

Improving causal inference research in general medical journals

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Standfirst: Observational studies aimed at causality must explicitly state the objectives, causal question(s), methods applied, and assumptions required.

Causal inference, the multi-disciplinary field focused on understanding cause and effect relationships, underpins many of the health and social care research topics. While reliance on clinical trials is well established, causal inference in observational research is currently undergoing a surge in popularity [1]. The use of causal wording in observational research has been largely discouraged across the medical journals until recently when only a few journals including The BMJ have opted to make the decision on a case-by-case basis. Recent publications highlight the increasing interest in causal inference and its importance in many facets of the works published in The BMJ [2–9].

In particular, three recent publications in The BMJ highlight trends in these topics and help clarify important aspects for the design and interpretation of health research. The first two aid in the design and analysis of studies aimed at inferring causation from observational data by using a target trial emulation framework.[6,7] Cashin and colleagues importantly add a framework for reporting the increasing number of target trial emulations we are anecdotally seeing, both in our submissions and in the literature more widely[7, 10]. Fu and colleagues dig more deeply into the nuts and bolts of setting up a target trial emulation that helps to align the time zero, importantly avoiding selection bias due to immortal person time in observational research [6]. These studies are important in formalizing the approach to a more rigorous design of observational research when causation is of interest and, when followed, may help increase the quality of, and confidence in, the results.

But, more fundamentally, how should research studies, interested or not, in causation be presented? How should those be worded? In the past, most journals had limited their observational studies to using associational language only, though that is changing[11]. In this issue, Labreque and Kezios helpfully present a Research Methods and Reporting paper focused on exactly this question.[doi:10.1136/bmj-2025-085749] They argue that researchers should be clear about the goals of research and report those results in a way that clearly communicates the goals of the research and what the authors found.

First, they suggest that researchers should be explicit about their research question. Is it causal? Is it something else? Being clear here facilitates better reporting and a clearer understanding of methods downstream. Next, the authors stress the importance of taking the question of interest into account when reporting findings. For instance, if the primary question of interest is causal, the authors suggest not focusing on reporting associations, because they are not related to the true question at hand, contradict the true implications of the research findings, and are disconnected from the methods needed to make valid causal inferences. Instead, the authors emphasise reporting findings as causal with the caveat that multiple assumptions are necessary to reassure readers that the inferences are accurate. To do this, they suggest separating the idea of the causal effect, the data-generating process, the estimated causal effect, and the numbers we compute using data, which may represent the causal effect or not. The distinction implies that the causal effect and estimation are not necessarily the same number, and certain assumptions are necessary to map from the estimation to the true causal effect.

We find this work compelling. Our experience suggests that there is often a mismatch between the desire to obtain causal inferences and the challenges of communicating such work to a broad, generalist audience. As a result, researchers frequently temper their language framing causal questions in terms of associations to avoid overinterpretation, but at the cost of obscuring their true scientific intent. But what Labreque and Kezios provide is a way to move forward from these constraints; a way to remain honest with our intent and still use caution in interpreting the results while not obfuscating what researchers have done. If researchers follow this guidance, we think it will result in much greater clarity about what researchers really want to know, why they did what they did, and provide more useful limitations sections where authors can highlight assumptions they think held, those that were weaker, and how to improve estimation going forward.

These works show that causal inference in observational research is becoming more mainstream including being increasingly appreciated by the regulatory bodies [12,13]. Papers like those listed above serve to both show how to perform rigorous studies evaluating causal questions but also how to responsibly report the findings while being true to the researchers' intent while maintaining appropriate restraint. We look forward to seeing more Research Methods and Reporting papers that highlight these topics, and to seeing original research in The BMJ and other journals that makes use of their guidance.

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