

***European Radiology* Manuscript requirements for submissions**

Edition 1 (December 2022)

Dear authors,

The Editors of *European Radiology* have put together the following requirements and recommendations for your submission to the journal. The aim is to help you improve your work by enhancing scientific soundness and style.

Note that manuscripts that fail to comply with instructions marked as **Must have** will be sent back to authors upon submission for correction.

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Article title

Article titles are the first point of contact with the reader. They should be as short and catchy as possible but include as many details as needed to grasp the essence of your work.

Must have:

State which body part, disease, and/or problem are being investigated. Be as concise as possible.

No use of abbreviations is allowed (exceptions: *CT, MR, MRI, PET, US, Bi-RADS, Li-RADS, Pi-RADS*).

Nice to have:

No more than 15 words.

If space allows, indicate study type (e.g., randomised clinical trial) and clinical trial or cohort name (e.g., DETERMINE, MESA).

Tips

① Avoid “pilot study” or “preliminary study” when your study does not qualify as such. See L Thabane et al ([doi: 10.1186/1471-2288-10-1](https://doi.org/10.1186/1471-2288-10-1)) and Halligan et al ([doi: 10.1007/s00330-021-07971-1](https://doi.org/10.1007/s00330-021-07971-1)).

① If you have a nuclear medicine paper, stick to the [EANM nomenclature](#).

Abstract + clinical relevance statement

Must have:

Word limit of 250 for the abstract, with an extra 40 words available for a clinical relevance statement.

Nice to have

Use the following structure and provide details on:

Objectives	<ul style="list-style-type: none"> Main objective (the problem which should be solved) of the study and provide context for it, if space allows.
Materials & Methods <i>Study design</i> <i>Modalities/ Interventions</i> <i>Data collection</i> <i>Participations</i>	<ul style="list-style-type: none"> Identification as a study of diagnostic accuracy using at least one measure of accuracy. Description of the index test and reference standard. Summary of statistical tests performed. Describe compared groups, intervention and control group. State/list the modalities and procedures performed. Retrieval method, prospective/retrospective, period of enrolment. Main eligibility criteria for participants. Single or multicentre.
Results	<ul style="list-style-type: none"> In the first sentence, indicate the number, sex, and mean age \pm standard deviation of the patients/participants enrolled. <i>Example: for 100 patients of 60 men and 40 women, write 100 patients (mean age, 47 years +/- 10 [standard deviation], 60 men) were evaluated.</i> Numerical data, <i>p</i> values for all comparisons. <i>Example: (group A, 25 \pm 4, group B 50 \pm 5, <i>p</i> = .01)</i> Include confidence intervals, if appropriate. <i>Example: (AUC, 0.70; 95% CI: 0.64, 0.77; <i>p</i> < .001).</i>
Conclusion	<ul style="list-style-type: none"> Must answer the problem exposed as objective and be derived from the results.

	<ul style="list-style-type: none"> Do not elaborate on the importance of the study or other implications.
Clinical relevance statement	<ul style="list-style-type: none"> Max. 40 words statement summarising the clinical relevance and/or benefits of the study for patients.

Tips

① According to the type of the study, you are advised to consult the following abstract checklists: [STARD](#), [STROBE](#), [PRISMA-DTA](#), [PRISMA](#), [TRIPOD](#), [CONSORT](#).

① Study design considerations: In a prospective study, data collection was planned with an idea of prospective results, and optimally with the size of the cohort, i.e. before the index test and reference standard were performed. Enrolment of participants with consent, data analysis, and outcomes were specified prior to initiating the study. When data of prospective study is reworked, it is no longer considered a prospective study. Methodology must be decided beforehand. Optimally, a calculation should exist based on the size of cohort. If the main prospective study did not include your study purpose in the original design, classify as a retrospective study/retrospective analysis of prospective cohort, specialised approval should be obtained.

A retrospective study looks backwards and examines already acquired data.

Key points

The role of the key points is to invite the reader to read the study. They should be short and catchy.

Must have:

3 Key Points highlighting the importance of the study.

No use of abbreviations is allowed (exceptions: *CT, MR, MRI, PET, US, Bi-RADS, Li-RADS, Pi-RADS*).

