



New Zealand Veterinary Journal Instructions for Authors

(updated January 2024)

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Scope and general policy

The *New Zealand Veterinary Journal* (NZVJ) publishes original peer-reviewed research findings, clinical studies, brief reports, correspondence and review articles, originating from New Zealand and internationally. Topics should be relevant to New Zealand veterinary and animal science communities, and include the disciplines of infectious disease, medicine, surgery and the health, management and welfare of production and companion animals, horses and New Zealand wildlife, as well as veterinary education and training, and the role of veterinarians in society. If you are unsure whether an article is suitable for the NZVJ, please contact the Editors for advice prior to submission.

The editorial policies of the NZVJ are in accordance with the *Uniform Requirements for Manuscripts Submitted to Biomedical Journals* published by the International Committee for Medical Journal Editors (ICMJE) at: www.icmje.org.

For specific policies, see page 9. Please ensure you have read these prior to the submission of your manuscript.

Publication options

The NZVJ is published by Taylor & Francis on behalf of the New Zealand Veterinary Association.

Accepted manuscripts are published online as the Version of Record as soon as possible following acceptance and proofing, and are subsequently allocated to issues published bimonthly in January, March, May, July, September and November each year.

Publication charges and fast-track publication

There are no charges for the routine publication of articles in the NZVJ.

For page charges relating to the printing of figures in colour, please refer to the Figures section below.

Provision exists for authors to advance publication of articles that have been refereed and accepted in the usual way, ahead of their scheduled date, upon payment of a \$NZ450 base fee plus \$NZ225 per page.

Open Access agreements

Before submitting your article to the *NZVJ*, please visit the links below to establish whether you or any of your coauthors are affiliated with an institution or organisation that may allow you to publish your article Open Access at no cost to you. *NZVJ*'s publisher, Taylor & Francis, has such agreements in place in a number of countries, including New Zealand and Australia.

<https://authorservices.taylorandfrancis.com/choose-open/publishing-open-access/oa-agreements/>

<https://www.tandfonline.com/openaccess/members?pageSize=10&subjectTitle=&startPage=3>

When you submit your article, if you believe you may be eligible for Open Access publishing under one of these agreements, please assign the role of 'Corresponding Author' to a coauthor who is affiliated with an eligible institution. You will need to give their physical and email addresses at that institution as their primary affiliation details. The 'Contact Author', who liaises with the *NZVJ* editorial team during review and revision, can be a different person.

If you have any queries about this at any stage during submission, please contact the *NZVJ* Editorial Office at nzvj@vets.org.nz

Open Access options

Articles can be made fully and permanently open access online, and for hosting in open access repositories and/or distribution without license, on payment of an Author Publishing Charge of \$US3300. This option is only made available after an article has been accepted. More information is provided [here](#).

Green open access/self-archiving

Authors can share their accepted articles after publication, as described [here](#). Each author can distribute free access to an electronic version of their article to 50 friends, colleagues, or contacts following publication. Authors can post the Author Accepted Manuscript on their personal website at any point after publication of their article and on the author's institutional or subject repository, after an embargo period of 12 months following publication of the Version of Record.

Submission of manuscripts

Authors should submit their manuscripts online using the [Taylor & Francis Submission Portal](#). All submissions must include an electronic version of the manuscript text as a Word document. Tables and figure caption should be included in the main manuscript file. Figures and supplementary material should be uploaded as separate files. Please do not try to upload your text as a PDF file. The system will automatically convert all of your files to a single PDF proof.

Authors will be guided step-by-step through uploading files directly from their computer. Please read the section above on Open Access agreements before beginning your submission.

Peer review

All articles submitted for publication that are considered within the scope of the *NZVJ* will be independently refereed by at least two referees regardless of source. Referees are selected by the Editors. Referees will remain anonymous, unless both the referee and the Editor agree otherwise, and they are obliged to keep all unpublished information confidential. Referees are asked to state explicitly whether or not any conflicts of interest exist that could bias their opinions of the manuscript, and to disqualify themselves from reviewing specific manuscripts if they believe it to be appropriate.

Following consultation with one of the members of the *NZVJ* Editorial Board, referees' reports are then used to determine whether the manuscript can be considered for publication or not. A final decision is made by the editors and a report is sent to the authors including the decision and recommendations for revision. The revised manuscript is assessed by the Editors to determine whether all points raised by reviewers have been addressed and, if required, a revised manuscript may be sent for re-review by the same or additional reviewers.

