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Overcrowding in emergency departments: Organisational strategies—Cingolo project and fast track

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ABSTRACT

Background and Objectives: Emergency Department (ED) overcrowding, understood as the disproportion between the demand for health care and the resources available, is a critical issue impacting patient safety, care quality, and healthcare system efficiency. This study examines the strategies implemented at Perugia Hospital to address overcrowding and optimize hospital resources. **Methods**: Key initiatives include the Cingolo project, aimed at improving patient admissions through better management of bed availability and early discharge, and the introduction of fast track pathways for specific specialties like ophthalmology and ENT, which streamline patient care and reduce waiting times. **Results**: The Cingolo project significantly improved hospital stay efficiency, reducing inpatient days by 2179, resulting in a financial saving of €1.55 million. Additionally, the fast-track pathways helped reduce ED overcrowding and waiting times, enhancing patient satisfaction. Organizational measures such as the establishment of a permanent technical table, bed manager roles, and the integration of community services for post-discharge care were also key in managing patient flow. **Conclusion**: Future improvements include expanding day service packages, creating a short stay unit, and refining the use of the ED's Short-stay intensive observation unit. These efforts highlight the importance of coordinated care and resource management to tackle ED overcrowding, ensuring timely, appropriate, and cost-effective patient care.

Key words: Emergency Department overcrowding, Cingolo project, bed management, fast track pathways, healthcare efficiency

INTRODUCTION

The Emergency Department (ED) is dedicated to immediately meeting the assistance requirements retained to be urgent by the population. On the basis of this definition, the ED's mission seems complex: to guarantee timely, appropriate and optimal responses and interventions for patients who arrive at the hospital in an unscheduled manner.

In a situation where the normal operation of the Emergency Department is hindered by the disproportion between the healthcare demand, consisting of the number of patients waiting and in care, and the available physical, human and/or structural resources needed to meet this demand, we speak of overcrowding.

One noteworthy element is the fact that peaks of overcrowding within the Emergency Department lead to undesirable and very significant consequences in terms

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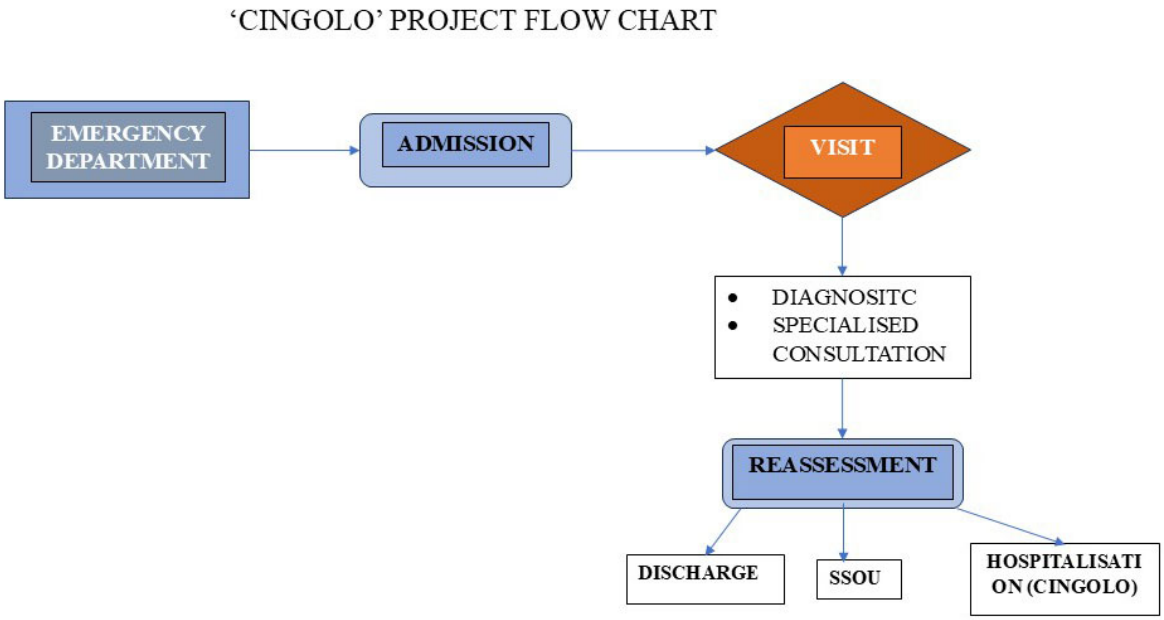

