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A cross-sectional analysis of patient care pathways and profiles in a dental emergency department

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Introduction: Hospital dental emergency (DE) departments are assumed to improve access to emergency care. Patients use these facilities at night and during weekends, mainly because private care is not available at these times. However, motivation for using hospital care during office hours remain unclear. This study aimed to investigate the characteristics and care pathways of patients consulting a DE department during office hours and to identify the profiles of DE department users. **Methods:** A descriptive cross-sectional study was performed in the DE department of La Timone Hospital (Marseille, France). Structured interviews were conducted with 150 patients. The interview guide explored sociodemographic data, dental care behaviour, characteristics of the emergency visit, care pathway and follow-up. Descriptive statistics and a multiple correspondence analysis were used for statistical analysis of the data collected. **Results:** The main motivation for seeking care was pain (76%), and 59.3% of the patients attended the DE department as a first intention. The main reasons for coming to the hospital were trust in hospital practitioners (42%) and convenience of care accessibility (40.1%). Two contrasting profiles of patients were identified: young patients with a low income (regular users of DE departments, seeking acute pain relief); and elderly patients (infrequent users of DE departments, seeking follow-up care). **Conclusion:** This study highlighted that hospitals can be a primary pathway to DE care even though private care may be available. However, serious limitations regarding the continuity of care in the hospital exist, regardless of patient profile.

Key words: Dental care, emergency department, health services accessibility, pain

INTRODUCTION

In the case of a dental emergency (DE), patients tend to seek care in general emergency departments as they would do for any urgent medical problem^{1,2}. However, appropriate management of DEs requires specific knowledge, clinical skills and specialised equipment. Moreover, general emergency departments rarely include dentists in their medical teams^{3,4}. As a result, patients do not receive appropriate dental treatment and may require subsequent appointments, or might even experience worsening of general health^{5,6}. This situation also leads to loss of time and adverse impacts on human and financial resources for hospitals⁶⁻⁸. To improve patient access to emergency dental care, better integration of dentists in general emergency departments and/or the development of separate DE departments are required and have been suggested since the 1970s^{3,4,9-11}. When such facilities exist, a year-on-year increase in attendance has been highlighted¹². The trend for increased use of these facilities at night and during weekends is mainly

because care in the private sector is not available at these times^{1,12}. However, a tangible lack of information was noted regarding patients' motivations to seek emergency dental care in a hospital on weekdays when many private offices are open⁶. The purpose of this cross-sectional study was to investigate the characteristics and care pathway of patients attending a DE department during regular office hours. The investigators hypothesised that the reason for attending a DE department would stem mainly from the inability to access emergency care in private practice. The specific aims of the present study were to gain insight into the motivations and profiles of patients who use these health-care settings in order to identify the benefits and limitations of DE departments.

METHODS

Study design and Institutional Review Board approval

In 2015, a descriptive cross-sectional study was conducted in the dental service of La Timone Hospital

(Marseille, France). This university dental service is a public medical and educational institution in which patients can access two types of dental care: emergency management (in the DE department); and general dental care (in other departments). The data used in the present study were obtained from structured interviews addressing the characteristics and care pathways of patients consulting the DE department. The study protocol received approval from the Ethics Committee of Aix-Marseille University (reference 2014-10-1).

Setting

The DE department of La Timone Hospital functions as a walk-in service: patients decide when urgent care is needed. However, this service is available exclusively during office hours (from 08.30 h to 17.30 h) from Monday to Friday. The time period of delivery of care in the DE department thus overlaps the times when the majority of dental offices are open. In France, the social security system pays for 70% of most fees related to DE care. The remaining 30% can be covered by complementary health insurance (CHI). For some chronic diseases the French social security system covers 100% of the treatment cost. Finally, patients with a low income can benefit from services that provide full coverage for basic dental care: these are 'Couverture Maladie Universelle' (CMU) for patients of French nationality; and 'Aide médicale d'État' (AME), which is the equivalent of CMU but for foreign patients.

Participants

Participants were patients consulting the dental service of La Timone Hospital (Marseille, France) and spontaneously expressing a demand for DE care.

Inclusion criteria for patients were as follows:

- Adult (≥ 18 years of age)
- Able to understand and speak French
- Provided informed consent to participate in the study.

Exclusion criteria were as follows:

- State of health incompatible with an interview
- Patient under tutorship or curatorship
- Patient ineligible for assistance from the French social security system.

