

PEER REVIEW HISTORY

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ARTICLE DETAILS

TITLE (PROVISIONAL)	Managing waiting times in diagnostic medical imaging
AUTHORS	Vainieri, Milena ; Nuti, Sabina

VERSION 1 - REVIEW

REVIEWER	Mythreyi Bhargavan Chatfield Director of Data Registries American College of Radiology USA
REVIEW RETURNED	18-May-2012

THE STUDY	<p>The description of methods is vague and non-specific. When mentioning models and plans, it is essential to specify the content and framework of these tools. Methods are sometimes discussed in the results section, but the numerical results are not provided (for example, results of the "correlation analysis between the use rates and the percentage of examinations provided by private institutions"); this makes it difficult to evaluate exactly what was done.</p> <p>The statistical methods are not exactly appropriate. When considering the effect of more than one factor on variability in wait times, it might have been more useful to use ANOVA methods of some kind.</p> <p>The language needs some editing for clarity.</p> <p>The last question does not really apply to this paper.</p>
RESULTS & CONCLUSIONS	<p>The presentation of results is not very clear. It is not always easy to tell what part of the results came from the analysis as part of this study and what is based on published literature.</p> <p>The interpretation and conclusions are not always based on the data used in this analysis, and are sometimes extrapolated from other publications. The source of a conclusion or recommendation is not always clear.</p>
GENERAL COMMENTS	<p>The paper addresses an important and practical question, and is worthy of being published. The authors need to address some of the issues mentioned above, and clarify the writing.</p>

REVIEWER	Derek J. Emery, M.D., FRCPC Associate Professor Department of Radiology and Diagnostic Imaging The University of Alberta Edmonton, Canada
REVIEW RETURNED	06-Sep-2012

THE STUDY	<p>To increase the global impact of this study it will it useful to have some more background information on your health system in order to put these findings in context.</p> <p>Is this a completely public health system where the government covers the cost of all health care – including diagnostic imaging? Is access to diagnostic imaging procedures purposefully limited by the government in order to control costs? How many MRI and CT scanners are there in each local health region? Are all of the radiologists employees of the health regions?</p> <p>Do the inhabitants of the local health region receive all of their medical care within the local region or do they have to travel to other regions in order to receive specialty care? If they are receiving their care in another region – will their imaging also be completed in that region? Do your results take this into account?</p> <p>The statistical methods are not completely described in the methods section.</p>
RESULTS & CONCLUSIONS	<p>There are a total of six research questions. This is an ambitious undertaking for a single paper. The actual results are only superficially described in the paper.</p> <p>For RQ1: The numbers used for the correlation analysis are not presented in the paper.</p> <p>For RQ2: The analysis of substitution effect only considered CT and MRI. Other modalities may substitute for CT and MRI such as ultrasound of the abdomen of X-ray of the facial bones.</p> <p>For RQ3: Certain types of procedure have a greater variability. In the appendix it appears that some regions do not perform any exams of certain types. Is this a reflection of subspecialty institutions located within certain regions?</p> <p>For RQ4: Do you have a similar matrix to figure 2 for MRI?</p> <p>For RQ5: Is the number of radiologists the major determinant of capacity? Is the capacity to perform CT and MRI also limited by the number of machines or by the availability and funding of technical staff?</p> <p>For RQ6: From the data presented, I am not convinced that radiologist productivity has been measured accurately. You refer to unpublished studies that are not available to the reader. Are the duties and job descriptions of radiologists in the different regions equivalent? Are some of the radiologist sub specialists who deal only with CT of a certain organ system or are they all generalists?</p> <p>Figure 1: The colour coding is not optimal. I was not able to differentiate between the two shades of yellow and the two shades of green.</p>
GENERAL COMMENTS	<p>I agree with the authors that the marked variability in use rates between regions suggests that there is both inappropriate overuse and inappropriate underuse of MRI and CT within Tuscany.</p>

VERSION 1 – AUTHOR RESPONSE

Reviewer: Mythreyi Bhargavan Chatfield
Director of Data Registries
American College of Radiology
USA

The description of methods is vague and non-specific. When mentioning models and plans, it is essential to specify the content and framework of these tools. Methods are sometimes discussed in the results section, but the numerical results are not provided (for example, results of the "correlation analysis between the use rates and the percentage of examinations provided by private institutions"); this makes it difficult to evaluate exactly what was done.

The statistical methods are not exactly appropriate. When considering the effect of more than one factor on variability in wait times, it might have been more useful to use ANOVA methods of some kind.

The language needs some editing for clarity.

The presentation of results is not very clear. It is not always easy to tell what part of the results came from the analysis as part of this study and what is based on published literature.

The interpretation and conclusions are not always based on the data used in this analysis, and are sometimes extrapolated from other publications. The source of a conclusion or recommendation is not always clear.

The paper addresses an important and practical question, and is worthy of being published. The authors need to address some of the issues mentioned above, and clarify the writing.

We deeply restructured the paper. We added more data in the results section highlighting more our results than those coming from literature. We used the Anova method and revised the conclusion section. An English mother tongue revised the writing.

