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Starry Aims to Overcome Knowledge Translation Inertia

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Starry Aims to Overcome Knowledge Translation Inertia: The Standards for Reporting Implementation Studies (StaRI) Guidelines

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In 2007, *Academic Emergency Medicine* hosted a Consensus Conference on "Knowledge Translation in Emergency Medicine" with the objective of identifying high-yield research priorities for the concept of moving from evidence to action.[1] Patients often fail to receive care that aligns with quality indicators, and the Institute of Medicine has estimated that on average 17 years pass before just 14% of effective interventions reach the bedside.[2-4] Equally important is the concept that de-implementing wasteful, inefficient, or outdated clinical approaches frequently require more time and effort than is available, so the trajectory of bedside decision-making often yields to the status quo.[5]

Changing the habits of a professional lifetime in order to incorporate research into clinical practice requires more than publishing a manuscript or highlighting contemporary studies in lectures. Awareness of new information is challenging with over 3500 biomedical manuscripts appearing on PubMed daily, including increasing numbers of emergency medicine manuscripts every year. Clinicians must first accept research or guideline recommendations, which is far from guaranteed as some opinion leaders claim that most published findings are inaccurate or misguided.[6] Once clinicians accept new findings as valid and worth considering, the diagnostic test or therapeutic intervention must be applicable to the real-world patients they are treating and easily accessible in the round-the-clock emergency department (ED). The multiple inclusion and exclusion criteria inherent to hypothesis-testing research often limit external validity,[7] while new tests, devices, or procedures may be unavailable.[8] Changing practice also requires motivation to do things differently, acquisition of the necessary skills and resources to adapt and an organizational ethos that promotes, and values the implementation of change. These theoretical concepts underpin behavior change in individuals,[9] and need to be addressed within the existing routines of an organization.[10]

Adding to the complexity of translating appropriate research into clinical practice is incomplete reporting of implementation studies[11] in part due to the lack of acceptable standardization for the design, conduct, and reporting of implementation science. A multidisciplinary group of North American clinical researchers developed a framework describing the attributes of "Dissemination and Implementation" science in 2014 at the National Institutes of Health.[12] One priority identified was to develop an implementation science reporting guideline, as the 359 existing guidelines promoted by the Enhancing the Quality and Transparency of Health Research (EQUATOR, see http://www.equator-network.org/) were deemed inadequate for the high-quality reporting standards necessary to reproduce complex implementation strategies.[12] In response, an international collaboration of implementation scientists have now published the Standards for Reporting Implementation Studies (StaRI) guidelines to facilitate a uniform structure for the methods, results, and interpretation of implementation research (freely available online at http://www.equator-network.org/reporting-guidelines/stari-statement/).[13,14] The foundations of StaRI are rooted in two key concepts.

- Dual reporting strands for (1) Implementation Strategy and (2) Intervention. The intervention is the evidence-based novel technology, process, or resource being introduced into practice, the implementation strategy concentrates on healthcare delivery components such as promotion by opinion leaders, staff resources, infrastructure, and the theoretical model used to promote change in practice.[15,16]
- Explicit and contextual explanation of the environment in which the implementation approach is employed, including concurrent regional and national policy scenarios that prompted institutional investment in evidence uptake and diffusion of innovation.

The value of prior implementation studies in emergency medicine could have been improved by adherence to StaRI reporting guidelines. For example, in order to reduce inappropriate indwelling urinary catheters in older ED patients, Mulcare et al. described an implementation effort consisting of multiple slide presentations, prominent posters, and distribution of pocket cards.[17] Each of these strategies disseminates knowledge of protocols and quality indicators, but does not consistently align clinician values with contemporary behavior adaptation models,[15] prevailing opinion leaders,[18] or concurrent funding or policy imperatives that either propel or impede implementation.

StaRI is also relevant to de-implementation. Self et al. aimed to reduce blood culture contamination rates at two community hospitals by eliminating the use of non-sterile gloves during phlebotomy.[19] Their de-implementation strategy included local leaders, training videos, and workshops, but no formal behavioral or system-level change model and the results do not evaluate potential costs, unintended consequences, or sustainability. This project did not reference or follow any reporting standards; adherence to the existing Standards for Quality Improvement Reporting Excellence (SQUIRE) reporting guidelines[20] or StaRI could have improved the transparency of research.[12]

The details required by StaRI necessitate space in an era when publishers are increasingly imposing word limits. In comparison with an observational study exploring diagnostic accuracy of a new test or a randomized trial evaluating therapies, implementation studies are a complex mix of timing, environment, personnel, patient fit, momentum, and resources. Journal editorial boards may be able to be more flexible with the word limits for implementation science manuscripts adhering to StaRI, but other solutions will be needed such as concise descriptions using timelines or tables,[14] or innovative approaches to online supplements. A related tension for authors may be the long-standing academic paradigm which rewards publishing quantity over quality typically emphasizing the raw numbers of publications and citation counts rather than the overall clarity and measurable impact of individual manuscripts.[21] Whilst the StaRI reporting guidelines encourage investigators to report in one manuscript the longitudinal details that are essential to reproduce successful implementation of a concept into practice (or de-implementation out of practice) – other options will include publishing protocols or detailed descriptions of developmental phases.

Journals have an important role in promoting use of reporting standards. In emergency medicine, 41% of journals do not mention any reporting guidelines in their author instructions and as a result researchers often fail to adhere to recommendations.[22,23] Adherence to reporting guidelines improves the transparency and comparability of research across journals and specialties.[24] Journal instructions should refer potential authors to appropriate EQUATOR guidelines and reminding reviewers of relevant reporting standards may improve the quality of reviews. Therefore, *Academic Emergency Medicine*'s author instructions will now refer investigators to the StaRI reporting guidelines for implementation research.

Generations of researchers have transformed medicine into a societal resource with the potential to prolong the quality and quantity of life via disease and injury prevention, patient education, and the alleviation of psychological and physical suffering. Shortening the delay between practice-ready knowledge and routine bedside use of that knowledge is the next frontier of medicine. Adherence to StaRI reporting guidelines will provide a template to enhance communication and understanding of effective and ineffective efforts to bridge the gap between knowledge and practice. We may need to change, but challenge and opportunity lie ahead.

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