INTRODUCTION

Inadequate clinical information in medical imaging requests negatively affects the clinical relevance of imaging performed and the quality of resultant radiology reports. Currently, there are no published Australian guidelines on what constitutes adequate clinical information in computed tomography (CT) requests. This study aimed to determine specific items of clinical information radiologists require in CT requests for acute chest, abdomen and blunt trauma examinations, to support optimal reporting.

METHODS

A panel of 24 CT-reporting consultant radiologists participated in this e-Delphi consensus study. Panellists undertook multiple online survey rounds of open-ended, dichotomous and Likert scale questions, receiving feedback following each. Round 1 responses formulated lists for each CT examination. Round 2 set a threshold of 80% agreement after dichotomous scoring. Round 3 accepted items which averaged 4 or more on a 5-point Likert scale. Round 4 required panellists to rank items within the aggregated, accepted lists, based on panellists’ perceived level of usefulness.

RESULTS

The large numbers of round 1 items (chest: 101, abdomen: 76, blunt trauma: 80) were rationalised and grouped into categories to facilitate efficiency during subsequent rounds. Twenty-three chest, 24 abdomen and 17 blunt trauma items met the 80% agreement threshold in round 2. Items below threshold were included in round 3; numbering 44, 19 and 23 for chest, abdomen and blunt trauma, respectively. Through the e-Delphi process, we formulated clinical information criteria standards for three CT types.

CONCLUSIONS

The developed standards will guide Australian referrers in providing adequate clinical information in CT requests, to support optimal reporting, diagnosis and treatment.

Keywords

computed tomography, education, interprofessional/multidisciplinary, medical imaging, standards

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Abstract

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Methods: A panel of 24 CT-reporting consultant radiologists participated in this e-Delphi consensus study. Panellists undertook multiple online survey rounds of open-ended, dichotomous and Likert scale questions, receiving feedback following each. Round 1 responses formulated lists for each CT examination. Round 2 set a threshold of 80% agreement after dichotomous scoring. Round 3 accepted items which averaged 4 or more on a 5-point Likert scale. Round 4 required panellists to rank items within the aggregated, accepted lists, based on panellists’ perceived level of usefulness.

Results: The large numbers of round 1 items (chest: 101, abdomen: 76, blunt trauma: 80) were rationalised and grouped into categories to facilitate efficiency during subsequent rounds. Twenty-three chest, 24 abdomen and 17 blunt trauma items met the 80% agreement threshold in round 2. Items below threshold were included in round 3; numbering 44, 19 and 23 for chest, abdomen and blunt trauma, respectively. Through the e-Delphi process, we formulated clinical information criteria standards for three CT types.

Conclusions: The developed standards will guide Australian referrers in providing adequate clinical information in CT requests, to support optimal reporting, diagnosis and treatment.
diagnosis and reporting confidence of radiologists. Most importantly, adequate clinical information included in requests improves radiologists’ ability to answer clinical questions posed by referrers and recommend appropriate follow-up imaging. This ensures reports are useful and positively contribute to patient care.

Previous studies have highlighted the problem of inadequate clinical information in requests. Radiologists’ dissatisfaction\(^8\) and the reported feelings of inadequate radiology knowledge of junior doctors\(^9\) may be due to the lack of criteria standards available to detail the clinical information needed in requests. Subjective terms such as adequate, relevant and sufficient are commonly used to describe the type and quality of clinical information needed in requests.\(^11\) Currently, there appears to be a mismatch between perceptions of these terms between referrers and radiologists. Therefore, it is essential for radiologists to feedback their expectations regarding clinical information to encourage improved requesting. The ambiguity and subjectivity of these descriptive terms demonstrate the need for further investigation. The establishment of criteria standards may help define adequate clinical information to be included in requests.

Criteria standards have been used in healthcare publications to standardise research and quality assurance systems.\(^13,14\) For the purpose of this paper, a criteria standard is defined as a set of recommendations outlining specific elements of clinical information required in requests to enable accurate and confident reporting. This study aimed to create criteria standards for clinical information required by radiologists in three commonly requested examinations to support optimal reporting, diagnosis and treatment for best patient outcomes.

