

Table 2: Example definitions and case studies for dissemination and implementation methods and evaluation approaches

Method	Definition	Case Example(s)
Adaptive research designs based on analysis of interim data	<p>"An adaptive design clinical study is...a study that includes a prospectively planned opportunity for modification of one or more specified aspects of the study design and hypotheses based on analysis of data (usually interim data) from subjects in the study."</p> <p>Hsu HS, Gupta G. An overview of the FDA draft guidance on adaptive design clinical trials. 2010. www.fda.gov/.</p>	<p>Zhou X, Liu S, Kim ES, Herbst RS, Jack Lee J. (2008). Bayesian adaptive design for targeted therapy development in lung cancer--a step toward personalized medicine. <i>Clin Trials</i> 5(3), 181-193.</p>
Comparative-effectiveness research (CER)	<p>"...the generation and synthesis of evidence that compares the benefits and harms of alternative methods to prevent, diagnose, treat, and monitor a clinical condition or to improve the delivery of care. The purpose of CER is to assist consumers, clinicians, purchasers, and policy makers to make informed decisions that will improve health care at both the individual and population levels."</p> <p>Institute of Medicine. Initial National Priorities for Comparative Effectiveness Research. Board on Health Care Services (HCS). Washington, DC: National Academies Press; 2009.</p>	<p>Hu JC, Xiangmei G, Lipsitz SR, Barry M, D'Amico AV, Weinberg AC, Keating NL. (2009). Comparative effectiveness of minimally invasive vs. open radical prostatectomy. <i>JAMA</i> 302(14), 1557-1564.</p> <p>Mittman B. Achieving the promise of CER: The role of implementation science. http://cmore.med.ucla.edu/present/Mittman-UCLA-CER-June2010.pdf</p>

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Method	Definition	Case Example(s)
Complex adaptive systems thinking	<p>"Complex adaptive systems are characterized by continuing self organization, requiring the system to be open at a state far from equilibrium, with ill-defined boundaries, being sensitive to initial conditions and involve a large number of non-linear interactions and multiple feedback loops. Crucially, all interactions are automatically focused around the system's attractor or 'shared vision'."</p> <p>Sturmberg JP, O'Halloran DM, Martin, CM. (2012). Understanding health system reform--a complex adaptive systems perspective. <i>Journal of Evaluation in Clinical Practice</i> 18(1), 202-208.</p>	<p>Begun JW, Zimmerman B, Dooley K. (2003). Health care organizations as complex adaptive systems. In Mick SM and Wyttenbach M (Eds.), <i>Advances in Health Care Organization Theory</i>. San Francisco: Jossey-Bass.</p> <p>Lanham HJ, McDaniel RR, Crabtree BF, Miller WL, Stange KC, Tallia AF, Nutting PA. (2009). How improving practice relationships among clinicians and nonclinicians can improve quality in primary care. <i>Jt Comm J Qual Patient Saf.</i> 35(9), 457-466.</p>
Cost-benefit and cost-effectiveness analysis	<p>"Cost-effectiveness analyses (CEA) provides useful information to help health care payers manage the use of costly medical technologies in order to maximize the health of their patient populations when facing constrained budgets, and to clinicians and patients to help guide treatment decisions based on CEA's unique endpoints, perspectives, and time horizon."</p> <p>NCI Cost-Effectiveness Analysis Working Group. Recommendations for the evaluation and prioritization of cost-effectiveness analyses (CEA) paired with NCI-sponsored treatment trials and a funding mechanism for supporting CEA. Prepared for CTAC, September 21, 2010. http://deainfo.nci.nih.gov/</p>	<p>Gold MR, Siegel JE, Russell LB, Weinstein MC. (Eds.) (1996). <i>Cost-effectiveness in health and medicine</i>. New York: Oxford University Press.</p> <p>Ritzwoller DP, Sukhanova A, Gaglio B, Glasgow RE. (2009). Costing behavioral interventions: a practical guide to enhance translation. <i>Ann Behav Med</i> 37(2), 218-27.</p>

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Method	Definition	Case Example(s)
Health impact assessment	<p>“Health Impact Assessment (HIA) is a means of assessing the health impacts of policies, plans and projects in diverse economic sectors using quantitative, qualitative and participatory techniques. HIA helps decision-makers make choices about alternatives and improvements to prevent disease/injury and to actively promote health.”</p> <p>World Health Organization. http://www.who.int/hia/en/</p>	<p>Improving health in the United States: The role of health impact assessment. National Research Council (US) Committee on Health Impact Assessment. Washington, DC: National Academies Press (US); 2011.</p> <p>Ross CL, Leone di Nie K, Dannenberg AL, Beck LF, Marcus MJ, Barringer J. (2012). Health impact assessment of the Atlanta BeltLine. <i>American Journal of Preventive Medicine</i> 42(3), 203-213.</p> <p>Mittlemark MB. (2001). Promoting social responsibility for health: health impact assessment and healthy public policy at the community level. <i>Health Promotion International</i> 16(3), 269-274.</p>
Health inequalities/disparities assessment	<p>“A health disparity/inequality is a particular type of difference in health (or in the most important influences on health that could potentially be shaped by policies); it is a difference in which disadvantaged social groups-such as the poor, racial/ethnic minorities, women, or other groups who have persistently experienced social disadvantage or discrimination-systematically experience worse health or greater health risks than more advantaged social groups.”</p> <p>Braveman P. (2006). Health disparities and health equity: concepts and measurements. <i>Annu Rev Public Health</i> 27, 167-194.</p>	<p>Institute of Medicine, Committee on Quality Health Care in America. <i>Crossing the quality chasm: A new health system for the 21st century</i>. Washington, DC: National Academies Press, 2003.</p> <p>Jeal N, Salisbury C. (2004). A health needs assessment of street-based prostitutes: cross-sectional survey. <i>Journal of Public Health</i> 26(2), 147-161.</p>

