

# Case management programs in emergency department to reduce frequent user visits: a systematic review

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**Abstract.** *Background and Aim:* Inappropriate visits to the Emergency Department (ED) by frequent users (FU) are a common phenomenon because this service is perceived as a rapid and concrete answer to any health and social issue not necessarily related to urgent matters. Could Case Management (CM) programs be a suitable solution to address the problem? The purpose is to examine how CM programs are implemented to reduce the number of FU visits to the ED. *Methods:* PubMed, CINAHL and EMBASE were consulted up to December 2018. This review follows PRISMA guidelines for systematic review, as first outcomes were considered the impact of CM interventions on ED utilization, costs and composition of teams. *Results:* Fourteen studies were included and they showed patients with common characteristics but the FU definition wasn't the same. Twelve studies provided a reduction of ED utilization and seven studies a cost reduction. The main tool used is the individual care plan with telephone contact, supportive group therapy, facilitated contacts with healthcare providers and informatics system for immediate identification. The CM team composition is heterogeneous, even if nurses are considered the most used professional figures. *Conclusions:* In contrast with a standardized method, a customized approach of CM program helps frequent users in finding an appropriate answer to their needs, thus decreasing inappropriate visits to the ED. ([www.actabiomedica.it](http://www.actabiomedica.it))

**Key words:** case management, emergency service, patient care planning, vulnerable populations, frequent users

## Introduction

Emergency Department (ED) is facing the issues of overcrowding and lengthy waiting times due to a disproportionately elevated number of visits (1, 2). The ED is perceived as a rapid and concrete answer to any health and social issue not necessarily related to urgent matters. Moreover local services are often bypassed because they are perceived as little efficient (3). The visits to the ED for non-urgent matters range between

9% and 54.1% in the USA, between 25.5% and 60% in Canada, and between 19.6% and 40.9% in Europe (4).

Many studies have underlined the presence of frequent users (FU) who often aren't in need of urgent aid and could receive better cares in a different setting compared to that of the ED (1, 3, 5). According to a systematic review carried out in the USA, FUs are identified as patients who visit the ED at least 4 times a year (or 3 times a month) (1). They represent between 4.5% and 8% of the patients who use the pro-

vided service and between 21% and 28% of all the ED medical activity (1). These patients are often defined “vulnerable” patients (6) because they have a low social and economic status (7) and they have difficulties in taking care of themselves independently, especially when complications and exacerbations of their chronic condition arise (8, 9). As a result, non-urgent visits to the ED increase and many healthcare resources are used (5, 10).

To tackle this issue, many healthcare systems are trying to implement new organizational set-ups both in hospitals and territorially (11), among those the Case Management (CM) program (12, 13) which is a collaborative approach used to assess, plan, facilitate and coordinate healthcare related matters (14). It aims at meeting patients’ and their families’ health needs through communication and available resources, thus, improving individual and healthcare system outcomes (15, 16). The CM can be implemented through programs that include various social activities as well as provide clinical assistance such as the individual care plan (ICP) (17), support group therapy (18), assistance in obtaining stable housing (19), linkage to medical care providers (20, 21) and telephone contact (20, 22).

## **Aim**

The aim of the study is to examine if and how the CM programs are implemented to reduce the number of FU visits to the ED.

## **Methods**

### *Design*

A systematic review was carried out. All types of articles (observational and experimental) in English were considered potentially suitable. PubMed, CINAHL and EMBASE were consulted up to December 2018 and the studies published in the last 10 years were taken into account because this review aimed to explore the current trends. This review was undertaken in accordance with the PRISMA guidelines (23).

### *Inclusion and exclusion criteria*

We included the studies that describe CM intervention, considering FU adult patients who visit the ED for any kind of clinical or social purpose or who are in need of assistance. Limitations concerning sex, ethnicity, co-morbidity or other characteristics were not applied. Studies indicating CM programs which were developed and implemented both by a single professional figure (doctor, nurse, social worker) and by a multidisciplinary team were taken into account. The studies indicating the composition of the CM teams and the patients’ medical-nursing pathway were analyzed. Limitations regarding the duration of the program and the implementation modalities were not imposed. As first outcomes of interest, were considered the impact of CM interventions on ED utilization, costs and team composition.

