DESCRIPTION

Radiography is the official peer-reviewed journal of the Society and College of Radiographers and the European Federation of Radiographer Societies.

Radiography promotes evidence-based practice by disseminating high quality clinical, scientific and educational research related to all aspects of diagnostic and therapeutic radiography. We publish research articles, systematic and narrative reviews, editorials and letters of international relevance that advance knowledge and encourage innovation within radiography. We welcome radiography research submissions that embrace robust and innovative qualitative, quantitative and mixed method approaches.

Radiography is essential reading for researchers, radiographer practitioners*, radiography educators and student radiographers. We aim to influence clinical practice and patient care by informing practitioners, managers, leaders and policy makers working within or aligned to clinical imaging and radiation therapy services.

* Inclusive of all radiography practitioners including diagnostic and therapeutic radiographers, medical radiation technologists, radiologic technologists, radiation therapists, medical radiation practitioners, sonographers and nuclear medicine technologists.

ABSTRACTING AND INDEXING

Scopus
BioEngineering Abstracts
INIS Atomindex
Cumulative Index for Nursing and Allied Health Literature
Biotechnology and Bioengineering Abstracts
Emerging Sources Citation Index (ESCI)
Embase
Embase
Sociedad Iberoamericana de Informacion Cientifica (SIIC) Data Bases
PubMed/Medline
EDITORIAL BOARD

**Editor-in-Chief**
Jonathan McNulty, University College Dublin, Dublin, Ireland
Radiography, Radiology, Education

**Associate Editors**
Theophilus Akudjedu, Bournemouth University Institute of Medical Imaging & Visualisation, Faculty of Health and Social Sciences, Lansdowne, United Kingdom
Radiography, MRI, Neuroimaging, Management, Education
Amy V. Hancock (nee Taylor), University of Exeter, Exeter, United Kingdom
Qualitative, Quality of life, Late effects, Patient experience, Oncology, Radiotherapy
Robert Meertens, University of Exeter, Exeter, United Kingdom
Medical Imaging, Radiography, Bone Health, Near Infrared Spectroscopy
Ruth Reeve, Portsmouth Hospitals NHS Trust, Portsmouth, United Kingdom and University of Southampton, Southampton, Portsmouth, United Kingdom
Radiography, ultrasound, patient experience
Andrew Tootell, University of Salford, Salford, United Kingdom

**EFRS Editorial Fellow**
Bo Mussmann, Odense University Hospital, Odense, Denmark

**International Advisory Board**
Kamarul Amin Abdullah, Sultan Zainal Abidin University, Kuala Terengganu, Malaysia
Medical Imaging, Digital Image Processing, Radiography
William Antwi, University of Ghana, Legon, Ghana
1. Medical Imaging 2. Child Protection
Rob Appleyard, Sheffield Hallam University, Sheffield, United Kingdom
John Cathcart, Ulster University - Derry Londonderry Campus, Londonderry, United Kingdom
Diagnostic Radiography, Computed Tomography, 3D imaging, Education
Geoffrey Currie, artificial intelligence, machine learning, deep learning, pharmacology, radiopharmacy, theranostics, nuclear medicine, molecular imaging
Ernest Ekpo, The University of Sydney, Sydney, New South Wales, Australia
Medical Imaging
Hesta Friedrich-Nel, Health Sciences education, health professions education, radiation therapy
Maryann Hardy, University of Bradford, Faculty of Health Studies, Bradford, United Kingdom
Diagnostic Imaging
Peter Hogg, University of Salford, Salford, United Kingdom
breast cancer, Image quality optimisation
Yobelli Jimenez, The University of Sydney, Faculty of Medicine and Health, Sydney, Australia
Education, Ethics, Infection prevention and control, Student wellbeing
Elizabeth A. Krupinski, Emory University School of Medicine, Atlanta, Georgia, United States of America
medical image perception, human factors, observer performance
Luis Lança, Lisbon Polytechnic Institute Lisbon School of Health Technology, Lisboa, Portugal
Medical Imaging, Radiography
Maud Lundén, University of Gothenburg, Göteborg, Sweden
Geoffrey Luntsi, University of Maiduguri, Borno State, Nigeria
Medical Imaging (Sonography), Radiography
Gordon Mander, Darling Downs Hospital and Health Service, Toowoomba, Australia
Computed Tomography, Systematic Reviews, Diagnostic Test Accuracy, Advanced Practice, Healthcare Improvement
Jonathan R. McConnell, Yorkshire Imaging Collaborative, Yorkshire, United Kingdom
Role development of radiographers, Radiographer reporting, Education, Workforce, Artificial intelligence, Radiology workforce
Helen Anne McNair, The Royal Marsden NHS Foundation Trust, London, United Kingdom
Translation of novel radiotherapy technologies into clinical practice, involving investigating the efficacy and efficiency of intensity modulated radiotherapy and image guided radiotherapy, deliver radiotherapy using real-time treatment planning, by redeploying the radiotherapy workforce to create an optimal patient pathway
Nejc Mekiš, University of Ljubljana, Faculty of Health Sciences, Ljubljana, Slovenia
General radiography, optimization in radiography, image quality, digital radiography, statistics, dosimetry
Eija Metsälä, Metropolia University of Applied Sciences, Helsinki, Finland
Kristi Moore, University of Mississippi, University Park, Mississippi, United States of America
Niamh Moore, University College Cork, Cork, Ireland
Benjamin Morris, Cox College, Springfield, Missouri, United States of America
Radiation Oncology, Advanced Practice
Alexandra Partner, University of Derby, Derby, United Kingdom
Simulation, Placement, Quality, Student Experience, Patient Care
Charlotte Primeau, University of Warwick, Coventry, United Kingdom
Biological anthropology, Forensic imaging, Bioarchaeology, Medical CT scanning, Micro-CT, Radiography, Radiology
Louise Rainford, University College Dublin, Dublin, Ireland
Medical Imaging, Education, Radiography
Neill Roberts, Leeds Teaching Hospitals NHS Trust, Leeds, United Kingdom
Radiotherapy, Breast Cancer, Advanced Practice
Marie-Louise Ryan, University College Dublin, Dublin, Ireland
Radiography
Joana Santos, Polytechnic Institute of Coimbra College of Health Technology of Coimbra, Department of Dietetics and Nutrition, Coimbra, Portugal
Bev Snaith, Mid-Yorkshire Hospitals NHS Trust and University of Bradford, Wakefield, United Kingdom
Rachel Toomey, University College Dublin, Dublin, Ireland
Radiography, Radiation Protection, Medical Image Perception
Yat Man Tsang, Princess Margaret Cancer Centre, Radiation Medicine Program, Toronto, Ontario, Canada
Radiographer, Radiation Oncology, Radiotherapy, Advanced Practice
Bimali Weerakoon, University of Peradeniya, Peradeniya, Sri Lanka
Francis Zarb, University of Malta, Msida, Malta
Radiation Dose and Image quality optimisation; Radiography education; Radiography research
Dlama Zira Joseph, Bayero University, Kano, Nigeria

