

Traumadoc in Practice: Understanding providers' experiences and attitudes

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Abstract

Aims

Traumadoc is the national decision support tool used in the reception of severely injured patients in Ireland. Evaluation and provider-feedback of Traumadoc is important to ensure frequent use of the proforma, necessary for consistency across the trauma system.

Methods

We conducted a national, cross-sectional survey of emergency medicine doctors and nurses across Ireland. This survey was supported and disseminated through the Irish association of emergency medicine (IAEM). The survey consisted of an 11-item questionnaire and collected information regarding user-friendliness and clinical effectiveness of Traumadoc using Likert Scales and open-ended questions.

Results

97 emergency medicine professionals from various hospital groups responded. Majority of respondents (56%, 54/97) used Traumadoc infrequently. While respondents felt Traumadoc was useful in guiding resuscitation and improving documentation, many criticized its usability in a high acuity setting, with 57% (57/97) believing it requires revision and 43% (43/97) preferring a digital version. Common concerns included the document's lengthiness, time-pressure difficulties, and redundancy in documentation. Although respondents appreciated the layout and visual prompts, few felt the document streamlined trauma care.

Discussion

Traumadoc provides a standardized framework for the reception of trauma patients, however, its underutilization due to lack of user-friendly features highlights the need for a revised, more intuitive version.

Introduction

Management of the trauma patient is a time-critical period requiring clear and decisive practice in stabilizing, rapidly assessing and establishing a definitive management strategy^{1,2}. Fast and definitive care of these patients is facilitated by effective communication, cohesive interdisciplinary teamwork and a standardized decision support tool that ensures the completion of time-critical actions².

The initial period of patient reception and resuscitation are prone to errors in trauma care. Human factors such as inexperience, time pressure, multitasking, reliance on memory, and breakdowns in trauma team coordination are often causes for these avoidable errors³. The use of decision support tools designed specifically for trauma teams can potentially improve protocol compliance and reduce errors³⁻⁵. As a result, decision support tools are used widely in trauma resuscitation⁶⁻⁸.

In Ireland, the paper-based Traumadoc (figure 1) is a decision support tool endorsed by the Irish Association for Emergency Medicine (IAEM) clinical guidelines committee, the Emergency Medicine Programme (EMP) and the National Office of Clinical Audit (NOCA) for use as the national trauma proforma in the reception of injured patients. Traumadoc was designed in accordance with Advanced Trauma Life Support (ATLS) principles and underpinned by the standards set out by the Major Trauma Audit. The proforma underwent multiple iterative cycles at both urban and rural level 4 hospitals prior to its national rollout. Traumadoc was the first national proforma to provide trauma team members with an organised approach in the real-time management of trauma patients.

