Journal of Advanced Research in Applied Sciences and Engineering Technology

Journal homepage:
https://semarakilmu.com.my/journals/index.php/applied_sciences_eng_tech/index
ISSN: 2462-1943



# Organisational Factors and Self-Reported Triage Accuracy among Emergency Healthcare Professionals in A Malaysian Government Hospital

Alias Mahmud[1,*], Nor Awanis Zainal Abidin[2], Abdul Raimi Abd Kadir[3]

[1] Faculty of Technology and Applied Sciences, Open University Malaysia, Malaysia

**ARTICLE INFO**

***Article history:***
Received 12 October 2026
Received in revised form 9 November 2026
Accepted 10 November 2026
Available online 16 November 2026

***Keywords:***
Emergency department; healthcare professionals; infrastructure; overcrowding; self-reported triage accuracy; staffing; triage

**ABSTRACT**

Triage decisions are made under pressure, yet staff perceptions of the working environment do not necessarily reflect how accurately individual patients are prioritised. This cross-sectional survey examined how overcrowding, workload, staffing, and hospital facilities related to healthcare workers' self-reported triage practices at a Malaysian government hospital. A total of 66 nurses and assistant medical officers were purposively selected from a reported population of 80. The questionnaire responses were summarised using descriptive statistics, and Pearson correlation analysis examined relationships between variables. On a five-point scale from 1 (strongly disagree) to 5 (strongly agree), average item scores ranged from 1.64 to 2.42. The reported correlations with self-reported practice were r = .676 for overcrowding/workload, r = .728 for staffing and r = .586 for facilities/infrastructure (all $p < .001$). The findings highlight significant relationships between perceived organisational conditions and self-reported triage practices but do not establish causal effects or objectively verified triage accuracy. Further research should incorporate validated scoring procedures and objective measures of triage performance.

## 1. Introduction

In an emergency department, triage determines which patient needs attention first. This decision must often be made quickly, before a full clinical assessment is possible. Assigning too low a priority to a critically ill patient (under-triage) may delay essential treatment. Assigning an unnecessarily high priority (over-triage) can also have consequences, as staff and equipment may then be diverted from patients with more urgent needs [6,8].

The quality of a triage decision depends on more than the clinician's knowledge. A busy waiting area, repeated disruptions, constrained assessment time and limited access to colleagues or equipment can all affect the conditions in which judgements are made. In an evidence-based review, reported triage accuracy among emergency nurses ranged from 59.3% to 82%, with variation linked to professional, patient and workplace issues [13]. Record-based studies likewise identify clinical experience, time spent classifying patients and local service conditions as relevant considerations [12,14].

* *Corresponding author.*
*E-mail address: abdulraimi@oum.edu.my*

These questions are appropriate to government emergency departments in Malaysia, where a volatile flow of patients must be managed with the staff and facilities available at the time. Lim *et al*., [8], comparing conventional three-tier triage with the Emergency Severity Index, established the value of assessing classification against an independent reference. Such studies differentiate what a clinician believes about their performance from whether a particular patient was classified correctly. That difference is not merely theoretical: Jordi *et al*., [7] found high self-confidence among nurses in four Swiss hospitals, although they classified only 59.6% of standardised cases correctly.

The three key work environment features identified were overcrowding and workload, staffing, and facilities and infrastructure. Thus, the study examined whether emergency staff views on workload, staffing, and triage facilities were reflected in how they described their own triage. It also looked at whether. The methods used to measure and report these relationships were sound. Those are two separate issues. The survey may help identify priorities for improving local services, but it doesn't show that workplace factors affected the accuracy of clinical decisions.

### *1.1 Emergency Department Overcrowding and Workload*

Emergency department (ED) crowding is about much more than just a large number of patients arriving at the same time. Delays can occur when patients arrive faster than staff can assess them, when treatment spaces aren't freed up quickly enough, or when admission and discharge processes back up. At the triage desk, crowding can create long queues, constant interruptions, and urgent demands all vying for attention. Van der Linden *et al*., [15] found that crowding is associated with delayed triage and a higher likelihood of missing recommended time targets. Chen *et al*., [3] also reported that ED patient volume was associated with both triage and admission delay decisions. These findings support the need to consider workload, although they don't prove it had the same effect in the hospital studied here.