Editorial Board Members
Helle Precht, University of Southern Denmark, Department of Regional Health Research, Odense, Denmark
Radiography, Image quality, radiation dose, patient experiences, Computed Tomography, Digital Radiography
Ian Simcock, Great Ormond Street Hospital for Children NHS Foundation Trust, London, United Kingdom
post-mortem imaging, micro-CT, MRI, radiography

Representatives of the Council of the Society and College of Radiographers
Sharon Stewart, Glasgow Caledonian University, Glasgow, United Kingdom
Radiography, Covid19, Simulation, Student experience, diagnostic imaging

Honorary Editor
Julie Nightingale, Sheffield, United Kingdom

Editors Emeriti
Richard C Price, University of Hertfordshire, Hatfield, United Kingdom
Peter Hogg, University of Salford, Salford, United Kingdom
H Brian Bentley†, Formerly University of Leeds and University of Salford, Salford, United Kingdom

College of Radiographers Representative
Marcus Jackson, University of London, London, United Kingdom

Society of Radiographers Representative
Sharon Stewart, Glasgow Caledonian University, Glasgow, United Kingdom
Radiography, Covid19, Simulation, Student experience, diagnostic imaging
INTRODUCTION

Radiography is the official peer-reviewed journal of the Society and College of Radiographers and the European Federation of Radiographer Societies.

Radiography promotes evidence-based practice by disseminating high quality clinical, scientific and educational research related to all aspects of diagnostic and therapeutic radiography. We publish research articles, systematic and narrative reviews, editorials and letters of international relevance that advance knowledge and encourage innovation within radiography. We welcome radiography research submissions that embrace robust and innovative qualitative, quantitative and mixed method approaches.

Radiography is essential reading for researchers, radiography practitioners*, radiography educators and student radiographers. We aim to influence clinical practice and patient care by informing practitioners, managers, leaders and policy makers working within or aligned to clinical imaging and radiation therapy services.

* Inclusive of all radiography practitioners including diagnostic and therapeutic radiographers, medical radiation technologists, radiologic technologists, radiation therapists, medical radiation practitioners, sonographers and nuclear medicine technologists.

From January 2021, Radiography has moved to an online only format and aims to publish four standard issues and one special issue per annum.

Types of contribution, word lengths and illustrations

Papers related to Radiotherapy and Oncology, Clinical Imaging and Radiography Education and Research are welcomed. The contribution must align with one of the following paper types:

Original Full Length Research Papers (3,000 words; 4,000 words qualitative and mixed methods* papers):

These papers typically comprise empirical research following the standard scientific article format (introduction, method, results, discussion, and conclusion). All original papers should have a scientific abstract which will not exceed 280 words. The article manuscript should be 3,000 words, minus the reference list and figures. However, we acknowledge that qualitative research papers and mixed methods papers* may require up to 4,000 words.*A quantitative questionnaire which includes some open answer questions would not normally constitute true mixed methods research

Systematic Review and Meta Analyses (4,000 words):

Systematic Review articles should have a scientific abstract not exceeding 280 words and be no more than 4,000 words in length. Systematic reviews could be based upon Cochrane or meta-analysis principles. The search strategy should include sources that have been used (databases, publications etc) and should detail the search decisions made (e.g. in a PRISMA flow chart). The criteria used to select and methodologically appraise the article references must be indicated. Please ensure that tables summarise the data efficiently; additional detail may be requested to be available as online supplementary data.

Narrative Review Articles (3,500 words):

Narrative Review articles should have a review abstract of no more than 280 words and be approximately 3,500 words in length. Review articles use the existing knowledge base to generate an article. At a simple level they simply discuss and debate the issues. The sources that have been used (databases, publications, free text searches etc) should be stated.