Nice to have:

Use the following structure:

- 1st Key Point: Briefly introduce the specific problem being studied. Do not overgeneralise.
- 2nd Key Point: Summarise the main results.
- 3rd Key Point: State the main clinical relevance conclusion/effect of the study results.

Ideally no more than 15 words per key point.

Avoid hypotheticals and vague language (*no* 'could', 'might', 'can in future', etc.).

Avoid opinions or extrapolations that are not proven by the study.

Do not copy sentences already used in the main text or abstract as Key Points.

Examples

Example of **ineffective** Key Points:

- Breast cancer is a leading cause of death in Europe (**Too general, no added value**).
- PBO of IIA, CIA and IAA is effective in placenta accreta (**Overuse of specialised abbreviations that are not explained**).
- Diaphragmatic curvature showed a significant deterioration after 1 year in Pompe patients compared to healthy controls, but the curvature seems to remain stable over this period in patients who were treated with enzyme replacement therapy for less than 3 years, possibly indicating a positive effect of ERT (**Too long**).

Example of **effective** Key Points:

- Surface roughness is associated with the colour Doppler ultrasound twinkling phenomenon (**Good introductory Key Point**).
- Artificial intelligence (AI) and radiomics applied to nuclear medicine provide great help in prostate cancer (**Good summarising Key Point**).
- The developed AI system improved radiologists' performance in lesion classification (**Good concluding Key Point**).

Keywords

Keywords help your article to be more visible in future online searches.

Must have:

3 to 5 terms from [Medical Subject Headings \(MeSH\)](#) Keywords.

Nice to have:

Choose those Keywords that best fit your article topic and include:

- modality (body part)
- disease
- imaging modalities (CT, MRI, SPECT, but **NO** abbreviations)
- or problem being studied

Introduction

Nice to have

Not exceeding 400 words.

Include short paragraphs (2–3 sentences each) on the following:

- Specific position of the question (no general statements on the disease): include a summary of the open scientific questions.
- Purpose of the investigation: what is the specific problem, to what extent the literature tried to solve it, and what is its relevance in the current clinical context?
- How do you plan to solve this problem?

Tips

① Keep in mind:

- For prospective studies only: include your hypothesis.
- For reviews or meta-analyses: explain why a systematic review on this topic was needed and what it aimed to contribute to the field.
- For retrospective studies: state the aim of your research.
- Avoid sentences without specific added value for your study.

Materials and methods

This section should be given in sufficient detail to permit repetition of the experimental work. Adherence to applicable reporting guidelines (see [EQUATOR network](#) or [CLAIM for artificial intelligence papers](#)) is strongly recommended.

Must have:

- The first sentence should address institutional review board (IRB) approval and patient informed consent, including the reference to human and animal rights declarations and regulations.
- A clear statement of whether the study is retrospective or prospective.
- Date range of the study and patient enrolment, and retrieval method.
- Inclusion and exclusion criteria, consecutive or random selection.
- Description of the index test and reference standard (optionally in a dedicated table).
- Explanation of how the evaluation was performed.
- Mention of any utilised instruments or drugs (including contrast) with trade names, manufacturer's name in parentheses (*do not* include the country of origin).
- Statistical methods used to analyse the data.

Nice to have:

- Initials of all authors executing tests or readings/evaluations.
- Clearly and well-explained reading strategy.
- It is advised to have a statistical guarantor, ideally one of the authors, who will be responsible for sincerity and transparency of all statistical analyses, and answer any pre- or post-publication queries.
- If applicable, report the sample size calculation.

Tips

- ① Note that exclusion criteria should *not* be the opposite of the inclusion criteria, but a well-defined and explained reason not to include participants.
- ① Statistical consultation should be set before planning a study to ensure appropriate sample size and data analysis.

Results

The results section should describe the outcome of the study. Data should be presented as concisely as possible, if appropriate with the help of tables or figures.