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Method	Definition	Case Example(s)
Inclusive approach to evaluability assessment	<p>“Evaluability assessment is a process for clarifying program designs, exploring program reality, and, if necessary, helping to redesign programs to ensure that they meet these four criteria (program goals and priority information needs are well defined, program goals are plausible, relevant performance data can be obtained at reasonable cost, intended users of the evaluation results have agreed on how they will use the information). Evaluability assessment not only shows whether a program can be meaningfully evaluated but also whether evaluation is likely to contribute to improved program performance.”</p> <p>Wholey JS. (2004). Evaluability Assessment. In Wholey JS, Hatry HP, Newcomer KE. (Eds.) Handbook of Practical Program Evaluation, 2nd Edition. San Francisco: Jossey-Bass.</p>	<p>Judge K, Bauld L. (2001). Strong theory, flexible methods: evaluating complex community-based initiatives. <i>Critical Public Health</i> 11(1), 19-38.</p> <p>Leviton LC, Kettel Khan L, Rog D, Dawkins N, Cotton D. (2010). Evaluability assessment to improve public health policies, programs, and practices. <i>Annual Review of Public Health</i> 31, 213-233.</p>

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Method	Definition	Case Example(s)
Mediation analyses	<p>"An intervening variable (mediator) transmits the effect of an independent variable to a dependent variable."</p> <p>MacKinnon DP, Lockwood CM, Hoffman JM, West SG, Sheets V. (2002). A comparison of methods to test mediation and other intervening variable effects. <i>Psychological Methods</i> 7(1), 83-104.</p>	<p>Orlando M, Ellickson PL, McCaffrey DF, Longshore DL. (2005). Mediation analysis of a school-based drug prevention program: effects of Project ALERT. <i>Prevention Science</i> 6(1), 35-46.</p>
Mixed methods/qualitative analyses	<p>"...mixed methods research [is a] research approach or methodology: focusing on research questions that call for real-life contextual understandings, multi-level perspectives, and cultural influences; employing rigorous quantitative research assessing magnitude and frequency of constructs and rigorous qualitative research exploring the meaning and understanding of constructs; utilizing multiple methods (e.g., intervention trials and in-depth interviews); intentionally integrating or combining these methods to draw on the strengths of each; and framing the investigation within philosophical and theoretical positions."</p> <p>National Institutes of Health. Best Practices for Mixed Methods Research in the Health Sciences. Office of Behavioral and Social Sciences Research (OBSSR). http://obssr.od.nih.gov/scientific_areas/methodology/mixed_methods_research</p>	<p>Billinski HN, Duggleby W, Rennie D. (2010). The meaning of health in rural children: a mixed methods approach. <i>West J Nurs Res</i> 32(7), 949-966.</p> <p>Crabtree BF, Miller WL. <i>Doing Qualitative Research</i>. Thousand Oaks, CA: Sage Publications, 1999.</p>

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Moderation analyses	A moderator variable is a factor for which the effect of an intervention varies depending on the level of the factor	Buscemi J, Beech BM, Relyea G. Predictors of obesity in Latino children: acculturation as a moderator of the relationship between food insecurity and body mass index percentile. <i>Journal of Immigrant and Minority Health</i> 13(1), 149-154.
Multi level measurement	<p>"Multilevel analysis...a) allows the simultaneous examination of the effects of group-level and individual-level predictors, b) the nonindependence of observations within groups is accounted for, c) groups or contexts are not treated as unrelated, but are seen as coming from a larger population of groups, and d) both interindividual and intergroup variation can be examined. Thus, multilevel analysis allows researchers to deal with the micro-level of individuals and the macro-level of groups or contexts simultaneously." (174).</p> <p>Diez-Roux AV. (2000). Multilevel analysis in public health research. <i>Annual Review of Public Health</i> 21, 171-192.</p>	Blakely TA, Lochner K, Kawachi I. (2002). Metropolitan area income inequality and self-rated health--a multi-level study. <i>Social Science & Medicine</i> 54(1), 65-77.
Natural experiments	<p>"A natural experiment usually takes the form of an observational study in which the researcher cannot control or withhold the allocation of an intervention to particular areas or communities, but where natural or predetermined variation in allocation occurs. This often applies to area-based interventions intended to reduce health inequalities. It also applies to many other interventions in which changes in health are not the intended outcome, but rather constitute 'spillover' effects."</p> <p>Petticrew M, Cummins S, Ferrell C, Findlay A, Higgins C, Hoy C, Kearns A, Sparks L. (2005). Natural experiments: an underused tool for public health? <i>Public Health</i> 119, 751-757.</p>	Humphreys DK, Eisner MP. (2010). Evaluating a natural experiment in alcohol policy: The Licensing Act (2003) and the requirement for attention to implementation. <i>Criminology & Public Policy</i> 9(1), 41-67.

