Submitted: 26 September, 2022 Accepted: 11 January, 2023 Published: 08 September, 2023 DOI:10.22514/sv.2023.049

Open Access
Signa Vitae

ORIGINAL RESEARCH

The outcome of “non-urgent" patients diverted by triage at an emergency department

Jari Ylä-Mattila[1,*], Teemu Koivistoinen[2], Henna Siippainen[1], Heini Huhtala[3], Anna-Maija Kuukka[1], Sami Mustajoki[1]

[1]Emergency Department, Tampere University Hospital, FI-33521 Tampere, Finland
[2]Emergency Department, Kanta-Häme Central Hospital, FI-13530 Hämeenlinna, Finland
[3]Faculty of Social Sciences, Tampere University, FI-33014 Tampere, Finland

***Correspondence**
jari.yla-mattila@pirha.fi
(Jari Ylä-Mattila)

Abstract

No universal definitions have been proposed for non-urgent emergency department (ED) patients. Robust evidence on safety issues and the subsequent utilisation of health care services among diverted patients is insufficient. The aim of this study was to establish the revisit rate within 7 days, as well as the 30-day mortality and outcome of patients diverted by triage. An observational single-centre retrospective study was conducted at the Tampere University Hospital ED for the full calendar year of 2019. The primary outcomes were a revisit within 7 days and 30-day mortality. A total of 92,406 ED visits were registered. Of these patients, 7.8% (7216 visits) were diverted by triage. Among the diverted patients, the hospital revisit rate within 7 days was 10.1%, and a diagnostic or therapeutic intervention was performed on 81.4% of the readmitted patients. The all-cause 30-day mortality, hospitalisation and intensive care unit admission rates of diverted patients were 0.07%, 1.7% and 0.1%, respectively. Diverting non-urgent patients reduces ED visits. The current study showed a revisit rate of 10.1% and a 30-day mortality rate of 0.07% for diverted patients. There were more unanticipated adverse outcomes than reported previously, and the strategy may thus be suitable only for some groups of patients without increasing risks. Therefore, further investigation is needed to determine the factors associated with readmissions and adverse outcomes to enhance the performance of triage in the future.

Keywords

Divert; Emergency department; Mortality; Non-urgent patient; Triage

1. Introduction

A precise definition of a non-urgent patient has been pursued in emergency medicine literature for over four decades, but no valid, reliable and universally accepted definition has been presented [1–4]. A systematic review not only showed variability in the criteria used for categorising the urgency of an emergency department (ED) patient but also revealed wide variation in the proportion of patients categorised as non-urgent, ranging from 4.8% to 90% of all visits [3]. The comparability between triage studies has been challenging because of high variability in terms of the approach to measurements, data analysis and the reporting of results [5].

Denying access to an ED entails safety, ethical and legal issues [3, 6], especially if triage assessment alone is used as grounds for refusal by the triage system [6]. The ability of both physicians and nurses to predict eventual hospitalisation is poor [6], and it has also been reported that from 3% to up to 45% of all hospitalised patients are triaged as low-acuity cases [5]. Despite numerous studies spanning several decades [7–11], there is no universally accepted and reliable classification for prospectively determining the necessity of emergency care [4] or the effectiveness of diversion strategies [12]. Furthermore, the evidence is insufficient to conclude whether ED diversion alters the patients’ subsequent utilisation of ED services [12].

The priority in any medical evaluation is patient safety. When diversion is used as an intervention to control the input or the first phase of throughput to the ED [13], it should not endanger the diverted patient. A major study conducted in Singapore reported that not a single patient suffered adverse medical consequences when diverted to a primary care clinic instead of the ED [14]. In addition, ED diversion has been found to be no less safe for low-acuity patients than if they were treated in the ED [12], but robust evidence on the safety of ED diversion is lacking.

We conducted a retrospective observational study at the ED of a high-volume tertiary hospital which uses both pre-hospital and ED-based diverting strategies routinely. The purpose of this study was to determine the revisit rate and outcome of patients who were initially diverted by triage as a part of the ED-based strategy. We have thoroughly investigated all patients who revisited within 7 days or who died within 30 days after their first visit to the ED.

2. Methods

2.1 Study design and setting

A retrospective single-centre observational study was conducted at the ED of Tampere University Hospital, Finland. The data were collected retrospectively from 01 January to 31 December 2019 from the hospital's electronic patient records. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines were applied in this study [15].