Figure 1. Cingolo project flow chart.

of quality of care and safety for patients and operators, as well as an inadequate guarantee of delivery of essential levels of care.

The main negative consequences of overcrowding primarily affect patients: worsening outcomes (increased adverse events and higher mortality), delayed assessment and treatment, increased number of patients voluntarily leaving without having received treatment and reduced patient satisfaction. An overcrowded ED also affects healthcare operators and the organisational system, through non-adherence to good clinical practice guidelines with an increased risk of errors, rerouting of ambulances with a consequent reduction in their availability, especially for emergency aid interventions, and difficulty admitting patients to hospital because of a lack of beds in the multidisciplinary units most suited to them.

The negative effects of overcrowding also include the inappropriate use of short-stay intensive observation units (SSOU) in the ED which, because of a lack of beds in the hospital wards, admit an increasing number of patients who would normally merit a standard admission to hospital. This leads to a shortage of observation beds for pathologies compatible with this setting and, paradoxically, to an additional need for beds in the wards for patients who should be in the SSOU.

MATERIALS AND METHODS

The organisation of the Perugia Hospital in situations of overcrowding at the Emergency Department is governed by well-defined organisational procedures, to optimise and harmonise the modus operandi. Specifically, to handle different unexpected events that could affect hospital resources and particularly the Emergency Department, the following operational procedures have been drawn up:

- Procedure managing the PEIMAF (Internal Emergency Plan for Large-Scale Casualty Influx);
- Operational procedure: Large-scale hospital influx in case of influenza epidemics/heat waves;

The common objective is to redirect consultancy and diagnostic activities and and to support admissions to the most appropriate hospital facility.

To ensure that the problem is taken care of and to allow an adequate response to the needs of citizens turning to the Emergency Departments, the Perugia Hospital Management Office has also introduced strategies aimed at containing/eliminating the phenomenon of overcrowding through organisational actions, such as:

(a) Cingolo project (*Bridging project*);

(b) Activation of fast-track pathways from the ED to the Ophthalmology and ENT specialities for patients affected by conditions solely dealt with by these

departments.

Cingolo project

The aim of this project (Figure 1) is to apply a method for distributing admissions from the Emergency Department to the medical speciality wards, improving the appropriateness of the admission itself and simultaneously implementing strategies for an early and protected discharge.

The project adheres to the National Guidelines for The Development of A Management Plan for Overcrowding in Emergency Departments[1]—Ministry of Health 2019 and regional guidelines: *"Regional programme for the integrated management of patients in the Emergency Department through implementation of the following guidelines, in accordance with regional government decree DGR no. 803/2022: Management plan for overcrowding in Emergency Departments*" which is fully implemented by our hospital.

The modus operandi of the Cingolo project requires that each medical speciality ward be prepared to receive a defined number of admissions from the ED on a daily basis. The ED undertakes to distribute the admissions according to the number defined for each ward, regardless of the bed occupancy and bearing in mind the relevant pathology.

Umbria regional decree DGR No. 445 of 28/04/2023: regional programme for the integrated management of patients in the emergency department. adoption, in accordance with DGR No. 803/2022, of the following guidelines:

"in-hospital triage", "short-stay intensive observation units (SSOU) guidelines" and "management plan for overcrowding in emergency departments"[2–5]

To calculate the number of medical beds due (Table 1), the history of utilisation of acute beds by the Emergency Department was analysed, considering both the COVID-19 period and the previous phase. The historical figure for Emergency Department admissions in the Medical Speciality is around 10%. Based on the above numbers, the Emergency Department will automatically carry out daily medical admissions, distributing patients between the beds assigned to each ward in the procedure.

