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Title: Registered Reports: benefits and challenges of implementing in medicine

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Registered Reports (RRs) are a publication format that is submitted in two stages (1). At Stage 1, the introduction and proposed methods are peer-reviewed prior to commencing the study, and can be granted in-principle acceptance. At Stage 2, the full study is peer-reviewed to ensure that the protocol has been adhered to, with minor deviations documented and justified. To date, over 350 offer publication through RRs (2). The format has been slower to be adopted across medical and health journals, with approximately 1% of journals indexed in MEDLINE offering RRs (3). The British Journal of General Practice (BJGP) is one such medical journal offering RR submissions, having introduced the format in 2020. However, uptake is low. Since its introduction in 2020, the BJGP has to date has only published two (4, 5).

Benefits and challenges to publishing RRs

There are several benefits to adopting RRs for the medical research community. RRs are granted in-principle acceptance based on the study protocol, which means the subsequent findings do not influence the decision to publish. Therefore, the format can improve research quality by reducing the incentive for researchers to use 'questionable research practices' to increase the chance of publication, such as HARKing (Hypothesising After Results are Known) (6), *p*-hacking (re-running statistical analyses to generate a significant result) and selective outcome reporting (7). Stage 1 RRs also enable peer-review to be received at a crucial stage where changes can be implemented. Early evidence suggests RRs are indeed leading to significant improvements in methodological design and analysis (8).

There are also useful benefits to researchers adopting the format, as RRs alleviate the pressure to report statistically significant results to increase the chance of publication. RRs can therefore minimise the ‘file-drawer effect’ where many studies with non-significant findings are never published. In April 2023, one of us (Kelly Lloyd) published an RR in BJGP (4). While initially concerned an RR would delay publication, the format likely resulted in a quicker publication than following the traditional route as non-significant findings were observed for the main hypothesis. Indeed, research has found that studies published through the traditional route report a much higher rate of positive findings than RRs (96% in traditional literature vs. 44% in RRs) (9).

Despite the benefits of RRs, there are also challenges (1). For one, the format was originally developed quite narrowly for hypothesis-driven research; however RRs are continuously being adapted for other study designs, such as qualitative research (10). The time taken to review Stage 1 RRs will also inevitably delay study commencement (1), which can be challenging when there are contract and funding end dates. New initiatives are being developed to streamline this process. The ‘Peer Community in Registered Reports’ (PCI RR) aims to provide a central platform for receiving and reviewing RRs across multiple disciplinary journals (11), and also offers a scheduled review track to accelerate Stage 1 evaluation. Following acceptance of Stage 2, authors have the option to publish in a PCI RR-friendly journal without further peer-review, which can expedite the publication process. To date, there are 33 PCI RR-friendly journals, most of which are oriented toward psychology or neuroscience, and there is a clear need for medical journals, such as the BJGP, to join such an initiative.

Overall, there are a multitude of benefits for the medical research community to adopt RRs, including reducing publication bias and outcome reporting bias. While there are challenges, many are being addressed with new initiatives, such as PCI RR. We call on more researchers to consider adopting the format, and medical journals to increasingly support RRs and its adjacent initiatives.

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Competing interests: Kelly Lloyd has previously advocated for adopting practices to improve health and medical research, including the implementation of RRs (www.ImproveHealthResearch.com).

Chris Chambers is a co-founder of RRs and PCI RR, and was part of the team that introduced RRs at *Cortex*. He currently serves as the RR editor at the journals *Imaging Neuroscience*, *PLOS Biology*, and *Royal Society Open Science*.

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