Do's

- Use the first sentence to describe the final cohort after application of inclusion/exclusion criteria described in the methods.
- Use **Figure 1** to represent the **flowchart** of the study, from initial retrieval to final study cohort.
- Summarise the **demographics** of your study sample, ideally, presented in **Table 1**
 - indicate number of patients/participants
 - mean age \pm standard deviation or median age and interquartile range
 - number of men vs women.
- Use tables and figures to illustrate your findings.
- If applicable, follow the same structure in the Results as in the Material and Methods (keep the same subheadings).
- Make efforts to improve legibility of the results, exposing them in a simple and logical manner.
- Report all collected statistical analyses, not only the positive findings.
- Try to cite all figures and tables in the Results section.

Don'ts

- Avoid elaborating on “trends” or any non-significant results.
- Do not include any statistical results based on tests that were not included in the corresponding section of Material and Methods.
- Do not include interpretation or opinions in the result section.

Tips

- ① *P* values should be generally expressed to 2 digits to the right of the decimal point. Exceptions are $p < 0.01$ and close to 0.05. Three digits to the right of the decimal point are allowed.
- ① Ask a “naïve” colleague, not involved in the study, to read the Results section and collect his/her opinion on the clarity.

Discussion

The discussion should be an interpretation of the results and their significance with reference to work by other authors. It should be written in with clear and concise language using the following structure.

Dos

- 1st paragraph: Summarise and interpret the results in a simple manner.
- 2nd paragraph: Comparison with the existing literature, background, and any useful comments.
- 3rd paragraph: Outline biases and limitations, explaining in detail what the limitations are and how these can be addressed in the potential future studies.
- 4th paragraph: Short and straightforward conclusion, including a statement on the clinical implications/relevance of your study. Support your conclusion with the main results of your study.

Don'ts

- Don't repeat information that is already stated in the Introduction.
- Don't start the discussion with general considerations about the question/disease.
- Don't introduce any new results. Discussion should be based only on the results stated in the previous chapter.
- Don't make general statements or conclusions.
- Don't make a hypothetical conclusion based on authors' opinions and wishes.

Tips

① Be aware that many readers (especially those who are non-specialised and want to simply improve their knowledge without getting into the details) will read the Introduction and the Discussion, *not* the Material and Methods or the Results. For those readers, the authors should consider that the Discussion is the natural continuation of the Introduction.

References

Must have:

All references must already be published or, at least, accepted for publication (DOI must already be available); i.e. do not use references that have not been accepted for publication.

Citations in the text should be in Arabic numerals typed in square brackets, e.g. [2, 5, 12].
References must be listed in the order in which they appear in the text.

Adhere to the below mentioned reference style.

Reference style

References should follow the following journal format:

- *Ward J, Robinson PJ (2002) How to detect hepatocellular carcinoma in cirrhosis. Eur Radiol 12:2258-2272*
- or**
- *Ward J, Robinson PJ (2002) How to detect hepatocellular carcinoma in cirrhosis. Eur Radiol. DOI:10.1007/s00330-002-1450-y*

If there are 6 authors or fewer, the names of **all** authors should be provided (i.e. 'et al' should not be used).

- *Lunkiewicz M, Forte S, Freiwald B, Singer G, Leo C, Kubik-Huch RA (2020) Interobserver variability and likelihood of malignancy for fifth edition BI-RADS MRI descriptors in non-mass breast lesions. Eur Radiol 30:77-86*
- or**
- *Lunkiewicz M, Forte S, Freiwald B, Singer G, Leo C, Kubik-Huch RA (2020) Interobserver variability and likelihood of malignancy for fifth edition BI-RADS MRI descriptors in non-mass breast lesions. Eur Radiol DOI: 10.1007/s00330-019-06312-7*

If there are 7 authors or more, only the names of the first 3 authors in the list should be given followed by 'et al'.

- *Thomassin-Naggara I, Trop I, Chopier J et al (2011) Nonmasslike enhancement at breast MR imaging: the added value of mammography and US for lesion categorization. Radiology 261:69-79*
- or**
- *Thomassin-Naggara I, Trop I, Chopier J et al (2011) Nonmasslike enhancement at breast MR imaging: the added value of mammography and US for lesion categorization. Radiology DOI: 10.1148/radiol.11110190*

All online resources should contain the date of last access.