Tampere University Hospital provides secondary care for over 500,000 residents in the Pirkanmaa Hospital District and is the only hospital in the region managing all severe emergency situations. In addition, the hospital is a tertiary care unit for a catchment area of over 900,000 residents. No referral is required, but the aim is to divert low-acuity patients to non-urgent health care services. Outside normal working hours, there are only a few other health care providers available in the region, which increases the proportion of lower-acuity patients in the ED.

A five-level triage system, the Emergency Severity Index (ESI) [16], is used to categorise the patients' need for care and to allocate resources. All patients entering the ED were evaluated by the triage team. Triage is always carried out by trained nurses, and a physician is assigned for consultation. One nurse is responsible for triaging patients arriving by ambulance, and two to five nurses perform triage on walk-in patients. The urgency evaluation consists of the patient's medical history, an interview, an evaluation of the severity of symptoms, the measurement of vital signs and, if appropriate, point-of-care analyses (alcometer, c-reactive protein, rapid antigen group A Streptococcus test, urinary strip test). Triage nurses assess the ESI class independently, and they are also allowed to triage away and divert patients to other suitable health care providers outside the ED without consulting a physician, but they are encouraged to consult a physician in case of any obscurity. The ESI classification is not used for diverted patients.

2.2 Population and data collection

The study population consists of patients who were triaged away as non-urgent patients but who revisited within 7 days or died within 30 days. The hospital's data management services provided the list of diverted patients as well as the time stamps and admissions data. One investigator completed the data from the hospital's electronic patient records. Causes of death data were provided by Statistics Finland.

2.3 Study protocol

The revisits of diverted patients within 7 days included any contact with the ED or the hospital's other emergency units. Patients who were only referred to the appropriate unit (paediatric ED, obstetrics and gynaecology emergency unit or a regional hospital ED) within the hospital district were excluded. Direct revisits to ophthalmology or otorhinolaryngology units were excluded because all of the emergency situations are treated in the ED. In addition, paramedic consultations and patient phone calls were excluded.

Revisits were divided into the unplanned and planned groups according to the instructions given by the triage team. With planned revisits, the patient was instructed to return to the ED the following day for a specific reason (*e.g.*, ultrasonography for deep vein thrombosis or muscle and tendon injuries, cardioversion for atrial fibrillation with optimal heart rate).

Unplanned revisits were further analysed by the reason for the revisit, whether it was for the same reason as the first contact with triage or a different one. Furthermore, unplanned revisits were divided into two subgroups according to the outcome of the triage re-evaluation: patients who were again triaged away and those who were admitted to the ED. In the case of an ED admission, the most urgent intervention or event was recorded.

If the initial judgement on the correctness of the triage decision was obscure, the case was independently classified by each member of the expert panel, who were not blinded to the study objectives and hypothesis. The expert panel consisted of two emergency medicine specialists, a further physician with specialist qualifications in both internal and emergency medicine and a nurse specialising in triage. Due to the heterogeneity of patients' complaints or findings, no systematic tool or guidance could be provided for evaluation. Thus, the expert panel's assessment of correctness was based on each member's opinion of the documented vital signs and symptoms. Interrater reliability assessments were not performed, but in the event of a tie, the triage evaluation was registered as incorrect. In addition, revisits for the same reason may also have been evaluated as correct in cases where, according to documented symptoms and findings during the first visit, the course of the disease was not foreseeable and triaging these patients away was regarded as acceptable in a retrospective analysis by the expert panel. To manage multiple visits within 7 days, each triage evaluation was assessed and recorded independently.

2.4 Data analysis

All-cause 30-day mortality, hospitalisation and intensive care unit (ICU) admission rates and ratios were calculated for the triaged-away population. Microsoft Excel for Mac (v.16.56, Microsoft Corporation, Redmond, WA, USA) was used for data collection and analysis.

3. Results

During the full year of 2019, a total of 92,406 ED visits were recorded, 92.1% of which (n = 85,095) proceeded to ED treatment area visits. For 95 visits, the reason for the visit could not be verified from the electronic database. A total of 7216 (7.8% of all ED visits) visits were diverted by triage. The final study population consisted of 5 deaths, 603 unplanned revisits and 123 planned revisits (Fig. 1).

3.1 The study population

Among the 7216 patients diverted by triage, there were 726 hospital revisits (including two revisits before death) within 7 days, yielding a 10.1% revisit rate. Of these, 94% (n = 685) were revisits to the ED and 6% (n = 41) to other hospital units.