**Methods**

Human Research Ethics committee approval was obtained from the University of Queensland prior to commencing the study (2020000682). A Delphi study was conducted to gain consensus from computed tomography (CT) reporting radiologists as to what constitutes adequate clinical information for specific CT examinations. The Delphi method is an iterative process used to develop consensus on a particular topic. Key features used to reduce bias include anonymity of participants, multiple survey rounds and feedback to the expert panel following each round.\(^15\) For this study, an e-Delphi method was used to facilitate efficient data collection via online means, a process which has been previously successful in formulating healthcare guidelines.\(^16\)

This study focused on three examinations (CT chest, CT abdomen and CT for blunt trauma [CT trauma series]). These were chosen based on statistics of commonly requested CT scan types at a local Australian trauma hospital. It is proposed that the establishment of criteria standards for these common scans will yield clinical value and support improving patient outcomes.

**Recruitment**

Members of the expert panel were recruited via voluntary sampling, with consultant radiologists who report CT imaging being eligible. All Directors of Radiology at Australian trauma hospitals on the ‘Australia and New Zealand Trauma Registry’\(^17\) were contacted via email to invite their eligible staff to take part in the study in June 2020. These hospitals were chosen due to their greater exposure to trauma imaging and recognised expertise in the field.

Potential panellists were provided with a participant information sheet (PIS). Panel members demonstrated their consent to participate by completing the round 1 survey via a link included in the PIS. A panel of 10–15 members\(^18\) has been previously recommended; however, a systematic review\(^19\) of Delphi studies which formulated healthcare quality indicators reported a median of 17 expert panellists. For this study, a total of 24 panellists opted into round 1, a number in keeping with the reported literature.

**e-Delphi survey rounds**

The e-Delphi process consisted of four online survey rounds. Before commencement, a draft survey was piloted with local radiologists, whose feedback on readability and clarity was incorporated before survey finalisation. In round 1, panellists were asked open-ended questions. Free-text, extended responses were encouraged to enable panellists to detail their opinions. Round 1 was conducted in June 2020. For each of the three CT scan types, panellists were asked to detail what specific clinical information in requests is essential to assist them to confidently select a scan protocol and report imaging. Panellists were asked to consider which items of clinical information they would seek from a referrer if they were personally receiving a request. This round generated three lists (one per scan type) of items of clinical information deemed essential for protocolling and reporting. Responses from panellists were collated, and similar items were rationalised and categorised by two radiographers with 30 years’ shared experience in interpreting clinical information. Examples of rationalisation of similar terms included ‘location of pain’ and ‘site of pain’, whereas responses such as ‘location of symptoms’ and ‘specific location of pain’ were considered unlike responses in the
round 4 was to improve usability of the criteria standards considered most essential by the expert panel. The aim of was necessary to refine the item lists, to determine those three criteria standards were extensive. Therefore, round 4 were reported as non-essential but useful.

standards, whilst items which scored a mean of 2.5 to 4 with a mean score of 4 were accepted in the criteria confidently protocol and report CT imaging. All items useful they considered each item to be in assisting them to

1. Review of all panellists’ responses for same or similar terms used
2. Similar terms amalgamated together if the meaning of terms used were deemed to have similar meanings, for example ‘abdominal surgical history’ and ‘prior abdominal surgeries’ were amalgamated to ‘list of previous abdominal surgeries’
3. Responses that included different terms but were deemed to have similar meanings were grouped together, for example ‘white cell count’, ‘WCC’ and ‘LFTs’ were grouped together in ‘pathology results’ category

In round 2, panellists were provided with a summary of responses received in round 1 and were asked to indicate whether or not they considered each item essential in assisting them to confidently protocol and report. Round 2 was conducted in July 2020. All items of clinical information deemed essential by 80% or more of panellists were accepted in the criteria standards. Panellists were also encouraged to provide additional items of clinical information missing from the round 1 list, for inclusion in the subsequent round.

In round 3, the panellists were provided with a summary of round 2 responses, which outlined the accepted items and those not accepted. Round 3 was conducted in August 2020. The list of ‘not accepted’ items (not deemed essential by at least 80% of panellists in the previous round), as well as additional items from round 2, were included in the round 3 survey. This round required panellists to subjectively rate each item on a 5-point Likert scale (1 = Not Useful, 5 = Essential) according to how useful they considered each item to be in assisting them to confidently protocol and report CT imaging. All items with a mean score of 4 were accepted in the criteria standards, whilst items which scored a mean of 2.5 to 4 were reported as non-essential but useful.