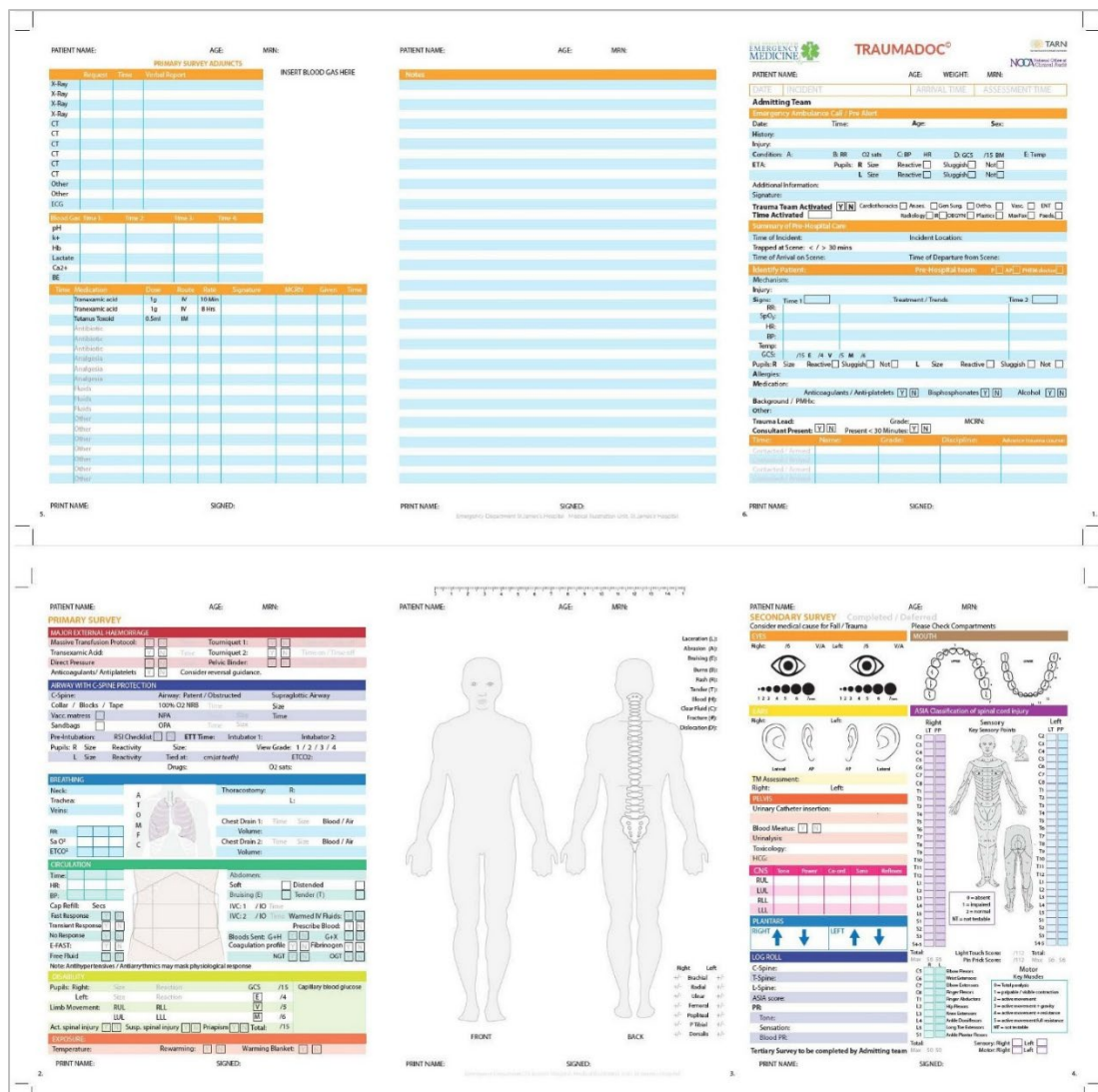
Since its introduction in 2019, the use of Traumadoc has been encouraged in trauma receiving hospitals across Ireland. Most clinician feedback regarding its use has been anecdotal and no countrywide clinician survey has been conducted to appraise the tools usability. Decision support tools should be continuously evaluated to ensure appropriate use and alignment with clinical workflows⁹. If poorly integrated, such tools can increase cognitive load and reduce efficiency, leading clinicians to use their own knowledge to make clinical decisions⁵.

The purpose of this study was to conduct a national survey of trauma providers in Ireland to evaluate the usability of Traumadoc during trauma reception. This survey will provide insight into Traumadoc's real-time application, identify practical application weaknesses and recognize strategies to improve its design and usability.

Methods

A national, cross-sectional survey of emergency medicine hospital doctors and nurses was conducted throughout Ireland. This survey study was approved by the University College Dublin (UCD) research ethics committee (Reference Number: LS-LR-24-216-Phillips)

This survey was supported by the IAEM, the representative national body for emergency medicine in Ireland. A convenience sample from the IAEM mailing list was included. The survey was developed and distributed using SurveyMonkey, an online survey platform. Participants were invited to complete the survey using an anonymous, electronic link distributed via the IAEM mailing list in July 2024. Participation in this survey was voluntary, and respondents consented to participate via an electronic consent 'tick box' function. The survey was estimated to take 5 minutes to complete.



The figure displays four pages of the Traumadoc form, a standardized trauma assessment tool. The forms are organized into sections for patient demographics, vital signs, and a detailed trauma assessment. The assessment includes sections for head, neck, chest, abdomen, and extremities, with checkboxes for various injuries and conditions. The forms also include a section for the admitting team and a section for the patient's medical history. The forms are designed to be completed by emergency medicine hospital doctors and nurses.