Description of procedures

An interview guide was developed and first tested on patients to evaluate the relevance of the questions and the patients' ability to understand them, as well as to establish a standardised reply grid that would facilitate the future collection of responses. The test phase

ended when responses were redundant (which was the case after 20 patients had been interviewed). The final interview guide included 20 questions that were split into five categories: (i) sociodemographic data; (ii) dental care behaviour; (iii) characteristics of the emergency visit; (iv) emergency care pathway; and (v) patient's follow-up care (*Figure 1*). Except for questions addressing sociodemographic data, all items were open questions that required binary (yes/no) or developed responses. A numeric pain scale, asking the patient to quantify pain using a score of between 0 and 10, was used for pain assessment. Subsequently, and according to pre-existing categories, three levels of pain were considered for the statistical analysis: mild (score < 4); moderate (score ≥ 4 and < 7); and severe (score ≥ 7)¹³.

Data were recorded from 5 January 2015 to 18 December 2015, each weekday from Monday to Friday. School holiday periods (17 out of 52 weeks) were excluded. A single investigator (MG) conducted the interviews at various times of the day and when patients were waiting to receive emergency dental care. The data collected were strictly anonymous, with no information allowing further identification of the patient.

Statistical analysis

Statistical analysis was performed using SAS 9.4 Software (SAS Institute Inc., Cary, NC, USA) and R Software version 3.4.0 (R Foundation for Statistical Computing, Vienna, Austria). Descriptive statistics were given for qualitative variables and presented in the form of frequencies and percentages. Multiple correspondence analysis (MCA) was performed to explore the relationship between several categorical variables relative to the dental care behaviour of patients attending the DE department of La Timone hospital. For this analysis, 12 variables relative to dental care behaviour (listed below *Figure 2*) were considered as active variables, and sociodemographic characteristics (age, sex, occupation and type of social coverage) were used as supplementary variables. This analysis was performed using the MCA function of FactoMineR R package. For interpretation, we first focused on active variable categories that contributed more than the expected average contribution (i.e., 3.85%) and provided good representation of both dimensions, and then we focused on supplementary variable categories with absolute values of the *vs.* test > 2 .

RESULTS

A total of 150 patients were interviewed. Patients' sociodemographic characteristics and dental care behaviour are presented in *Table 1*.

1. What is your gender?
2. What is your age?
3. What is your occupation?
4. What is your social coverage?
5. Are you involved in follow-up dental care in the present dental service?
6. Would you qualify your dental follow-up as regular or irregular?
7. Do you have a regular dentist?
8. The last time you saw a dentist, was it for an emergency visit?
9. How many dental emergency consultations have you had over the past 12 months (visit of the day included)?
10. What are your reasons for attending today (symptoms)?
11. Please quantify your pain at that time by giving a number between 0 and 10, where "0" means "no pain at all" and "10" means 'pain as bad as it could be'.
12. Why do you think your problem is urgent?
13. Have you ever consulted for the same problem (same tooth concerned)?
14. How long have you been waiting to consult since you identified the dental problem?
15. Could you give us one main reason explaining why you waited more than 48 h before seeking care?
16. Did you come directly to the dental emergency department of La Timone hospital?
17. If no, could you tell us about your care pathway before coming to this dental emergency department?
18. Could you tell us about the reasons you are using this service instead of going to a private office?
19. After today's consultation, do you think more dental care will be necessary?
20. If yes, where would you like to pursue care?

Figure 1 Interview guide.

Sociodemographic data

Participant age ranged from 18 to 87 (mean \pm SD: 42.3 \pm 18.1) years, and the male-to-female ratio was 1:1. The age group most represented was patients aged 18–29 years. Regarding occupation, 26.67% of patients were full-time workers, 10.67% were part-time workers and the remaining 62.66% had no professional activity at that time (34% were unemployed, 8.67% were students and 20% were retired). Regarding social coverage, almost one-third (32.66%) of the patients depended on CMU or AME. 'No CHI' (11.33%) corresponded to patients paying for 30% of the fees, while '100%' (4%) and CHI (52%) corresponded to patients totally discharged from basic dental care.

Dental care behaviour

Most patients (92%) were external patients (i.e., not under follow-up care in the dental service). Patients described their dental follow-up care as either 'irregular' (80.7%) or 'regular' (19.3%). The majority had no regular dentist (77.3%). For 62% of the patients, the last consultation with a dentist was because of an emergency. When asked about the number of DE consultations over the past 12 months (present consultation included), 35.3% of the patients declared one emergency visit, 34.7% declared two and 30% declared three or more.

