**DESCRIPTION**

*Heart, Lung and Circulation* publishes articles integrating clinical and research activities in the fields of basic cardiovascular science, clinical cardiology and cardiac surgery, with a focus on emerging issues in cardiovascular disease. The journal promotes multidisciplinary dialogue between cardiologists, cardiothoracic surgeons, cardio-pulmonary physicians and cardiovascular scientists.

The journal accepts original articles, current reviews, brief communications, and letters to the Editor, concerned with clinical practice and research in all fields of cardiovascular disease. The journal particularly invites submissions concerned with the issues of cardiovascular ageing, indigenous cardiovascular health, devices, tissue repair and replacement.

To purchase books on Cardiology or to browse our comprehensive range of Medical titles, please visit us at shop.elsevier.com.au.  

**IMPACT FACTOR**

2017: 1.921 © Clarivate Analytics Journal Citation Reports 2018

**EDITORIAL BOARD**

*Editor-in-Chief:*  
**A. Robert Denniss**, Dept. of Cardiology, Westmead and Blacktown Hospitals, Sydney, NSW, Australia

*Commissioning Editor:*  
**Ann Gregory**, The Cardiac Society of Australia and New Zealand, 189 Kent Street, Sydney, NSW 2000, NSW, Australia

*Editorial Manager:*  
**Deborah Edward**, The Cardiac Society of Australia and New Zealand, 189 Kent Street, Sydney, NSW 2000, NSW, Australia

*Founding Editor:*  
**Franklin Rosenfeldt**, Swinburne University of Technology, Melbourne, Vic, Australia
Heart Rhythm Editors:
Kim Hoe Chan, Royal Prince Alfred Hospital, Sydney, NSW, Australia
Haris M. Haqqani, The Prince Charles Hospital (Queensland Health), Brisbane, Qld, Australia

Cardiology Editors:
Gemma Figtree, The University of Sydney, Sydney, NSW, Australia
Harry Lowe, Concord Repatriation General Hospital, Sydney, NSW, Australia
William Anthony Parsonage, Royal Brisbane & Women's Hospital, Brisbane, Qld, Australia
Richard W. Jeremy, Central Sydney Cardiology, Sydney, NSW, Australia
Aaron Sverdlov, The University of Newcastle, Newcastle, NSW, Australia
James Chong, The University of Sydney, Westmead, New South Wales, Australia

Cardiothoracic Surgery Editors:
John Alvarez, Sir Charles Gairdner Hospital, Perth, WA, Australia
Andrew Cochrane, Monash Medical Centre, Melbourne, Vic, Australia
Alastair Royse, Royal Melbourne Hospital, Melbourne, Vic, Australia
Adam El Gamel, Waikato Hospital, Hamilton, New Zealand

Paediatric Cardiology and Surgery Editors:
Michael Cheung, Royal Children's Hospital Melbourne, Melbourne, Vic, Australia
Yves d'Udekem, Royal Children's Hospital Melbourne, Melbourne, Vic, Australia
Robert Justo, Queensland Health, Brisbane, Qld, Australia

Cardiac Imaging Editors:
Daniel Friedman, Prince of Wales Hospital, Sydney, NSW, Australia
Joseph Selvanayagam, Flinders University, Adelaide, SA, Australia
Tony Stanton, University of Queensland, Brisbane, Qld, Australia

Basic Cardiovascular Science Editor:
Salvatore Pepe, Murdoch Childrens Research Institute, Melbourne, Vic, Australia

Indigenous Cardiovascular Health Editors:
Warren Walsh, Prince of Wales Hospital, Sydney, NSW, Australia
Anna Rolleston, The Centre for Health, Tauranga, New Zealand

Cardiovascular Nursing Editor:
Patricia Davidson, Johns Hopkins University, Baltimore, MD, USA

Allied Health Editor:
Julie Redfern, The University of Sydney, Sydney, NSW, Australia