Figure 1: Traumadoc

Two Emergency Medicine Consultants with subspeciality interest in trauma and one trauma advanced nurse practitioner developed the survey. The survey was adapted from various acceptability and usability survey questionnaires¹⁰⁻¹². The final survey consisted of an 11-item questionnaire measuring dimensions including user-friendliness and clinical effectiveness using a 5-point Likert Scale and open-ended questions (See Appendix)¹³. Display logic was used for two questions based on preceding answers.

Responses were analyzed using descriptive and frequency statistics. Incomplete responses were removed from final analysis. Comparisons between groups were analyzed using Fisher's exact test. Open ended questions were reviewed manually for dominant themes. Themes were coded, and the codes were applied by one investigator (BAB) to all individual responses. Data analyses were performed using Stata version 18.0.

Results

One hundred and five emergency medicine doctors and nurses responded. Eight incomplete responses were excluded from analysis. In total, 62 doctors and 35 nurses responded. The 97 respondents represented 8 hospital groups from wide ranging geographical locations. Respondent demographics are reported in table 1.

Table 1: Respondent and institution demographics

<u>Demographic (n=97)</u>	<u>Respondents N (%)</u>
<u>Hospital group</u>	
Royal college of surgeons in Ireland (RCSI) hospital group	30 (30.9)
Ireland East Hospital Group (IEHG)	26 (26.8)
Dublin Midlands Hospital Group	13 (13.4)
University Hospital Limerick (UL) Hospital	2 (2.06)
South/Southwest Hospital Group	6 (6.19)
Children's Health Ireland	5 (5.15)
Saolta Hospital Group	15 (15.46)
<u>Trauma designation</u>	
Major Trauma Centre	27 (27.8)
Trauma Unit	50 (51.54)
Not applicable	20 (20.62)
<u>Hospital Role</u>	

Medical	62 (63.92)
Nursing	35 (36.08)
<u>Grade (Medical)</u>	
Consultant (EM)	24 (24.74)
Consultant (Other)	3 (3.09)
Specialist registrar (EM)	11 (11.3)
Specialist registrar (Other)	2 (2.06)
Registrar	12 (12.37)
Senior house officer (SHO)	4 (4.12)
Intern	1 (1.03)
<u>Grade (Nursing)</u>	
Advanced nurse practitioner	3 (3.09)
CNM 3	1 (1.03)
CNM2	23 (23.71)
CNM1	1 (1.03)
Registered Nurse	7 (7.22)
<u>Years in practice</u>	
Less than 1 year	6 (6.19)
1-5 years	31 (31.95)
6-10 years	21 (21.6)
More than 10 years	32 (32.99)

Footnote: EM: emergency medicine; CNM: Clinical nurse manager.

Twenty-eight respondents (28.89%) reported using Traumadoc more than 20 times in the emergency setting whereas 8 respondents (8.25%) reported 'never' using Traumadoc (figure 2). Respondents working in major trauma centers were more likely to use Traumadoc 'often' when compared to those working in trauma units ($p = 0.0164$). Comparisons of responses by hospital role, medical and nursing grade demonstrated little disparity, with statistical comparisons indicating no significant differences.