Characteristics of the emergency visit

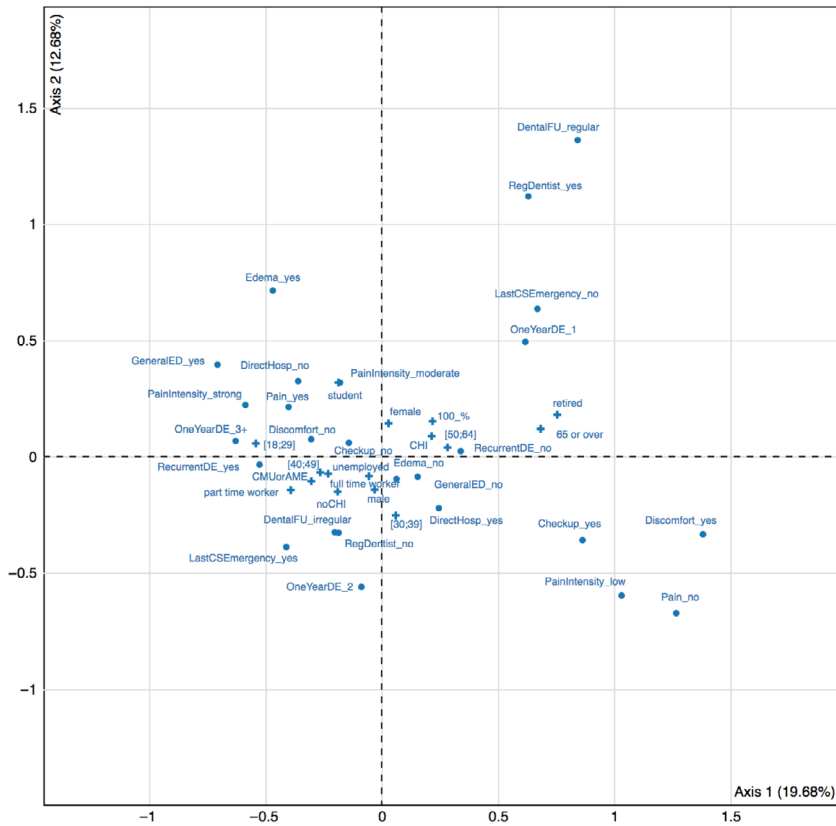
The reasons for visiting the DE department are shown in Table 2. The main motivation was pain (76%), and patients' pain intensity was categorised as mild (30%), moderate (24.7%) and severe (45.3%). Other reasons were discomfort (18%), need for a checkup (14%), oedema (12%), aesthetic complaint (4.7%)

and bleeding (2.7%). To the question 'why do you think your problem is urgent?', 91.3% of the patients expressed a feeling of urgency: 66% evoked pain, 38% indicated a major impact of the oral issue on their daily living, 24% expressed a fear of the condition worsening and 11.3% expressed potential repercussions on health. Despite coming to a DE department, 8.7% of the patients declared that their problem was not urgent. Among the respondents, 39.3% had previously sought emergency care for the same reason. These situations were noted in the study under the term 'recurrent DE'.

Emergency care pathway

One question considered the delay between the first identification of the oral problem and the decision to seek emergency care. Patients who stated that their oral issue was not urgent ($n = 13$) were excluded from this question. Moreover, some patients declared themselves unable to estimate this delay ($n = 5$). The responses of the remaining 132 patients are presented in Table 3. The delay ranged from a few hours to more than a week. The search for care was considered immediate for the 35.6% of patients who declared a delay of <48 h. The patients reporting more than 48 h of delay ($n = 85$) were asked to provide their main reason for waiting: 41.2% declared a lack of time; 30.6% hoped for spontaneous improvement; 7.1% reported a fear of the dentist; 5.9% gave financial reasons; and 3.5% stated difficulties in accessing care because of a weekend or a holiday preceding their examination.

