

## Introduction to Type 2 Translational Research

### An Annotated Bibliography

Available with live “Find It” links to University of Wisconsin (UW) Library resources at <http://www.hip.wisc.edu/t2trbio.doc>

Note that “Find It” links must be accessed from a UW computer.

Compiled by Maureen A. Smith, MD MPH PhD  
maureensmith@wisc.edu, University of Wisconsin-Madison

The National Institutes of Health (NIH) have recently selected translational research as a major Roadmap Initiative (supported by all NIH institutes and centers) and have designated U.S. \$41.5 million in 2006 for the funding and planning of Institutional Clinical and Translational Science Awards—a figure that is expected to grow to one half billion dollars by 2012. The purpose of these awards, according to the NIH, is nothing less than “to create an academic home environment that will develop the discipline of clinical and translational science.” The program announcement (Planning Grants for Institutional Clinical and Translational Science Awards, <http://grants.nih.gov/grants/guide/rfa-files/RFA-RM-06-001.html>) goes on to define what this discipline will encompass:

*Translation research includes two areas of translation. One is the process of applying discoveries generated during research in the laboratory, and in preclinical studies, to the development of trials and studies in human studies. The second area of translation concerns research aimed at enhancing the adoption of best practices in the community. (p. 4)*

Many studies that are “Type 2 translational research” already exist in the literature. Type 2 translational research includes effectiveness research, dissemination and implementation research, and policy research. (Other terms also exist including quality improvement research, knowledge translation, and diffusion of innovations). Effectiveness research determines whether findings from efficacy studies are applicable in typical community settings. Dissemination and implementation research tests strategies to implement effective interventions more widely. Policy research examines the broader impact of an intervention or program, often in relation to the resources required to implement it. If you are interested in sorting through the multiple ways of thinking about Type 2 research, Sussman et al. (2006) published an article in *Evaluation & the Health Professions* that reviews definitions and conceptual models. [[Find It](#)] [[PubMed](#)]

Rather than swimming through the literature to identify the relevant “pearls,” I have gathered a series of articles that provide an introduction to Type 2 translational research. This introduction is primarily targeted at researchers who hope to write NIH or other peer-reviewed grants.

#### General Introductory Articles

*Lenfant (2003) Clinical research to clinical practice - Lost in translation?* *The New England Journal of Medicine*. 349:868-874. [[Find It](#)] [[PubMed](#)]

The former director of the NIH National Heart, Lung, and Blood Institute (NHLBI) provides a compelling assessment of the need for Type 2 translational research. Everyone should read this article, as this guy can really write and knows what he is talking about.

*Woolf (2008) The meaning of translational research and why it matters.* *JAMA*. 299:211-213. [[Find It](#)] [[PubMed](#)]

This commentary tackles some of the confusion that exists regarding, “What exactly is translational research?” and, “What is the difference between Type 1 and Type 2 translational research?” Dr. Woolf calls for increased investment in Type 2 research, arguing that it has been

historically undervalued compared to Type 1 research despite greater potential to yield improvements in population health.

*Dougherty & Conway (2008). The “3T’s” Road Map to Transform US Health Care: The “How” of High-Quality Care. JAMA. 299:2319-2321. [\[Find It\]](#) [\[PubMed\]](#)*

This commentary by leaders at the Agency for Healthcare Research and Quality further addresses the confusion noted in the Woolf article. The authors introduce the “3T’s Road Map” for transforming health care quality, which essentially splits T2 research into two categories: effectiveness research (T2) versus dissemination, implementation, and policy research (T3). They also outline key factors that will influence the ability of translational research to yield substantial improvements in health care quality, emphasizing the critical role of feedback loops among T1, T2, and T3 research activities.

*Green (2001) The ecology of medical care revisited. The New England Journal of Medicine. 344:2021-2025. [\[Find It\]](#) [\[PubMed\]](#)*

This updates the great figure from White, et al., (1961) [\[Find It\]](#) [\[PubMed\]](#) on the ecology of medical care. The White figure has been widely quoted for years and it was time for some new numbers! The most important thing is to review Figure 2 in this article; it will likely stick with you once you see it. The figure essentially defines the magnitude of each target audience for Type 2 translational research.

## Effectiveness Research

Effectiveness research focuses on identifying who benefits from an intervention in a typical community setting.

*Wells (1999) Treatment research at the crossroads: the scientific interface of clinical trials and effectiveness research. American Journal of Psychiatry. 156:5-10. [\[Find It\]](#) [\[PubMed\]](#)*

The basic proposition for effectiveness studies is: “if we want more evidence-based practice, we need more practice-based evidence.” Wells compares and contrasts efficacy and effectiveness studies, producing a very practical overview of differences in study methodologies and their implications for internal and external validity.