Workload effects may also depend on the experience of the healthcare worker performing triage. More experienced staff may identify urgent cases more quickly, but that may not be the case for less experienced staff. Pressure can still affect the time and attention available for assessment. Saban *et al*., [11] examined how workload affected the relationship between mindfulness and triage accuracy, and Cetin *et al*., [1] found links between patient volume and the time available to classify patients. That's why it makes sense to look at workload. It's important to note though that a staff member's perception of a shift being 'crowded' doesn't necessarily mean that a particular triage decision was right or wrong.

### *1.2 Staffing and Professional Capacity*

At triage, staffing affects whether patients can be seen without such long interruptions, whether a second opinion is available, and whether staff can take appropriate breaks. With the number of the fact that the number of available practitioners doesn't match patient demand means that fatigue and time pressure may well impact how consistently the protocols are adhered to. Cetin *et al*., [1] found that triage accuracy was influenced by staff seniority, shift, patient load and time available for assessment. They also stressed the importance of having appropriately trained staff on hand during periods of high demand. Seo *et al*., [12] reported an accuracy rate of 84.9% in their setting and found that greater clinical experience.

Longer assessment times were associated with better patient classification. Staffing capacity, however, cannot be assessed by staff numbers alone. A larger team may still be uncoordinated in patient classification if staff are not appropriately trained. Conversely, a department that relies

entirely on a small number of experienced staff may be stretched to the limit during night shifts, when staff are on leave, or when there is a sudden influx of patients. Mistry *et al*., [10] found that responses to the same common Emergency Severity Index scenarios varied between the different healthcare centres. Workforce planning should therefore consider not just the number of staff available, but also their training, experience, skill mix, and distribution across shifts.

### *1.3 Facilities, Infrastructure and Decision Support*

Reliable triage also relies on the environment in which the staff work. Staff need a proper place to assess patients, working equipment to take vitals, easy access to clinical guidelines, reliable documentation systems, and a clear process for handling urgent issues. Donabedian's [4] structure-process-outcome framework is a useful way to think about these factors. A well-resourced, well-organised environment may support better care, but it doesn't necessarily mean every triage decision was correct. This is particularly pertinent when the information about the facilities is based on staff opinion rather than direct observation. Information systems may also help staff carry out triage more consistently, particularly when they do so.

They work well in real-world clinical practice. Villa *et al*., [16] reported shorter triage times after introducing a step-by-step Emergency Severity Index algorithm into their electronic health record. They also saw improved timely assessment of the most acutely unwell patients. That said, the observed benefits are not due to the software itself. The value of such systems also depends on ease of use, staff training, reliable hardware, and successful integration into existing clinical workflows.

### *1.4 Objective Accuracy Versus Self-Reported Performance*

We need an objective basis to assess triage accuracy and determine whether the assigned priority was appropriate. This could be an expert review, a standardised clinical scenario or a retrospective assessment using sufficiently complete patient data. Agreement, weighted kappa, sensitivity, specificity, and separate measures of under-triage and over-triage can then describe performance. The values obtained differ from study to study and setting to setting [6,8,10]. None of these measures can be derived from a clinician's confidence rating alone.

Questionnaires can of course tell us a lot about practice. They can tell us about perceived barriers to good practice, how confident staff are in applying protocols, and what they think happens during a busy shift. The downside is that recollection and social desirability will influence responses. If the same person rates the workplace and their own performance, shared response tendencies may lead to an overestimation of the association. Jordi *et al*., [7] illustrate this: confidence was high, but accuracy on the standardised scenarios was very low. The present survey should therefore be viewed as evidence of perception rather than as a measure of the number of patients correctly triaged.

### *1.5 Conceptual Framework*

Table 1 uses Donabedian's [4] framework to structure the activities covered by this survey. The 'structural' factors of workload, staffing levels, physical space, equipment and clinical protocols are all seen as potential influences on triage. The questionnaire items primarily focus on staff perceptions of the triage process (their confidence, use of protocols, and awareness of potential errors). An objective outcome would, of course, require separate evidence (e.g. agreement with expert classification, rates of under-triage and over-triage, patient safety, etc.).

