

# StaRI Aims to Overcome Knowledge Translation Inertia: The Standards for Reporting Implementation Studies Guidelines

Researchers, educators, and clinicians working in the field of geriatric medicine confront significant challenges in overcoming the cognitive, political, financial, and logistical obstacles that slow the uptake of effective interventions or the de-implementation of ineffective interventions. Long-held faith that peer-reviewed publications, clinical guidelines incorporating the highest-quality research, and continuing medical education are efficient vehicles to translate evidence into clinical practice have been challenged.<sup>1</sup> The Institute of Medicine estimates that the path from definitive published evidence to routine bedside uptake of that knowledge requires an average of 17 years—and even then only 14% of the evidence is used.<sup>2</sup> For example, a review of 30 proven interventions for chronic heart failure care assessed routine practice in the institutions that had published the original randomized controlled trials; only half of the U.S. centers had implemented or sustained the practice that they had demonstrated to be effective.<sup>3</sup>

The path from knowledge to healthcare delivery is complex, with multiple barriers between medical researchers, clinicians, and patients, as depicted in the Knowledge Translation Pipeline (Figure 1).<sup>4</sup> Maintaining awareness of contemporary research is increasingly difficult with more than 3,500 biomedical publications appearing on PubMed daily, and critical reading and healthy skepticism are necessary because it has been suggested that much published research is misleading.<sup>5</sup> Medical investigators too often work in silos separated from clinicians, which leads to research that asks the wrong questions, targeting individuals dissimilar from those for whom the intervention is intended, using resources unavailable in many settings, and assessing less-important surrogate outcomes.<sup>6,7</sup>

Methods of transforming health services research into healthcare delivery include quality improvement projects and implementation science. Although the shared objective of quality improvement and implementation science researchers is to improve the health of individuals and populations and the efficiency of healthcare systems, the paths to attaining these goals diverge with the methods. Quality improvement typically consists of local initiatives that seek to adapt the ergonomics, efficiency, and behavior within one healthcare setting, perhaps using rapid implementation cycles. Such interventions may be unique to the setting in which they are used, with limited external validity. In contrast, implementation science encompasses the key components of knowledge translation, including

whether an intervention reaches the intended audience, whether it is delivered as intended, what personnel and resources are required to implement it, and whether it can be reproduced and sustained in diverse settings.<sup>8,9</sup>