Interventional Cardiology Editors
Ravinay Bhindi, The University of Sydney, Sydney, NSW, Australia
Andrew TL Ong, The University of Sydney, Sydney, NSW, Australia
Peter Psaltis, SAHMRI, South Australian Health & Medical Research Institute, Adelaide, SA, Australia
Jim Stewart, Auckland Heart Group, Auckland, New Zealand

Sports Cardiology Editor
Andre La Gerche, Baker Heart Research Institute, Melbourne, Vic, Australia

Genomics and Precision Medicine Editor
John Atherton, Queensland Health, Brisbane, Qld, Australia

Editorial Board:
Con Aroney, Brisbane, Qld, Australia
Alex Brown, Melbourne, Vic, Australia
Fardar Charchar, Ballarat, Vic, Australia
Derek P. Chew, Bedford Park, South Australia, Australia
Eugene (Joss) du Toit, Gold Coast, Qld, Australia
Ben Freedman, Concord, Sydney, NSW, Australia
Scott Harding, Wellington, New Zealand
Livia Hool, Perth, WA, Australia
Garry Jennings, Melbourne, Vic, Australia
Simon Knight, Melbourne, Vic, Australia
Leonard Kritharides, Sydney, NSW, Australia
Scott P. Levick, Milwaukee, WI, USA
Yeung Leng Lim, Singapore
Peter McDonald, Canberra, ACT, Australia
Christian Mussap, Liverpool, NSW, Australia
Jonathan Mynard, Parkville, Vic, Australia
Benjamin Ng, Sydney, NSW, Australia
Doan Ngo, Newcastle, NSW, Australia
Jason Peart, Gold Coast, Qld, Australia
Martin Vila Petroff, La Plata, Argentina
A. Mark Richards, Christchurch, New Zealand
Peter Ruygrok, Auckland, New Zealand
Ryan Schraie, Townsville, Qld, Australia
Liza Thomas, Sydney, NSW, Australia
Elmer Villanueva, Suzhou, Jiangsu, China
Michael Ward, Sydney, NSW, Australia
Gillian Whalley, Dunedin, NZ
Harvey White, Auckland, NZ
Michael Williams, Dunedin, New Zealand
Gavin Wright, Melbourne, Vic, Australia
Magdi Yacoub, London, England, UK
Dimitry Zorov, Moscow, Russian Federation
INTRODUCTION

Editor in Chief
Professor A. Robert Denniss
Departments of Cardiology, Westmead and Blacktown Hospitals, Sydney, Australia

Commissioning Editor
Dr Ann T Gregory
Heart, Lung and Circulation Editorial Office
Level 6, Suite 601
1 Castlereagh Street, Sydney NSW 2000, Australia
Ph +61 (0)2 9226 7990
E-mail: ann.gregory@hlc-journal.net.au

Editorial Manager
Dr Deborah Edward
Heart, Lung and Circulation Editorial Office
Level 6, Suite 601
1 Castlereagh Street, Sydney NSW 2000, Australia
Ph +61 (0)2 9226 7990
E-mail: journal@csanz.edu.au

Founding Editor
Professor Franklin L. Rosenfeldt
Head Cardiac Surgical Research Unit
Alfred Hospital and Baker Institute, Melbourne
Phone: 61 (0)3 9276 3684
Fax: 61 (0)3 9276 2317

Heart, Lung and Circulation publishes articles integrating clinical and research activities in the fields of basic cardiovascular science, clinical cardiology and cardiac surgery, with a focus on emerging issues in cardiovascular disease. The Journal particularly invites submissions concerned with the issues of cardiovascular ageing, Indigenous cardiovascular health, devices, and tissue repair and replacement. The Journal promotes multidisciplinary dialogue between cardiologists, cardiothoracic surgeons, cardio-pulmonary physicians and cardiovascular scientists and allied health professionals with an interest in cardiovascular diseases.

Types of article
Contributions falling into the following categories will be considered for publication: Original articles, current reviews, discussion papers, commentaries, editorials and letters to the Editor. Please be aware that clinical spotlights no longer conform to the journal’s aims and scope and only exceptional submissions will be considered. Clinical Spotlights will be submitted with the expectation that if accepted they will be published online only.

