Author's response to reviews

Title: Estimating Radiation Effective Doses from Whole Body Computed Tomography Scans Based on U.S. Soldier Patient Height and Weight

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Version: 2 Date: 13 August 2011

Author's response to reviews: see over
Dear BMC Editors,

Thank you for your consideration of the attached article. We appreciate the thoughtful and constructive comments made by the reviewers. We have revised the manuscript based upon their suggestions as appropriate. Below is a full rejoinder to the reviewer comments and the author actions made with the manuscript. Thank you again for your consideration and we look forward to your decision for inclusion within your journal.

Sincerely,

Robert Prins, PhD
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Reviewer Comments

Reviewer #1

Specific Comments
Page 5, Line 1 of Last Paragraph
“…The most common method of estimating the effective dose when machine-based parameters…”

Author: Corrected.

Page 6, Line 4 from bottom of page
“…The conversion coefficient used in our study for a chest abdomen pelvis (CAP) scan is 0.015 mSv mGy\(^{-1}\) cm\(^{-1}\) [14,15].”

What is the basis for this conversion coefficient? What scanner, what phantom?

Author: The conversion coefficient (0.015 mSv mGy-1) used in this study was published by Shrimpton et al in 2006. The conversion coefficient was developed using
the standard reference phantoms in the ImPACT patient dosimetry calculator (Khusheed et al) and was developed to be largely independent of CT scanner model and operating conditions. This conversion coefficient has been used in the National Radiological Protection Board (UK) Report NRPB-W67 on CT examination doses in the UK in 2003. Additionally, the conversion coefficient has been used in the European Commission guidelines (Appendix C) published in 2004 for assessment of patient dose in CT.


Page 9, Line 3 under Results
Never start a sentence with a numeral – please rephrase.

Author: Corrected.

Review #2

- Major Compulsory Revisions
This paper has a serious problem. Please read ICRP publication 103. Effective dose cannot be used for the assessment of individual risk. Tissue weighting factors that are used for calculation of effective dose are mean values representing an average over many individuals of both sexes. Precisely, effective dose is defined and estimated in a Reference Person. This quantity provides a value which takes account of the given exposure conditions but not of the characteristics of a specific individual. In ICRP publication 102 and 103, it is recommended that effective dose should be used for comparing doses from different diagnostic procedures and for comparing the use of similar technologies and procedures in different hospitals and countries as well as for use of different technologies for the same medical examinations.

Author: Agree with the reviewer’s comments. The manuscript has been changed to emphasize that the effective dose is estimated to a reference person and that when physical parameters (height, weight, etc.) are adjusted the estimate of the effective dose is then made to a mathematical phantom. At no time do the authors imply that the algorithm be used to a real patient population but that the algorithm is merely based off of physical parameters of a specific population.

- Minor Essential Revisions
1) Page 5: Please replace “machine-baed” with “machine-based.”
2) Page 8: Please specify details about luminescent dosimeters (material, etc).

Author: Corrected

3) Page 9: Significant digits of equation 5 should be two digits because significant digit of the conversion coefficient (0.015) is two digits. Significant digit of the effective dose is also two digits.

Author: Corrected

4) Page 13: You should not put a quote in the conclusion section.

Author: The manuscript has been changed in order to remove the quote in the conclusion section.

5) Page 17: Where is the caption of Figure 5? Where do you refer to Figure 5?

Author: The author cannot find any reference to a Figure 5. There are four figures (1, 2, 3, 4a, and 4b). These figures are referred to in the manuscript and are explained in the captions.

- Discretionary Revisions

1) I think the background section is too long. Please shorten it as possible.
2) You should use subtitles in the methods section.

Author: The background section was shortened as suggested. The decision was made to not include subtitles in the methods section to obviate any reader confusion.