Following round 3, the lists of accepted items for the three criteria standards were extensive. Therefore, round 4 was necessary to refine the item lists, to determine those considered most essential by the expert panel. The aim of round 4 was to improve usability of the criteria standards by limiting the number of items, thus increasing the likelihood of referrer adherence in clinical practice. In round 4, the panellists were provided with a summary of round 3 responses and were asked to rank all items depending on their opinion of their relative usefulness. Round 4 was conducted in October 2020.

A summary of the e-Delphi process is shown in Figure 1. Study data were collected using the Qualtrics™ online survey platform. Participants received subsequent survey rounds via email. Up to two reminders were sent to participants who had not responded. Comments and feedback were compiled after each round and discussed among the investigators.

Results

Panel Characteristics
A total of 24 CT-reporting consultant radiologists from Australian trauma hospitals took part in round 1 to form the expert panel. Although all Australian trauma hospitals recognised by the ‘Australia and New Zealand Trauma Registry’ were contacted to invite participation, participants from only four Australian states were represented: Queensland (21), Western Australia (1), South Australia (1) and Tasmania (1) Characteristics of the panellists are shown in Table 1.

Completion Rates
Nineteen of 24 expert panellists completed all three surveys of rounds 2 and 3. Fourteen of 24 expert panellists responded to round 4, an overall retention rate of 58.3%.

e-Delphi Survey Rounds 1–3
In round 1, the large numbers of items (chest: 101, abdomen: 76, blunt trauma: 80) from expert panellists were rationalised and grouped into overall categories of clinical information. The following numbers of items met the threshold of 80% or greater agreement by all panellists in round 2 – chest: 23, abdomen: 24 and blunt trauma: 17. Items falling below the 80% threshold were included in round 3.

Round 3 consisted of 44, 19 and 23 items for chest, abdomen and blunt trauma, respectively. Round 3 questioning invited panellists to rate each remaining item according to their opinion of its usefulness. Based on these results, the criteria standards were formed, along with lists of items deemed ‘moderate to high’ or ‘low’ level of usefulness. Table 3 lists the items deemed non-essential but useful in the protocoling and reporting process.
Round 4 focused on improving the usability of the standards by determining the top 10 most useful items of clinical information. Three lists of the top 10 items for each scan type were created, forming the refined criteria standard lists. These lists and the remaining items deemed essential but not included in the Top 10, are listed in Table 2.

**Discussion**

This study has formulated criteria standards for essential items of clinical information required by radiologists in acute CT requests that are specific to Australian practice.

Other similar international studies exist: The iRefer guidelines and the Reason for exam Imaging Reporting and Data System (RI-RADS) grading system.

The iRefer guidelines 8th edition, produced by the Royal College of Radiologists, United Kingdom, draw on the findings of previous editions, synthesising a multitude of evidence to create 270 guidelines. The iRefer guidelines utilised 300 radiologists and clinicians who freely gave their time to participate in a Delphi study. These guidelines support imaging referral decisions by general and emergency department practitioners and have resulted in a 20% reduction in requested examinations.

RI-RADS is a proposed grading system to evaluate the quality of clinically pertinent information in imaging requests. It is based on the American College of Radiology’s (ACR) practice guideline for communication of diagnostic findings, which requires the communication of relevant clinical information, a working diagnosis and/or pertinent clinical signs and symptoms. RI-RADS focuses on three categories of information as key indicators of quality: impression, clinical findings and the diagnostic question. The RI-RADS grading system has similar goals to our Delphi study in improving the communication between referrer and radiologist as it enhances continuous feedback. However, it maintains the use of subjective descriptive terms such as ‘adequate’, ‘barely adequate’, ‘considerably limited’ and ‘deficient’ to grade the quality of clinical information. This language promotes ambiguity and may lead to the ineffective communication of radiologists’ requirements of the
Table 2. Criteria Standards – essential clinical information for CT requests.

| CT Scan | Top 10 essential items of clinical information | Remaining essential items |
|---------|-----------------------------------------------|---------------------------|
| **CT Chest for acute (non-traumatic) chest symptoms** | | |
| 1. Clinical suspicion for PE with supporting Wells Criteria | 11. Onset of pain (e.g. sudden/severe/slow/insidious/gradually worsening) |
| 2. Side and site of each symptom | 12. Duration of each symptom |
| 3. Clinical suspicion for Acute Aortic Syndrome | 13. Presence or absence of pain |
| 4. Suspected diagnosis (e.g. PE vs lung vs vascular vs MSK aetiology) | 14. Side of Pain |
| 5. Presence of fever/febrile | 15. Specific surgical history (e.g. previous right upper lobectomy) |
| 6. Haemodynamic status/Hypotensive or Normotensive (e.g. BP and HR) | 16. History of IVDU |
| 7. History of cancer/presence of known neoplasia | 17. Presence of known DVT |
| 8. Prior history of chest pathology | 18. White Cell Count |
| 9. Presence of shortness of breath/dyspnoea | | |
| 10. Presence of haemoptysis | | |