Letters to the Editor (500 words):

To be considered for publication in the Journal, letters commenting upon recently published articles must reach us within 2 months of publication of the original item. Letters of general interest, unlinked to earlier items in the journal, are also considered. Correspondence letters are not usually peer reviewed but the journal may invite replies from the authors of the original publication, or pass on letters to these authors. All letters are edited and proofs will be sent out before publication.
Technical notes (1,400 words):
These could be similar to a full length research paper, but with less data, or could also be a note on a piece of imaging equipment or a novel technique. They describe issues of technical importance to clinical departments and may include the results of a small investigation. Technical notes are written in a factual manner.

Guest Editorials (approx. 1000 words):
These will be commissioned by the editorial team and will cover items of contemporary interest.

Case Reports:
Radiography will no longer be accepting submissions of case report articles for consideration in the Journal. Authors wishing to submit case report articles on medical imaging topics may wish to submit their article to Radiology Case Reports.

Authors are requested to include their word count at the end of the manuscript. A maximum of 6 figures is recommended.

If you need any further help, please visit our Support Center

Submission checklist
You can use this list to carry out a final check of your submission before you send it to the journal for review. Please check the relevant section in this Guide for Authors for more details.

Please note recent changes to manuscript requirements:
1. Changes to abstract structure and word count;
2. Highlights no longer required;
3. Twitter handle can be included, please provide on your Title page.
Please read the Guide for Authors for further information on abstract preparation.

Ensure that the following items are present:

One author has been designated as the corresponding author with contact details:
• E-mail address
• Full postal address
• Twitter handle (optional)

All necessary files have been uploaded:
Manuscript:
• Include keywords
• All figures (include relevant captions)
• All tables (including titles, description, footnotes)
• Ensure all figure and table citations in the text match the files provided
Graphical Abstract file (where applicable)
Supplemental files (where applicable)

Further considerations
• Manuscript has been 'spell checked' and 'grammar checked'
• Ensure that the manuscript includes page numbering
• All references mentioned in the Reference List are cited in the text, and vice versa
• Permission has been obtained for use of copyrighted material from other sources (including the Internet)
• A competing interests statement is provided, even if the authors have no competing interests to declare
• Journal policies detailed in this guide have been reviewed
• Referee suggestions and contact details provided, based on journal requirements

For further information, visit our Support Center.

BEFORE YOU BEGIN
Ethics in publishing
Please see our information on Ethics in publishing.
Studies in humans and animals
If the work involves the use of human subjects, the author should ensure that the work described has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for experiments involving humans. The manuscript should be in line with the Recommendations for the Conduct, Reporting, Editing and Publication of Scholarly Work in Medical Journals and aim for the inclusion of representative human populations (sex, age and ethnicity) as per those recommendations. The terms sex and gender should be used correctly.

Authors should include a statement in the manuscript that informed consent was obtained for experimentation with human subjects. The privacy rights of human subjects must always be observed.

All animal experiments should comply with the ARRIVE guidelines and should be carried out in accordance with the U.K. Animals (Scientific Procedures) Act, 1986 and associated guidelines, EU Directive 2010/63/EU for animal experiments, or the National Research Council's Guide for the Care and Use of Laboratory Animals and the authors should clearly indicate in the manuscript that such guidelines have been followed. The sex of animals must be indicated, and where appropriate, the influence (or association) of sex on the results of the study.

Informed consent and patient details
Studies on patients or volunteers require ethics committee approval and informed consent, which should be documented in the paper. Appropriate consents, permissions and releases must be obtained where an author wishes to include case details or other personal information or images of patients and any other individuals in an Elsevier publication. Written consents must be retained by the author but copies should not be provided to the journal. Only if specifically requested by the journal in exceptional circumstances (for example if a legal issue arises) the author must provide copies of the consents or evidence that such consents have been obtained. For more information, please review the Elsevier Policy on the Use of Images or Personal Information of Patients or other Individuals. Unless you have written permission from the patient (or, where applicable, the next of kin), the personal details of any patient included in any part of the article and in any supplementary materials (including all illustrations and videos) must be removed before submission.

Declaration of interest
All authors must disclose any financial and personal relationships with other people or organizations that could inappropriately influence (bias) their work. Examples of potential competing interests include employment, consultancies, stock ownership, honoraria, paid expert testimony, patent applications/registrations, and grants or other funding. Authors must disclose any interests in two places: 1. A summary declaration of interest statement in the title page file (if double anonymized) or the manuscript file (if single anonymized). If there are no interests to declare then please state this: 'Declarations of interest: none'. 2. Detailed disclosures as part of a separate Declaration of Interest form, which forms part of the journal's official records. It is important for potential interests to be declared in both places and that the information matches. More information.

Authors should disclose any conflicts of interest under the subheading "Conflict of interest statement" in a separate file. Do not include this statement in the manuscript file, as your manuscript should be anonymised for the review process. If there are no conflicts of interest, authors should state that there are none.

Declaration of generative AI in scientific writing
The below guidance only refers to the writing process, and not to the use of AI tools to analyse and draw insights from data as part of the research process.