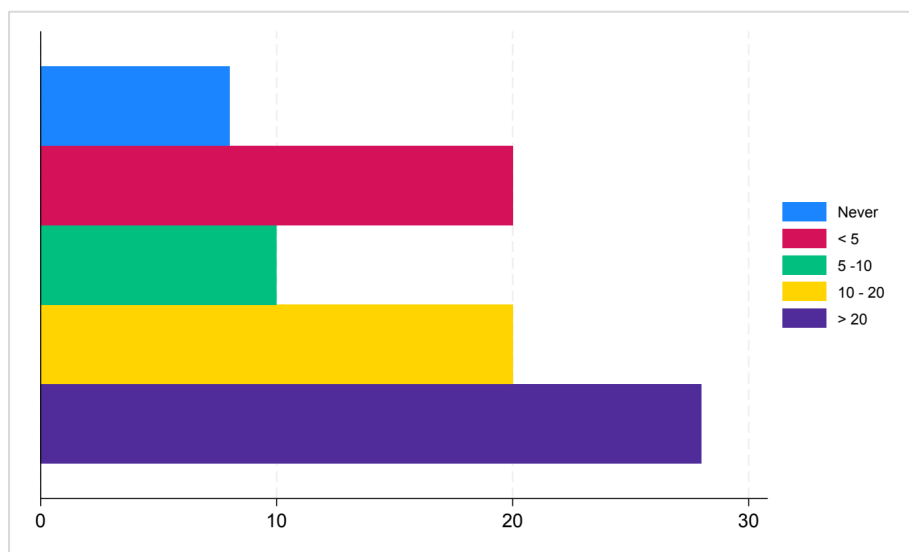


Figure 2: Bar graph illustrating the frequency of use of Traumadoc by respondents in the reception and resuscitation of trauma patients.

An average of 20% of respondents (21/97) found Traumadoc easy to complete and follow, but only 11% (11/97) felt it was easy to use in real-time. 26% (26/97) believed it improved documentation, and 11% (11/97) felt it aided clinical decision-making. 38% (38/97) felt it did not integrate other specialties in trauma care. Nearly half (48%, 48/97) found Traumadoc difficult to complete under time pressure. Figure 3 illustrates these usability responses.

Approximately 40% of respondents (41/97) found Traumadoc useful for guiding patient resuscitation and interventions, while 38% (38/97) believed it improved clinical documentation. Only 5% (5/97) felt that Traumadoc reduced time to critical interventions, and 15% (15/97) thought it enhanced overall team communication.

Most respondents (57/97; 57%) felt that Traumadoc requires a revision. Additionally, 43% (43/97) would prefer a digital trauma application with more prompts than the current paper-based version.

Various challenges associated with the use of Traumadoc were expressed by respondents. Nineteen percent of respondents (19/97) felt Traumadoc lacked usability and flow, with one describing it as 'cumbersome to use (and) interrupts the flow of trauma resuscitation.' Fifteen percent (15/97) cited repetition and duplication of documentation as a difficulty, particularly across clinical charts. Thirteen percent (13/97) found Traumadoc too complex and lengthy, specifically in high-acuity settings, with descriptions like 'too wordy,' 'too long,' and 'too busy.'

When asked about the positive aspects of Traumadoc's layout and functionality, 11% of respondents (11/97) found it easy to follow and visually clear. Many appreciated the colourful format. Five percent (5/97) enjoyed the visual prompts, such as the body map and diagrams,

while 3% (3/97) considered the document comprehensive, covering all potential injury areas. Interestingly, 5% (5/97) appreciated its detailed data collection metrics.

Several areas for improvement were identified by respondents. 14% (14/97) suggested simplifying Traumadoc by removing prehospital data and reducing repetition. 12% (12/97) proposed more space for free-text documentation, preferring free text above check functions, and 6% (6/97) suggested a specific section for nursing documentation. Interestingly, 2% (3/97) proposed patient-specific versions, such as for paediatric patients. 5% (5/97) felt an electronic version could enhance real-time use.