Examination in this DE department was the first choice for 59.3% of patients who came directly to the hospital. Among the 40.7% of patients for whom it was their second choice, 45.9% had previously attempted to obtain an appointment in private practice, 43.3% had consulted a private dentist, 18.3% had gone to a general emergency department and



Legend of active variables in Figure 2

| Active variables | Meaning | Answer modalities |
|------------------------|--|----------------------|
| Checkup | Oral Checkup | yes/ no |
| DentalFU | Dental follow-up | regular/irregular |
| DirectHosp | DE as a first choice | yes/ no |
| Discomfort | Discomfort | yes/ no |
| Edema | Edema | yes/ no |
| GeneralED | Visit to a general emergency department | yes/ no |
| LastCSEmergency | Last consultation with a dentist was an emergency | yes/ no |
| OneYearDE | Number of DE consultations over the 12 past months | 1 / 2 / 3+ |
| Pain | Pain | yes/ no |
| PainIntensity | Pain intensity | mild/moderate/severe |
| RecurrentDE | Recurrent dental emergency | yes/ no |
| RegDentist | Regular dentist | yes/ no |

Figure 2 Multiple correspondence analysis plot for the first two dimensions: graphical representation of active (•) and supplementary (+) categories. After Greenacre adjustment to Benzécri correction, the first two dimensions accounted for 73.16% of the total inertia.

8.3% had first sought advice from a doctor and/or pharmacist. Several responses from patients were permitted. When asked about the motivations for coming to the hospital, the most common reasons cited by patients were trust in dentists practicing in this type of institution (42%), followed by the possibility of open access care without needing an appointment (40.1%). Finances (19.4%), failure to get an appointment in the private sector (18%), the need for a

second opinion because of unsolved problems (14.7%) and a medical context requiring specific care (4.7%) were cited less frequently. Several responses from patients were permitted.

Patients' follow-up care

Patients who were not already engaged in follow-up care in the dental service ($n = 138$) were finally asked

Table 1 Patients' sociodemographic characteristics and dental care behaviour ($n = 150$)

| Variables | Categories | <i>n</i> | % |
|---|------------------|----------|------|
| Sociodemographic characteristics | | | |
| Age group (years) | 18–29 | 47 | 31.3 |
| | 30–39 | 24 | 16 |
| | 40–49 | 22 | 14.7 |
| | 50–59 | 19 | 12.7 |
| | 60–69 | 14 | 9.3 |
| | 70–79 | 14 | 9.3 |
| Sex | 80–89 | 10 | 6.7 |
| | Female | 75 | 50 |
| Occupation | Male | 75 | 50 |
| | Student | 13 | 8.7 |
| Social coverage | Retired | 30 | 20 |
| | Unemployed | 51 | 34 |
| | Part-time worker | 16 | 10.7 |
| | Full-time worker | 40 | 26.7 |
| Dental care behaviour | 100% | 6 | 4 |
| | CMU or AME | 49 | 32.7 |
| | CHI | 78 | 52 |
| | No CHI | 17 | 11.3 |
| Regular dentist | Yes | 34 | 22.7 |
| | No | 116 | 77.3 |
| Last consultation with a dentist was an emergency | Yes | 93 | 62 |
| | No | 57 | 38 |
| Dental follow-up | Regular | 29 | 19.3 |
| | Irregular | 121 | 80.7 |
| Recurrent dental emergency | Yes | 59 | 39.3 |
| | No | 91 | 60.7 |
| Number of emergency consultations over the last 12 months (present consultation included) | One | 53 | 35.3 |
| | Two | 52 | 34.7 |
| | Three or more | 45 | 30 |

AME, Aide médicale d'État; CHI, complementary health insurance; CMU, Couverture Maladie Universelle.

Table 2 Declared reasons for visiting the dental emergency (DE) department ($n = 150$)

| Declared reason | <i>n</i> | % |
|---------------------|----------|-----|
| Pain | 114 | 76 |
| Discomfort | 27 | 18 |
| Checkup | 21 | 14 |
| Oedema | 18 | 12 |
| Bleeding | 4 | 2.7 |
| Aesthetic complaint | 7 | 4.7 |

Patients could provide multiple responses; therefore, the total \neq 100%.

Table 3 Declared delay between identification of the oral problem and the decision to seek emergency care ($n = 132$)

| Declared delay | <i>n</i> | % |
|-------------------|----------|------|
| <24 h | 36 | 27.3 |
| ≥24 h but <48 h | 11 | 8.3 |
| ≥48 h but <1 week | 38 | 28.8 |
| ≥1 week | 47 | 35.6 |

if, and how, they planned to pursue oral care after the emergency consultation. Among them, 70.3% thought that complementary dental care would be necessary following the emergency consultation, of whom 68% desired to pursue care in the dental service and 18.6% in a private office, and 13.4% did not plan any follow-up.