Where authors use generative artificial intelligence (AI) and AI-assisted technologies in the writing process, authors should only use these technologies to improve readability and language. Applying the technology should be done with human oversight and control, and authors should carefully review and edit the result, as AI can generate authoritative-sounding output that can be incorrect, incomplete or biased. AI and AI-assisted technologies should not be listed as an author or co-author, or be cited as an author. Authorship implies responsibilities and tasks that can only be attributed to and performed by humans, as outlined in Elsevier’s AI policy for authors.

Authors should disclose in their manuscript the use of AI and AI-assisted technologies in the writing process by following the instructions below. A statement will appear in the published work. Please note that authors are ultimately responsible and accountable for the contents of the work.
Disclosure instructions
Authors must disclose the use of generative AI and AI-assisted technologies in the writing process by adding a statement at the end of their manuscript in the core manuscript file, before the References list. The statement should be placed in a new section entitled 'Declaration of Generative AI and AI-assisted technologies in the writing process'.

Statement: During the preparation of this work the author(s) used [NAME TOOL / SERVICE] in order to [REASON]. After using this tool/service, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the content of the publication.

This declaration does not apply to the use of basic tools for checking grammar, spelling, references etc. If there is nothing to disclose, there is no need to add a statement.

Submission declaration and verification
Submission of an article implies that the work described has not been published previously (except in the form of an abstract, a published lecture or academic thesis, see 'Multiple, redundant or concurrent publication' for more information), that it is not under consideration for publication elsewhere, that its publication is approved by all authors and tacitly or explicitly by the responsible authorities where the work was carried out, and that, if accepted, it will not be published elsewhere in the same form, in English or in any other language, including electronically without the written consent of the copyright-holder. To verify compliance, your article may be checked by Crossref Similarity Check and other originality or duplicate checking software.

Use of inclusive language
Inclusive language acknowledges diversity, conveys respect to all people, is sensitive to differences, and promotes equal opportunities. Content should make no assumptions about the beliefs or commitments of any reader; contain nothing which might imply that one individual is superior to another on the grounds of age, gender, race, ethnicity, culture, sexual orientation, disability or health condition; and use inclusive language throughout. Authors should ensure that writing is free from bias, stereotypes, slang, reference to dominant culture and/or cultural assumptions. We advise to seek gender neutrality by using plural nouns (“clinicians, patients/clients”) as default/wherever possible to avoid using "he, she," or "he/she." We recommend avoiding the use of descriptors that refer to personal attributes such as age, gender, race, ethnicity, culture, sexual orientation, disability or health condition unless they are relevant and valid. When coding terminology is used, we recommend to avoid offensive or exclusionary terms such as "master", "slave", "blacklist" and "whitelist". We suggest using alternatives that are more appropriate and (self-) explanatory such as "primary", "secondary", "blocklist" and "allowlist". These guidelines are meant as a point of reference to help identify appropriate language but are by no means exhaustive or definitive.

Authorship
All authors should have made substantial contributions to all of the following: (1) the conception and design of the study, or acquisition of data, or analysis and interpretation of data, (2) drafting the article or revising it critically for important intellectual content, (3) final approval of the version to be submitted.

Changes to authorship
Authors are expected to consider carefully the list and order of authors before submitting their manuscript and provide the definitive list of authors at the time of the original submission. Any addition, deletion or rearrangement of author names in the authorship list should be made only before the manuscript has been accepted and only if approved by the journal Editor. To request such a change, the Editor must receive the following from the corresponding author: (a) the reason for the change in author list and (b) written confirmation (e-mail, letter) from all authors that they agree with the addition, removal or rearrangement. In the case of addition or removal of authors, this includes confirmation from the author being added or removed.

Only in exceptional circumstances will the Editor consider the addition, deletion or rearrangement of authors after the manuscript has been accepted. While the Editor considers the request, publication of the manuscript will be suspended. If the manuscript has already been published in an online issue, any requests approved by the Editor will result in a corrigendum.
Article transfer service
This journal uses the Elsevier Article Transfer Service to find the best home for your manuscript. This means that if an editor feels your manuscript is more suitable for an alternative journal, you might be asked to consider transferring the manuscript to such a journal. The recommendation might be provided by a Journal Editor, a dedicated Scientific Managing Editor, a tool assisted recommendation, or a combination. If you agree, your manuscript will be transferred, though you will have the opportunity to make changes to the manuscript before the submission is complete. Please note that your manuscript will be independently reviewed by the new journal. More information.

Copyright
Upon acceptance of an article, authors will be asked to complete a 'Journal Publishing Agreement' (see more information on this). An e-mail will be sent to the corresponding author confirming receipt of the manuscript together with a 'Journal Publishing Agreement' form or a link to the online version of this agreement.

Subscribers may reproduce tables of contents or prepare lists of articles including abstracts for internal circulation within their institutions. Permission of the Publisher is required for resale or distribution outside the institution and for all other derivative works, including compilations and translations. If excerpts from other copyrighted works are included, the author(s) must obtain written permission from the copyright owners and credit the source(s) in the article. Elsevier has preprinted forms for use by authors in these cases.

Author rights
As an author you (or your employer or institution) have certain rights to reuse your work. More information.

Elsevier supports responsible sharing
Find out how you can share your research published in Elsevier journals.

Role of the funding source
You are requested to identify who provided financial support for the conduct of the research and/or preparation of the article and to briefly describe the role of the sponsor(s), if any, in study design; in the collection, analysis and interpretation of data; in the writing of the report; and in the decision to submit the article for publication. If the funding source(s) had no such involvement, it is recommended to state this.