Please ensure that you select the appropriate article type from the list of options when making your submission. Authors contributing to special issues should ensure that they select the special issue article type from this list.

Word Limits by Category of Manuscript
Once accepted, Editorials, Reviews and Original Articles will be published in print as well as online. Some articles submitted under other categories, especially those submitted as Clinical Spotlights, will be published online only. Review articles Limit to 6500 words including title page, abstract, text, figure legends and all references. The total number of references should not exceed 80. Subtract 100 words for each illustration and 300 words for each table. Original articles: Maximum 4500 words including title page, abstract, text, references and figure legends. A ‘How-to-do-it’ article is a description of a useful surgical technique that is not an original technique and should contain descriptive, illustrative material. If illustrating a new technique, the paper article should be expanded and submitted as an...
original article. Images: One or two photographs and brief descriptions. Correspondence (Letters to the Editor), and Updates: Limit to 500 words, including references. Subtract 100 words for each illustration and 300 words for each table. Commentaries are commissioned, authoritative evidence-based and/or opinion pieces that relate principally to a specific article or articles published, generally, in the same edition of the Journal. Limited to 2500 words including references. Subtract 100 words for each illustration and 300 words for each table. Editorials are limited to 2500 words including references. Subtract 100 words for each illustration and 300 words for each table.

BEFORE YOU BEGIN

Ethics in publishing
For information on Ethics in publishing and Ethical guidelines for journal publication see https://www.elsevier.com/publishingethics and https://www.elsevier.com/journal-authors/ethics. Please be aware that all submissions to the journal are checked for text similarity. Submissions that exceed the journal's acceptable limit may be returned to the author.

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-blind) or the manuscript file (if single-blind). If there are no interests to declare then please state this: 'Declarations of interest: none'. This summary statement will be ultimately published if the article is accepted. 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.

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 originality, your article may be checked by the originality detection service Crossref Similarity Check.

Use of inclusive language
Inclusive language acknowledges diversity, conveys respect to all people, is sensitive to differences, and promotes equal opportunities. Articles should make no assumptions about the beliefs or commitments of any reader, should contain nothing which might imply that one individual is superior to another on the grounds of race, sex, culture or any other characteristic, and should use inclusive language throughout. Authors should ensure that writing is free from bias, for instance by using 'he or she', 'his/her' instead of 'he' or 'his', and by making use of job titles that are free of stereotyping (e.g. 'chairperson' instead of 'chairman' and 'flight attendant' instead of 'stewardess').

Regulatory requirements
- **Research Protocol**
  Authors must state that the protocol has been approved by the appropriate Ethics Committee (state which).
- **Human Investigation**
  All work should conform to the 'Statement on Human Experimentation' by the National Health and Medical Research Council of Australia, or the equivalent in other countries. The ethical guidelines that were followed by the investigators must be included in the Methods section of the manuscript. State clearly that the subject gave informed consent. Anonymity should be preserved.
- **Humane Animal Care**
  The Methods section must contain a statement assuring that all animals received humane care in accordance with the 'Statement on Animal Experimentation' by the National Health and Medical Research Council of Australia, or its equivalent in other Countries (for example the 'Guide for the Care and Use of Laboratory Animals' published by the National Institutes of Health).
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.

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 then this should be stated.

Open access
This journal offers authors a choice in publishing their research:

Subscription
• Articles are made available to subscribers as well as developing countries and patient groups through our universal access programs.
• No open access publication fee payable by authors.
• The Author is entitled to post the accepted manuscript in their institution’s repository and make this public after an embargo period (known as green Open Access). The published journal article cannot be shared publicly, for example on ResearchGate or Academia.edu, to ensure the sustainability of peer-reviewed research in journal publications. The embargo period for this journal can be found below.

Gold open access
• Articles are freely available to both subscribers and the wider public with permitted reuse.
• A gold open access publication fee is payable by authors or on their behalf, e.g. by their research funder or institution.