*Shrier et al. (2007) Should meta-analyses of interventions include observational studies in addition to randomized controlled trials? A critical examination of underlying principles. American Journal of Epidemiology. 166:1203-1209. [\[Find It\]](#) [\[PubMed\]](#)*

This is a somewhat more rigorous assessment of the information obtained from efficacy and effectiveness studies. Although effectiveness studies can use either experimental or observational study designs, they often focus on studying interventions in vivo (i.e., as they are implemented in community practice) rather than in vitro (i.e., in a randomized trial setting). This article is notable for a terrific discussion of “confounding by indication,” which is a major methodological issue for observational effectiveness studies. It also has a thought-provoking discussion of whether randomized double-blind studies estimate the actual intervention effect that clinicians are most interested in.

*lezzoni (1995) Risk adjustment for medical effectiveness research: an overview of conceptual and methodological considerations. Journal of Investigative Medicine. 43:136-150. [\[Find It\]](#) [\[PubMed\]](#)*

Risk adjustment is widely used to control for differences between comparison groups in observational effectiveness studies. Lisa lezzoni wrote the book on this (literally) and this is a quick run-through of the information that you would find in her larger textbook. [Not available online]

*Patrick & Chiang (2000) Measurement of health outcomes in treatment effectiveness evaluations: conceptual and methodological challenges. Medical Care. 38:1114-1125. [\[Find It\]](#) [\[PubMed\]](#)*

There is an increasing focus on measuring self-reported health status and quality of life as important outcomes for effectiveness research. This article summarizes the many dimensions that can be evaluated.

## Dissemination and Implementation Research

Dissemination and implementation research focus on understanding how to implement interventions to achieve improvement, and how to “scale up” and spread interventions beyond an initial success.

*Aaron & Stryer (2003) Moving from rhetoric to evidence-based action in health care.* Journal of General Internal Medicine. 18:589-591. [[Find It](#)] [[PubMed](#)]

Effective collaboration with community-based organizations is critical. You might not want to go to the full extreme of community-based participatory research (where the community participates in every aspect of the research). Even so, it is extremely useful to be familiar with the basic tenets of CBPR when you build your own relationships with clinical practices and community organizations. The authors focus primarily on research with community members and organizations in this article, but they briefly discuss AHRQ’s initiatives to engage provider organizations and health institutions in research partnerships. [Note: additional information about CBPR can be obtained from a great [University of Washington web site](#) and from an [AHRQ Evidence Report](#) (#99; Contract No. 290-02-0016) prepared in 2004.]

*Shojania & Grimshaw (2005) Evidence-based quality improvement: the state of the science.* Health Affairs. 24:138-150. [[Find It](#)] [[PubMed](#)]

This recent article provides a nice (and slightly irreverent) overview of the history of quality improvement research. Note that the Institute of Medicine is using the term “quality improvement research;” it is basically the same thing as dissemination and implementation research within the healthcare system. These interventions may address organizational (systems) redesign as well as clinician or patient-directed behavior change. The authors identify multiple problems with current approaches to QI research, and outline the steps required to make QI efforts based as much on evidence as the practices they seek to implement.

*Van Bokhoven et al. (2003) Designing a quality improvement intervention: a systematic approach.* Quality & safety in health care. 12:215-220. [[Find It](#)] [[PubMed](#)]

There are a host of different issues involved in designing a quality improvement intervention. A systematic methodology is described, including problem analysis, intervention design, and pretests. The authors highlight a few theoretical foundations, but there is not much detail on the theory. However, I’ve provided a series of articles below to help you identify appropriate foundations for your own interventions.

*Moulding et al. (1999) A framework for effective management of change in clinical practice: dissemination and implementation of clinical practice guidelines.* Quality in Health Care. 8:177-183. [[Find It](#)] [[PubMed](#)]

Although you might not want to use this framework for practice change wholesale, it is a good condensed review of five theories from social and behavioral sciences, including diffusion of innovation theory, the transtheoretical model of behavior change, health education theory, social influence theory, and social ecology. The authors explore the relevance of each theory to guideline development and implementation. Nine key theoretical concepts are identified and incorporated into a five-step process.

*Grol & Wensing (2004) What drives change? Barriers to and incentives for achieving evidence-based practice.* Medical Journal of Australia. 180:Supplement-60. [[Find It](#)] [[PubMed](#)]

Type 2 translational research requires understanding barriers and incentives to achieving change in practice. This article is useful as it helps you think through the limitations of what you are proposing. Planning the intervention needs to address potential barriers at various levels and account for the nature of the innovation, characteristics of the professionals and patients, and social, organizational, economic, and political context.

[Note: if you need more in-depth assessment of barriers and incentives, two somewhat dense review articles have been published by Greenhalgh et al. 2004 [\[Find It\]](#) [\[PubMed\]](#) in *Milbank Quarterly* and Fleuren et al. 2004 [\[Find It\]](#) [\[PubMed\]](#) in *Int J Qual Hlth Care* that provide greater detail on organizational and individual clinician behavior change, respectively.]