Open access
Please visit our Open Access page for more information.

Language (usage and editing services)
Please write your text in good English (American or British usage is accepted, but not a mixture of these). Authors who feel their English language manuscript may require editing to eliminate possible grammatical or spelling errors and to conform to correct scientific English may wish to use the English Language Editing service available from Elsevier's Author Services.

Submission
Our online submission system guides you stepwise through the process of entering your article details and uploading your files. The system converts your article files to a single PDF file used in the peer-review process. Editable files (e.g., Word, LaTeX) are required to typeset your article for final publication. All correspondence, including notification of the Editor's decision and requests for revision, is sent by e-mail.

Submit your article
Please submit your article via https://www.editorialmanager.com/radiography/

Additional information
Radiography requires authors to submit manuscripts in accordance with the Uniform Requirements for Manuscripts submitted to Biomedical Journals, October 2004, International Committee of Medical Journal Editors, http://www.icmje.org

PREPARATION
Queries
For questions about the editorial process (including the status of manuscripts under review) or for technical support on submissions, please visit our Support Center.
Peer review
This journal operates a double anonymized review process. All contributions will be initially assessed by the editor for suitability for the journal. Papers deemed suitable are then typically sent to a minimum of two independent expert reviewers to assess the scientific quality of the paper. The Editor is responsible for the final decision regarding acceptance or rejection of articles. The Editor's decision is final. Editors are not involved in decisions about papers which they have written themselves or have been written by family members or colleagues or which relate to products or services in which the editor has an interest. Any such submission is subject to all of the journal's usual procedures, with peer review handled independently of the relevant editor and their research groups. More information on types of peer review.

Double anonymized review
This journal uses double anonymized review, which means the identities of the authors are concealed from the reviewers, and vice versa. More information is available on our website. To facilitate this, please include the following separately:

Title page (with author details): This should include the title, authors' names, affiliations, acknowledgements and any Declaration of Interest statement, and a complete address for the corresponding author including an e-mail address.

Anonymized manuscript (no author details): The main body of the paper (including the references, figures, tables and any acknowledgements) should not include any identifying information, such as the authors' names or affiliations.

Use of word processing software
It is important that the file be saved in the native format of the word processor used. The text should be in single-column format. Keep the layout of the text as simple as possible. Most formatting codes will be removed and replaced on processing the article. In particular, do not use the word processor's options to justify text or to hyphenate words. However, do use bold face, italics, subscripts, superscripts etc. When preparing tables, if you are using a table grid, use only one grid for each individual table and not a grid for each row. If no grid is used, use tabs, not spaces, to align columns. The electronic text should be prepared in a way very similar to that of conventional manuscripts (see also the Guide to Publishing with Elsevier). Note that source files of figures, tables and text graphics will be required whether or not you embed your figures in the text. See also the section on Electronic artwork.

To avoid unnecessary errors you are strongly advised to use the 'spell-check' and 'grammar-check' functions of your word processor.

Article structure
Subdivision - unnumbered sections
Divide your article into clearly defined sections. Each subsection is given a brief heading. Each heading should appear on its own separate line. Subsections should be used as much as possible when cross-referencing text: refer to the subsection by heading as opposed to simply 'the text'.

Introduction
State the objectives of the work and provide an adequate background, avoiding a detailed literature survey or a summary of the results.

Literature Review
A literature review section should extend, not repeat, the background to the article already dealt with in the Introduction and lay the foundation for further work.

Methods
Provide sufficient detail to allow the work to be reproduced. Methods already published should be indicated by a reference: only relevant modifications should be described.

Results
Results should be clear and concise.

Discussion
This should explore the significance of the results of the work, not repeat them. A combined Results and Discussion section is often appropriate. Avoid extensive citations and discussion of published literature.

Conclusions
The main conclusions of the study may be presented in a short Conclusions section, which may stand alone or form a subsection of a Discussion or Results and Discussion section.
Appendices
If there is more than one appendix, they should be identified as A, B, etc. Formulae and equations in appendices should be given separate numbering: Eq. (A.1), Eq. (A.2), etc.; in a subsequent appendix, Eq. (B.1) and so on. Similarly for tables and figures: Table A.1; Fig. A.1, etc.

Essential title page information
• Title. Concise and informative. Titles are often used in information-retrieval systems. Avoid abbreviations and formulae where possible.
• Author names and affiliations. Please clearly indicate the given name(s) and family name(s) of each author and check that all names are accurately spelled. You can add your name between parentheses in your own script behind the English transliteration. Present the authors' affiliation addresses (where the actual work was done) below the names. Indicate all affiliations with a lower-case superscript letter immediately after the author's name and in front of the appropriate address. Provide the full postal address of each affiliation, including the country name and, if available, the e-mail address of each author.
• Corresponding author. Clearly indicate who will handle correspondence at all stages of refereeing and publication, also post-publication. This responsibility includes answering any future queries about Methodology and Materials. Ensure that the e-mail address is given and that contact details are kept up to date by the corresponding author.
• Present/permanent address. If an author has moved since the work described in the article was done, or was visiting at the time, a 'Present address' (or 'Permanent address') may be indicated as a footnote to that author's name. The address at which the author actually did the work must be retained as the main, affiliation address. Superscript Arabic numerals are used for such footnotes.