Regardless of how you choose to publish your article, the journal will apply the same peer review criteria and acceptance standards.

For gold open access articles, permitted third party (re)use is defined by the following Creative Commons user licenses:
Creative Commons Attribution-NonCommercial-NoDerivs (CC BY-NC-ND)
For non-commercial purposes, lets others distribute and copy the article, and to include in a collective work (such as an anthology), as long as they credit the author(s) and provided they do not alter or modify the article.

The gold open access publication fee for this journal is **USD 2500**, excluding taxes. There is a 20% discount off the open access publication fee for members of the Society. The Society member price is **USD 2000**, excluding taxes. Learn more about Elsevier's pricing policy: [https://www.elsevier.com/openaccesspricing](https://www.elsevier.com/openaccesspricing).

**Green open access**
Authors can share their research in a variety of different ways and Elsevier has a number of green open access options available. We recommend authors see our [open access page](https://www.elsevier.com/openaccess) for further information. Authors can also self-archive their manuscripts immediately and enable public access from their institution's repository after an embargo period. This is the version that has been accepted for publication and which typically includes author-incorporated changes suggested during submission, peer review and in editor-author communications. Embargo period: For subscription articles, an appropriate amount of time is needed for journals to deliver value to subscribing customers before an article becomes freely available to the public. This is the embargo period and it begins from the date the article is formally published online in its final and fully citable form. [Find out more.](https://www.elsevier.com/openaccess)

This journal has an embargo period of 24 months.

**Elsevier Researcher Academy**
Researcher Academy is a free e-learning platform designed to support early and mid-career researchers throughout their research journey. The "Learn" environment at Researcher Academy offers several interactive modules, webinars, downloadable guides and resources to guide you through the process of writing for research and going through peer review. Feel free to use these free resources to improve your submission and navigate the publication process with ease.

**Language (usage and editing services)**
Please write your text in good English (Australian English is preferred, however, American or British usage is accepted, but not a mixture of these). Note, that the Journal is published in Australian English. 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 WebShop ([http://webshop.elsevier.com/languagediting/](http://webshop.elsevier.com/languagediting/)) or visit our customer support site ([http://support.elsevier.com](http://support.elsevier.com)) for more information. Work that does not meet basic criteria for comprehension in English may be returned to the author for language improvement or rejected.

**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.

**Submission**
Submission to this journal is a completely online process. Use the following guidelines to prepare your article. Via the homepage of this journal ([http://ees.elsevier.com/hlc](http://ees.elsevier.com/hlc)) you will be guided stepwise through the creation and uploading of the various files. The system automatically converts source files to a single Adobe Acrobat PDF version of the article, which is used in the peer-review process. Please note that even though manuscript source files are converted to PDF at submission for the review process, these source files are needed for further processing after acceptance. All correspondence, including notification of the Editor's decision and requests for revision, takes place by e-mail and via the author's homepage, removing the need for a hard-copy paper trail. If you are unable to provide an electronic version, please contact the editorial office prior to submission [Dr Deborah Edward: email: journal@csanz.edu.au; telephone: +61 (0)2 9226 7990].
Referees
Please submit the names and institutional e-mail addresses of several potential referees. For more details, visit our Support site. Note that the editor retains the sole right to decide whether or not the suggested reviewers are used.

Additional information
Tables and figures may be presented with captions within the main body of the manuscript; if so, figures should additionally be uploaded as high resolution files.

PREPARATION

Peer review
This journal operates a double blind 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. More information on types of peer review.

Double-blind review
This journal uses double-blind 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.
Blinded 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.

Microsoft Word is the preferred software program. Manuscripts in 11 point Arial or Times New Roman fonts are preferred and more reliably convert to PDF files during electronic submission. 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: https://www.elsevier.com/guidepublication). 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 illustrations.

Submission of manuscripts
Every submission, regardless of category, must include:

Cover letter, stating the category of article (Original Articles, Clinical Spotlight, Images, or Letters to the Editor) and the section to which they wish to submit (Cardiac Surgery; Cardiology; Cardiovascular Basic Science, etc.).

