# Guidelines for Reporting Secondary Studies in Software Engineering

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**Abstract**

*The reporting of secondary studies on software engineering has drawn criticism from a number of tertiary studies. Our goal is to provide recommendations for the reporting of secondary research related to software engineering (SE) that would address issues that have been noticed in the reporting of SRs, or software engineering systematic reviews. Approach: We examine the objections raised by SE secondary research and determine the principal areas of the issue. Based on its status as the reporting guideline recommended by the Cochrane Collaboration, whose SR guidelines were a major input to the guidelines developed for SE, we evaluate the PRISMA 2020 (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) statement as a potential solution to the need for SR reporting guidelines. In the context of SE secondary studies, we outline its benefits and drawbacks.We also evaluate reporting requirements for qualitative reviews and mapping studies, comparing their content and structure to PRISMA 2020 for comparison. Results: Secondary study reports are of varying quality, as previous tertiary investigations have confirmed. On the other hand, impromptu suggestions that modify reporting requirements might lead to needless text repetition. We affirm that while the PRISMA 2020 declaration primarily focuses on quantitative reviews, mixed-methods reviews, and meta-analyses, it also covers issues related to SE reporting. That being said, we demonstrate how the PRISMA 2020 item definitions can be expanded to include the data required for reporting qualitative reviews and mapping studies.*

*Keywords: Evidence-based software engineering, systematic reviews, quality reviews, mixedmethods reviews, PRISMA 2020*

## I. INTRODUCTION

THE goal of this article is to introduce and justify the SEGRESS guidelines that we have developed for reporting secondary studies in software engineering (SE). The SEGRESS guidelines are based on the PRISMA 2020 standard, which was developed to support the reporting of medical and healthcare-related systematic reviews. The main reason for developing SEGRESS was to address criticisms of SE systematic review reports raised in recent tertiary studies (see Budgen et al. [1], Zhou et al. [2], Ampatzoglou et al. [3], Yang et al. [4]). Criticisms include problems in finding the information required, such as recommendations [1], lack of standards for assessing the validity of secondary studies ([2] and [3]), and problems with study quality assessment [4]. In Section 2, we summarise the criticisms reported in these studies in more detail.

These both justifies theneed for SE reporting guidelines that are suitable for software engineering researchers, and also identifies essential information that such guidelines need to ensure is reported. In Section 3, we introduce the PRISMA 2020 statement, which is the current international standard for reporting SRs in healthcare. Since the original SE guidelines for software engineering systematic reviews ([5], [6]) were based on healthcare guidelines, it seems plausible that PRISMA 2020 could be of use to SE researchers. In this section, we confirm that once the terminology used in PRISMA 2020 is explained, it addresses all the issues raised in Section 2. However, the developers of PRISMA 2020 make it clear that the statement is intended for quantitative SRs, mixedmethod reviews, and meta-analysis. This limitation on the scope of PRISMA 2020 is a major barrier to its adoption by researchers in software engineering, because secondary studies in SE are often mapping studies (i.e., secondary studies that aim to classify the literature related to a research topic) or

qualitative reviews (i.e., secondary studies that use qualitative methods to synthesize primary study results) [7]. To overcome this limitation, we have developed SEGRESS as an extension of PRISMA 2020 that incorporates guidelines for mapping studies and qualitative reviews. In Section 4, we show that mapping studies can be reported using PRISMA 2020 by omitting some of the standard items related to risk of bias (i.e., quality assessment and certainty assessment), and providing extended explanations to confirm that the synthesis for mapping studies is restricted to simple charts and category counts