**Table 1**
Corrected structure-process-outcome interpretation

| Structure | Process Measured in This Survey | Outcome Needed for Objective Accuracy |
|---|---|---|
| Overcrowding; staffing; space; equipment; protocols; technology | Confidence; perceived adherence; perceived errors; organisational beliefs | Expert agreement; under-triage; over-triage; patient-safety indicators |

Source: Adapted conceptually from Donabedian [4]; current study measures perceptions and self-reported process

## 2. Methodology

### *2.1 Study Design and Setting*

A quantitative, cross-sectional study was conducted among healthcare personnel involved in emergency triage at a government hospital in Melaka, Malaysia. The study aimed to examine relationships between organisational factors, including overcrowding and workload, staffing adequacy, and facilities and infrastructure, and healthcare personnel's self-reported triage practices in the emergency department.

The study used a cross-sectional design to collect information on participants' perceptions and reported practices at a single point in time. This approach was considered appropriate for identifying associations between organisational factors and triage practices within the existing clinical environment.

### *2.2 Study Population and Sampling*

The study population included nurses and assistant medical officers directly involved in ED triage. 80 healthcare workers were identified as eligible. The minimum required sample size was ascertained using the Krejcie and Morgan sample size table. Simple random sampling was used to select participants from the eligible study population (i.e. each individual had an equal chance of being selected). A total of 66 healthcare workers took part in the study (representing 82.5% of the eligible population).

### *2.3 Research Instrument*

Data were collected using a structured, self-administered questionnaire to assess healthcare staff views on organisational factors and their self-reported triage practice. The questionnaire was in five parts. The first part covered demographic information, and the other four parts assessed overcrowding and workload, staffing, facilities and infrastructure, and self-reported triage. The items were all measured on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree). The instrument contained both positively and negatively worded items to capture a range of perceptions and experiences.

### *2.4 Pilot Study and Reliability Testing*

A pilot study with 10 emergency healthcare staff was conducted to assess the questionnaire's internal consistency before the main data collection. Reliability was assessed via Cronbach's alpha for the four domains of interest: overcrowding and workload ($\alpha$ = .627), staffing ($\alpha$ = .828), facilities and infrastructure ($\alpha$ = .912) and self-reported triage ($\alpha$ = .917). Three of the domains had acceptable

to excellent internal consistency and were therefore retained for the main study. The overcrowding and workload domain had considerably lower reliability but was still included.

### *2.5 Data Collection Procedures*

Data were collected via an online, structured, self-completed questionnaire distributed to eligible nurses and assistant medical officers involved in emergency triage. The online format allowed participants to complete the questionnaire at their convenience without interrupting their normal clinical duties. The questionnaire asked participants to provide information on their demographic profile, their views on the organisational issues they encountered, and their self-reported triage practices based on their ED experience. The completed questionnaires were then compiled for statistical analysis. A total of 66 responses were included in the study.

### *2.6 Data Analysis*

Data were analysed using both descriptive and inferential statistical methods. Descriptive statistics (frequencies and percentages) described the participants' demographic characteristics. Means and standard deviations were calculated to describe participants' responses regarding overcrowding and workload, staffing, facilities and infrastructure, and self-reported triage practice.

Pearson's correlation coefficient was used to assess the strength and direction of the associations between the three organisational factors and self-reported triage practice. We conducted a correlation analysis to determine whether variation in the perceived organisational factors was associated with variation in reported triage practice. Because the study was cross-sectional and relied on self-reported responses, the findings should be interpreted as associations rather than evidence of causality or actual triage accuracy.

## 3. Results

### *3.1 Participant Characteristics*

The study included 66 participants. Most were women (50 participants; 75.8%). Nurses formed the largest professional group, with 45 participants (68.2%), while 21 (31.8%) were assistant medical officers. Most participants were aged 31-50 years: 40.9% were 31–40, and 37.9% were 41–50. Most had between one and ten years of experience working in emergency care, and 59 participants (89.4%) had attended triage training.

It is important to report the professional groups clearly because an earlier description incorrectly stated that assistant medical officers were the majority. As shown in Table 1, nurses made up most of the sample.

**Table 2**
Participant characteristics (N = 66)

| Characteristic | Category | n | % |
|---|---|---|---|
| Sex | Male | 16 | 24.2 |
| | Female | 50 | 75.8 |
| Age | 21-30 years | 14 | 21.2 |
| | 31-40 years | 27 | 40.9 |
| | 41-50 years | 25 | 37.9 |
| | 51 years or above | 0 | 0.0 |
| Profession | Assistant medical officer | 21 | 31.8 |
| | Nurse | 45 | 68.2 |
| | Other | 0 | 0.0 |
| Emergency experience | Less than 1 year | 9 | 13.6 |
| | 1-5 years | 29 | 43.9 |
| | 6-10 years | 28 | 42.4 |
| Triage training | Yes | 59 | 89.4 |
| | No | 7 | 10.6 |

### *3.2 Descriptive Findings*

For overcrowding and workload, average item scores ranged from 1.636 to 2.348. The highest mean was for the statement that workload affected concentration (M = 2.348, SD = 0.774). The lowest mean was for the statement that a large number of patients made careful triage difficult (M = 1.636, SD = 0.598). Both scores were below the 3-point midpoint of the scale, indicating overall disagreement. The higher score therefore indicates less disagreement than the other statement and does not indicate that most respondents agreed that workload affected concentration.