Conflict of interest: When the proposed publication concerns any commercial product, either directly or indirectly, the author must include in the cover letter a statement (1) indicating that he or she has no financial or other interest in the product or distributor of the product or (2) explaining the nature of any relationship between himself or herself and the manufacturer or distributor of the product. Other kinds of associations, such as consultancies, stock ownership, or other equity interests or patent-licensing arrangements, must also be disclosed. If, in the Editor's judgement, the information disclosed represents a potential conflict of interest, it may be made available to reviewers and may be published at the Editor's discretion; authors will be informed of the decision before publication.

Sources of outside support for research, including funding, equipment, and drugs, must be named in the cover letter.
Gene association studies: For authors considering submission of a manuscript reporting a gene association study, please note that the article will not be considered for peer review unless the study includes two independent cohorts, clearly described, including locality where each cohort was recruited, numbers of patients, age range, gender and ethnicity. It is also crucial that such studies must be treated with appropriate statistical analysis that considers correction for multiple testing. Authors are required to state that these conditions have been met in their submission letter to the Editor.

Complete manuscript: This includes title page, abstract, text, tables, acknowledgments, required disclosures (see below), references and illustrations. The financial support for the project must be acknowledged, or 'no external financial support' declared. The ethical guidelines that have been followed must be stated clearly. The role(s) of the funding organisation, if any, in the collection of data, its analysis and interpretation, and in the right to approve or disapprove publication of the finished manuscript must be described in the Methods section of the text.

Note that the online manuscript submission program requires separate entries of some information that also appears in the manuscript. These separate entries are needed to manage processing and reviewing your manuscript and correspondence. In addition, the following must be submitted in Hard Copy direct to the Editorial Office if applicable: Permission from the publisher (copyright holder) to reproduce any previously published table(s), illustration(s) or photograph(s) in both print and electronic media.

Permission from unmasked patients appearing in photographs.

Arrange complete manuscript as follows: (1) title page, (2) abstract and keywords if required, (3) text, (4) acknowledgments, (5) disclosures if required, (6) references, (7) tables (each complete with title and footnotes) (8) figures and (9) figure legends. Number pages consecutively, beginning with the title page as page 1 and ending with the legend page.

Article structure
Subdivision
Divide your article into clearly defined sections. Any subsection may be given a brief heading. Each heading should appear on its own separate line.

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

Material and methods
Provide sufficient details to allow the work to be reproduced by an independent researcher. Methods that are already published should be summarized, and indicated by a reference. If quoting directly from a previously published method, use quotation marks and also cite the source. Any modifications to existing methods should also 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.** List all authors by first name, all initials, family name and highest academic degree using, for example, 'MD, PhD' for holders of both degrees (membership listing is optional, but do not include initial degrees (eg BSc)). Please clearly indicate the given name(s) and family name(s) of each author and check that all names are accurately spelled. 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 city and state and country name of each affiliation.

• **Corresponding author.** Clearly indicate who will handle correspondence at all stages of refereeing and publication, also post-publication. Ensure that the full contact address and 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.

**Abstract**
A concise and factual abstract is required. The abstract should state briefly the purpose of the research, the principal results and major conclusions. An abstract is often presented separately from the article, so it must be able to stand alone. For this reason, References should be avoided, but if essential, then cite the author(s) and year(s). Also, non-standard or uncommon abbreviations should be avoided, but if essential they must be defined at their first mention in the abstract itself.

**Keywords**
Immediately after the abstract, provide at least 2 keywords associated with their paper using British 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.

**Abbreviations**
Define abbreviations for descriptive terms at first appearance in the text (eg Atrial Fibrillation (AF). Periods of time should be abbreviated as 'secs' (seconds), 'mins' (minutes) and 'hrs' (hours). Use the words in full at the beginning of a sentence and in sub-headings. Ensure consistency of abbreviations throughout the article.