### *Search strategy*

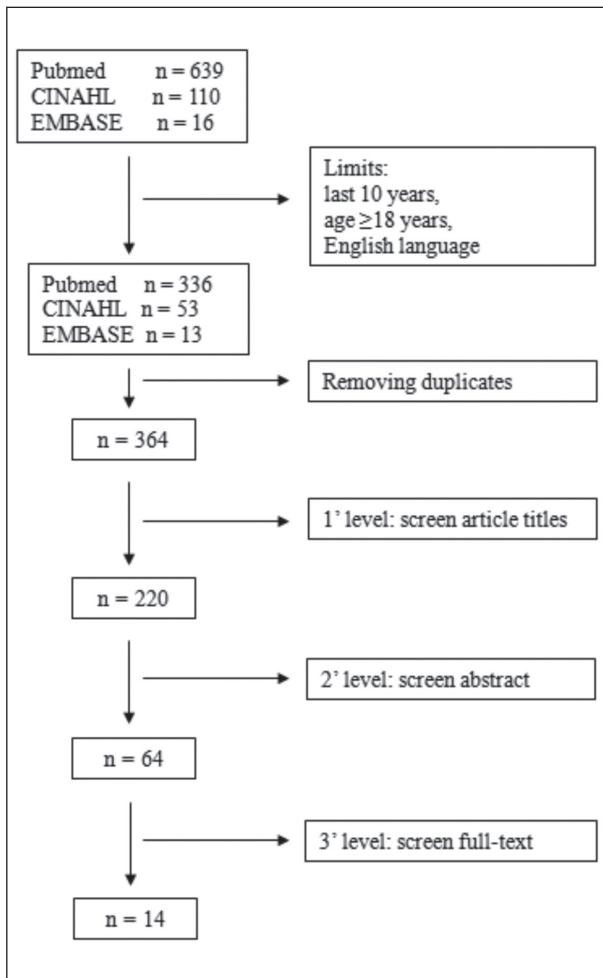
The key terms used in the literature search included: “frequent user\*”, “frequent attender\*”, “emergency department\*”, “Hospital Emergency Service\*”, “Emergency Unit\*”, “Accident and Emergency Department”, “Emergency Room\*”, “case management”, “case manager”, “patient care management”.

### *Search outcomes*

Considering the large number of publications resulting from the bibliography search, an evaluation process based on three levels was used. They were: appropriateness of the titles, evaluation of the abstracts and of the full-texts.

Each evaluation level was analyzed separately by two authors who examined all the bibliographic references judging whether they were potentially suitable. The results of each level were compared and a third author solved any disagreement. Figure 1 shows the search strategy flow diagram used to obtain the results.

After having selected the articles that would be included in this research, two of the authors used a standard Excel module to extract the data. Any disagreement which arose during this stage was solved by means of a third author.



**Figure 1.** Search and selection flow diagram

Fourteen studies corresponding to the research criteria were found: 7 randomized controlled trials, 4 prospective observational and 3 retrospective observational studies.

#### *Quality appraisal*

The quality of the approved studies was assessed by using the CASP checklist (24, 25). This tool is made up of a list of questions. Each question is awarded from 1 to 11 points. The quality of each article was assessed by two authors independently. Any disagreement was dealt effectively through the aid of a third author. The marks of the selected articles were recorded in the last column of Table 1.

## **Results**

The details extracted from the chosen studies were synthesized in Table 1.

The selected studies analyzed 6031 participants undergone CM interventions, the majority were males with mean age 46 years. The study target population was heterogeneous and mainly consisted of people suffering from chronic conditions and socioeconomic issues, such as, for example, alcoholism (26), mental illnesses (26-31), illegal substance use (28, 30-34), homeless status (32, 35), chronic obstructive pulmonary disease (30, 32) and cardiovascular diseases (29, 30). Four studies (29, 33, 34, 36) showed that pain is a frequent reason for patients' ED visits.

Eleven studies gave a precise definition of the amount of annual and monthly visits to the ED that identified the patient as a FU. In the analyzed articles FU are people who visit the ED 5 (26, 27, 31) or 6 (21, 32) or 10 (28, 34) or 12 (33) times or more in a year, 3 (29, 34, 37) times or more in six months, 6 (33) times or more in three months, 4 times or more in a month (33, 34) and 3 (36) times or more in 3 days. These numbers remain unvaried but may be combined in different ways according to the study they are recorded in (33, 34). Two studies (30, 35) did not report a specific metric for frequency of use.