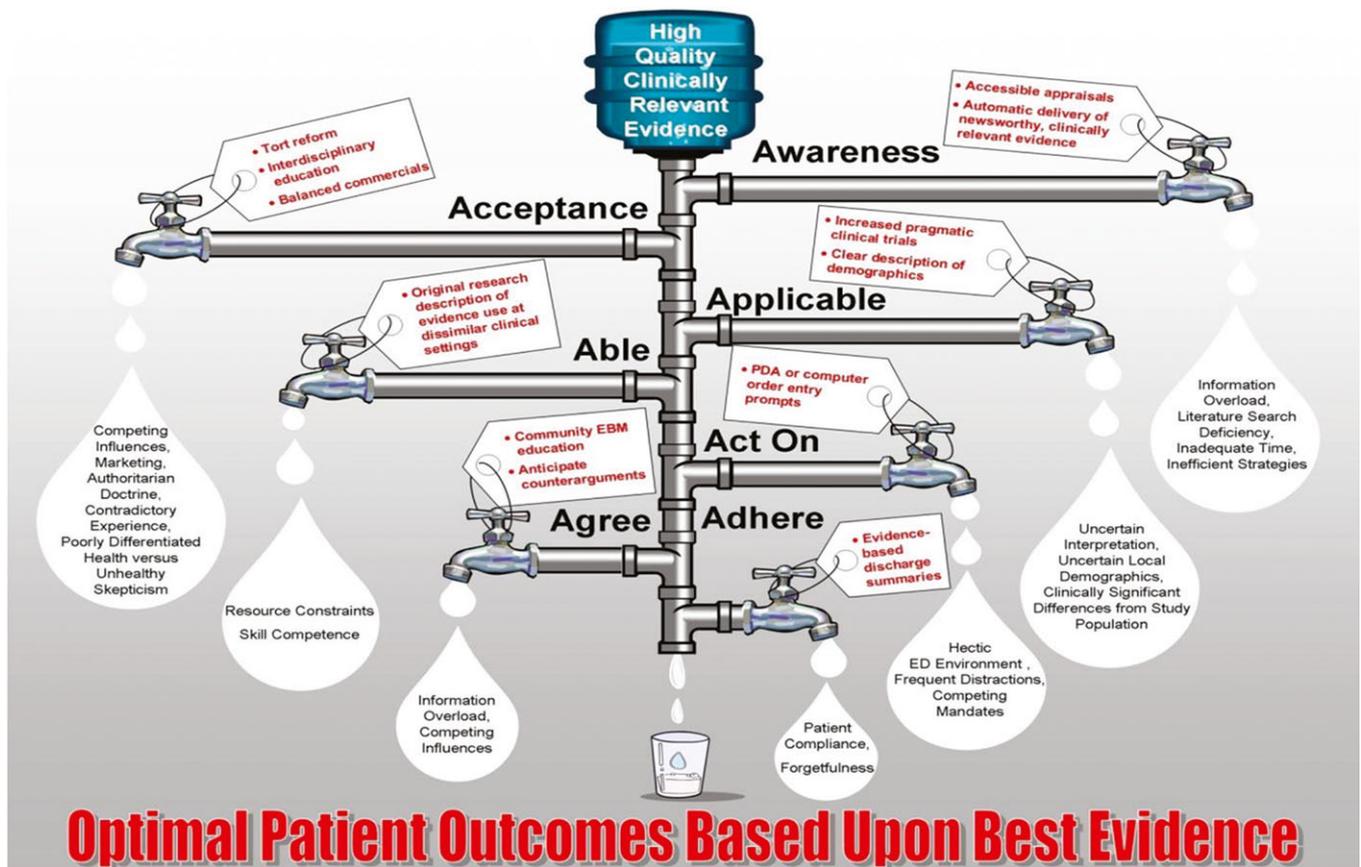
Healthcare providers have consistently criticized inadequate descriptions in reports, which provide insufficient detail to enable implementation strategies to be reproduced and support the roll-out of effective practice.<sup>10,11</sup> An international collaboration of implementation science experts developed the Standards for Reporting Implementation Studies (StaRI) guidelines to provide a transparent and uniform structure to describe the methods, results, and interpretation of implementation science research.<sup>12,13</sup> The StaRI group used methodology that Enhancing the Quality and Transparency of Health Research (EQUATOR, see <http://www.equator-network.org/>) recommended, including inviting the views of clinicians, educators, journal editors, and implementation science experts at different points in the process to ensure acceptable and thorough reporting standards.<sup>14,15</sup> The StaRI checklist has 27 items and is freely available at <http://www.equator-network.org/reporting-guidelines/stari-statement/> not only to investigators, reviewers, and editors, but also to commissioners, managers, and professionals seeking to improve healthcare services. A number of key concepts underpin StaRI.

A unique feature of StaRI is the two strands of reporting: implementation strategy and intervention. The intervention is the evidence-based technology or resource that is underprovided (or in the case of de-implementation research overused in lieu of a more-efficacious or -cost-effective alternative); the implementation strategy focuses on the components of the model used to promote delivery of the intervention, including leadership resources, personnel, costs, and infrastructural requirements.<sup>16</sup>

A robust, explicit description of the context within which the implementation strategy is deployed provides details that are too often lacking in current manuscripts. Understanding the context is essential to understanding why an implementation strategy was effective (or not). Readers need to know about features of the political, financial, or health service context that may influence adoption of the intervention and understand the local scenario, providers, or resource constraints that influence adaptation of the strategy.