Therefore, each ward must make available to the Emergency Department, on a daily basis (from 8:00 a.m. to 8:00 a.m. the following day), the number of beds stated in the above table.

The ward will thus have to guarantee the established free beds on a daily basis (24 hours), also through proper management of patient discharges, which will have to be assessed from the time of admission. If beds cannot be guaranteed because of overcrowding, scheduled admissions will have to be postponed in order to rebalance the influx of admissions as quickly as possible. In the event of unavailability of the beds due, admission will first be made to another Multidisciplinary Unit in the same Department and, in the second instance, additional beds will be added.

Table 1: Number of beds due in different departments counted in 2022 at the Perugia Hospital

Department/Unit	No. of beds due
Internal Medicine and Vascular Medicine	6
Gastroenterology	2
Clinical Neurology	2
Internal Medicine and Endocrine and Metabolic Sciences	2
Occupational Medicine	1
Geriatrics	3
Respiratory Medicine/Respiratory ICU	1
Internal Medicine	6
Infectious Diseases	1
Nephrology	1
Total	**25**

Weekly meetings were scheduled from the outset of the project, with the participation of all the Directors of the Multidisciplinary Units of the medical specialities included in the Cingolo project, together with the Health Directorate of the Hospital.

The meetings aim to analyse hospitalisation trends from the previous week, sharing the data processed through the Qlik S Hub computerised dashboard. This way, it was possible to detect any critical issues in the project right from the start and to implement the necessary improvements. Moreover, these meetings facilitated learning of the different phases of the process and cooperation between professionals, in order to ensure cooperation throughout the work group.

Fast track pathways

The fast track pathway (Figure 2) is a care response model for minor emergencies that occur at the ED, to be applied to patients who show signs and symptoms or have a case history of a condition that clearly indicate one specific speciality.

The Perugia Hospital has active fast track pathways for two specialisms:

(1) Ophthalmology, dating back to 1 December 2021;

(2) ENT, dating back to 1 December 2022.