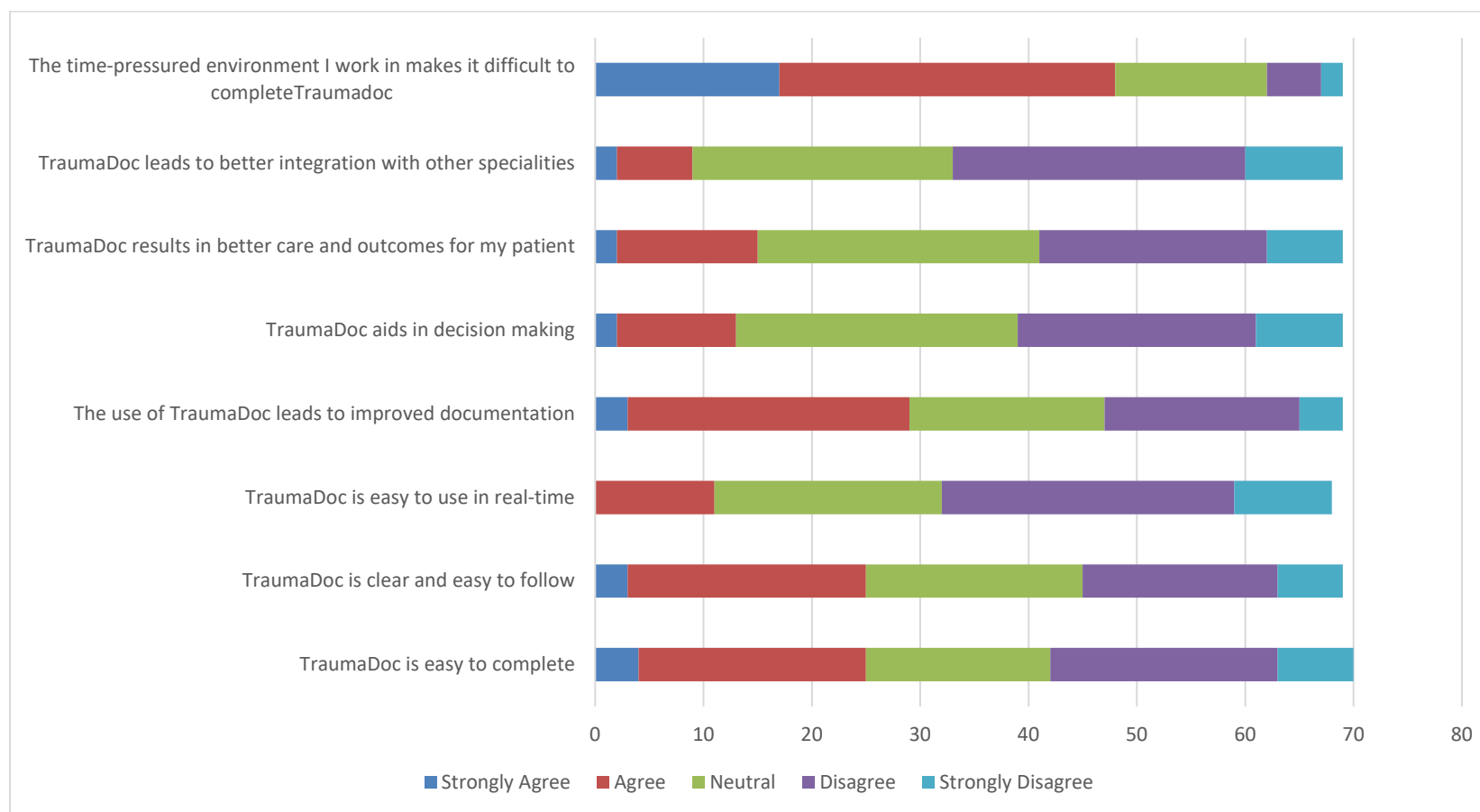


Figure 3: Stacked bar Graph illustrating the usability of TraumaDoc

Discussion

We conducted a national survey to evaluate the usability of Traumadoc as a decision support tool in the reception of trauma patients. The founding aims of Traumadoc were to prompt the delivery of time-critical actions of which 40% of respondents agreed the proforma achieves, and secondly, to allow accurate and efficient data entry, however, half felt it was difficult to accomplish in time-pressured situations.

A concern among respondents was the lack of flow and lengthiness of the proforma, which failed to integrate both clinician and nursing records, resulting in repetitive and redundant clinical documentation. Although certain positive features of the proforma were noted, most respondents felt that it was ill-suited for real-time documentation in an acute setting. Since its introduction, Traumadoc has not been updated. More than half of respondents agreed that a revision is required, suggesting the introduction of a more simplified version.

This survey enabled us to reach a broad national audience through the support of the IAEM. This allowed us to engage emergency healthcare providers across Ireland. This approach was a cost-effective means to gather data from a large and diverse group of respondents, including providers with varying levels of experience.

Importantly we included emergency nursing staff in the survey who are integral members of the hospital trauma teams, enabling us to obtain a more comprehensive view of the proforma's use. Historically, surveys evaluating decision support tools have focused primarily on the perspectives of physicians, often overlooking the significant role played by nursing teams in the trauma setting¹⁴.