Concerning CM interventions, eight studies (21, 26-28, 30, 33, 34, 36) created ICPs. Four studies (27, 29, 32, 37) recognized the importance of telephoning patients directly, thus, simplifying the course of their treatment. Among these treatments, a study (29) showed that motivational support was given too. Four studies (21, 26, 29, 37) facilitated contacts with healthcare providers and two studies (26, 32) organized group meetings with patients who needed the same kind of treatment. Two studies (30, 33) showed how patients enrolled in CM programs were immediately identified by the computerized system guaranteeing them appropriate treatments. Two studies (27, 31) included home visits and ambulatory care. Two studies (26, 35) guaranteed that homeless people receive an apartment through social services. Only in a study (26) patients were enrolled in treatment pathways defined by other departments.

Analyzing the selected articles, differences among CM team compositions stood out. In seven studies

**Table 1.** Summary of selected studies (n=14)

AUTHOR (YEAR)	JOURNAL	COUNTRY	TYPE OF STUDY	NUMBER OF ED-ACCESS	FREQUENT USERS CHARACTERISTICS	FOLLOW UP	CASE MANAGEMENT TEAM	INTERVENTIONS	MAIN FINDINGS	CASP QUALITY SCORE
Boekmann et al. (2017)	Gen Intern Med	Switzerland	RCT	≥ 5 in a year	125 patients, male 57.2%, mean age 48.5 years. Chronic condition, medical co-morbidity or psychiatric illness.	1 year	4 nurse practitioners and 1 chief resident.	ICP, providing intervention in an ambulatory care, hospital or home setting. Telephone contact with case management team.	Reduction of ED access: -19% (P=.048).	10/11
Ching et al. (2014)	Hong Kong J Emerg Med	China	Prospective observational	≥ 3 visits in 3 days	14 patients, male 78.6%, mean age 43.3 years. Cases were divided into the pain management or chronic disease group according to their chief complaint.	6 months	Physicians, primary care physicians, psychiatrists, social workers and pharmacologists.	ICP dynamically with internal ED information system.	Reduction of ED access: -58.5% (P=.004).	9/11
Crane et al. (2012)	Ann Board Fam Med	USA	Prospective observational	≥ 6 in a year	36 patients, male 55.6%, mean age 34 years. Chronic pain, 75%, substance abuse 47%, COPD/asthma 17%, homeless 19%.	1 year	1 family physician, 1 nurse case manager and 2 behavioral health providers.	ICP, group appointment, direct telephone access and sessions with the care manager.	Reduction of ED access per month: -35% (P<.001). Reduction of costs (ED and inpatient) per patient per month: -80% (P<.001).	10/11
Edgren et al. (2016)	Eur J Emerg Med	Sweden	RCT	≥ 3 in 6 months	473 patients, male 43.6%, mean age 69.5 years. Generalized or unspecified pain diagnosis, hypertension, ischemic heart disease, atrial fibrillation.	2 years	Nurse case manager.	Telephone-based intervention, facilitated contacts with healthcare providers, coxeted patients' disease self-management and supported interactions with social services.	Reduction of ED access: -14% (P=.007). Reduction of costs per patient per year: -16% (P=.004).	10/11
Grover et al. (2016)	Emerg Med	USA	Prospective observational	≥ 12 in a year ≥ 6 in 3 months ≥ 4 in a month	533 patients, male 32.2%, mean age 42.6 years. Chronic conditions 71.4%, chemical dependency evaluation/ding abuse treatment 30.7%, pain management 25.0%.	From 1 month to 8 years	ED nurse and nurse case manager.	ICP based on chronic medical problems and reasons for repeat ED usage. Patients were "flagged" in the ED information system for immediately identify.	Reduction of ED access per month: -56.5% (P<.001).	10/11
Grover et al. (2018)	West J Emerg Med	USA	Retrospective observational	≥ 10 in a year ≥ 6 in 6 months ≥ 4 in a month	138 patients, male 44.9%, mean age 42.4 years. Substance use 63.5%, pain management 60.4%, physician 16%.	19 months	Registered nurse, emergency physicians, social workers, ED nurses, chemical dependency providers, behavioral health registered nurse, case managers and representatives from local insurance providers.	ICP.	Reduction of ED access: -49% (P<.05). Reduction of costs: -41% (P<.05).	11/11
Moschetti et al. (2018)	Plus One	Switzerland	RCT	≥ 5 in a year	125 patients, male 50%, mean age 46 years. Social difficulty 74.4%, somatic problem 72%, mental health problem 49.6%, risky behavior 30.4%, not having a primary care physician 16%.	1 year	4 nurses and 1 general practitioner.	ICP, providing intervention in an ambulatory care, hospital or home setting and telephone contact with case management team.	No reduction of ED costs: -19% (P=.29).	10/11