Profiles of patients seeking emergency dental care in the DE department

Multiple correspondence analysis was conducted to explore the simultaneous relationships between several dental care behaviours of patients consulting the DE department and to characterise profiles of patients. This multivariate exploratory analysis allowed investigation of the pattern of relationships between several categorical variables. The graphic representation of categories is presented in *Figure 2*. This two-dimensional space enabled the mapping of dental care behaviour variables as active variables and sociodemographic data as supplementary variables. Supplementary variables did not contribute to the creation of the dimensions, but they were included on the scatterplot to visualise how they related to the dimensions. The first dimension (horizontal axis) represents patients whose reason for examination was related to pain (on the left side) to those whose reason for examination was a discomfort with no or only a mild level of pain (on the right side). The second dimension (vertical axis) distinguished individuals having regular dental follow-up, a regular dentist and whose last examination was not a DE (at the top of *Figure 2*) to individuals without a regular dentist, irregular dental follow-up and whose last consultation with a dentist was for an emergency (at the bottom of *Figure 2*). In addition, the examination of supplementary variable categories showed a clear contrast between young patients (18–29 years old) and elderly patients (≥ 65 years of age) in the first dimension. Similarly, unemployed patients and beneficiaries of CMU or AME were different from retired patients and patients with CHI. Therefore, the first axis highlighted a social gradient and distinguished two very different patient profiles. The first profile was characterised by young patients who were from disadvantaged socio-economic backgrounds, who sought treatment for severe pain and who were recurrent users of the emergency department. The second profile concerned elderly patients (≥ 65 years of age), who were retired and had a CHI, whose consultations were triggered by no pain or mild pain and who were using the emergency department as a first step towards follow-up care. No sociodemographic characteristic seemed to explain the contrast observed on the second dimension (regular *vs.* irregular dental care habits), and no association

between patient gender and dental care behaviour was evident.

DISCUSSION

This cross-sectional study aimed to investigate the care pathway of patients attending a DE department during regular office hours. The investigators hypothesised that coming to hospital would mainly be a result of the inability of patients to access emergency care in private practice. However, hospital was the first choice of care for 59.3% of the patients who came directly to the DE department. Moreover, although they did not come directly to the DE department, 18.3% of the patients chose the hospital rather than private practice because they first were seen in a general emergency department. The main reason for coming to the hospital was greater trust in hospital care than that provided by private practice (42%). A good opinion that patients may have of hospital practitioners¹⁴ and a lack of confidence towards dentists in private practice^{15,16} have been reported. A second reason for choosing the hospital was convenience of access to care (40.1%), which is a well-known reason for using walk-in emergency services^{17,18}. Furthermore, almost 20% of the respondents mentioned financial reasons for choosing the hospital. This highlights that some patients may have a false perception of the cost linked to DE care because, in France, basic dental fees are the same regardless of the type of practice (private/public). Finally, inability to get an appointment in a private dental office concerned 18% of the patients who we interviewed *versus* 40% reported in a Finnish study¹⁹. It should be noted that this can be explained by the dentist's refusal to provide emergency care or by the patient's inability to attend the appointment at the time offered by their dentist. Overall, it can be concluded that the reasons for coming to a hospital for DEs during office hours differ from those for out-of-hours periods when the inability to access private practice prevails.

Additionally, the reasons for coming to the hospital for DEs were investigated because free walk-in services may encourage consultations for non-urgent reasons²⁰. However, our results confirmed that pain is by far the primary reason for emergency consultation^{10,17,21–24}, which is considered by most dentists as a relevant motivation for urgent care^{25,26}. Moreover, the present study reported that only a minority of patients (8.7%) recognised their problem as not urgent, which was in accordance with previous publications^{18,24}. Although most patients presented for valid reasons, this study confirmed that they tend to delay consultation, while professional judgment would expect patients to seek treatment immediately in an emergency context. After identifying an oral problem,