- *Foundational Model of Anatomy, NCBO BioPortal (2022) Available via <https://bioportal.bioontology.org/ontologies/FMA>. Accessed 11 Apr 2022*

Figure captions

Figure captions should be understandable even when not reading the full paper. They must be brief and provide clear, concise explanations of the illustrations.

Do's

- Explain all images comprising the figure.
- Address and explain any symbols/visual aids used in the figure (arrows, arrowheads, asterisks, lines, colour shades), and make sure that any symbols/visual aids are clearly visible and of appropriate size. Unless explicitly needed, these should be black or white.
- Define all abbreviations appearing in the images and include all units.
- Explain the entire figure in the caption and specify only the characteristics/differences in the individual panels.
- Any uncommon abbreviations used in the caption must be written in full when first mentioned.
- Multiple images (panels) within one figure should be marked with a lowercase letter (e.g. *Figure 1a*, *Figure 2b*) for each of the panels. These should be addressed in the Figure captions using the same lowercase letters.
- Figure numbers and captions should be included only in the caption (and not embedded in the figure file).

Don'ts

- Don't describe the images in detail.
- Don't provide analysis of the images; image interpretation should be a part of main text.
- Don't repeat information that is already included in the main text.

Example 1 (good / bad):

- Dual-energy CT angiographic examination obtained in a 73-year-old female patient (BMI 34.6 kg/m²) with Chronic Thromboembolic Pulmonary Hypertension. DECT perfusion images (transverse CT sections; 2-mm thick) obtained at the level of the carina (**a**), right bronchus intermedius (**b**) and lower lung zones (**c**) illustrating the adequate depiction of numerous perfusion defects (arrows) despite image graininess in this obese patient
- Dual-energy CT angiographic examination obtained in a 73-year-old female patient (BMI 34.6 kg/m²) with CTEPH. DECT perfusion images (transverse CT sections; 2-mm thick) obtained at the level of the carina (**a**). DECT perfusion images (transverse CT sections; 2-mm thick) obtained at the level of the right bronchus intermedius (**b**). DECT perfusion images (transverse CT sections; 2-mm thick) obtained at the level of the lower lung zones (**c**) illustrating the adequate depiction of numerous perfusion defects (arrows) despite image graininess in this obese patient (**repetitive information**)

Example 2 (good / bad):

- Longitudinal plane of B-mode US features in the first metatarsophalangeal joint: **a** Echogenic foci (arrows). **b** Double-contour sign (arrows). **c** Cortical bone erosions (arrows). **d** Joint cavity effusion (arrows). **e** Tophus (arrows)
- Longitudinal plane of B-mode US features in the first metatarsophalangeal joint: **a** Echogenic foci. **b** Double-contour sign. **c** Cortical bone erosions. **d** Joint cavity effusion. **e** Tophus (**symbols in the figure, not addressed**)

Tables

Tables help the reader to understand larger data by summarising it in a clear and concise way. They must be numbered in Arabic numbers and should include a title.

Dos

- All abbreviations in the table must be explained.
- Footnotes in tables are denoted by superscript lower-case letters (or asterisks for significance values and other statistical data).
- Cite each table in numeric order in the main text.
- Limit your tables to no more than one typed page.
- Provide information on statistical variability when applicable (standard deviations for mean values or confidence intervals).
- Make tables understandable by themselves without reference to the results section.
- Indicate sub-sections of the first column by indenting the items within a section.
- Make sure that each column follows the same heading all the way down.
- Make sure that each row follows the same heading all the way across.
- Contain each item of data within its own cell.
- Define all abbreviations used in tables in the footnotes of each table.
- Indicate significance of any special characters/symbols or font typeface (**bold**, *italic*) in the footnote.

Don'ts

- Don't use special typeface or symbols if there is no special significance to it.
- Don't use visual aids to distinguish results (no coloured letters, highlighted cells, images, or emoticons; the typesetting does not allow for these in the tables).
- Don't include tables that are longer than one typed page or require landscape formatting; these can be included in the Supplementary Material.

Tips

① Present the same data consistently (e.g., to the same number of significant digits) throughout the abstract, text, tables, figures, and supplements.