**CT Abdomen for acute (non-traumatic) abdominal symptoms**

| | |
|---|---|
| 1. Presence of infective symptoms e.g. fever/pyrexia, nocturnal fevers | 11. History of malignancy anywhere in the body |
| 2. Location of symptoms | 12. List of constitutional symptoms (e.g. weight loss, early satiety) |
| 3. Specific location of pain (e.g. RUQ, LLQ) | 13. List of concurrent symptoms/findings (e.g. nausea, vomiting, diarrhoea, fever/signs of peritonism) |
| 4. Haemodynamic status (separate to active bleeding for likelihood of scan showing the bleeding point – is the patient safe to be scanned and does the patient require a multiphase study?) | 14. Duration of pain (e.g. hours, days, weeks) |
| 5. Clinical suspicion for a specific diagnosis or differential leading to a unique protocol (e.g. renal colic (non-contrast), haematuria (CT-IVP), rectal bleeding (GIT bleed protocol), leaking aneurysm (CTA protocol) etc.) | 15. Previous abdominal imaging and reports |
| 6. History of prior abdominal pathology (e.g. previous stones (urinary, GB), diverticulitis, cirrhosis, IBD, cholelithiasis) | 16. Full Blood Count |
| 7. Presence of bleeding bowel/urinary symptoms (e.g. haematuria, haematochezia, melena) | 17. History of IVDU |
| 8. Specific location of tenderness | | |
| 9. Duration of each symptom | | |
| 10. List of previous abdominal surgeries, e.g. 'Whipples’ not just ‘multiple bowel surgeries’ | | |

**CT Multi-Trauma (CT Trauma Series)**

| | |
|---|---|
| 1. Mechanism of trauma/injury | 11. Localising neurology |
| 2. Type of injury (e.g. crush injury, pulmonary barotrauma, straddle injury) | 12. Haemoptysis, haematemesis or blood in urine |
| 3. Velocity/speed/indication of severity of trauma | 13. Clinical suspicion for all injuries that could be imaged in the same session and single contrast dose (e.g. ankle fracture) |
| 4. Suspected sites of injury | 14. If suspected haemodynamically unstable – list of symptoms, for example BP, haematuria, haematochezia, falling haemoglobin |
| 5. Haemodynamic state (stable vs unstable) | | |
| 6. Location (site and side) of pain (e.g. midline neck pain, right-sided chest pain, RUQ pain/bruising, left hip pain) | | |
| 7. Presence or absence of known displaced fractures (multiphase study indication) | | |
| 8. Abnormal vital signs (BP, HR, ECG, GCS etc.) | | |
| 9. Clinical concern regarding specific injuries, for example liver, spleen, spine, pelvis | | |
| 10. What the clinician is trying to confirm, exclude, define, or follow the progress of/clinical question | | |

Abbreviations: BP = blood pressure; CTA = CT angiogram; CT-IVP = CT intravenous pyelogram; DVT = deep vein thrombosis; ECG = electrocardiogram; GB = gallbladder; GCS = Glasgow Coma Scale; GIT = gastrointestinal tract; HR = heart rate; IBD = inflammatory bowel disease; IVDU = intravenous drug use; LLQ = left lower quadrant; MSK = musculoskeletal; PE = pulmonary embolism; RUQ = right upper quadrant.
**Table 3.** Non-essential but useful items of clinical information for CT requests.

| CT Scan                                | Useful but non-essential items                                                                 |
|----------------------------------------|-------------------------------------------------------------------------------------------------|
| **CT Chest for acute (non-traumatic) chest symptoms** | Symptoms:  
• List of infective symptoms  
• Presence of productive cough  
• Presence of haemoptysis  
• Loss of consciousness  
• Presence of vomiting  
• Presence of pleurisy  
• Pain in relation to breath pleuritic or not  

Pain characteristics:  
• Exact location of pain (focal/diffuse)  
• Duration of pain  
• Nature/character of pain  
• Site/s of pain referral  