An explicit description of how the implementation strategy was expected to work is crucial. For example, a recent implementation study reported in the *Journal of the American Geriatrics Society* (JAGS) found no benefit from

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**Figure 1.** The Knowledge Translation Pipeline.<sup>4</sup> This illustration depicts the flow of practice-ready evidence to optimal outcomes. Each spout represents the preventable leaks of information based on barriers, with the tags hanging around the water handles indicating methods to slow the leaks. The droplets of water illustrate specific examples of information loss, misuse, or inappropriate applicability at each level. The first five leaks focus on physicians and healthcare teams, and the last two leaks are specific to the patient's environment.

training physical therapists to deliver home-based cognitive behavioral self-management for older adults with activity-limiting pain,<sup>17</sup> but the program logic used to adapt the therapist's delivery of cognitive behavioral therapy, the fidelity with which self-management was delivered in the home, and participants' adherence to the program were not reported. It is therefore unclear whether lack of effectiveness equates to an inadequate implementation strategy (educating physical therapists), a weak intervention (home-based cognitive behavioral therapy for pain), poor adherence (limited uptake by participants), or some combination of these factors.

Adherence to StaRI reporting guidelines, which will now appear in the JAGS author instructions for implementation science submissions, provides manuscript preparation recommendations that will enable readers to identify implementation studies, differentiate the components that work from those that do not, and decide how closely the context matches their own situation. Most, although not all, EQUATOR research indicates that adherence to appropriate reporting recommendations standardizes key methodological reporting across journals and specialties,<sup>18,19</sup> although some researchers and journals underemphasize and underuse applicable recommendations.<sup>20,21</sup>

Disseminating and using the StaRI guidelines also presents challenges. There are 358 reporting guidelines

registered on the EQUATOR website covering methodologies such as randomized controlled trials (RCTs), including a number of extensions to address RCT subtypes, observational studies, diagnostic and prognostic research, meta-analyses, and quality improvement, but none address the unique philosophy of implementation research while encompassing a broad range of methodologies.<sup>8</sup> The StaRI guidelines were designed to complement rather than duplicate existing EQUATOR reporting standards. For example, a pragmatic randomized trial design of an implementation study should adhere to StaRI but include the applicable elements of the Consolidated Standards of Reporting Trials—Pragmatic standard.<sup>22</sup>

Implementation science is concerned with promoting uptake of proven interventions into routine practice, raising the question as to when evidence is sufficiently compelling to justify implementation. Who defines the “best evidence,” and at what threshold does a new intervention become “high quality”? Research is needed to develop objective, consensus-based approaches to defining “best evidence” that should feed into the pipeline of implementation science.<sup>23,24</sup>

StaRI challenges word counts. At the journal level, publishers increasingly pressure editorial boards to limit word counts to reduce manuscript production costs. Implementation science is more complex than two-arm RCTs

and will necessitate innovative or flexible approaches to accommodate the required descriptions of implementation strategy, intervention, and context required. Use of on-line repositories or prior publication of descriptions of implementation strategies may resolve the tension between the need for brevity and adequate description, but open access to these developmental or descriptive papers will be essential if readers are not to be frustrated by being advised that “the description has been previously reported” in an unobtainable publication. At the author level, academic currency is traditionally quantified and compared between investigators within one’s specialty and outside of one’s specialty according to raw publication numbers, citation counts, and various measures of the effects of research.<sup>25</sup> Authors will have to choose between one coherent and adequately thorough manuscript (which will require a paradigm shift in rewarding academic productivity) and multiple publications (risking accusations of ‘salami publishing,’ none of which convey the full story). More positively, the increased interest in influence has raised the profile of applied research, and implementation researchers will find it relatively easy to prove the influence of their work on clinical practice.

Finally, the existence of EQUATOR reporting guidelines does not guarantee higher-quality research, but the hope is that the concepts elucidated in StaRI will highlight and clarify aspects of study design as CONSORT has for RCTs.<sup>19</sup> Aging societies worldwide present complex problems for healthcare systems across medical and surgical specialties. Incorporating StaRI reporting guidelines should clarify understanding of the components required to implement effective interventions or de-implement harmful or wasteful strategies using a scientific approach and ensure that reports of the implementation studies are easily identifiable and well described to inform future practice today—rather than in 17 years’ time.

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