The final decision concerning acceptability of a manuscript is the responsibility of the Editors. Failure to comply with journal policy at any stage is grounds for rejection.

Preparation of manuscripts

Authors are urged to consult a recent issue of the *NZVJ* and follow the style therein as closely as possible. Manuscripts must be written in English of a high standard and are expected to have been peer-reviewed for scientific content and correctness of language and presentation prior to submission. Manuscripts that conform poorly with editorial requirements may be returned without review.

For authors requiring additional editorial input prior to submission, assistance can be obtained from [Taylor & Francis Editing Services](#).

Article types

Review Article: For topics within the scope of the *NZVJ*, systematic or narrative reviews, meta-analysis and appropriate syntheses of material without meta-analysis will be considered.

Max words: 10,000

Max. figures and/or tables: 8

Internal headings: Flexible, but should include an abstract and keywords

Notes: Reviews should have a clearly stated specific objective and scope and make a useful contribution to the advancement of the subject. Narrative reviews should present a critical assessment of the published literature rather than just summarising it. Systematic reviews, in addition to following a clear protocol, should also include critical assessment. Review articles are usually only published in *NZVJ* following invitation from the editors of the Journal.

Research Article: These report new and substantial contributions to veterinary science based on original research.

Max. words: 8,500

Max. figures and/or tables: 8

Internal headings: Abstract, Introduction, Materials and methods, Results, Discussion, Acknowledgements and References

Notes: Research Articles should be based on original research that makes a substantial contribution to veterinary science either through its novelty, elegance of execution or value in supporting existing theory. The subject should have relevance to the veterinary and/or animal science communities in New Zealand. Experimental and observational studies will be considered, so long as they are of high quality, suitably constructed and appropriately analysed. Prospective studies are preferred.

Brief Report: As above but for observations that, while valuable, are limited or preliminary because of factors such as sample size, sampling methodology, null findings, or design features that limit inference.

Max. words: 3,500

Max. figures and/or tables: 4

Internal headings: Abstract, Introduction, Materials and methods, Results, Discussion, Acknowledgements and References

Note: As above but for observations that, while valuable, are limited or preliminary because of factors such as sample size, sampling methodology, null findings, or design features that limit inference. Pilot studies, retrospective analyses of clinical data (including a control group) and studies reporting descriptive statistics without inferential analysis are generally more suitable to this article type.

Clinical Study: These report novel observations from clinical practice, including investigations of disease outbreaks, case series and analyses of clinical data (lacking a control group).

Max. words: 4,500

Max. figures and/or tables: 4

Internal headings: Abstract, Introduction, Case History, Clinical Findings, Pathological Findings and/or Laboratory Findings and/or Treatment and Outcome, Discussion, Acknowledgements and References

Note: Single case reports will not be considered unless of substantial novelty or significance, e.g. a novel putative infectious disease.

Peer-reviewed Correspondence. This format is generally used for descriptions of single cases which may be considered if of particular value to the NZ veterinary community.

Max. words: 2,000

Max. figures and/or tables: 1, unless by prior arrangement with the Editors

Internal headings: No headings but main text may be followed by References. Text should follow the general sequence for Research Articles or Clinical Studies.

Note: Letters to the Editor (e.g. comments on papers published in the journal) may also be published under the heading of "Correspondence". Please submit these articles via the Submission Portal using article type 'Note'.

Journal layout

A style sheet showing the correct formatting is provided on the [NZVJ website](#) as a Word document to assist authors in preparing their manuscripts. Number all pages consecutively, and every fifth line in the left margin of each page, continuously. An EndNote style file for formatting NZVJ references is also available and can be obtained by contacting the Editorial Office at

Format

Titles should be short, specific and informative. Do not use trade names, abbreviations or acronyms in the title.

Authors' names and addresses. Use initials (without stops) and surnames only, separated by commas. Alphabetic superscripts should be used after each author's name to identify their affiliation, address, and the author for correspondence ([§]), on the first page. The addresses for authors should be those at the time the work was undertaken. If since then any author has moved elsewhere, their current address should also be given, and a superscript symbol (*†#) used to identify the author in question. Please identify one author as the corresponding author: their email address will normally be displayed in the article PDF and the online article. Please note that no changes to affiliation can be made after your paper is accepted.