a majority (64.4%) of patients waited for 48 h or longer before seeking a dental consultation; this proportion was in accordance with previous work showing that 66%–85.5% of patients wait more than 2 days before seeking an emergency consultation^{17,23,27}. However, without proper management, dental problems tend to worsen over time and may lead to potentially dangerous self-care strategies²⁸. In addition to the delay, the present study explored the reasons why patients postpone DE care beyond 48 h. Lack of time ranked first (41.2%), which appeared contradictory to the notion of urgency. It was followed by adopting a wait-and-see attitude (30.6%), which carries an obvious risk of aggravating the underlying condition. Personal factors, such as dental anxiety (7.1%) or financial reasons (5.9%), represented only a minor proportion of the responses. In this study, the patients were asked to quantify the time between the appearance of the oral problem and the emergency consultation. The delays reported were consistent with those in previous publications^{10,17,19,23–25,27}. However, it was demonstrated that the use of emergency care occurs when pain becomes unbearable and can no longer be managed by self-care strategies^{17,29}. For more accurate assessment, the delay could be quantified from the time the oral problem became dependent on professional care rather than when it was first identified by the patient.

In order to define the benefits and limitations of DE departments, the present study investigated the characteristics of patients who use these facilities. Compared with previous publications addressing DE care, the population of the present study showed consistency regarding the gender ratio (1:1) and the most represented age class (18–29 years)^{17–19,27,30}. This work also confirmed that users of DE departments are often characterised by poor dental follow-up^{17–19} and are mostly from disadvantaged social backgrounds^{12,21,31}. Indeed, in the present study, the proportion of patients covered by CMU was almost two and a half times higher than the rate reported for this region in France³². Whereas previous studies provided a general description of subjects who attended the DE department^{12,17–19,21,27,30,31}, this study aimed to highlight profiles of patients by linking sociodemographic characteristics to care-seeking behaviours. The MCA was chosen in the present study because it allows simultaneous analysis of all outcomes and characterised patients' profiles³³. This method led to the identification of two profiles of patients using the DE department, who were characterised by different motivations towards hospital care. The first profile included young patients with a low income, regular users of the ED who sought acute pain relief. Quick resolution of symptoms and no desire for follow-up treatment are attitudes previously described among

emergency patients^{17,34}. Such behaviours favour incomplete care and tooth extraction, with patients experiencing rapid deterioration of their oral health and associated repercussions on their quality of life^{35,36}. The second profile highlighted – elderly patients (low users of DE services and using the emergency department as a first step towards follow-up care) – has been less documented so far. This was consistent with a previous publication reporting that among patients using DE departments, the oldest patients were those who most often sought follow-up care³⁰. Although the two profiles of patients identified in this study are very different, both raised the issue of follow-up after DE care in a hospital setting. Currently, DE departments aim to provide episodic treatment, and the proportion of patients subsequently accessing follow-up care is an unresolved issue^{6,10,36}. This situation may lead to recurrent emergency consultations and serious complications, which may result in hospitalisation or even death^{37,38}. It should be noted that in the present study almost 40% of patients consulted for a recurrent condition. Free walk-in services promote the patient's autonomy, allowing them to consult on their own without previously depending on a professional deciding whether the situation is urgent or not. However, the absence of continuity of care must be a major concern when considering extension of DE care to a hospital setting.

Through identifying contrasting profiles of patients, this study allowed greater insight into the users of DE departments. However, some limitations exist regarding the small sample size. The latter was directly related to the methodology for data collection: structured interviews require a greater degree of involvement by both patients and investigators than do self-administered questionnaires. However, the choice of structured interviews was strongly motivated by the wish not to exclude patients on the basis of reading difficulties. This method and the fact that the data-collection period voluntarily excluded school holidays, when many private dental offices could be closed, aimed to reduce the recruitment bias. Another limitation can be raised regarding the fact that the findings of the present study cannot be extrapolated to DE departments in France and worldwide. At the time of writing there were around 20 DE departments in France, and the external validity of the present study should be confirmed with a multicentre approach.

CONCLUSION

This study highlights that hospital DE departments are used as a primary pathway to emergency care for patients, even when private care is available. However, DE departments seem to show serious limitations regarding continuity of care, regardless of the

patient profile. Additional studies should consider follow-up of patients after they have received DE care in a hospital setting. Overall, DE departments should supplement private emergency care provision rather than replace it.

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Conflicts of interest

The authors deny any conflicts of interest.

Ethics statement

The investigation conformed to the provisions of the Declaration of Helsinki. Each participant received a written explanation of the terms of the study prior to participation. Verbal consent was obtained from all participants who were involved in the present study. The consent procedure was approved by the Ethics Committee of Aix-Marseille University, which gave its approval before the study began.

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