Peddie et al. (2011)	N Z Med J	Australia	Prospective observational	≥ 10 in a year	87 patients, male 40%, mean age 35 years. Diseases: medical 45%, psychiatric 29%, substance/alcohol abuse 26%.	4 years	Nurse, ED consultant, medical specialists, psychiatric services and social workers.	ICP.	The interventions and the control are insufficient to prove the utility.	10/11
Reinius et al. (2013)	Eur J Emerg Med	Sweden	RCT	≥ 3 in 6 months	211 patients, male 40.3%, mean age 62.6 years. Hypertension 26%, ischemic heart disease 19%, chronic obstructive pulmonary disorders 9%, heart failure 15%, anxiety disorders 9%, generalized or unspecified pain 41%, atrial fibrillation 18%.	1 year	Case management nurses.	Telephone calls: motivational conversations (13%), support for patient self-care (17%), education on basic medical issues (18%), providing contact with counselors (3%) or social services (5%), providing contacts with primary care physicians (14%) primary care nurse (5%) and help to establish contacts or appointments at other healthcare facilities (15%).	Reduction of ED access: -20% (P not available). Reduction of costs: -45% (P=.004).	11/11
Sadowski et al. (2009)	Jama	USA	RCT	Not define	201 patients, male 74%, mean age 47 years. Homeless adults with chronic medical illnesses median duration of homelessness of 30 months.	18 months	Social worker with post-graduate specialization.	Provision of transitional housing and subsequent placement in stable housing.	Reduction of ED access: -24% (P=.03).	10/11
Shah et al. (2011)	Med Care	USA	Retrospective observational	≥ 6 in a year	98 patients, male 59.2%, mean age 46.6 years. Diseases of pancreas 15.56%, asthma 6.67%, Charlson comorbidity 2 years index, mean 1.4.	2 years	Not identified the professional profiles.	ICP, schedule appointments, arranging for support services, discharge plans and communication with providers.	Reduction of ED access: -32% (P<.001). Reduction of costs per patient per year: -26% (P<.001).	9/11
Shumway et al. (2008)	Ann J Emerg Med	USA	RCT	≥ 5 in a year	167 patients, male 75%, mean age 43 years. Mental disorders (22%), injury (16%), diseases of the skin (8%), endocrine disorders (5%), digestive system disorders (5%), respiratory illnesses (5%).	2 years	Nurse practitioner, a primary care physician and a psychiatrist.	ICP, assessment, crisis intervention, individual and group supportive therapy, linkage to medical care providers, referral to services when needed, assistance in obtaining stable housing and income entitlements.	Reduction of ED access: (P=.01) no single number or percentage available. Reduction of costs per patient: (P=.01) no single number or percentage available.	11/11
Stegopoulos et al. (2017)	Plus One	Canada	RCT	≥ 5 in a year	83 patients, male 47%, mean age 42.7 years. Anxiety disorders 61.5%, mood disorders 63.9%, psychotic disorders 25.6%, substance misuse disorder 53%, personality disorder 25%.	1 year	Not identified the professional profiles.	Home visits, crisis intervention, supportive therapy, practical needs assistance and care coordination, aiming to integrate hospital, community and social care and improve continuity of care.	No reduction of ED access -14% (P=.31).	10/11
Stokes-Buzzelli et al. (2010)	West J Emerg Med	USA	Retrospective observational	Not define	45 patients, male 75%, mean age 48 years. Substance abuse problems 89%, mental illness 72%, various medical co-morbidity as asthma, COPD 44%, hypertension 64%.	2 years	ED attending physician, ED medical social worker, ED mental health social worker, ED psychologist, ED resident, ED clinical nurse specialists and a student healthcare volunteer.	ICP, use of health information technologies and electronic medical record systems for immediately identify.	Reduction of ED access: -25% (P=.046). Reduction of costs per patient per 2 years: -25% (P=.049).	9/11

Legend: COPD chronic obstructive pulmonary disease, ED Emergency Department, ICP individual care plan, RCT randomized controlled trial

(26–28, 30, 32, 34, 36) an actual multidisciplinary team was recognized. It was made up of various professional figures with specific characteristics who collaborated to guarantee that local services took responsibility for ED patients. Three studies (29, 33, 37) deemed professional nurses specialized in CM to be the main CM protagonist. In an article (35) social workers with a post-graduate specialization were considered central in CM, whereas two articles (21, 31) didn't clearly define what kind of professional figure carried out the task but only identified him/her with the Case Manager.