**Acknowledgements**
Collate acknowledgements in a separate section at the end of the article before the references and do not, therefore, include them on the title page, as a footnote to the title or otherwise. List here those individuals who provided help during the research (e.g., providing language help, writing assistance or proof reading the article, etc.).

**Numbering**
Numbers up to 10 must be written in words unless part of a formula or calculation.

**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, please include the following sentence:

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

**Nomenclature and units**
Follow internationally accepted rules and conventions: use the international system of units (SI). If other quantities are mentioned, give their equivalent in SI. Authors wishing to present a table of nomenclature should do so on the second page of their manuscript.
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.

Table footnotes
Indicate each footnote in a table with a superscript lowercase letter.

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.
A detailed guide on electronic artwork is available on our website: https://www.elsevier.com/artworkinstructions.

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 finalised, 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): Colour or grayscale photographs (halftones), keep to a minimum of 300 dpi.
TIFF (or JPEG): Bitmapped (pure black & white pixels) line drawings, keep to a minimum of 1000 dpi.
TIFF (or JPEG): Combinations bitmapped line/half-tone (colour or grayscale), keep to a minimum of 500 dpi.

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

Colour 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 colour figures then Elsevier will ensure, at no additional charge, that these figures will appear in colour online (e.g., ScienceDirect and other sites) in addition to colour reproduction in print. Further information on the preparation of electronic artwork.

Give the type of stain and magnification power for all photomicrographs.

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
Tables should be double-spaced on separate pages (one to each page). Number tables consecutively in accordance with their appearance in the text. Place footnotes to tables below the table body and indicate them with superscript lowercase letters. Avoid vertical rules. Be sparing in the use of tables and ensure that the data presented in tables do not duplicate results described elsewhere in the article.

Statistics
For group data where appropriate error bars should always be shown. For non-parametric data quartile ranges should be shown.

References
Reference style
Consecutive numbers in square brackets should be used to indicate references in the text, e.g., [1,2], as part of the text and not raised above it. The full reference should be cited in a numbered list essentially according to the Vancouver Uniform Requirements (see 5th ed., Ann Intern Med 1997;126(1):36-47). Endnotes should be placed at the end of the manuscript following the Acknowledgements.

Journal References should contain the names of the first 6 authors (surnames followed by initials), followed by "et al." Title of communication in lower case lettering, Title of Journal [abbreviated according to International Serials Data System-List of Serial title Word Abbreviations, 1985 (ISDS-ISO International Centre, 20 rue Bachaumont, 75002 Paris, France)], year of publication; volume number: first and last page number. For communications which have been accepted for publication, but not yet printed, the reference must contain the journal name and year.


References to multi-author books with editor(s) should contain Author Name(s) in the same format as above: Title of contribution. In: Name(s) of editor(s). Title of book. Publisher's location: Name; Year of publication. If necessary page range (see below).


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.

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. All citations in the text should refer to:
1. Single author: the author's name (without initials, unless there is ambiguity) and the year of publication;
2. Two authors: both authors' names and the year of publication;
3. Three or more authors: first author's name followed by "et al." and the year of publication.
Citations may be made directly (or parenthetically). Groups of references should be listed first alphabetically, then chronologically. Examples: "as demonstrated (Allan, 1996a, 1996b, 1999; Allan and Jones, 1995). Kramer et al. (2000) have recently shown ...."
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.

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.

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 management software
This journal has standard templates available in key reference management packages EndNote (http://www.endnote.com/support/enstyles.asp) and Reference Manager (http://refman.com/support/rmstyles.asp). Using plug-ins to wordprocessing packages, authors only need to select the appropriate journal template when preparing their article and the list of references and citations to these will be formatted according to the journal style which is described below.

Users of Mendeley Desktop can easily install the reference style for this journal by clicking the following link:
When preparing your manuscript, you will then be able to select this style using the Mendeley plug-ins for Microsoft Word or LibreOffice.