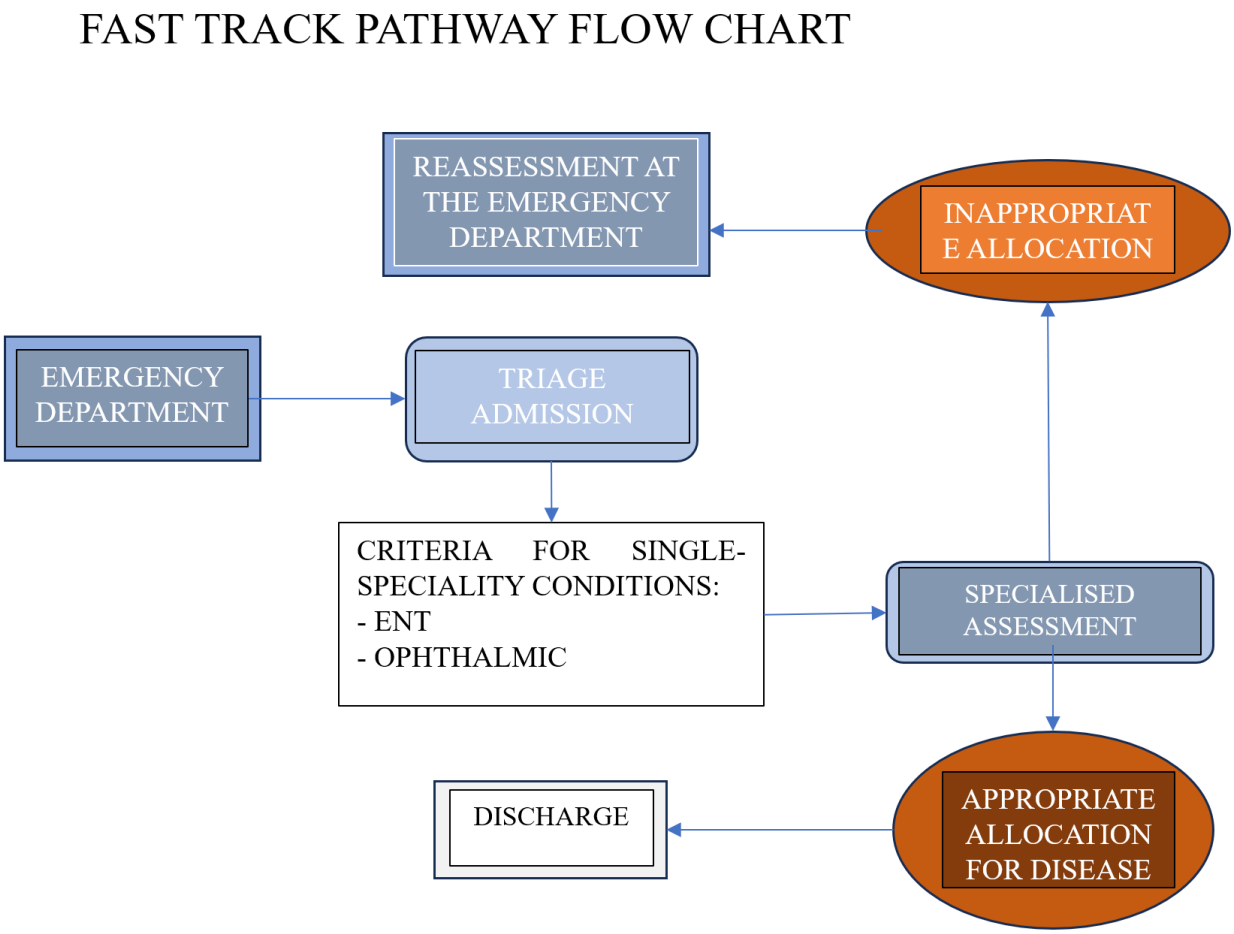

Figure 2. Fast track pathway flow chart.

The organisational pathway includes:

- Identification of specific inclusion and exclusion criteria for the application of fast track pathways for nursing management;
- definition of the computerised fast track triage sheet;
- training of triage staff;
- creation of a monitoring system of the process, using specific indicators.

The training of staff within the hospital's competence involved experienced triage staff with an appropriate training period together with specialist doctors to share the criteria.

The fast track pathway is activated by the Emergency Department triage nurse who, after ascertaining the user's health needs, sends the user directly to the reference outpatient clinic if they present a picture suggestive of a pathology falling within a list of conditions defined and agreed between the Emergency Department and the Ophthalmology or ENT Clinic.

Clinical responsibility is taken over by the specialist doctor providing the examination, who only accesses the patient list of that specific pathway and closes the report using the same application as the Emergency Department.

Re-entry of the patient into the general Emergency Department pathway is possible if, based on the list of clinical presentations agreed between the Emergency Department and the Ophthalmology or ENT Clinic, the referral is inappropriate.

The fast track pathways is guaranteed for 12 hours.

RESULTS

Cingolo project

The reference period examined for the comparison evaluation was November/December 2022 to January 2023 (Table 2, columns A and B) compared with November/December 2023 to January 2024, period during which the project was implemented, which was

Table 2: Comparison data for Cingolo project

	A Nov.–Dec., 2022	B Jan., 2023	A + B Total	C Nov.–Dec-, 2023	D Jan., 2024	C + D Total	(C + D) - (A + B) Total
Number of patients	1803	899	2702	1830	847	2677	-25
Mean admission (days)	10.53	9.79		9.33	9.03		-3.16
Trimmed mean hospitalisation (days)	9.15	8.65		8.65	8.16		-1.49
Mean weight of the DRG	1.25	1.24		1.26	1.29		0.03
Days of admission	17,230	8259	25,489	15,662	7648	23,310	-2179
Number of patients	1803	899	2702	1830	847	2677	-25

DRG: diagnosis related group

started on 18/11/2023 (Table 2, columns C and D).

