EDITORIAL

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Studying the efficacy of diagnostic imaging, as clearly pointed out by the famous paper of Fryback and Thornbury¹ from 1991, means comparing the usefulness of diagnostic imaging examinations and procedures. From the six theoretical levels discussed by these authors, most of the studies published in DMFR reach only Level 1 (technical efficacy) or Level 2 (diagnostic accuracy efficacy). Very rarely, Level 3 (diagnostic thinking efficacy) or, almost never, Level 4 (therapeutic efficacy) may be reached. Yet, let me assure you, this is not specific to DMFR, rather to the vast majority of publications in the field. Certainly, there are ethical issues involved in carrying out studies involving ionizing radiation that aim for higher efficacy levels such as Level 3 or 4. This general consideration cannot be easily ignored and will always be an obstacle in radiographic imaging. Nevertheless, DMFR would be happy to publish more studies that are designed for higher efficacy levels, as Levels 3 and 4 provide real evidence on whether or not an imaging procedure may be justified. But even for the low level of diagnostic accuracy efficacy (Level 2), it is relatively common for us to receive submissions that do not reach this standard. You certainly all know that the golden standard for evaluation of diagnostic accuracy of an imaging method lies in receiver operating characteristics (ROC) analysis. A sufficient number of observers rate their findings according to a predefined confidence scale, and through ROC analysis these confidence

ratings are used to provide sensitivity and specificity for a step-wise altered cut-off point. The latter represents ordered descending (or ascending) combinations of the rating groups.² It is certainly no secret that sensitivity and specificity analysis requires a robust knowledge of the actual status of the object under study, *i.e.* knowledge of the “ground truth”. Unfortunately, DMFR receives many submissions that do not test against this true situation; rather they assess the “prettiness” of an image. Observers subjectively rate image quality in the sense of prettiness. Please note that there is no evidence that a good-looking image is better from a diagnostic point of view, *i.e.* is more accurate than a less good-looking one. In the light of modern post-processing methods applied by all manufacturers, particularly for cone beam CT images, this approach seems even more questionable.

In conclusion, DMFR would like to invite all authors to submit Level 3 or 4 studies, since they provide real evidence in the sense of justification evidence. If accuracy is aimed for, ROC studies will be strongly preferred over subjective image quality assessments. Accuracy instead of beauty: that is DMFR’s goal!

Sincerely,
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Editor-in-Chief DMFR

References

1. Fryback DG, Thornbury JR. The efficacy of diagnostic imaging. *Med Decis Making* 1991; **11**: 88–94.
2. Hanley JA. Receiver operating characteristic (ROC) methodology: the state of the art. *Crit Rev Diagn Imaging* 1989; **29**: 307–335.