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## Personal View

## Improving the quality of reporting in veterinary journals: How far do we need to go with reporting guidelines?

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Publication in the international peer-reviewed literature is one of the most important outputs of any research. It provides a public record of the research conducted and the primary means by which research findings are shared with others in the research community and more broadly (Simerer et al., 2008). High quality reporting of research studies, particularly in terms of transparency, accuracy and completeness, is fundamental to this process, as it allows the research to be critically evaluated (Simerer et al., 2008).

Despite its importance, however, the quality of reporting is variable, both in the medical (Jüni et al., 2001) and veterinary (Burns and O'Connor, 2008; Sargeant et al., 2009) literature. In a recent evaluation of 100 clinical trials in livestock species, randomly selected from all such trials published in the English language between 2006 and 2008, details of key features such as randomisation, double blinding and the number of subjects lost to follow-up were reported in only 67%, 4% and 62% of trials, respectively (Sargeant et al., 2009). In a systematic review of studies from 1960 to 2005 reporting immunisation with *Moraxella bovis* vaccines in young cattle, Burns and O'Connor (2008) reported a similar lack of methodological quality information (including randomisation and blinding) necessary to judge the evidence produced in each study.

In response to these concerns, guidelines were developed by international scientific teams to promote the quality of reporting of research studies, thereby improving both the value and reliability of medical research literature. These guidelines are written as checklists, flow diagrams, or in the form of explicit text, specifying the minimum information that is required in each section of a published paper (*Introduction, Materials and methods*, etc.) to provide a transparent, accurate and complete account of the research. In the *Materials and methods* of studies reporting randomised clinical trials, for example, each of the following criteria (as listed in the relevant guidelines, in this case the CONSORT statement<sup>1</sup>) needs to be addressed if readers are to judge the validity of the presented evidence:

- **Participants:** Eligibility criteria for participants and the settings and locations where the data were collected.
- **Interventions:** Precise details of the interventions intended for each group and how and when they were actually administered.
- **Objectives:** Specific objectives and hypotheses.

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<sup>1</sup> Consolidated standards of reporting trials; see: <http://www.consort-statement.org>.

- **Outcomes:** Clearly defined primary and secondary outcome measures and, when applicable, any methods used to enhance the quality of measurements (e.g. multiple observations, training of assessors).
- **Sample size:** How sample size was determined and, when applicable, explanation of any interim analyses and stopping rules.
- **Randomisation:** Randomisation including sequence generation (method used to generate the random allocation sequence, including details of any restriction, e.g., blocking, stratification), allocation concealment (method used to implement the random allocation sequence, e.g., numbered containers or central telephone, clarifying whether the sequence was concealed until interventions were assigned), and implementation (who generated the allocation sequence, who enrolled participants and who assigned participants to their groups).
- **Blinding (masking):** Whether or not participants, those administering the interventions and those assessing the outcomes were blinded to group assignment. If done, how the success of blinding was evaluated.
- **Statistical methods:** Statistical methods used to compare groups for primary outcome(s); methods for additional analyses, such as subgroup analyses and adjusted analyses (Moher et al., 2001).

Reporting guidelines are available for a broad range of study designs, including (1) diagnostic accuracy studies (STARD<sup>2</sup>; Bossuyt et al., 2003); (2) observational studies in epidemiology (STROBE<sup>3</sup>; von Elm et al., 2007); (3) outbreak investigations in a hospital setting (ORION<sup>4</sup>; Stone et al., 2007); (4) randomised clinical trials (CONSORT<sup>1</sup>; Moher et al., 2001) and (5) systematic reviews and meta-analyses (PRISMA<sup>5</sup>; Moher et al., 2009). Guidelines are also available for economic evaluations (Drummond et al., 2005), qualitative research (Tong et al., 2007) and good publication practice for pharmaceutical companies (Graf et al., 2009). They are generally presented in two parts; firstly, a brief outline, then a more detailed explanation and elaboration; for example, for the STROBE statement, these are provided by von Elm et al. (2007) and Vandenberg et al.

<sup>2</sup> Standards for the reporting of diagnostic accuracy studies; see: [www.stard-statement.org](http://www.stard-statement.org).

<sup>3</sup> Strengthening the reporting of observational studies in epidemiology; see: [www.strobe-statement.org](http://www.strobe-statement.org).

<sup>4</sup> Guidelines for transparent reporting of outbreak reports and intervention studies of nosocomial infection; see: [www.idrn.org/orion.php](http://www.idrn.org/orion.php).

<sup>5</sup> Preferred reporting items for systematic reviews and meta-analyses; see: [www.prisma-statement.org](http://www.prisma-statement.org).

(2007), respectively. These statements have recently been consolidated within the EQUATOR network.<sup>6</sup>

The relevance of these reporting guidelines applies to all forms of biomedical research, including veterinary medicine. Boden and Parkin (2008) recently reviewed the STROBE statement, highlighting its application to veterinary medicine. Furthermore, Salvin et al. (2010), in an article published in this issue of *The Veterinary Journal*, and More et al. (2008) used the STROBE and ORION statements, respectively, to guide the reporting of their research. The REFLECT<sup>7</sup> statement was recently developed (as an extension of the CONSORT statement) for randomised controlled trials for livestock and food safety (O'Connor et al., 2010; Sargeant et al., 2010).

Scientific authors are very familiar with guidelines relating to ethical considerations (e.g., authorship, conflicts of interest, protection of animals in research) and manuscript preparation (for further information, see 'Uniform Requirements for Manuscripts Submitted to Biomedical Journals' prepared by the International Committee of Medical Journal Editors<sup>8</sup>). Increasingly, key medical journals, including the *British Medical Journal*, *The Lancet*, the *New England Journal of Medicine* and *PLoS Medicine*, either require or recommend author compliance with the above-mentioned reporting guidelines. As yet, a similar approach is not standard practice among veterinary journals. This would be partly resolved through efforts, such as this *Personal View*, to raise awareness of these reporting guidelines among veterinary researchers. In addition, I would recommend that veterinary journals require author compliance with relevant reporting guidelines, in the interest of high quality reporting of veterinary medical research.

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<sup>6</sup> Enhancing the quality and transparency of health research; see: <http://www.equator-network.org>.

<sup>7</sup> Reporting guidelines for randomized controlled trials for livestock and food safety; see: <http://www.reflect-statement.org/statement>.

<sup>8</sup> ICMJE; see: [http://www.icmje.org/urm\\_full.pdf](http://www.icmje.org/urm_full.pdf), updated October 2008.