as in the region of Lazio. It also improved patient treatment both in terms of response speed and use of appropriate therapies. This type of programme allowed the participants to realize that updating treatment practices can lead to better outcomes.

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