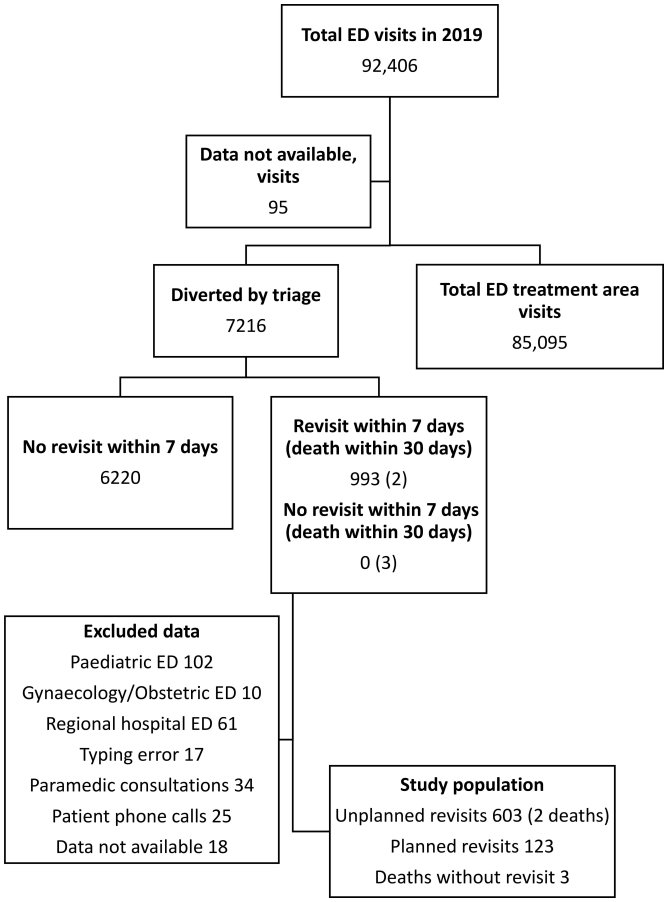

FIGURE 1. Study selection flowchart. ED: emergency department.

Of the revisits, 603 (83.1%) were unplanned, and 123 (16.9%) were planned (Table 1).

In the population of patients triaged away, 5 died within 30 days (Table 2). The all-cause mortality rate was 0.07%. A total of 591 revisits eventually required some diagnostic or therapeutic intervention, representing 81.4% of the revisits and 8.2% of all diverted patients. Of the revisits, 18.6% (n = 135) were again diverted by triage. A total of 122 readmissions (1.7% of all initially diverted visits) led to hospitalisation within 7 days (2 deaths, 114 unplanned revisits and 6 planned revisits), and 7 (5.7%) of the hospitalised patients were admitted to the ICU during the same hospitalisation, representing 0.1% of all patients triaged away.

TABLE 1. The classification of all revisits (n = 726) within 7 days after being diverted by triage.

	n = 726	%
Revisits to hospital		
Unplanned revisits	603	83.1
To ED	562	
Death within 30 days	1	
To other units	41	
Death within 30 days	1	
Planned revisits to ED	123	16.9

ED: emergency department.

3.2 Unplanned revisits

In the case of two deceased patients, both had an unplanned revisit and were subsequently hospitalised and operated on. However, the revisit of one of these two patients did not occur until after 9 days and is thus not included in the revisit analysis (Table 2).

The vast majority (n = 114, 95% of all 120 hospitalisations) of the hospitalisations not leading to death (n = 2) were for unplanned revisits. The complaint was the same on both visits for 86 (75.4%) of the hospitalised patients. Furthermore, only 35 patients were subsequently hospitalised if the initial evaluation by triage was considered to be incorrect. With unplanned ICU admissions not leading to death, the initial triage evaluation was regarded as correct in all cases (Table 3).

If the first evaluation leading to the patient being triaged away was retrospectively considered correct, the second hospital visit for the same reason (n = 418) led to discharge after a comprehensive physician's assessment in 38.8% (n = 162) of the patients. Assessment by a physician with an intervention (treatment, referral or hospital admission) was required in 36.1% (n = 151) of the revisits. A quarter of the patients (n = 104) were re-triaged away again, and one patient left without being seen (Table 3).

With incorrect triage evaluations (n = 57), discharge with treatment and non-ICU hospital admission were the most common outcomes, representing 31.6% and 61.4% of the patients, respectively. One patient was incorrectly evaluated twice; *i.e.*, incorrectly re-triaged away by triage. The patient had severe kidney failure and used immunosuppressive medication for another disease. Another patient was incorrectly evaluated once by triage and once by the physician during the ED visit. This patient had a carotid dissection but had the symptoms already documented when evaluated for the first time by triage. One patient discharged themselves against medical advice; nevertheless, the first triage evaluation was incorrect (Table 3).