This study is not without limitations. The low response rate may affect the generalizability of our findings. This response rate is consistent with a similar survey¹⁵ and is a well-recognized shortcoming of voluntary surveys. The low response rate may, however, also reflect clinicians' overall attitudes toward the current proforma. Additionally, this may indicate the presence of self-selection bias, as clinicians who do not regularly use the proforma may not have felt compelled to participate, while those with a greater interest in trauma may have been more likely to engage with the survey. Strategies to improve future survey engagement should leverage social media platforms, society newsletters and targeted launching during annual society meetings.

The National Office for Trauma Services (NOTS) was established in 2015 to implement the National Trauma Strategy, A Trauma System for Ireland¹⁶. This strategy restructured the trauma system, creating two regional networks, each with a Major Trauma Centre (MTC) to handle complex cases, supported by trauma units for less critical care. Trauma systems ensure coordinated care across all phases, integrating local public health systems to improve

outcomes. Processes like Traumadoc standardize care and are more widely used in MTCs and trauma units. Revising this strategy, incorporating provider feedback, is vital for consistency across the trauma system.

The results of this survey indicate that a revision of the current paper-based Traumadoc is required. In the short term, a post-survey action meeting will be required to review the findings from the Traumadoc survey and determine whether a full, partial or prompt update of this document is necessary. Updating current guidelines can be a time-consuming process. A Delphi technique would be highly advantageous, comprising of a range of specialist consultants, including EM physicians, orthopaedics, critical care, general surgeons and nursing representatives to efficiently reach a consensus. The goal will be to assess whether the proforma aligns with current guideline recommendations, eliminate unnecessary data fields and improve clinical flow. The Trauma Reception and Resuscitation System, used in Melbourne, Australia, was similarly developed following analysis of clinical practice and literature review by both experienced clinicians, nurses and technical advisors ³.

Three core considerations play a role in the successful implementation of change in healthcare systems¹⁷. These include 1. The opportunity for healthcare workers to influence change, 2. The readiness of healthcare workers for change, and lastly 3. Whether healthcare workers value the expected change¹⁷. In a recent study, physicians and nurses felt that changes in healthcare systems are better received when they directly influence solution formation and the change implementation process from the start¹⁷ highlighting the importance of involving all trauma team members in the testing and implementation process of the revised Traumadoc.

Prior to the formal implementation of a revised version of Traumadoc into the clinical setting, usability testing should be conducted to evaluate user-system interaction, adherence to guidelines, and system performance, including potential errors¹⁸. Simulation based testing is likely to provide valuable insights and such an approach may be beneficial in the test phase of a new proforma.

In the long term, the introduction of Clinical Decision Support Systems (CDSS) would be required. CDSS integrate patient data with evidence-based, computerized clinical knowledge to provide patient-specific recommendations, accessible via desktops, tablets, or smartphones. CDSS tools improve guideline adherence, reduce prescribing errors, minimize duplication, and enhance documentation¹⁹. There is limited data with respect to real environment CDSS platforms in other trauma systems. TraumaFlow, a CDSS used in Leipzig, Germany, has been shown to facilitate faster decision-making, reduce cognitive workload, and enable systematic approaches in treating trauma patients, particularly for less experienced clinicians²⁰. Developing a CDSS requires collaboration among clinicians, technical experts, and

administrators and can be resource intensive. Healthcare systems must balance the costs of purchasing versus developing a tailored CDSS solution. Integrating CDSS into the reception of trauma patients in the future will enable the standardization of care across all trauma systems in Ireland.

Traumadoc fulfilled a critical gap in trauma care, providing a standardized framework for the reception of trauma patients, particularly when none existed. As part of our commitment to strengthening trauma systems, Traumadoc, like all processes, must be subject to the iterative cycle of improvement science. The current Traumadoc is underutilized due to its lack of user-friendly features, highlighting the need for a revised version. It is undoubtedly a huge undertaking, requiring the time and expertise of multiple trauma providers. A more intuitive, user-friendly version is essential to address the time-sensitive nature of managing major trauma patients. The successful implementation of a revised Traumadoc may assist in the improved coordination of care of trauma patients.

Declarations of Conflicts of Interest:

None declared.

