

## CT Study (Roberts' Study) NOTES

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How to identify when it is appropriate (or inappropriate) to perform a CT scan in a trauma patient.

All patients have a GCS (Glasgow Coma Score) of 14–15, meaning they are alert, awake, and responsive. Question: is there a variable or collection of variables to evaluate pre-scan to determine whether the scan is useful? Consider risk aversion vs. cost-effectiveness.

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MD resources for investigation:

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A selection of previous studies evaluating the utility of CT scans (more exist):

- 1) 

*Arch Surg.* 2006;141:468-475

**Whole Body Imaging in Blunt Multisystem Trauma Patients Without Obvious Signs of Injury**

*Results of a Prospective Study*

Ali Salim, MD; Burapat Sangthong, MD; Matthew Martin, MD; Carlos Brown, MD; David Plurad, MD; Demetrios Demetriades, MD
- 2) 

*J Trauma.* 2004;57:1072–1081.

**Blunt Abdominal Trauma Patients: Can Organ Injury Be Excluded without Performing Computed Tomography?**

Pierre A. Poletti, MD, Stuart E. Mirvis, MD, K. Shanmuganathan, MD, Tasuyoshi Takada, MD, Karen L. Killeen, MD, David Perlmutter, MD, James Hahn, MD, and Bernadette Mermillod, BSC
- 3) 

*Emerg Med J* 2011;28:378–382. doi:10.1136/emj.2009.076414

**Major trauma CT scanning: the experience of a regional trauma centre in the UK**

Christopher M Smith, Louise Woolrich-Burt, Richard Wellings, Matthew L Costa

4) **Pan computed tomography versus selective computed tomography in stable, young adults after blunt trauma with moderate mechanism: A cost-utility analysis**

Wayne S. Lee, MD, Nancy A. Parks, MD, Arturo Garcia, MD, Barnard J.A. Palmer, MD, MEd,  
Terrence H. Liu, MD, MPH, and Gregory P. Victorino, MD, *Oakland, California*

*Emerg Radiol* (2013) 20:393–400

DOI 10.1007/s10140-013-1124-x

5) **Use of computed tomography in the setting of a tiered trauma team activation system in Australia**

Michael M. Dinh • Kai H. Hsiao • Kendall J. Bein •  
Susan Roncal • Charbel Saade • Kee Fung Chi •  
Richard Waugh

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**Variable identification key:**

CXR = Chest X-Ray

Fast = Focused Abdominal ultraSound for Trauma (looking for fluid in the abdomen through four different ultrasound spots)

iCT C = Initial CT chest

dCT C = Delayed CT chest

CT a/p = CT on abdomen/pelvis

TTP = Tenderness to palpation

Ecchymosis = Bruising

ISS = Injury Severity Score.

ISS > 15 = a severe injury. ISS < 15 not a severe injury.

INR = International Normalized Ratio (a measurement of coagulopathy)

ISI = International Sensitivity Index

PR = Prothrombin ratio

PT = Prothrombine time or “protime”

PTT = Partial thromboplastin time (normal = 1.5 or less)

Note: Patients who are on Coumadin (generic name = warfarin... i.e., rat poison)

“Base deficit” is measured by getting blood gas. Amount of bicarbonate less than normal. Indicator of lack of perfusion.

AIS (Abbreviated Injury Severity) body regions:

1 Head	
2 Face	1 Minor
3 Neck	2 Moderate
4 Thorax	3 Serious
5 Abdomen	4 Severe
6 Spine	5 Critical
7 Upper extremity	
8 Lower extremity	
9 External and other (skin/burns)	

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Wednesday, August 17, 2016. Email update (to Greg Roberts, MD) regarding data:

We'll need a bit more information to statistically determine if there is a collection of variables that can predict whether a CT scan is useful (if the results of the scan are likely to alter patient care).

We'll need three additional columns in the database populated with 0s and 1s (0=no, 1=yes).

**Column 1.** By conducting the CT scan, was any additional diagnostic information obtained?

**Column 2.** If yes, did the additional information affect the clinical management of the patient?

**Column 3.** If the CT scan was negative, was the patient (who would have otherwise been admitted) sent home instead? This column is not just all clean CT scans. It's patients who would have been admitted if it weren't for the CT scan. We're evaluating resource management here; I assume there will be a lot more 0s than 1s, but even a few 1s could be important.

\* To avoid a very damning limitations section, it needs to be an MD making these decisions. And to limit the length of the methods section (I would rather avoid having to talk about inter-rater reliability), it would be best if it were a single MD rather than a tag team approach.

\* Re: Column 2. I'm assuming all changes to patient care are (more or less) good. Decisions based on CT scans never worsen the quality of care or pointlessly extend treatment duration or inflate costs. Is that safe for me to assume? If not, we'd need a fourth column.