Abstracts should contain the following internal sub-headings for Research Articles and Brief Reports: Aims, Methods, Results, Conclusions, Clinical relevance, and Keywords. For Clinical Studies use: Case history, Clinical findings, Diagnosis, Clinical relevance, and 5–7 keywords. Keywords should reflect the important content of the manuscript that will be used by search engines to locate the article. Keywords, may be single or phrases of 2–3 words. It can increase article visibility to search engines if one or two keywords are included in the title and abstract.

Abstracts should be ≤ 400 words in length, brief and informative when read in isolation from the article. All non-standard abbreviations (see below) should be listed after the Abstract.

Introduction. This should set the study in context by briefly reviewing relevant knowledge, providing the rationale for the study, and should end with a clear and concise statement of the study's aims.

Materials and methods should contain sufficient detail to allow others to repeat the study. For studies that involve the experimental use of humans or animals, include a statement to the effect that all procedures involving the experimental use of animals were approved by the (registered name) Animal Ethics Committee (city, country). The generic name, dose and route of administration should be given for drugs, and the manufacturer's name and location (city, state, and country) of drugs, reagents and specialised equipment used should be stated in parentheses on first reference. Thereafter, only generic names should be used. Details of all statistical methods used must be given at the end of this section under the sub-heading "*Statistical analyses*", and should include adequate detail to allow readers to determine precisely how data have been analysed and presented. See below for Statistical guidelines.

Results should be presented concisely and logically without discussion or reference to other work. Data presented in tables and figures should not be repeated in the text. Actual probability values should be given, to 2 or 3 decimal places, wherever possible (e.g. "p = 0.011" rather than "p < 0.05") except where p < 0.001.

Discussion should evaluate and interpret the results and relate these to other relevant studies. Do not repeat or present new results in this section. Care should be taken to develop the Discussion in a logical and concise manner, and it should end with a statement of conclusions and brief summary of the clinical relevance of your findings, where applicable.

Acknowledgements should be brief, and only include people who have made a direct contribution or provided material or financial support. All sources of funding for the submitted research must be stated.

Journal style

Style and spelling follow *Fit to Print* (J Hughes and D Wallace, Dunmore Publishing Ltd, Auckland, NZ, 2010) and the *Concise Oxford Dictionary*, except that the verbal suffix "-ise" is used, not "-ize".

Numbers < 10 are written as words, unless followed by an abbreviation or unit of measure. Numbers ≥ 10 are generally written as numerals unless at the beginning of a sentence. A decimal point must always be preceded by a numeral, e.g. "0.5", not ".5"; do not use a comma, i.e. not 0,5. Numbers ≥ 1,000 should include a comma.

Quantities. All measurements should be reported in SI units or their decimal multiples, unless it is normal practice in a discipline to use derivatives, e.g. the international unit and the Curie. The New Zealand Standard 6501 (available from Standards New Zealand at: www.standards.co.nz), contains the recommended units of measure.

Dates take the form "25 August 2000" in the text, but they may be abbreviated in tables and figures. Use the 24-hour clock for times of day. When used as units, spell in full hours, minutes and seconds.

Nomenclature. All biotica should be identified by their scientific names when the English term is first used, with the exception of common domestic animals. Scientific names at all taxonomic ranks should be italicised. Names of organisms should be given in full when used in the Title and when first used in the Abstract or text; after first use, names of genera should be abbreviated as far as possible without causing confusion.

Footnotes should only be used in the main text to indicate the address of people cited as personal communications.

Do not use underlining and do not number sub-headings or use itemised lists.

Abbreviations

The following abbreviations may be used without definition in the *NZVJ*. In addition, all chemical elements, common chemical formulae, SI and units of measure used with a value should be used without definition. Abbreviations are generally not permitted in the Title. Plural abbreviations do not require “s”.