The data reported in the table show a significant improvement in indicators of organisational appropriateness, such as:

- A reduction in the mean hospital days, while maintaining a similar number of patients admitted to hospital (-25);
- Increased mean weight of the *diagnosis related group* (0.03);
- Significant reduction in the overall number of days in hospital (-2.179).

Moreover, slots for performing imaging and diagnostic tests were also made available and human resources were optimised, with a consequent improvement in overall cost efficiency.

In 2023, FADOI, the Italian Scientific Society of Internal Medicine, conducted a survey on 98 hospital facilities in Italy, which revealed that there are approximately 1 million admissions per year to internal medicine wards and that at least half involve patients over the age of 70. Furthermore, over 50% of these patients extend their hospital stay by an average of one week beyond medical necessity, resulting in approximately 2 million excess inpatient days.[6]

Considering that the mean cost of an inpatient day is € 712 (date from the OECD), the health cost amounts to over one and a half billion per year.

The data from the Perugia Hospital are in line with the survey, showing that patients admitted *via* the cingolo project to medical speciality wards have a mean age of 73.1 years, while the median and the modal ages are 78 and 85 years, respectively. On the other hand, with regard to health costs, the reduction of 2179 inpatient days has lead to a financial saving of €1,551,448.00.

Fast track pathways

The activation of fast track with initial assessment in triage for an obvious single speciality leads to an immediate request for a consultation in the relevant ward. This eliminates the first visit to the Emergency Department outpatient clinic, which could prove to be inconclusive, and reduces the waiting time required for a specialist visit.

With the introduction of fast-track pathways, we have therefore witnessed:

- Reduced ED overcrowding;
- Shorter waiting lists and overall time spent at the ED admissions;
- Reduced number of patients voluntarily leaving without having received treatment;
- Increased user satisfaction.

DISCUSSION

To facilitate the procedure operationally, a series of organisational actions was implemented by the Medical Directorate:

Establishment of a permanent technical table, coordinated by the Medical Directorate and consisting of the Emergency Department Director, the Bed Management Head, the Medicine I and II Department Directors and supported, in data control, by the Management Control Office, through the use of the Qlik S Hub computerised dashboard. The Technical Table has the task of monitoring the application of the method (with particular attention to scheduled admissions to the wards) involving all the Directors of the Multidisciplinary Units of the medical speciality.

Optimisation of procedures to ensure continuity of care, by assessing care needs during hospitalisation to facilitate the transfer of patients with conditions that no longer require high-intensity medical care to Community Services, but do require integrated socio-healthcare management aimed at reintegrating patients into their living environment.

The pathways available are the protected discharge [*from hospital*] to Community Services or transfer to a lower-intensity hospital setting. Indeed, Hospital-Community integration should be optimised and encouraged as much as possible in order to allow earlier and organised discharges, with a positive impact on the duration of hospitalisation and inappropriate readmissions to the ED and/or ward.

Inter-organisational Cingolo project, which aims to simplify the diagnostic-therapeutic pathway of patients between hospitals offering different levels of care, enhancing functional integration between the Perugia Hospital, the reference hub and the Local Health Unit 1 general hospital and optimising the use of beds, thereby improving the appropriateness of admissions to the Emergency Department. The project is applied to stabilised acute patients, subacute patients or chronic patients with exacerbations who attend the Emergency Department of the Perugia Hospital, with an initial need for diagnosis and stabilisation and who, if they require hospitalisation, are subsequently manageable in the medium-intensity medical speciality units of the general hospitals, using the dedicated daily plan for beds and bearing in mind the residency criterion.