Reviewer: Derek J. Emery, M.D., FRCPC
Associate Professor
Department of Radiology and Diagnostic Imaging
The University of Alberta
Edmonton, Canada

To increase the global impact of this study it will be useful to have some more background information on your health system in order to put these findings in context.

Is this a completely public health system where the government covers the cost of all health care – including diagnostic imaging? **Yes** Is access to diagnostic imaging procedures purposefully limited by the government in order to control costs? **No** How many MRI and CT scanners are there in each local health region? **It's mainly up to Local Health Authorities** Are all of the radiologists employees of the health regions? **Yes those working in public structures**

Do the inhabitants of the local health region receive all of their medical care within the local region or do they have to travel to other regions in order to receive specialty care? If they are receiving their care in another region – will their imaging also be completed in that region? Do your results take this into account? **In Italy it is not important where patients receive the services (in or out of the local health authorities/region; by public or private providers) because, when services are essential like the diagnostic imaging, they are covered by public resources and so they tracked through administrative data.**

We introduced a short background on the Tuscan Health System that should respond to the previous questions

The statistical methods are not completely described in the methods section. There are a total of six research questions. This is an ambitious undertaking for a

single paper. The actual results are only superficially described in the paper.

We restructured the paper trying to better describe methods and increasing the results (data and comments)

For RQ1: The numbers used for the correlation analysis are not presented in the paper. We introduced them

For RQ2: The analysis of substitution effect only considered CT and MRI. Other modalities may substitute for CT and MRI such as ultrasound of the abdomen or X-ray of the facial bones.

The modalities to take into account for the substitution effects have been identified by the radiologists of the research group. They decided to focus only on CT and MRI. This point is a potential limit of the analysis.

For RQ3: Certain types of procedure have a greater variability. In the appendix it appears that some regions do not perform any exams of certain types. Is this a reflection of subspecialty institutions located within certain regions?

We better explained this aspect into the paper, the appendices show the financial value of the examinations that exceed the median use rate. Blank areas into the appendices identify that procedures (performed by districts) are lower or on the median rates.

For RQ4: Do you have a similar matrix to figure 2 for MRI?

We introduced the MRI matrix in figure 2

For RQ5: Is the number of radiologists the major determinant of capacity? Is the capacity to perform CT and MRI also limited by the number of machines or by the availability and funding of technical staff?

We added in the results the correlation matrix that includes the number of machines per inhabitants. As regards the technical staff, there was a high level of correlation with the radiologists indices, thus we focused only on radiologists

For RQ6: From the data presented, I am not convinced that radiologist productivity has been measured accurately. You refer to unpublished studies that are not available to the reader. Are the duties and job descriptions of radiologists in the different regions equivalent? Are some of the radiologist sub-specialists who deal only with CT of a certain organ system or are they all generalists?

We tried to better explain this step into the methods section. The study we refer to is an Italian report written by the Italian National Scientific Committee of Radiologists. It is available on internet only in Italian.

Duties and job descriptions across the health authorities analyzed are equivalent. The radiologists are mainly generalists. We used a deductive approach, based on working times, to theoretically identify the radiologists dedicated to CT or MRI.

Figure 1: The colour coding is not optimal. I was not able to differentiate between the two shades of yellow and the two shades of green.

Indeed there are not two shades of yellow or green. The colours are five and they refer to the five tiers of evaluation adopted by Tuscany Region: dark green (very good performance); green (good performance); yellow (medium performance); orange (bad performance); red (very bad performance). Thus district areas that register CT use rates less than 42.88 or between 62.1 and 58.26 are all coloured in yellow because the evaluation given by Tuscany Region is an "average performance". In particular in the first case Tuscany Region assessed the performance as "average performance" because there is the risk of a lack of service but it is limited considering that the Tuscany Region registers the highest CT use rate of the Italian Regions (it is mentioned into the report available only in Italian written by Nuti and Barsanti).

VERSION 2 – REVIEW

REVIEWER	Derek J. Emery M.D., FRCPC Associate Professor Department of Radiology and Diagnostic Imaging The University of Alberta Edmonton, Canada
REVIEW RETURNED	02-Nov-2012

THE STUDY	Description of the research methods is much improved from the original version. I am not a statistician and will leave it up to the editors to ensure that the statistical methods are appropriate. For Figure 1. - the information you provided in the response to the previous review regarding the colour coding (very good, good, medium, bad and very bad) should be included in the text or in a figure legend.
GENERAL COMMENTS	The restructured version of the paper is much improved. This is an important area of research.

VERSION 2 – AUTHOR RESPONSE

I am glad to submit the manuscript with the minor revision.

As you may notice by the file reporting the tracks, we added only few sentences to explain the meaning of the colors used in the figure 1 as requested by the reviewer. In particular we included in the text the following sentences: "(Figure 1). reports the appraisal made by the Tuscan Health System on the CT and MRI use rates in 2009. The colors identify the evaluation on the basis of the distance from the median use rate: better results are positioned closer to the median rate while worst results are positioned farther from the median because of the increasing risk of over/under use. The appraisal is organized into five colored bands: very good (dark green); good (green); medium (yellow); bad (orange) and very bad (red) performance."