ATP	Adenosine triphosphate
bp	Base pair
cfu	Colony forming units
CT	Computed tomography
DM	Dry matter
DNA	Deoxyribonucleic acid
EDTA	Ethylene diamino tetra-acetate
ELISA	Enzyme-linked immunosorbent assay
epg	Eggs per gram of faeces
H&E	Haematoxylin and eosin
HPLC	High performance liquid chromatography
Ig	Immunoglobulin
IM	Intramuscular(ly)
IV	Intravenous(ly)
MRI	Magnetic resonance imaging
mRNA	Messenger ribonucleic acid
NZ	New Zealand
PCR	Polymerase chain reaction
RNA	Ribonucleic acid
rpm	Revolutions per minute
rRNA	Ribosomal ribonucleic acid
SC	Subcutaneous(ly)
UK	United Kingdom
USA	United States of America

Statistical terms

ANOVA	Analysis of variance
CI	Confidence intervals
CV	Coefficients of variation
df	Degrees of freedom
GLM	Generalised linear model
HR	Hazard ratio
IQR	Inter-quartile range
LSD	Least significant difference
LSM	Least squares means
n	Number of samples
OR	Odds ratio
r	Correlation coefficient
R ²	Coefficient of determination
RR	Relative risk
SD	Standard deviation
SE	Standard error
SED	Standard error of the difference
SEM	Standard error of the mean
χ^2	Chi-squared

The use of other abbreviations should be limited as much as possible. They should not be used if they are in any way ambiguous. Non-standard abbreviations should be listed after the Abstract, and their meaning must be defined in the text when first used. For international units, “IU” should be used; “U” should be used for enzyme activity. Units of length, weight and volume should be given in lower case, although upper case L for litre (e.g. kg, mg/L). Abbreviations for chemical elements, SI units, contractions and suspensions in common use (but excluding “e.g.” and “i.e.”) are not followed by stops; other suspensions generally are (e.g. pers. comm.). The abbreviations “e.g.” and “i.e.” are not italicised but “*et al.*”, “*ad libitum*” “*in vivo*”, “*in vitro*” and *vs.* are.

References

The accuracy of references is the responsibility of authors, and references must be verified against the original article. Please ensure that all articles cited in the text, tables and figures are included in the References list and *vice versa*.

In the text, citations should be listed in parentheses in chronological order, citing authors' names, and using "*et al.*" after the first author's name where there are more than two, e.g. (Jones 1994; Smith and Jones 1996; Smith *et al.* 2000). When listing more than one publication by the same author, only list the years of publication e.g. (Tasker *et al.* 2003b, 2006, 2009). In general, no more than three citations should be included after a statement.

In the References list, references must be in alphabetical order of the first author and include the names of all authors, except if there are more than 10 author names, in which case put "*et al.*" after the 10th author and delete the remaining names. For publications authored by a group, the group name may be listed as the author and if this commonly abbreviated, the abbreviation may be used for the in-text citation (e.g. RNZSPCA 2020). When no author is given, use the term "Anonymous" in both text and the References list.

References with the same first author should be listed in the order: a) single author; b) two authors alphabetically according to the name of the second author; c) three or more authors, chronologically. The letters a, b, c, etc. should be appended to the year for papers published by the same authors in the same year. Include a DOI if available, in the format [https://doi.org/10\[etc\]](https://doi.org/10[etc]) rather than doi:10[etc].

Authors' names should be in bold, with no stops between initials. Journal titles and names of books should be in italics, in full (not abbreviated). Do not use stops after the year, unless followed by a DOI.

An EndNote style file for formatting NZVJ references can be obtained by contacting the Editorial office at nzvj@vets.org.nz. Please note that the correct terms list must be loaded into EndNote in order for it to correctly format journal names, see https://support.clarivate.com/Endnote/s/article/EndNote-20-Generate-full-or-abbreviated-journal-names?language=en_US

Use the following examples as a guide:

For journal articles:

Pomroy WE, Charleston WAG, West DM. Failure of young goats to acquire resistance to *Haemonchus contortus*. *New Zealand Veterinary Journal* 37, 23–6, 1989. <https://doi.org/10.1080/00480169.1989.35542>

For preprint articles with a digital object identifier:

Kenyon PR, Morel PCH, Morris ST, West DM. A note on the effect of vasectomised rams and short-term exposures to entire rams prior to the breeding period on the reproductive performance of ewe lambs. *Applied Animal Behaviour Science*. 2007. <https://doi.org/10.1016/j.applanim.2007.04.006>

For chapters in a book or an occasional proceedings:

***Weinstein L, Swartz MN.** Pathogenic properties of invading microorganisms. In: Sodeman WA Jr, Sodeman WA (eds). *Pathogenic Physiology: Mechanisms of Disease*. Pp 457–72. WB Saunders, Philadelphia PA, USA, 1974

For articles in proceedings published in a regular series:

***Hanlon DW.** Reproductive problems in the postpartum cow. *Proceedings of the 15th Annual Seminar of the Society of Dairy Cattle Veterinarians of the New Zealand Veterinary Association*. Pp 209–17, 1998

Xu ZZ, Burton LJ. Reproductive efficiency in lactating dairy cows. *Proceedings of the New Zealand Society of Animal Production* 56, 34–7, 1996

For theses:

***McDougall S.** Postpartum anoestrus in the New Zealand dairy cow. *PhD thesis*, Massey University, Palmerston North, NZ, 1994

For government acts and grey literature

***Anonymous.** *Animal Welfare Act 1999*. New Zealand Government Printer, Wellington, NZ, 1999

***New Zealand Companion Animal Council.** *Companion Animals in New Zealand 2016*. Auckland, NZ, 2016

Citation of non-peer-reviewed references, (e.g. reports, conference proceedings, text books, theses) is discouraged but not precluded. Authors are specifically discouraged from citing their own publications in non-peer-reviewed sources; such data should be cited as "unpublished" or original data presented. If non-peer-reviewed references are cited, these should be less than 2 years old and clearly distinguished as such in the text by qualifying statements such as "preliminary data" or "non-peer-reviewed reports". In the References list, non-peer-reviewed articles should be preceded by an asterisk before the first author's name, e.g.

***Loth L, Stone M.** Weaner pig mortality rates on New Zealand farms affected by PMWS. *Surveillance* 32 (1), 3–6, 2005

When referencing a website, the data provided must be substantiated, and you should be personally satisfied that the data

are defensible. Please provide the full title of the work, its full URL so that the exact information being referred to can be accessed, most recent date the website was accessed, and the name of the organisation publishing the website. The authors' names should be provided wherever possible, although organisation names or acronyms are allowed. If neither are available, list as Anonymous, e.g.

***Anonymous.** *New Zealand Dairy Statistics 2008-09.* http://www.lic.co.nz/pdf/dairy_stats/DAIRY_STATISTICS_08-09.pdf (accessed 02 November 2010). LIC and DairyNZ, Hamilton, NZ, 2009

Avoid using abstracts as references, and do not use “unpublished data” or “personal communications” unless they exist in written form. If they do, they may be referred to in the text, but should not appear in the References list. A pers. comm. should be a numbered footnote including the author’s initials and last name, followed by workplace name, city and country.

References to papers that have been accepted but not published should be cited as “in press”, whereas papers that have been submitted but not accepted should be referred to in the text as “unpublished data” and should not be included in the References list.

Tables

Tabular material should be included on separate pages after the References. Information in tables should not be repeated in the text. Tables must be numbered consecutively (Arabic numbers) in the order they are referred to and be understandable without reference to the text. The title should be a single sentence placed above the table; additional explanatory information including non-standard abbreviations should appear as alphabetically ordered footnotes ^{a b} cross-referenced to the column entries. If using superscript letters to denote significant differences between means, use ^{x y z} and elaborate these in footnotes.

Tables should be constructed using the Table function of a word processor or spreadsheet (Word or Excel preferred), with each entry in a separate cell; do not use tabs or line breaks within cells. Do not use vertical lines. Use horizontal lines to separate the table from the title and footnotes, and column headings from data. Only the first letter of column or row headings should be capitalised. Unit descriptors should be placed under each column heading in parentheses and chosen to minimise the number of digits in each column. Report zero values as “0”, any values not tested as “NT”, and identify the statistical measure of variation used in either the title or footnotes.

Figures

Figures for publication should be submitted in the highest quality format possible. Failure to comply with the following instructions will result in figures being returned to authors and publication being delayed.

Authors are required to pay the cost of printing colour images at a cost of \$NZ540 per page. Please indicate on submission if you require colour printing. If this option is not chosen, figures will appear as colour online and in greyscale in print. Please consider this when selecting colours or patterns in graphs and charts. For example, if three colours are required, a dark shade, a light shade and a medium shade of the same colour (or different colours) are easier to distinguish in greyscale than three medium shades of different colours. [Simplified Science Publishing](#) provides more information and resources on how to choose an appropriate colour palette.

No specific feature within an image may be enhanced, obscured, moved, removed or introduced. Adjustments of brightness, contrast or colour balance are acceptable if they are applied to the whole image and as long as they do not obscure, eliminate or misrepresent any information present in the original. Any digital manipulation must be mentioned in the figure caption.