Twitter handle
We can now include your Twitter handle on your published paper. If you would like your Twitter handle to be included, please provide it on your Title page.

Structured abstract
A structured abstract, by means of appropriate headings, should provide the context or background for the research and should state its purpose, basic procedures (selection of study subjects, observational and analytical methods), main findings (giving specific effect sizes and their statistical significance, if possible), and principal conclusions. It should emphasize new and important aspects of the study or observations. The implications for practice section should emphasise new or important aspects of the study for radiography practice (clinical, academic or research). Abstracts should be no more than 280 words.

The structured abstract headings are as follows:

Full Length Article/Systematic Review Article:

Introduction
Methods
Results
Conclusion
Implications for practice

Narrative Review Article:

Objectives
Key Findings
Conclusion
Implications for practice

Graphical abstract
Although a graphical abstract is optional, its use is encouraged as it draws more attention to the online article. The graphical abstract should summarize the contents of the article in a concise, pictorial form designed to capture the attention of a wide readership. Graphical abstracts should be submitted as a separate file in the online submission system. Image size: Please provide an image with a minimum of 531 × 1328 pixels (h × w) or proportionally more. The image should be readable at a size of 5 × 13 cm using a regular screen resolution of 96 dpi. Preferred file types: TIFF, EPS, PDF or MS Office files. You can view Example Graphical Abstracts on our information site.
**Keywords**
Immediately after the abstract, provide a maximum of 6 keywords, using American spelling and avoiding general and plural terms and multiple concepts (avoid, for example, 'and', 'of'). Be sparing with abbreviations: only abbreviations firmly established in the field may be eligible. These keywords will be used for indexing purposes.

**Classifications**
In addition to selecting searchable keywords which will be displayed on the first page of your published article, you are requested to also select the relevant journal classification words or phrases that best fit with your manuscript. These classifications are then used to assist the Editor in selecting the most appropriate reviewers for your manuscript.

**Abbreviations**
Define abbreviations that are not standard in this field in a footnote to be placed on the first page of the article. Such abbreviations that are unavoidable in the abstract must be defined at their first mention there, as well as in the footnote. Ensure consistency of abbreviations throughout the article.

**Acknowledgements**
Collate acknowledgements in a separate file and do not, therefore, include them in the manuscript file (as your manuscript should be anonymised for the review process). List here those individuals who provided help during the research (e.g., providing language help, writing assistance or proof reading the article, etc.).

All contributors who do not meet the criteria for authorship should be listed in this acknowledgements file. Authors should disclose whether they had any writing assistance and identify the entity that paid for this assistance.

**Formatting of funding sources**
List funding sources in this standard way to facilitate compliance to funder's requirements:

Funding: This work was supported by the National Institutes of Health [grant numbers xxxx, yyyy]; the Bill & Melinda Gates Foundation, Seattle, WA [grant number zzzz]; and the United States Institutes of Peace [grant number aaaa].

It is not necessary to include detailed descriptions on the program or type of grants and awards. When funding is from a block grant or other resources available to a university, college, or other research institution, submit the name of the institute or organization that provided the funding.

If no funding has been provided for the research, it is recommended to include the following sentence:

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

**Units**
Follow internationally accepted rules and conventions: use the international system of units (SI). If other units are mentioned, please give their equivalent in SI.

Measurements of length, height, weight and volume should be given in metric units (metre, kilogram, litre) or their decimal multiples in terms of the International System of Units http://www.bipm.fr/en/si/. Temperatures should be given in degrees Celsius and blood pressure in mmHg.

**Equipment and drugs:** When quoting specific equipment or drugs, state in parentheses the name and address of the manufacturer. Generic names should be used wherever possible.

**Math formulae**
Please submit math equations as editable text and not as images. Present simple formulae in line with normal text where possible and use the solidus (\/) instead of a horizontal line for small fractional terms, e.g., \(X/Y\). In principle, variables are to be presented in italics. Powers of e are often more conveniently denoted by exp. Number consecutively any equations that have to be displayed separately from the text (if referred to explicitly in the text).
Footnotes
Footnotes should be used sparingly. Number them consecutively throughout the article. Many word processors can build footnotes into the text, and this feature may be used. Otherwise, please indicate the position of footnotes in the text and list the footnotes themselves separately at the end of the article. Do not include footnotes in the Reference list.

Artwork

Electronic artwork

General points

• Make sure you use uniform lettering and sizing of your original artwork.
• Embed the used fonts if the application provides that option.
• Aim to use the following fonts in your illustrations: Arial, Courier, Times New Roman, Symbol, or use fonts that look similar.
• Number the illustrations according to their sequence in the text.
• Use a logical naming convention for your artwork files.
• Provide captions to illustrations separately.
• Size the illustrations close to the desired dimensions of the published version.
• Submit each illustration as a separate file.
• Ensure that color images are accessible to all, including those with impaired color vision.

A detailed guide on electronic artwork is available.
You are urged to visit this site; some excerpts from the detailed information are given here.