Clinical observations and tests:  
• Physical signs  
• Presence or absence of infective prodrome  
• Presence of tachycardia/tachypnoea  
• Presence of desaturation  
• Supporting results/investigations  

Risk factors for specific conditions:  
• History of Marfan syndrome  
• Presence of cardiac risks  

Medical history:  
• Prior similar presentations  
• Presence of chronic conditions  
• Presence of predisposing conditions  
• Pre-existing congenital/genetic diseases  
• Presence of idiopathic pulmonary fibrosis (IPF)  
• Smoking history (pack/s per year)  
• Cardiac history  

Pathology results:  
• D-dimer  
• CRP  
• Inflammatory markers  
• Infection status  
• Troponin status  

Previous imaging/reports:  
• Previous chest imaging/reports  
• All previous imaging/reports (any region of the body)  

Non-chest symptoms:  
• Clinical suspicion for additional extra-thoracic pathology that can also be encompassed in index study and a single contrast dose  
• Presence or absence of abdominal symptoms  

| **CT Abdomen for acute (non-traumatic) abdominal symptoms** | Symptoms:  
• Severity of symptoms  
• If diarrhoea, include details of travel history  

Pain characteristics:  
• Intensity/severity of pain  
• Character/nature of pain (e.g. pleuritic, central, colicky, ache, peritonitic, constant)  
• Speed of onset of pain (e.g. sudden and severe, gradual and worsening)  

(Continued)
Table 3. Continued.

| CT Scan | Useful but non-essential items |
|---------|---------------------------------|
|         | • Any change in radiation of pain (e.g. pain radiation to groin) |
| Medical history: | • If history of malignancy, include details of treatment regime |
|         | • Medication history |
|         | • List of chronic conditions |
|         | • If site of pathology is known, include a detailed description |
|         | • Compromised immune status |
| Surgical history: | • Surgical history (anywhere in the body) |
| Previous imaging/reports: | • Previous imaging and reports of regions other than the abdomen |
| Non-abdominal symptoms: | • Clinical suspicion for any extra-thoracic pathology that could also be imaged in the same session with a single contrast dose |

CT Multi-Trauma (CT trauma series) ED Treatment:

| Mechanism of trauma: | • Resuscitation to date |
|                      | • Any fatalities in the incident |
|                      | • Time of injury/time since injury |
|                      | • Protective equipment used (e.g. seatbelt, helmet) |
| Medical history: | • Presence of chronic condition |
|                   | • History of malignancy/tumour |
|                   | • History of lung disease |
|                   | • History of stroke |
|                   | • Current medications (e.g. anticoagulation) |
| Surgical history: | • Any previous surgery |
|                   | • List of previous surgeries (not only ‘multiple surgeries’) |
| Injury sites: | • Localising or lateralising symptoms |
| Pain characteristics: | • Duration of pain |
|                    | • Intensity of pain |
|                    | • Site/s of pain referral |
| Clinical observations/physical examination findings: | • If weakness is present – grade lower motor neuron/upper motor neuron facial palsy |
|                    | • In absence of high-velocity trauma or other significant mechanisms of injury, list clinical findings relevant to each body area being requested as part of the scan |
|                    | • Sites of point tenderness |
| Prior imaging/reports: | • Any past imaging or report |
|                      | • Significant prior imaging (e.g. Abdomen X-ray showed free gas) |
|                      | • Erect chest X-ray findings if already performed |
quality of clinical information in requests. Whilst RI-RADS encourages individual radiologists to feedback to their referrers their preferred items of clinical information, our study has sought to formulate a consensus for widespread use that is specific to CT examinations.

Our Delphi study was successful in gaining consensus from consultant radiologists who regularly report acute CT examinations and as a result, criteria standards for all three scan regions have been formed. These criteria standards outline what constitutes adequate clinical information for acute CT examinations for the chest, abdomen and blunt trauma (CT trauma series). As the iRefer guidelines 8th edition and our study used similar methodologies, it is possible that a similar reduction in requested examination numbers may result from the adoption of our criteria standards in an Australian setting.

After round 1, a high number of items were submitted. This was an expected finding as other studies using the Delphi method have reported similar results.

As this study’s aim was to produce a usable set of standards, it was necessary to apply consensus-building methods in subsequent rounds. The use of dichotomous rating, Likert scale and ranking of elements reduced the lists of standards to 10 per scan type. These methods have been used successfully in other Delphi studies to refine large amounts of respondent data into pragmatic item lists.