3.3 Planned revisits

In the planned revisit group (n = 123), there were no deaths within 30 days. One planned revisit was incorrectly evaluated as being due to a venous instead of an arterial thrombosis, a diagnosis that was made the next day. Six of the patients with planned revisits were hospitalised, and of them one was admitted to the ICU due to septic shock, the symptoms of which had developed between the ED visits.

4. Discussion

Of all ED visits, 7.8% did not result in a visit to the ED treatment area after the triage registration process. This is in line with the previously reported ED-based diversion rate, ranging from 7.9% to 36% [12, 14]. Finnish law provides that, whenever a patient enters an ED, the patient's need of care must be evaluated by an educated health care professional [17]. Depending on the evaluation, the patient can be diverted and instructed to contact another appropriate primary health care or social services provider outside the ED to receive the necessary care [17]. However, there are no national or universally accepted definitions for non-urgent cases, which

TABLE 2. Deaths (n = 5) within 30 days after being diverted by triage.

Deaths no.	Symptoms in triage evaluation	Duration of symptoms	Days to readmission	ICU admission	Outcome*	Days to death	Cause of death**
1	Ear pain, right hand and left foot pain	months	-	-	-	2	Sedative overdose
2	Skin rash and itching	months	-	-	-	7	Cardiomyopathy
3	Left hip pain, no trauma	hours	0	No	Operation	12	Intestinal occlusion caused by obturator hernia, aspiration pneumonia
4	Mild lethargy, urinary incontinence	days	5	No	Procedure	8	Aortic valve stenosis with regurgitation, urethral stricture, urinary retention
5	Obstipation	weeks	9	Yes	Operation	13	Occlusive colon carcinoma, aspiration pneumonia

ICU, Intensive Care Unit.
**"Procedure" refers to a measure that takes place in the ED, whereas "operations" are performed somewhere else within the hospital.*
***Provided by Statistics Finland.*

TABLE 3. Outcome of the unplanned revisits (n = 601) to the hospital within 7 days (no death within 30 days) after being diverted by triage.

	Reason for revisits and initial triage evaluation*			
	Same reason		Different reason	Total
	Correct	Incorrect		
	n = 418	n = 57	n = 126	n = 601
Unplanned revisits				
Re-triaged away	104	1	30	135
ED admission				
Discharged without treatment	162	1	53	216
Discharged with treatment	77	18	12	107
Referral to outpatient clinic	23	1	3	27
Discharged against medical advice	0	1	0	1
Left without being seen	1	0	0	1
Hospital admission				
Non-ICU admission	48	35	25	108
ICU admission	3	0	3	6

ICU, Intensive Care Unit; ED, emergency department.
**Correctness of initial decision to divert and triage away was retrospectively evaluated by expert panel.*

may lead to safety, legal and ethical issues [3].

The current study thoroughly describes subsequent ED utilisation among diverted patients, the data on which have previously been limited [12]. The overall revisit rate was 10.1% within 7 days, the majority of which (94%) comprised revisits to the ED. However, the vast majority of the patients who were triaged away (92%) did not return to the hospital, or they were re-triaged away after a triage re-evaluation. Therefore, had no patients been diverted, there would have been an average of 20 more ED visits per day, which would most certainly have had an impact on the allocation of resources.

Diverting patients is primarily a tool for the appropriate allocation of resources in an ED, and it may be suitable only for some groups of patients. The first triage evaluation was retrospectively considered to be correct in as many as 75% of the patients who returned to the hospital with the same complaint but subsequently needed a diagnostic and therapeutic intervention. One explanation for this phenomenon is that some medical conditions are not easily recognisable in their early phase but become more evident as they progress with time. In addition, the lack of validated guidelines most probably leads to a high degree of variability in the criteria by which patients are diverted.

The priority in any medical evaluation, including ED triage, is patient safety. In previous studies, not a single patient suffered adverse medical consequences when diverted to a primary care clinic instead of the ED [14]. In addition, ED diversion has been found to be no less safe for low-acuity patients than if they were treated in the ED [12]. Furthermore, no deaths have been reported within 72 hours of triage [11] or within 1-week follow-up [18]. One study had limited statistical power to demonstrate a difference in 30-day mortality between diverted and non-diverted patients [7]. In our study, five of the 7216 diverted patients died within one month, yielding an all-cause 30-day mortality rate of 0.07%. While our best effort is always made to avoid any errors, it is our opinion that the mortality rate was low, especially considering the high volume of patients evaluated by the triage system.