Assignment of the function of bed manager who is responsible for:

- Facilitating the referral of patients to the wards, by collecting the needs of the Emergency Department with regard to the type of patients and agreeing with the wards on the timing of referral;
- monitoring scheduled admissions;
- monitoring transfers between wards;
- liaising with the Protected Discharge Office for discharges to out-of-hospital care settings;
- integrating with peripheral hospitals for the "decentralisation" of patients who do not require admission to a level II hub facility;
- managing in agreement with the Hospital Management Office the admissions outside the ward ("supports"): mapping and support in management.

Identification of a discharge officer within each multidisciplinary unit of the medical speciality, who must promptly inform the Bed Manager of the number of daily discharges in order to fulfil the Emergency Department's request for beds.

Definition of the time of admission to the ward for patients coming from the Emergency Department in order to avoid long waits during admission procedures.

The improvement actions planned for the future are:

- Activation of structured pathways in the form of Day Service packages for deferrable conditions, for which non-critical patients can be sent home, but for whom diagnostic and therapeutic pathology packages have been activated (*e.g.*, "diabetes" package, "heart failure" package, "chronic respiratory diseases" package, "inflammatory bowel diseases" package, *etc.*). As such, at discharge, the ED doctor will refer the patient to the relevant specialist on a given date, thereby ensuring the "care pathway".
- Establishment of an Emergency Department Short Stay Unit with the function of managing patients and bed availability directly from the Emergency Department, with the consequent possibility of responding in real time to the changing need for beds over 24 hours, as well as more consistent clinical management of the patient in continuity with the care already provided in the Emergency Department.
- Increasing the number of consultation requests from the Emergency Department so that the patient can be assessed by the Specialist at the time of admission to the Emergency Department, avoiding, when possible, admission to a hospital ward.
- Implementation of the use of the "computerised dashboard" of beds, accessible to all Multidisciplinary Units, in which the use of available beds by the Emergency Department is automatically and progressively recorded, so as to be able to monitor their "use" over 24 hours.
- Appropriateness of the use of the Emergency Department's Short-Stay Intensive Observation Unit (SSOU) by overcoming the concept of the SSOU as an "admission room", *i.e.*, a temporary reception facility for patients who cannot access the wards due to unavailability of beds.

The SSOU's functions include:

1. clinical observation;
2. short-term therapy for moderately complex conditions;
3. possibility of in-depth diagnostics.

All of the above is completed when the patient is appropriately admitted to hospital or discharged.

It is clear that the problem in healthcare is not only that there is insufficient funding, but also—and more importantly—that this money is ill spent: the public healthcare system is unjustly burdened with over one and a half billion Euros per year because of the deficiencies of the social care system, but also of the community healthcare services which are ill equipped to manage patients.

It is, therefore, essential to ensure and encourage continuity of care at a community level, starting from an analysis of the care needs right from admission to hospital, detecting the hospital discharge pathways capable of guaranteeing the best care for patients and optimisation of healthcare facility resources at the same time.

DECLARATIONS

Author contributions

All authors conceived of the presented idea, discussed the results and contributed to the final manuscript, providing a critical feedback.

Use of large language models, AI and machine learning tools

None declared.

Conflicts of interest

There is no conflict of interest among the authors.

Data sharing statement

No additional data is available.

REFERENCES

1. Ministry of Health. National Guidelines for The Development of A Management Plan for Overcrowding in Emergency Departments, 2019.
2. Ministry of Health. National Guidelines on In-Hospital Triage, 2019.
3. Umbria Regional Decree DGR No. 445 of 28/04/2023: Regional Programme for The Integrated Management of Patients in The Emergency Department.
4. Region of Umbria. Regional programme for the integrated management of patients in the Emergency Department through implementation of the following guidelines, in accordance with regional government decree DGR No. 803/2022: Management plan for overcrowding in Emergency Departments.
5. Ministry of Health. National Guidelines on The Short-Stay Intensive Observation Units (SSOU), 2019.
6. FADOI survey. Scientific Society of Internal Medicine, January 2023