To limit the number of accepted items for the final criteria standards, a fourth round was applied. It was thought ten items for each criteria standard would be a more practical number when used in a clinical setting. The high item count after round 3 for all scan types suggests a desire from radiologists for more information from referrers. This finding has been discussed by Fatahi, Krupic & Helstrom in their evaluation of the quality of written and oral communication between radiologists and referrers.

The high number of items considered essential by radiologists when interpreting CT imaging is expected. A study by Leslie, Jones & Goddard investigated how clinical information impacts CT reporting, found a link between importance of clinical information and complexity of investigation. Given current guidelines are not specific in outlining the level of detail or amount of clinical information required in requests, it is possible that CT requests are lacking essential clinical information.

Panellists were invited to provide feedback throughout the study. Some expressed difficulty in suggesting essential items of clinical information without an accompanying clinical question or specific scan type or protocol. A recent study by Aubin, Eskander, Drew et al. claimed that when clinical information includes a clinical question, this question is routinely answered in the report. Moreover, the line of questioning within survey rounds intentionally mimicked the local CT referral process, whereby referrers provide clinical information to the radiologist, who is responsible for determining the appropriate scan type and protocol. The feedback given during our study may be indicative of radiologists’ desire to tailor CT examinations by engaging in two-way communication with referrers. The replacement of analogue requesting methods with electronic systems has rendered such conversations impractical and increasingly unlikely to occur.

Another option for radiologists to obtain all items of essential clinical information they require is via search of each patient’s medical records. The recent transition to electronic health records (EHR) in Australia has improved access to information for all clinicians, rendering such searches possible. However, EHR searches can be time-intensive and have a detrimental impact on radiologists’ efficiency. Imaging requests which already contain essential clinical information maximise radiologists’ productivity.

**Implications for practice**

The education of referring clinicians on the essential, specific information required by radiologists has the potential to replace the need for two-way communication between radiologists and referrers, and inefficient EHR searching by radiologists. Ensuring referrers know what radiologists require at the point of scanning enables them to tailor their own patient interactions to ensure this information is provided. Previous studies have shown this has a positive impact on the timeliness, quality and clinical relevance of resultant radiology reports.

As EHR systems evolve, data-mining capabilities will likely become a useful feature for clinicians. Investigations have begun into the use of Artificial Intelligence to search EHR for essential clinical information for task-specific scenarios such as CT reporting. Harvey & Alkasab identified a key enabler of such a system to be gold standard for information relevance, applicable in different clinical scenarios. The creation of standards for required information, such as those developed here, may inform future data-mining initiatives.

**Implications for research**

This study has described how consensus standards for CT request information were developed. We intend to undertake further research to test the effectiveness of these standards in improving the quality of CT requesting in an acute care setting, and subsequently assess the impact of high-quality request information on resultant radiology reports.
Limitations

Although this study sought participation from major Australian trauma hospitals in all states, Victoria, New South Wales, Northern Territory and the Australian Capital Territory were not represented. Super-specialisation of CT radiologists was mentioned as a barrier to participation by some potential panellists, which may have affected participation rates in these areas. For example, CT abdomen specialists felt ill-equipped to answer survey questions not specific to the abdomen. Given the sample bias towards Queensland radiologists, these results may not be generalisable for all Australian states and territories. Further investigation is recommended to validate the findings on a national level.

Conclusion

Through a four-stage e-Delphi process, we have formulated criteria standards for essential clinical information required in CT requests for emergency presentations for chest, abdomen and for multi-trauma CT scans. These standards were created from iterative processes involving consultant radiologists from Australian trauma hospitals. The high number of suggested items indicates a strong desire from radiologists for quality information when reporting CT scans. The original lists of items of essential clinical details were simplified and refined to include only the 10 highest-ranked items of each scan type, to facilitate the communication of the criteria standards to referrers. We aim to educate referrers regarding these standards and measure the resultant impact on the quality of requests and resultant reports.

Ethical Statement

Ethics approval was obtained by the University of Queensland Institutional Human Research Ethics committee (2020000682). All procedures performed in this study comply with the National Statement on Ethical Conduct in Human Research and comply with the regulations governing experimentation on humans.

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Conflict of Interest

The authors declare no conflict of interest.

Data Availability Statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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