Formats
If your electronic artwork is created in a Microsoft Office application (Word, PowerPoint, Excel) then please supply 'as is' in the native document format.
Regardless of the application used other than Microsoft Office, when your electronic artwork is finalized, please 'Save as' or convert the images to one of the following formats (note the resolution requirements for line drawings, halftones, and line/halftone combinations given below):
EPS (or PDF): Vector drawings, embed all used fonts.
TIFF (or JPEG): Color or grayscale photographs (halftones), keep to a minimum of 300 dpi.
TIFF (or JPEG): Bitmaped (pure black & white pixels) line drawings, keep to a minimum of 1000 dpi.
TIFF (or JPEG): Combinations bitmapped line/halftone (color or grayscale), keep to a minimum of 500 dpi.

Please do not:
• Supply files that are optimized for screen use (e.g., GIF, BMP, PICT, WPG); these typically have a low number of pixels and limited set of colors;
• Supply files that are too low in resolution;
• Submit graphics that are disproportionately large for the content.

Photographs and Medical Images: Please supply original photographs and medical images for reproduction printed on glossy paper, very sharp and with good contrast. Remove non-essential areas. Clearly mark all illustrations on the back with the figure number and the Corresponding Author's name and, in cases of ambiguity, the correct orientation. Do not mount photographs or medical images unless part of a composite figure. People must not be identifiable in photographs (masking the eye are does not ensure anonymity), if they are, written permission for use of the photograph from the subject must accompany the submission. Photocopies of photographs are not acceptable.

Color artwork
Please make sure that artwork files are in an acceptable format (TIFF (or JPEG), EPS (or PDF) or MS Office files) and with the correct resolution. If, together with your accepted article, you submit usable color figures then Elsevier will ensure, at no additional charge, that these figures will appear in color online (e.g., ScienceDirect and other sites). Further information on the preparation of electronic artwork.

Figure captions
Ensure that each illustration has a caption. Supply captions separately, not attached to the figure. A caption should comprise a brief title (not on the figure itself) and a description of the illustration. Keep text in the illustrations themselves to a minimum but explain all symbols and abbreviations used.
Tables
Please submit tables as editable text and not as images. Tables can be placed either next to the relevant text in the article, or on separate page(s) at the end. Number tables consecutively in accordance with their appearance in the text and place any table notes below the table body. Be sparing in the use of tables and ensure that the data presented in them do not duplicate results described elsewhere in the article. Please avoid using vertical rules and shading in table cells.

References
Citation in text
Please ensure that every reference cited in the text is also present in the reference list (and vice versa). Any references cited in the abstract must be given in full. Unpublished results and personal communications are not recommended in the reference list, but may be mentioned in the text. If these references are included in the reference list they should follow the standard reference style of the journal and should include a substitution of the publication date with either 'Unpublished results' or 'Personal communication'. Citation of a reference as 'in press' implies that the item has been accepted for publication.

Reference links
Increased discoverability of research and high quality peer review are ensured by online links to the sources cited. In order to allow us to create links to abstracting and indexing services, such as Scopus, Crossref and PubMed, please ensure that data provided in the references are correct. Please note that incorrect surnames, journal/book titles, publication year and pagination may prevent link creation. When copying references, please be careful as they may already contain errors. Use of the DOI is highly encouraged.

A DOI is guaranteed never to change, so you can use it as a permanent link to any electronic article. An example of a citation using DOI for an article not yet in an issue is: VanDecar J.C., Russo R.M., James D.E., Ambeh W.B., Franke M. (2003). Aseismic continuation of the Lesser Antilles slab beneath northeastern Venezuela. Journal of Geophysical Research, https://doi.org/10.1029/2001JB000884. Please note the format of such citations should be in the same style as all other references in the paper.

Web references
As a minimum, the full URL should be given and the date when the reference was last accessed. Any further information, if known (DOI, author names, dates, reference to a source publication, etc.), should also be given. Web references can be listed separately (e.g., after the reference list) under a different heading if desired, or can be included in the reference list.

Data references
This journal encourages you to cite underlying or relevant datasets in your manuscript by citing them in your text and including a data reference in your Reference List. Data references should include the following elements: author name(s), dataset title, data repository, version (where available), year, and global persistent identifier. Add [dataset] immediately before the reference so we can properly identify it as a data reference. The [dataset] identifier will not appear in your published article.

Preprint references
Where a preprint has subsequently become available as a peer-reviewed publication, the formal publication should be used as the reference. If there are preprints that are central to your work or that cover crucial developments in the topic, but are not yet formally published, these may be referenced. Preprints should be clearly marked as such, for example by including the word preprint, or the name of the preprint server, as part of the reference. The preprint DOI should also be provided.

References in a special issue
Please ensure that the words 'this issue' are added to any references in the list (and any citations in the text) to other articles in the same Special Issue.

Reference style
Note shortened form for last page number. e.g., 51-9, and that for more than 6 Authors the first 6 should be listed followed by "et al." For further details you are referred to "Uniform Requirements for Manuscripts submitted to Biomedical Journals" (J Am Med Assoc 1997;277:927-934).

Journal abbreviations source
Journal names should be abbreviated according to the List of Title Word Abbreviations.

Video
Elsevier accepts video material and animation sequences to support and enhance your scientific research. Authors who have video or animation files that they wish to submit with their article are strongly encouraged to include links to these within the body of the article. This can be done in the same way as a figure or table by referring to the video or animation content and noting in the body text where it should be placed. All submitted files should be properly labeled so that they directly relate to the video file's content. In order to ensure that your video or animation material is directly usable, please provide the file in one of our recommended file formats with a preferred maximum size of 150 MB per file, 1 GB in total. Video and animation files supplied will be published online in the electronic version of your article in Elsevier Web products, including ScienceDirect. Please supply 'stills' with your files: you can choose any frame from the video or animation or make a separate image. These will be used instead of standard icons and will personalize the link to your video data. For more detailed instructions please visit our video instruction pages. Note: since video and animation cannot be embedded in the print version of the journal, please provide text for both the electronic and the print version for the portions of the article that refer to this content.