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## IMPORTANT MESSAGE TO GRADUATE STUDENT PURSUING CT UTILITY THESIS:

**Background Search.** The CT Scan file folder contains 5 PDFs of studies (all of those shown earlier in this document). It is very important to realize that these are not the *only* reports published on the utility of CT scans. It is up to you to search for, find, and acquire exactly *every* study on the topic ever published in a peer-reviewed journal in the English language. To initiate your search, schedule an hour-long appointment with Pacific's librarian and (with that librarian) build the most comprehensive search protocol possible. The librarian for Health and Exercise Science is Michelle Maloney. Here is her official library webpage: <http://www.pacific.edu/Library/Get-Help/Research-Help/Michelle-Maloney.html> and her email address is: [mmaloney@pacific.edu](mailto:mmaloney@pacific.edu); she is your primary resource for article searches, not me. Your primary search engine will be PubMed.gov. You can use Google Scholar to locate stragglers that PubMed didn't detect, but PubMed is your major source. Following your search, read *all potentially-relevant* abstracts. And then obtain *every single relevant* publication. If you're having trouble accessing one or more papers (*very likely*), do *not* ignore them or eliminate them from your list. I will show you how to get them. Save PDFs in a dedicated file folder and title them by first author's last name and then publication year (.PDF). Otherwise you'll waste an unconscionable amount of time trying to find them next time you need them.

**Writing an Introduction.** You are not a lawyer defending a client. You are not trying to convince readers of an idea; you are trying to characterize a phenomenon with no bias. If it turns out your hopeful finding is false or your gap in the literature is narrower than you'd like it to be, never imply otherwise. Your writing and findings should always be as accurate as possible no matter how interesting the alternative might be.

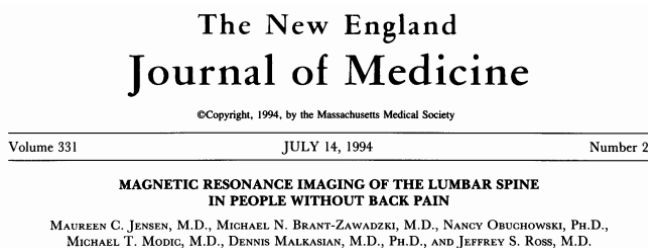
**Citing Sources.** It doesn't matter what type of reference format you prefer (APA, MLA, whatever) because you won't be citing anything yourself. You'll use EndNote. It's free: <https://www.myendnoteweb.com/EndNoteWeb.html?SID=2AC8C8BavXbi4zYn4wN&returnCode=ROUTER.Success&SrcApp=CR&Init=Yes> There are a lot of horrible things in the world (malaria, leukemia, genocide, whatever); manual citation is worse than all of them. That's obviously a bit hyperbolic, but the truth is: if you cite your sources by typing them out in *Microsoft Word*, you'll never publish anything. It's too much of a hassle. Don't do it. Use EndNote (or RefWorks if you prefer). Also, unless you plan on publishing in a Chinese journal (which, if you do, find another thesis advisor), the tiniest amount of plagiarism will destroy your career. In American journals, if you plagiarize a single sentence, you will be an Uber driver for the rest of your life. That one is *not* hyperbole; plagiarism is that serious. So *always* err on the side of over-citing. We can taper the attribution later. That's easy. Adding after-the-fact sources to a poorly cited document is practically impossible. Over-cite along the way and you'll be fine. And never (*ever*) cite anything inappropriately. What I mean by that: never state something and then support that claim with a citation that doesn't *actually* support that claim (assuming nobody will bother to verify that your citations support your claims). People really do verify. And if that verification is not favorable, your career will be hurt, guaranteed. Don't do it.

**Database Management.** It is crucial that you double- and triple-check accuracy as you input data, as you transfer it, digitize it, rearrange it, and so on. One mistake can ruin the entire database. And it is often ridiculously hard to undo. (Ask Mark VanNess about his experience having a former graduate student work on one of his CFS databases. Repairing the damage of a simple typo was too great; the database was thrown away and the paper scrapped. More than a hundred hours wasted by a typo. ← Not an exaggeration.)

**Conducting and Interpreting Analyses.** I will do this. And you will be in the room with me. While in the room, you'll learn how to build prediction equations, understand their outputs, and explain them clearly to scientific audiences. It's a useful skill no matter what field you decide to pursue.

**Publication.** We will submit your work for publication in a peer-reviewed surgery or trauma journal recognized by PubMed and Index Medicus. Our goal: September 2017. When you need help with writing, use Susan Weiner ([sweiner@pacific.edu](mailto:sweiner@pacific.edu)) and *then* me. You need to proceed with a degree of independence.

**Additional Notes.** Does what you see in the CT scan matter? How much does it matter?



Jacobson et al. *World Journal of Emergency Surgery* (2015) 10:46  
DOI 10.1186/s13017-015-0040-7

RESEARCH ARTICLE

Open Access



The limitations of using risk factors to screen for blunt cerebrovascular injuries: the harder you look, the more you find

Lewis E. Jacobson<sup>1\*</sup>, Mary Ziemba-Davis<sup>2</sup> and Argenis J. Herrera<sup>1</sup>

When writing your introduction, consider the big picture. The *whole* landscape might not make it into the draft of the manuscript that gets submitted, but it's important to consider context along the way.

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