*Glasgow et al. (2004) Translating what we have learned into practice - Principles and hypotheses for interventions addressing multiple behaviors in primary care. American Journal of Preventive Medicine 27(2): 88-101. [\[Find It\]](#) [\[PubMed\]](#)*

This article describes the behavior change principles (known as the 5A's) that outline a sequence of support activities (assess, advise, agree, assist, arrange) that are effective for helping patients to change various health behaviors. Findings indicate successful practices promoting sustainable changes in multiple behaviors are patient-centered, tailored, proactive, population based, culturally proficient, multilevel, and ongoing.

*Grimshaw et al. (2000) Experimental and quasi-experimental designs for evaluating guideline implementation strategies. Family Practice. 17: Supplement 1-6. [\[Find It\]](#) [\[PubMed\]](#)*

A good study design is critical to the ability to draw strong conclusions. Typically QI research has had weak study designs, but this is being increasingly recognized and highlighted as an area that must improve. In this article, various study designs are compared and contrasted, including uncontrolled before-after studies, time series designs, controlled before-after studies, patient randomized trials, and cluster randomized trials.

## Policy Research

Although there is more to policy research than cost-effectiveness analysis, policy research often relates the impact of an intervention to the resources required to implement it. Related research identifies and evaluates the policy changes that are necessary to encourage attempts to improve health.

*Gold et al. (2007) Medicare and cost-effectiveness analysis: time to ask the taxpayers. Health Affairs. 26:1399-1406. [\[Find It\]](#) [\[PubMed\]](#)*

The article by Gold et al. is an introduction to cost-effectiveness analysis (CEA), which compares the incremental cost in dollars of one intervention to another in creating a health gain. However, in reality most studies are "cost-efficacy" studies conducted in concert with clinical trials and don't incorporate information on the effectiveness of the intervention in usual practice. If CEA does start being used to set priorities for insurance coverage of interventions (as suggested in this article), this gap in relating cost to effectiveness rather than efficacy will get noticed!

*Mason et al. (2001) When is it cost-effective to change the behavior of health professionals? JAMA. 286:2988-2992. [\[Find It\]](#) [\[PubMed\]](#)*

Policy cost-effectiveness recognizes that there are additional costs to changing behavior, above and beyond the cost of an intervention itself. These are essentially the costs of dissemination and implementation. Basically, they argue that it may not always make economic sense to improve the uptake of underused cost-effective interventions or reduce the uptake of new and expensive interventions that are overused.

*Ferlie and Shortell. (2001) Improving the quality of health care in the United Kingdom and the United States: a framework for change. The Milbank Quarterly. 79(2): 281-315. [\[Find It\]](#) [\[PubMed\]](#)*

This article outlines a detailed multilevel approach to change to improve the quality of health care, including the major policy changes that should be considered and evaluated by each country.

## Writing Grants and Publications

*Delamater (2004) Perspective of NIH Review Committees [on Type 2 Translational Research].*

Presented at: From clinical trials to community: the science of translating diabetes and obesity research; January 12-13, 2004; Bethesda, MD. [\[Find It\]](#) [\[PubMed\]](#)

This is a section pulled from an NIDDK conference report titled “From clinical trials to community: the science of translating diabetes and obesity research.” It is focused primarily on interventions initiated and implemented by the investigator but many (although not all) of the points are also relevant to interventions implemented by a community partner.

Key points include: 1) The [Type 2] intervention must have a significant public health impact and solid basis in efficacy studies. 2) The study should be directed to diverse populations; conducted in real-world settings; have an appropriate control group; use an intent-to-treat design; provide measures of implementation, including process measures such as intervention fidelity, staffing time and costs, and consumer and staff satisfaction; and include reliable, valid and clinically practical measures of both short and long-term outcomes, including health behaviors, health outcomes, and quality of life. The intervention approach should be well described, innovative, and have a theoretical basis, and the study design should include measurement of hypothesized mediators of intervention response. 3) The investigators must have established a collaboration with the community-based organization, have expertise with the proposed intervention, and have demonstrated that the approach is feasible in the proposed setting. 4) The intervention approach must have a high degree of external validity, with high potential of being translated into other settings.

*Davidoff & Batalden (2005) Toward stronger evidence on quality improvement. Draft publication guidelines: the beginning of a consensus project.* *Quality & Safety in Health Care.* 14:319. [\[Find It\]](#) [\[PubMed\]](#)

Failure to publish quality improvement work is a serious deficiency in the literature on performance change. The authors propose guidelines for publication to help with writing, reviewing, editing, interpreting, and using such reports. These guidelines are also useful as a reminder for certain paragraphs to include in an NIH grant (e.g., context). [Note: two commentaries were published on this article in 2006. Baker [\[Find It\]](#) [\[PubMed\]](#) argues that better reporting of quality improvement efforts could assist in the design of effectiveness research. Pronovost & Wachter [\[Find It\]](#) [\[PubMed\]](#) take issue with the concept of “dumbing down” the scientific expectation of journals and readers.]