Data visualization
Include interactive data visualizations in your publication and let your readers interact and engage more closely with your research. Follow the instructions here to find out about available data visualization options and how to include them with your article.

Supplementary material
Supplementary material such as applications, images and sound clips, can be published with your article to enhance it. Submitted supplementary items are published exactly as they are received (Excel or PowerPoint files will appear as such online). Please submit your material together with the article and supply a concise, descriptive caption for each supplementary file. If you wish to make changes to supplementary material during any stage of the process, please make sure to provide an updated file. Do not annotate any corrections on a previous version. Please switch off the 'Track Changes' option in Microsoft Office files as these will appear in the published version.

Research data
This journal encourages and enables you to share data that supports your research publication where appropriate, and enables you to interlink the data with your published articles. Research data refers to the results of observations or experimentation that validate research findings, which may also include software, code, models, algorithms, protocols, methods and other useful materials related to the project.

Below are a number of ways in which you can associate data with your article or make a statement about the availability of your data when submitting your manuscript. If you are sharing data in one of these ways, you are encouraged to cite the data in your manuscript and reference list. Please refer to the "References" section for more information about data citation. For more information on depositing, sharing and using research data and other relevant research materials, visit the research data page.

Data linking
If you have made your research data available in a data repository, you can link your article directly to the dataset. Elsevier collaborates with a number of repositories to link articles on ScienceDirect with relevant repositories, giving readers access to underlying data that gives them a better understanding of the research described.

There are different ways to link your datasets to your article. When available, you can directly link your dataset to your article by providing the relevant information in the submission system. For more information, visit the database linking page.
For supported data repositories a repository banner will automatically appear next to your published article on ScienceDirect.

In addition, you can link to relevant data or entities through identifiers within the text of your manuscript, using the following format: Database: xxxx (e.g., TAIR: AT1G01020; CCDC: 734053; PDB: 1XFN).

**Data statement**
To foster transparency, we encourage you to state the availability of your data in your submission. This may be a requirement of your funding body or institution. If your data is unavailable to access or unsuitable to post, you will have the opportunity to indicate why during the submission process, for example by stating that the research data is confidential. The statement will appear with your published article on ScienceDirect. For more information, visit the Data Statement page.

**Cover letter**
The online submission system requires a cover letter to be submitted with the manuscript. This should include the following information: Confirmation of the fact that the manuscript is not under consideration for publication elsewhere. We encourage disclosure of correspondence from other journals and reviewers, if previously submitted, and we might contact relevant editors of such journals. Each author should have participated sufficiently in any submission to take public responsibility for appropriate portions of the content. Please provide full contact details for each author, and identify who is responsible for the integrity of the work as a whole. Publication is approved by all authors and tacitly or explicitly by the responsible authorities where the work was carried out. Information, including copies of very similar submissions/reports the author(s) has/have written. Any such submissions/reports should be referenced in the new manuscript. That the author(s) or author(s) institutions have no conflicts of interest. This includes financial or personal relationships that inappropriately influence (bias) his or her actions (such relationships are also known as dual commitments, competing interests, or competing loyalties) within 3 years of the work beginning submitted. If there are no conflicts of interest, authors should state that there are none. Confirmation of whether any parts i.e medical images, of the article have been sent by post to the Editorial Office.

**AFTER ACCEPTANCE**

**Online proof correction**
To ensure a fast publication process of the article, we kindly ask authors to provide us with their proof corrections within two days. Corresponding authors will receive an e-mail with a link to our online proofing system, allowing annotation and correction of proofs online. The environment is similar to MS Word: in addition to editing text, you can also comment on figures/tables and answer questions from the Copy Editor. Web-based proofing provides a faster and less error-prone process by allowing you to directly type your corrections, eliminating the potential introduction of errors. If preferred, you can still choose to annotate and upload your edits on the PDF version. All instructions for proofing will be given in the e-mail we send to authors, including alternative methods to the online version and PDF. We will do everything possible to get your article published quickly and accurately. Please use this proof only for checking the typesetting, editing, completeness and correctness of the text, tables and figures. Significant changes to the article as accepted for publication will only be considered at this stage with permission from the Editor. It is important to ensure that all corrections are sent back to us in one communication. Please check carefully before replying, as inclusion of any subsequent corrections cannot be guaranteed. Proofreading is solely your responsibility.

**Share Link**
The corresponding author will, at no cost, receive a customized Share Link providing 50 days free access to the final published version of the article on ScienceDirect. The Share Link can be used for sharing the article via any communication channel, including email and social media. Corresponding authors who have published their article gold open access do not receive a Share Link as their final published version of the article is available open access on ScienceDirect and can be shared through the article DOI link.

**AUTHOR INQUIRIES**
Visit the Elsevier Support Center to find the answers you need. Here you will find everything from Frequently Asked Questions to ways to get in touch.
You can also check the status of your submitted article or find out when your accepted article will be published.

© Copyright 2018 Elsevier | https://www.elsevier.com