The all-cause inpatient admission rate of all patients triaged away was 1.7%, which is within the range reported in previous reviews, between 0% and 3.8% [3, 12]. In the current retrospective study, there were only 35 unplanned revisits and subsequent hospitalisations in which the triage system incorrectly triaged the patient away on the first visit. This number, which constitutes 0.5% of all diverted patients, is more indicative of the triage system's ability or inability to predict the need for hospitalisation.

The strength of this study was the large study population and comprehensive data on the patients' later outcomes, with deaths in particular. Tampere University Hospital is the only hospital in the region managing all severe emergency situations. The distance to the closest hospital with similar resources is 80 km, which justifies us to assume that we have at least the vast majority of revisits in our data. However, the study also has its limitations. This was a retrospective, observational single-centre study conducted at the ED of a single university hospital in Finland, which decreases the generalisability to other EDs and health care systems, especially in countries where ED-based diversion by nurses only is not legal.

While the data on subsequent ED and hospital utilisation are comprehensive, the eventual ambulatory utilisation of health care services remains unknown because there was no regular follow-up for diverted or re-diverted patients or triage could not specifically divert patients to a primary care clinic. Therefore, it is possible that revisits may have taken place at primary health care units or hospitals located outside the Pirkanmaa Hospital District.

There is a risk of chart review study biases [19]. The evaluation of triage performance relied solely on the documentation by triage nurses or physicians, and there was no validated or structured practice for documentation. This relative lack of objective data may have influenced the expert panel's analysis. There was a risk of misclassification when, for example, we determined whether the initial triage evaluation was correct or whether the reason for a revisit was the same as on the first visit. Furthermore, the retrospective evaluation could be affected by the unblinded study setting and by the fact that all members of the expert panel were employed by the ED. In addition, this study lacks an interrater reliability assessment when evaluating the correctness of triage evaluations by the expert panel. However, in the event of a tie, the triage evaluation was registered as incorrect.

Although ED revisits, hospitalisation, ICU admission and mortality are objective indicators, one can argue that they are not the best markers for evaluating triage performance itself. Many non-urgent patients may require emergency services without a need for hospitalisation, and while hospitalisation can be due to a serious medical problem, it can also be associated with social problems. The decision to hospitalise a patient, as well as the categorisation as non-urgent, may be subjective [3, 6]. However, without these indicators, the assessment of the expert panel may be overemphasised.

5. Conclusions

Our study showed a revisit rate of 10.1% and a 30-day mortality rate of 0.07% for diverted patients when using triage with well-trained triage nurses. There were more unanticipated adverse outcomes than has been reported previously. Without efficient diverting, there would have been significantly more ED visits in a high-volume tertiary hospital. Further investigation is therefore needed to clarify the factors associated with readmissions or other adverse outcomes to enhance triage performance in the future.

AVAILABILITY OF DATA AND MATERIALS

Data supporting this study cannot be made available due to sensitive and private information of individual patients.

AUTHOR CONTRIBUTIONS

JYM and SM—designed the research study. JYM, AMK, HS and SM—performed the data research. HH—provided help and advice with the methodology and statistics. JYM—analyzed the data. JYM, TK and SM—wrote the manuscript.

SM and TK—were supervisors of the study. All authors contributed to editorial changes in the manuscript. All authors read and approved the final manuscript.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

According to Finnish legislation, register studies do not require approval by a hospital ethics committee [20]. The study was duly approved by the hospital's research director (R21511). The used data were collected from hospital's medical records and Statistics Finland retrospectively, thus separate consent of all subjects was not collected.

ACKNOWLEDGMENT

The authors acknowledge Jani Ovaska (Emergency Department, Tampere University Hospital) for his valuable work with the hospital's data management services.

FUNDING

This research was funded by Research Services of the Pirkanmaa Hospital District, grant number MJ0067.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

REFERENCES

[1] Zachariasse JM, van der Hagen V, Seiger N, Mackway-Jones K, van Veen M, Moll HA. Performance of triage systems in emergency care: a systematic review and meta-analysis. BMJ Open. 2019; 9: e026471.

[2] Kuriyama A, Urushidani S, Nakayama T. Five-level emergency triage systems: variation in assessment of validity. Emergency Medicine Journal 2017; 34: 703–710.