Staffing items had means of 1.909–2.303. Managing too many patients at once received the highest mean (M = 2.303, SD = 0.701), whereas having sufficient help during peak periods received the lowest (M = 1.909, SD = 0.626). Facilities/infrastructure items ranged from 2.197 to 2.415; the highest mean was for the statement linking complete triage facilities with accuracy (M = 2.415, SD = 0.635). For self-reported triage practice, item means ranged from 1.677 to 2.277. Belief in organisational influences had the highest mean (M = 2.277, SD = 0.625), and the statement that errors were rare had the lowest (M = 1.677, SD = 0.589). Under the printed response labels, these results do not indicate widespread agreement or high perceived accuracy.

**Table 3**
Overcrowding and workload scale

| Scale | Alpha | Reported Item Mean Range | SD |
|---|---|---|---|
| Overcrowding/workload | .627 | 1.636-2.348 | 0.774 |
| Staffing | .828 | 1.909-2.303 | 0.626 |
| Facilities/infrastructure | .912 | 2.197-2.415 | 0.635 |
| Self-reported triage practice | .917 | 1.677-2.277 | 0.625 |

Note: The questionnaire printed 1 = strongly disagree and 5 = strongly agree; neutral midpoint = 3.

### *3.3 Reported Associations*

The three reported Pearson's coefficients were all positive: r = .676 for overcrowding/workload, r = .728 for staffing, and r = .586 for facilities/infrastructure (all with N = 66 and p < .001, as shown in Table 3). These are moderate-to-strong associations between the scores as calculated. They do not, in any way, prove that greater crowding, worse staffing, or any of the other specific factors actually led to better triage accuracy.

**Table 4**
Reported pearson associations with self-reported triage practice

| Organisational Score | r | p | N | Permissible Interpretation |
|---|---|---|---|---|
| Overcrowding/workload | .676 | < .001 | 66 | Strong reported association; direction provisional |
| Staffing | .728 | < .001 | 66 | Strong reported association; not an independent or causal effect |
| Facilities/infrastructure | .586 | < .001 | 66 | Moderate reported association; direction provisional |

## 4. Discussion

This study found significant associations between perceived organisational factors and self-reported triage practice amongst emergency healthcare staff at a government hospital in Melaka, Malaysia. Staffing showed the strongest association (r = .728), followed by overcrowding/workload (r = .676) and facilities/infrastructure (r = .586). All of these associations were statistically significant (p < .001). This indicates that the perceived organisational environment is closely linked to how staff assess their triage practice. Again, these are only associations and should not be taken as evidence of causality or as independently validated measures of triage accuracy.

Overcrowding and workload were both strongly linked to self-reported triage practice scores. A body of literature has examined how increased patient numbers, time pressures, and competing clinical duties can affect triage decisions and patient flow [3,15]. In the busy ED, clinicians are constantly faced with the need to triage rapidly while also trying to accurately identify patients who require urgent intervention. The highest mean for the statement that workload affected concentration (M = 2.348, SD = 0.774) was still well below the 5-point scale midpoint. This suggests general disagreement, rather than widespread agreement, that concentration was impaired. So while workload is associated with reported practice, the data do not suggest that overcrowding per se negatively affected triage performance.

Staffing correlated most strongly with self-reported triage practice (r = .728). Sufficient staffing is clearly important for enabling timely patient assessments, effective communication, and appropriate clinical prioritisation. Prior work suggests that staffing conditions, workload, and clinical experience may all be associated with triage performance [1,12]. However, the staffing items produced some of the lowest mean scores (1.909 to 2.303), and the positively and negatively worded items were particularly difficult to interpret. The correlation we observed may also reflect overlap in perceptions of staffing shortages and workload pressures. As this was a bivariate analysis only, we cannot state that staffing is the single most important predictor of triage practice. A multivariable analysis is required to explore these relationships in more depth, taking into account other organisational and individual factors.