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Appendix:

The Traumadoc Survey:

The TraumaDoc Survey

The TraumaDoc is a decision support tool endorsed by the Irish Association for Emergency Medicine (IAEM) clinical guidelines committee for use as the national trauma proforma. In recent years, feedback with respects to the Traumadoc suggests that it is not being used by attending emergency physicians when receiving trauma patients.

The aim of this study, based out of University College Dublin, is to understand EM trauma-provider's experiences using the TraumaDoc. This will allow us to evaluate the acceptability and usability of TraumaDoc as a decision support tool in the clinical setting and understand any difficulties users may be encountering when using the document.

This study seeks to determine if there is the need for:

- **A comprehensive revision of the current TraumaDoc**
- **Consideration for a digital trauma application to replace the current paper based TraumaDoc**

This survey should take approximately 5-10 minutes to complete.

Please note that your responses are completely anonymous.

Your feedback is very important to us and we really appreciate you taking the time to participate.

* 1. Before you Begin Please Note the Following:

- I have read and understood the Information Leaflet
- I understand that this study is entirely voluntary.
- I understand that I will not be paid for taking part in this study.
- I know how to contact the research team if I need to.
- I understand that any information about me will be protected in accordance with the General Data Protection Regulation (GDPR).
- I agree to take part in this research study, having been fully informed of the risks and benefits in the participant information leaflet provided to me.

☐ Yes

☐ No

The TraumaDoc Survey

* 2. What hospital group do you currently work in?

* 3. Is your hospital a designated Trauma Unit or Major Trauma Centre?

* 4. What is your current role?

- ☐ Medical
☐ Nursing

The TraumaDoc Survey

* 5. Nursing: What is your grade/designation?

* 6. Medical: What is your grade/designation?

7. Years of Experience in Your Role

- ☐ Less than 1 year
- ☐ 1-5 years
- ☐ 6-10 years
- ☐ More than 10 years

The TraumaDoc Survey

* 8. How often do you or your team utilise/complete the TraumaDoc in the reception and resuscitation of trauma patients?

Always

☐

Often

☐

Sometimes

☐

Rarely

☐

Never

☐

* 9. How many times have you or your team been involved in utilising/completing the TraumaDoc?

☐ Never

☐ <5

☐ 5 to <10

☐ 10-20

☐ >20

The TraumaDoc Survey

* 10. Please read carefully and rate the following statements based on your use of the TraumaDoc in the reception and resuscitation of major trauma patients.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
The TraumaDoc is easy to complete.	☐	☐	☐	☐	☐
The TraumaDoc is clear and easy to follow.	☐	☐	☐	☐	☐
The TraumaDoc is easy to use in real-time.	☐	☐	☐	☐	☐
The use of the TraumaDoc leads to improved documentation.	☐	☐	☐	☐	☐
The TraumaDoc aids in decision making.	☐	☐	☐	☐	☐
The TraumaDoc results in better care and outcomes for my patient.	☐	☐	☐	☐	☐
The TraumaDoc leads to better integration with other specialities.	☐	☐	☐	☐	☐
The time-pressured environment I work in makes it difficult to complete the Traumadoc.	☐	☐	☐	☐	☐
I think that the TraumaDoc needs to be updated.	☐	☐	☐	☐	☐
I would use a digital trauma application with prompts more than the current TraumaDoc.	☐	☐	☐	☐	☐

* 11. What do you feel are the primary benefits of using TraumaDoc in the reception and resuscitation of major trauma patients? (Select all that apply)

- ☐ Streamlines patient assessments
- ☐ Enhances team communication
- ☐ Reduces time to intervention
- ☐ Useful as a prompt to aid in resuscitation and interventions
- ☐ Improves documentation
- ☐ Other (please specify)

* 12. What are the main challenges associated with using the current iteration of the TraumaDoc in the reception and resuscitation of major trauma patients?

The TraumaDoc Survey

* 13. What do you like about the layout and/or functionality of the TraumaDoc?

* 14. How could the layout and/or functionality of the TraumaDoc be improved?

15. Do you have any additional comments or suggestions regarding the TraumaDoc?

The TraumaDoc Survey

16. You indicated that you have never utilised the TraumaDoc in practice. Can you outline some barriers that have prevented you from utilising this in the reception and resuscitation of major trauma patients?

17. Do you have any additional comments or suggestions regarding the TraumaDoc?