Figures should be numbered consecutively using Arabic numerals in the order they are described in the text (e.g. “Figure 1”). They should be uploaded as separate image files (with the figure number as the file name) or placed at the end of the manuscript on separate pages. If figures are provided within the main document, separate image files will be required before acceptance, as described below. Figure captions should contain an explanation of all markers, lines and symbols used (i.e. the key), as well as all abbreviations. Each caption should contain sufficient information that it stands alone from the text. Authors should consult a recent issue of the *NZVJ* for examples of the presentation of Figures.

Figure size. Figures should be constructed exactly as the authors want them reproduced, at the final size for publication, e.g. single column width (88 mm) or double column width (185 mm).

Font size and line thickness as described below apply to the Figure at final publication size. Do not include a box around, or gridlines within, the figure.

Font size. The font for all text within the figure and axis labels should be sans-serif type (e.g. Arial) 7 point (equivalent to 2 mm height when printed).

Line thickness. The thickness of all lines including axes, tick marks, whiskers, and connecting lines between datapoints should be 0.2 mm (0.57 point)

Axis labels. Tick marks should face outwards, and titles for axes should run parallel to their axes, left to right and bottom to top, using capital letters for the first word only. State the value being measured, followed by its appropriate SI unit in parentheses, e.g. “Liveweight (kg)”

Symbols and shading. For line graphs the preferred symbols are ○ ● □ ■ △ ▲. If more symbols are required, ensure their shape is different enough that they are still distinct when overlapping occurs. Lines should not be visible within symbols or bars. For bar graphs use white, then black, then grey shading as either 10%, 30% or 50%. Do not use three-dimensional bar charts.

Photomicrographs, radiographs, photographs. Bar scales should be used on photo(micro)graphs and diagrams; magnifications should only be stated for electron photomicrographs. The thickness of lines for bars (depicting scale) or for arrows should be 0.53 mm (1.5 point) at the final size the figure will be reproduced (e.g. single column width, as above). Any lettering or numbers within a photomicrograph, radiograph or photograph should be lower case sans-serif type (e.g. Arial) 10 point. If figures require cropping or reorienting, this must be done prior to submission.

File formats. Figures for publication should be supplied as separate high-resolution files, either EPS or TIFF (though JPEG, or PNG may be acceptable), with a minimum resolution of 300 (photo(micro) graphs) or 600 (line drawing or graphs) dpi. PDF files are acceptable, but only if generated from a digital source, i.e. graphic software, NOT an image or scanned image. MS Excel files are permitted, provided that figures have been originally created in these formats and that all embedded images are at a suitable resolution.

Each figure, including each part of a figure, e.g. Figure 1a, Figure 1b, should be saved as a separate file, but do not add the labels (a, b, etc.) to the figure. Each figure should preferably not exceed 10 MB per individual file.

Supplementary Information

Supplementary information (SI) is material directly relevant to the conclusion of a paper that cannot be included in the printed version for reasons of space, e.g. survey questionnaires. SI is posted online with the article at the time of publication, generally as a single PDF. It must be related to and add to the content of the article. Categories of SI may include: supplementary figures, methods, tables, equations, data, videos or audio.

Supplementary information should be submitted at the same time as the manuscript and will be subject to peer-review and editorial scrutiny. SI is not copy-edited so authors should ensure that it is clearly and succinctly presented, and that the style conforms with the rest of the paper. Authors are responsible for the accuracy and content of all SI. Inclusion of SI is at the discretion of the Editor.

Supplementary tables and figures must have a separate numbering system from that used for tables and figures in the print version e.g. "Supplementary Figure 1". Each piece of SI should be referred to in the print version of the paper at an appropriate point in the text.

A reference list should be provided in the supplementary material for any references used therein.

Statistical guidelines

Aims

Clearly state the aims, objectives or hypotheses tested in the Abstract and at the end of the Introduction.

Materials and methods

Refer also to the relevant reporting guidelines e.g. [REFLECT](#). The following must be clearly described:

Selection of subjects. For experiments or field trials, the source and number of subjects (animals, groups, farms) in the study, the process for their selection and specific criteria for inclusion/exclusion must be stated.

Surveys. Indicate design (retrospective, cross-sectional, etc.), definition of target and sample populations, sampling methods used, and evidence that the sample population is representative of the target population. Where the target population is unknown conclusions cannot be extrapolated beyond the sample population. Where relevant, describe measures taken to maximise the rate of participation, and validation procedures. A copy of the questionnaire should be provided as Supplementary Information (see above).