Facilities and infrastructure were moderately positively associated with self-reported triage (r = .586). Adequate assessment areas, functional monitoring equipment, and accessible clinical resources are all important for providing effective emergency care. The highest mean for the statement on the link between full triage facilities and accuracy was 2.415 (SD = 0.635), which, on

the reported response scale, again indicates some disagreement. This should not be read as evidence that participants generally believed adequate facilities would lead to more accurate triage. The study also did not objectively assess the level of equipment available, the quality of the infrastructure or the impact of either on triage decisions. The association therefore needs to be explored further with a more formal assessment of facilities and objective performance data.

The participants' professional profiles are of course worth mentioning. 68.2% were nurses and 31.8% were assistant medical officers. 31.8% were aged between 31 and 50, and all had attended some form of triage training. They may have attended training in the past but may not be competent in applying the guidelines or may not have applied them consistently. As previous work has demonstrated the benefit of assessing triage decisions against established clinical guidelines [6-8], future research should incorporate the use of standardised clinical scenarios, direct observation or a retrospective review of triage records to assess classification accuracy.

## 5. Limitations

Several methodological issues remain. The single-centre design and small sample size will limit the generalisability of the findings. There is also the usual problem with self-reported questionnaires (recall bias, social desirability bias and common method bias). The questionnaire included both positively and negatively worded items, but the analysis did not confirm that reverse scoring was used in all cases. As such, the direction and clinical significance of the reported correlations are unclear. The overcrowding/workload domain also showed poor internal consistency (Cronbach's alpha = .627), raising concerns about the measure's reliability. The cross-sectional design also precludes causal conclusions.

Despite the study's limitations, the findings point to areas of the organisation worth examining in the context of ED quality improvement. Periodic reviews of staffing patterns, workload, and triage facilities could help identify operational issues. Again, these are areas for local investigation rather than interventions proven effective in this study. Future multi-centre work should use validated questionnaire scoring, multivariable analysis, and objective measures of triage performance (including both under- and over-triage rates) to generate stronger evidence for improving emergency triage.

## 6. Conclusion

The study found clear associations between the perceived organisational environment and self-reported triage practice. Staffing was the strongest correlate, followed by overcrowding and workload and then facilities and infrastructure. This underscores the importance of considering the organisational context in which triage occurs. The cross-sectional design and reliance on self-reported data, of course, preclude causal inference, and we can't say triage is actually any better or worse as a result. Future work should incorporate validated questionnaire scoring, objective measures of triage performance and larger multi-centre samples. Ongoing review of staffing levels, workload, and resource availability would be a useful tool for continuous quality improvement in emergency triage.

## Acknowledgment

The authors gratefully acknowledge Open University Malaysia for its support and extend our appreciation to colleagues who provided valuable feedback and constructive suggestions during the development of the study and preparation of the manuscript.

## References

[1] Cetin, Songül Biskin, Oktay Eray, Fatma Cebeci, Mustafa Coskun, and Meral Gozkaya. "Factors affecting the accuracy of nurse triage in tertiary care emergency departments." *Turkish Journal of Emergency Medicine* 20, no. 4 (2020): 163.https://doi.org/10.4103/2452-2473.297462.

[2] Chen, Shu-Shin, Jih-Chang Chen, Chip-Jin Ng, Ping-Ling Chen, Pi-Hsia Lee, and Wen-Yin Chang. "Factors that influence the accuracy of triage nurses' judgement in emergency departments." *Emergency Medicine Journal* 27, no. 6 (2010): 451-455.https://doi.org/10.1136/emj.2008.059311.

[3] Chen, Wanyi, Benjamin Linthicum, Nilay Tanik Argon, Thomas Bohrmann, Kenneth Lopiano, Abhi Mehrotra, Debbie Travers, and Serhan Ziya. "The effects of emergency department crowding on triage and hospital admission decisions." *The American journal of emergency medicine* 38, no. 4 (2020): 774-779. https://doi.org/10.1016/j.ajem.2019.06.039.

[4] Donabedian, Avedis. "The quality of care: how can it be assessed?." *Jama* 260, no. 12 (1988): 1743-1748. https://doi.org/10.1001/jama.1988.03410120089033.