Ten papers showed as main finding the decrease in visits to the ED (from 14% to 58.5%) and in only three studies (28, 29, 31) the results were insufficient to prove this utility. Furthermore, seven studies (26, 29–33, 37) reported a reduction in health costs (from 16% to 80%).

The duration of the most significant follow-up was 2 years (21, 26, 30, 37) followed by 1 year (27, 29, 31, 32). Fewer studies showed 6-month (36), 18-month (35), 19-month (34) and 4-year (28) follow-up periods. Only one study showed a 1-month to 8-year follow-up (33).

## Discussion

Despite being a heterogeneous group of patients, the most significant categories of those enrolled are: addiction to illegal substances, mental illness and homeless. These data correspond to the study of Ko et al. (38) and to the systematic review of LaCalle et al. (1).

Concerning the regularity of visits to the ED which identify the FU, findings show that patients who visit the ED  $\geq 5$  times a year and  $\geq 3$  times in 6 months are the most represented categories; in fact, a definition of a FU varies in the literature (30). It is interesting to note that no study considered patients who visit the ED a minimum of 4 times a year as FUs, moreover, only one study enrolled patients who visited the ED at least 3 times a month (criteria found in the literature regarding the definition of FU patients) (1). Not all the chosen studies used specific FU definitions.

The ICP is the most used tool in answer to the patients' needs. It is based upon the needs that brought each patient to turn to the ED. The ICP has been car-

ried out in different ways: structured telephone calls are deemed of great importance. The reason is simple: telephone calls enable the program to reach people at greater distances; hence, it is possible to guarantee a constant presence even when a physical meeting cannot take place. This reduces the risk of losing patients enrolled in the program to minimum levels (38).

Placing direct telephone calls also enables an immediate access to the National Health System in case of emergency. This could lead to considering direct telephone calls the gold standard of implementation; however, the evidence is still insufficient to judge them as such.

It is relevant to note how an early warning system and a clear communication method were used in two studies among health care suppliers to identify the FU.

Nine studies showed the significance of the roles of nurses working both individually and in a team. The reason could be that they take a holistic responsibility of their patient due to their nature and training.

The study of Shah et al. (21) doesn't specify who the professional case manager is, however it can be assumed it is a nurse due to the tasks he/she carries out. The study of Sadowski et al. (35) underlines the role of social workers defining them a point of reference for patients, since their job is to analyze and deal with homeless patients' needs. Considering this perspective, it is interesting to observe that the outcome of this analysis isn't just the decrease in the number of ED visits but also of the hospital use. This could be explained with a drop in admissions for social reasons, such as the inappropriate admission of a patient as a result of no alternatives as to where he/she should turn to instead.

The study of Moschetti et al. (39) analyzes the costs of the CM program implemented by Bodenmann et al. (27) allowing a more in-depth analysis of costs and interventions.

## Limits

Comparing the selected studies is difficult to carry out since said studies are little heterogeneous in terms of number of patients, methods used and FU definitions.

Some of the studies referred to healthcare realities are rather different in relation to organizations, structures and roles according to their country of origin. Hence, considering the composition of the CM teams, some professional figures cannot be compared because they exist only in some health care systems. The selected studies varied in the amount of details given to describe CM interventions making it challenging to assess the intervention scale and intensity.

Most of the studies focused only on one ED and didn't consider whether the patients, both enrolled and not enrolled in CM program, had had further contact with other local EDs.

## Conclusion

The review shows that in contrast with a standardized method, a customized CM approach helps FUs in finding an appropriate answer to their needs. The ICP takes patients' individual needs into consideration more than any other tool programming well-aimed interventions with the objective of satisfying them, and consequently, reducing visits to the ED and, in some cases, healthcare costs. The CM process must make use of hospital and territorial services, continuously integrating the medical and the social dimensions. Since FUs are a complex population for EDs, appropriate actions are needed to reduce their access.

Considering the global aging of population and the increase in chronic pathologies health care systems should implement policies of global care of the patient and of his/her family context. The CM can be a tool which should be applied with different methods. It could be desirable to carry out CM models also in the Italian EDs where there are no published studies.

**Conflict of interest:** None to declare

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