[3] Durand A, Gentile S, Devictor B, Palazzolo S, Vignally P, Gerbeaux P, *et al*. ED patients: how nonurgent are they? Systematic review of the emergency medicine literature. The American Journal of Emergency Medicine. 2011; 29: 333–345.

[4] Richardson LD, Hwang U. Access to care a review of the emergency medicine literature. Academic Emergency Medicine. 2001; 8: 1030–1036.

[5] Hinson JS, Martinez DA, Cabral S, George K, Whalen M, Hansoti B, *et al*. Triage performance in emergency medicine: a systematic review. Annals of Emergency Medicine. 2019; 74: 140–152.

[6] Durand A, Gentile S, Gerbeaux P, Alazia M, Kiegel P, Luigi S, *et al*. Be careful with triage in emergency departments: interobserver agreement on 1578 patients in France. BMC Emergency Medicine. 2011; 11: 19.

[7] Washington DL, Stevens CD, Shekelle PG, Baker DW, Fink A, Brook RH. Safely directing patients to appropriate levels of care: guideline-driven triage in the emergency service. Annals of Emergency Medicine. 2000; 36: 15–22.

[8] Birnbaum A, Gallagher J, Utkewicz M, Gennis P, Carter W. Failure to validate a predictive model for refusal of care to emergency-department patients. Academic Emergency Medicine. 1994; 1: 213–217.

[9] Brillman JC, Doezema D, Tandberg D, Sklar DP, Davis KD, Simms S, *et al*. Triage: limitations in predicting need for emergent care and hospital admission. Annals of Emergency Medicine. 1996; 27: 493–500.

[10] Vertesi L. Does the Canadian emergency department triage and acuity scale identify non-urgent patients who can be triaged away from the emergency department? CJEM. 2004; 6: 337–342.

[11] Derlet RW, Kinser D, Ray L, Hamilton B, McKenzie J. Prospective identification and triage of nonemergency patients out of an emergency department: a 5-year study. Annals of Emergency Medicine. 1995; 25: 215–223.

[12] Kirkland SW, Soleimani A, Rowe BH, Newton AS. A systematic review examining the impact of redirecting low-acuity patients seeking emergency department care: is the juice worth the squeeze? Emergency Medicine Journal. 2019; 36: 97–106.

[13] Asplin BR, Magid DJ, Rhodes KV, Solberg LI, Lurie N, Camargo CA. A conceptual model of emergency department crowding. Annals of Emergency Medicine. 2003; 42: 173–180.

[14] Anantharaman V. Impact of health care system interventions on emergency department utilization and overcrowding in Singapore. International Journal of Emergency Medicine. 2008; 1: 11–20.

[15] von Elm E, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, Vandenbroucke JP. The strengthening the reporting of observational studies in epidemiology (STROBE) statement: guidelines for reporting observational studies. Journal of Clinical Epidemiology. 2008; 61: 344–349.

[16] Gilboy N, Tanabe P, Travers DA, Rosenau AM, Eitel DR. Emergency Severity Index, Version 4: Implementation Handbook. 4th ed. Agency for Healthcare Research and Quality: Rockville, MD. 2005.

[17] Valtioneuvoston asetus kiireellisen hoidon perusteista ja päivystyksen erikoisalakohtaisista edellytyksistä. 2017. Available at: https://finlex.fi/fi/laki/alkup/2017/20170583 (Accessed: 05 October 2021).

[18] Washington DL, Stevens CD, Shekelle PG, Henneman PL, Brook RH. Next-day care for emergency department users with nonacute conditions. A randomized, controlled trial. Annals of Internal Medicine. 2002; 137: 707–714.

[19] Kaji AH, Schriger D, Green S. Looking through the retrospectoscope: reducing bias in emergency medicine chart review studies. Annals of Emergency Medicine. 2014; 64: 292–298.

[20] Ministry of Social Affairs and Health, Finland. Medical Research Act No. 488/1999. 2010. Available at: www.finlex.fi/fi/laki/kaannokset/1999/en19990488.pdf (Accessed: 10 February 2021).

How to cite this article: Jari Ylä-Mattila, Teemu Koivistoinen, Henna Siippainen, Heini Huhtala, Anna-Maija Kuukka, Sami Mustajoki. The outcome of "non-urgent" patients diverted by triage at an emergency department. Signa Vitae. 2023; 19(5): 91-96. doi: 10.22514/sv.2023.049.