[5] Hammad, Karen, Lingli Peng, Olga Anikeeva, Paul Arbon, Huiyun Du, and Yinglan Li. "Emergency nurses' knowledge and experience with the triage process in Hunan Province, China." *International emergency nursing* 35 (2017): 25-29.https://doi.org/10.1016/j.ienj.2017.05.007.

[6] Hinson, Jeremiah S., Diego A. Martinez, Paulo SK Schmitz, Matthew Toerper, Danieli Radu, James Scheulen, Sarah A. Stewart de Ramirez, and Scott Levin. "Accuracy of emergency department triage using the Emergency Severity Index and independent predictors of under-triage and over-triage in Brazil: a retrospective cohort analysis." *International journal of emergency medicine* 11, no. 1 (2018): 3. https://doi.org/10.1186/s12245-017-0161-8.

[7] Jordi, Karin, Florian Grossmann, Gary M. Gaddis, Eva Cignacco, Kris Denhaerynck, René Schwendimann, and Christian H. Nickel. "Nurses' accuracy and self-perceived ability using the Emergency Severity Index triage tool: a cross-sectional study in four Swiss hospitals." *Scandinavian journal of trauma, resuscitation and emergency medicine* 23, no. 1 (2015): 62. https://doi.org/10.1186/s13049-015-0142-y.

[8] Lim, Ban Jin Victor, Shaik Farid Ab Wahab, and Yee Cheng Kueh. "Validity and reliability of emergency severity index and conventional three-tier triage system in the emergency department, hospital universiti sains Malaysia." *The Malaysian journal of medical sciences: MJMS* 27, no. 2 (2020): 90. https://doi.org/10.21315/mjms2020.27.2.10.

[9] Martin, Andrew, Carolyn L. Davidson, Anne Panik, Charlotte Buckenmyer, Paul Delpais, and Michele Ortiz. "An examination of ESI triage scoring accuracy in relationship to ED nursing attitudes and experience." *Journal of Emergency Nursing* 40, no. 5 (2014): 461-468. https://doi.org/10.1016/j.jen.2013.09.009.

[10] Mistry, Binoy, Sarah Stewart De Ramirez, Gabor Kelen, Paulo SK Schmitz, Kamna S. Balhara, Scott Levin, Diego Martinez, Kevin Psoter, Xavier Anton, and Jeremiah S. Hinson. "Accuracy and reliability of emergency department triage using the emergency severity index: an international multicenter assessment." *Annals of emergency medicine* 71, no. 5 (2018): 581-587. https://doi.org/10.1016/j.annemergmed.2017.09.036.

[11] Saban, Mor, Efrat Dagan, and Anat Drach-Zahavy. "The Relationship between Mindfulness, Triage Accuracy, and Patient Satisfaction in the ED." In *Academy of Management Proceedings*, vol. 2019, no. 1, p. 13331. Briarcliff Manor, NY 10510: Academy of Management, 2019.https://doi.org/10.1016/j.jen.2019.08.003.

[12] Seo, Yon Hee, Kangbum Lee, and Kyeongmin Jang. "Factors influencing the classification accuracy of triage nurses in emergency department: analysis of triage nurses' characteristics." *BMC nursing* 23, no. 1 (2024): 764. https://doi.org/10.1186/s12912-024-02334-9.

[13] Suamchaiyaphum, MSN Krisada, and FAAN Adelais Markaki. "Triage accuracy of emergency nurses: an evidence-based review." *Journal of Emergency Nursing* 50, no. 1 (2024): 44-54. https://doi.org/10.1016/j.jen.2023.10.001.

[14] Suamchaiyaphum, Krisada, Allison R. Jones, and Shea Polancich. "The accuracy of triage classification using Emergency Severity Index." *International Emergency Nursing* 77 (2024): 101537. https://doi.org/10.1016/j.ienj.2024.101537.

[15] van der Linden, M. Christien, Barbara EAM Meester, and Naomi van der Linden. "Emergency department crowding affects triage processes." *International emergency nursing* 29 (2016): 27-31. https://doi.org/10.1016/j.ienj.2016.02.003.

[16] Villa, Stephen, Ellen J. Weber, Steven Polevoi, Christopher Fee, Andrew Maruoka, and Tina Quon. "Decreasing triage time: effects of implementing a step-wise ESI algorithm in an EHR." *International Journal for Quality in Health Care* 30, no. 5 (2018): 375-381. https://doi.org/10.1093/intqhc/mzy056.