Journal abbreviations source
Journal names should be abbreviated according to
List of title word abbreviations: http://www.issn.org/2-22661-LTWA-online.php;

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.

Video files: please supply 'stills' with your files: you can choose any frame from the video or make a separate image. These will be used instead of standard icons and will personalise the link to your supplementary information. For more detailed instructions please visit our artwork instruction pages at https://www.elsevier.com/artworkinstructions.

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. To facilitate reproducibility and data reuse, this journal also encourages you to share your 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).

**Mendeley Data**

This journal supports Mendeley Data, enabling you to deposit any research data (including raw and processed data, video, code, software, algorithms, protocols, and methods) associated with your manuscript in a free-to-use, open access repository. During the submission process, after uploading your manuscript, you will have the opportunity to upload your relevant datasets directly to Mendeley Data. The datasets will be listed and directly accessible to readers next to your published article online.

For more information, visit the Mendeley Data for journals page.

**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.

**Submission checklist**

The following list will be useful during the final checking of an article prior to sending it to the journal for review. Please consult this Guide for Authors for further details of any item.

**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

All necessary files have been uploaded, and contain:

- Keywords
- All figure captions
- All tables (including title, description, footnotes)

Further considerations:

- Manuscript has been 'spell-checked' and 'grammar-checked' (note that Microsoft Word uses US spelling and grammar)
- References are in the correct format for this journal
- 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)

Printed version of figures (if applicable) in colour or black-and-white

- Indicate clearly whether or not colour or black-and-white in print is required.

For any further information please visit our customer support site at [http://support.elsevier.com](http://support.elsevier.com).
Availability of accepted article
This journal makes articles available online as soon as possible after acceptance. This concerns the accepted article (both in HTML and PDF format), which has not yet been copyedited, typeset or proofread. A Digital Object Identifier (DOI) is allocated, thereby making it fully citable and searchable by title, author name(s) and the full text. The article's PDF also carries a disclaimer stating that it is an unedited article. Subsequent production stages will simply replace this version.

Online proof correction
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.

Offprints
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. Both corresponding and co-authors may order offprints at any time via Elsevier's Webshop. 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.

COPYRIGHT
This journal offers authors a choice in publishing their research: Open access and Subscription.

For subscription articles
Upon acceptance of an article, authors will be asked to complete a 'Journal Publishing Agreement' (for more information on this and copyright, see https://www.elsevier.com/copyright). 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 (please consult https://www.elsevier.com/permissions). 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: please consult https://www.elsevier.com/permissions.

For open access articles
Upon acceptance of an article, authors will be asked to complete an 'Exclusive License Agreement' (for more information see https://www.elsevier.com/OAAuthoragreement). Permitted reuse of open access articles is determined by the author’s choice of user license (see https://www.elsevier.com/openaccesslicenses).

Retained author rights
As an author you (or your employer or institution) retain certain rights. For more information on author rights for:
Subscription articles please see https://www.elsevier.com/journal-authors/author-rights-and-responsibilities.
Open access articles please see https://www.elsevier.com/OAAuthoragreement.
OPEN ACCESS
This journal does not ordinarily have publication charges; however, authors can now opt to make their articles available to all (including non-subscribers) via the ScienceDirect platform, for which a fee of US $2,500 applies (for further information on open access see https://www.elsevier.com/about/open-access/open-access-options). Please note that you can only make this choice after receiving notification that your article has been accepted for publication, to avoid any perception of conflict of interest. The fee excludes taxes and other potential costs such as colour charges. In some cases, institutions and funding bodies have entered into agreement with Elsevier to meet these fees on behalf of their authors. Details of these agreements are available at https://www.elsevier.com/fundingbodies. Authors of accepted articles, who wish to take advantage of this option, should complete and submit the order form (available at https://www.elsevier.com/locate/openaccessform.pdf). Whatever access option you choose, you retain many rights as an author, including the right to post a revised personal version of your article on your own website. More information can be found here: https://www.elsevier.com/authorsrights. Your publication choice will have no effect on the peer review process or acceptance of submitted articles.

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