Allocation to treatments. Describe the method of randomisation used to allocate subjects to treatment groups. If stratification, blocking, or matching are involved, these should be clearly described and considered in the analysis and results.

Power analysis. For all studies involving statistical analysis, indicate the procedures used to determine sample size, preferably considering both the power of the study and level of statistical significance in relation to anticipated biological outcomes. Do not conduct post-hoc retrospective power analyses based on the observations from the same study.

Statistical analysis

Describe statistical methods used in a sub-section of Materials and Methods headed 'Statistical analysis'. The statistical analysis section should take up no more than 20% of the total word count of the manuscript. There should be a clear and logical narrative thread documenting the variables of interest and the statistical methods employed to assess these. Complex

procedures should be referenced and Supplementary Information may be used to explain the structure of complicated statistical models or processes that may be less familiar to a general veterinary audience.

Analytical methods should be appropriate for the design of the study, and the unit of analysis (e.g. individual animal, group, farm, etc.), outcome variables and potential independent variables stated unambiguously together with their classification (numerical: continuous or integer; categorical: nominal or ordinal etc.). When several analytical methods are used, clearly state where each method was applied. Two-sided tests should be used unless a strong argument is presented to justify a one-sided test.

Details of software packages used should be identified by name, version and supplier, e.g. R v2.9.1 (R Development Core Team, 2009; R Foundation for Statistical Computing, Vienna, Austria), SAS v9.1 (2003, SAS Institute Inc., Cary NC, USA).

Assumptions. Many statistical methods have implicit assumptions (distribution of data, independence of observations, etc.). Data should be tested to ensure these assumptions are met. If transformation of data is used to meet the assumptions of a statistical method, it should be verified that the required effect has been achieved.

Lack of independence. If measurements are not independent (e.g. repeated measures on an individual animal, animals clustered in pens or flocks), appropriate measures should be taken to account for clustering. Possible correlation between outcome measurements, and co-linearity between explanatory variables in observational studies should be evaluated.

Extreme data points. Observations that are inconsistent with the overall data ('outliers') should not be excluded without clear justification, and any omissions should be documented.

Presentation

All items referred to in Materials and Methods should be presented in Results and *vice versa*.

Descriptive statistics. Measures of central tendency (e.g. mean, median) must be accompanied by measures of variation among individuals (e.g. SD, IQR) or precision for population estimates (e.g. SEM). For ordered qualitative data that do not approximate to a continuous linear measure, the use of means and SE or SD is invalid, and proportions should be stated.

For all comparisons, CI must be presented for population parameters, and estimates of effect such as OR and RR presented together with the relevant p-value. For comparative studies, CI for observed differences should be reported rather than separate CI for each comparison group.

Format. Use the following format: e.g. mean 14.2 (SD 7.4) or mean 14.2 (SEM 1.9) rather than 14.2 ± 7.4 . For CI use e.g. mean 14.2 (95% CI = 10.2–18.3), OR = 0.74 (95% CI = 0.57–0.96), and for range use e.g. median 6 (min 1, max 15).

Probability values are given in the form "p = 0.003" (lower case, spaces before and after = sign, to 2 or 3 decimal places only).

Numerical precision. Numerical results should be presented with appropriate precision. Means should not be presented to more than one decimal place more than the raw data. Percentages should not be presented with decimal places unless $n > 100$, and should always indicate the numerator and denominator, e.g. 10/40 (25%).

Hypothesis tests. Guidance on the appropriate reporting of the results from statistical tests can be found from the American Statistical Association at: <https://amstat.tandfonline.com/doi/full/10.1080/00031305.2016.1154108#.YJmNnpBySS>

Do not use p-values (e.g. $p < 0.05$) to dichotomise significant and non-significant results. Exact p-values should be reported to two or three decimal places when between 0.01 and 0.05, and to three decimal places when between 0.010 and 0.001. P-values < 0.001 should be reported as such. Measures of effect with 95% CI should be presented alongside p-values. Interpretation of hypothesis tests should consider study power, type-1 error rate (e.g. 0.05), sample size, the size of the effect with CI and biological significance. Multiple comparisons (whether between groups or of multiple outcome variables) require the use of an appropriate adjustment to control type-1 error.

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