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Method	Definition	Case Example(s)
Policy surveillance	<p>“Public health surveillance is the ongoing, systematic collection, analysis, and interpretation of health-related data with the a priori purpose of preventing or controlling disease or injury, or of identifying unusual events of public health importance, followed by the dissemination and use of information for public health action.”</p> <p>Lee LM, Thacker SB. (2011). Public health surveillance and know about health in the context of growing sources of health data. <i>Am J Prev Med</i> 41(6), 636-640.</p>	<p>Cameron R, Manske S, Brown S, Jolin MA, Murnaghan D, Lovato C. (2007). Integrating public health policy, practice, evaluation, surveillance, and research: the School Health Action Planning and Evaluation System. <i>American Journal of Public Health</i> 97(4), 648-654.</p>
Pragmatic clinical trials	<p>“A pragmatic trial [is]...a randomized controlled trial whose purpose is to inform decisions about practice.”</p> <p>Zwarenstein M, Treweek S, Gagnier JJ, Altman DG, Tunis S, Haynes B, Oxman AD, Moher D. Improving the reporting of pragmatic trials: an extension of the CONSORT statement. <i>BMJ</i> 337, a2390.</p>	<p>Glasgow RE, Gaglio B, Bennett G et al. Applying the PRECIS Criteria to Describe Three Effectiveness Trials of Weight Loss in Obese Patients with Comorbid Conditions. <i>Health Serv Res</i> 2011.</p> <p>Mutrie N, Campbell A, Whyte F, McConnachie A, Emslie C, Lee L, Kearney N, Walker A, Ritchie D. (2007). Benefits of supervised group exercise programme for women being treated for early stage breast cancer: pragmatic randomised controlled trial. <i>BMJ</i> 334, 517.</p>
Rapid learning studies	<p>Often refers to real time data (frequently automated, such as from electronic health records) on large number of real world patients treated under real world conditions.</p> <p>"...to quickly develop new evidence for daily medical practice and policy..." (w107).</p> <p>Etheredge L. (2007). A rapid-learning health system. <i>Health Affairs</i> 26(2), w107-w118.</p>	<p>Trotter RT, Needle RH, Goosby E, Bates C, Singer M. (2001). A methodological model for rapid assessment, response, and evaluation: the RARE program in public health. <i>Field Methods</i> 13(2), 137-159.</p>

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Method	Definition	Case Example(s)
Realist review and synthesis	<p>"Realist synthesis is an approach to reviewing research evidence on complex social interventions, which provides an explanatory analysis of how and why they work (or don't work) in particular contexts or settings. It complements more established approaches to systematic review, which have been developed and used mainly for simpler interventions like clinical treatments or therapies."</p> <p>Pawson R, Greenhalgh T, Harvey G, Walshe K. (August 2004). Realist synthesis: an introduction. Submitted to the ESRC Research Methods Programme Working Paper Series.</p>	<p>Greenhalgh T, Kristjansson E, Robinson V. (2007). Realist review to understand the efficacy of school feeding programmes. <i>BMJ</i> 325, 858-861.</p>
Regression-discontinuity design	<p>"The regression discontinuity (RD) design is considered to be the closest to a randomized trial that can be applied in non-experimental settings. The design relies on a cut-off point on a continuous baseline variable to assign individuals to treatment. The individuals just to the right and left of the cut-off are assumed to be exchangeable - as in a randomized trial. Any observed discontinuity in the relationship between the assignment variable and outcome is therefore considered evidence of a treatment effect."</p> <p>Linden A., Adams J.L. (2012). Combining the regression discontinuity design and propensity score-based weighting to improve causal inference in program evaluation. <i>J Eval Clin Pract</i> 18(1).</p>	<p>Zuckerman IH, Wutoh AK, Xue Z, Sutart B. (2006). Application of regression-discontinuity analysis in pharmaceutical health services research. <i>Health Services Research</i> 41(2), 550-563.</p>

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Sensitivity analyses	Mathematical calculations that isolate factors involved with an economic or CEA analyses. Specifically, it measures the degree of uncertainty in the estimate.	<p>Rehm J, Greenfield TK, Xie X, Robson L, Single E. (1999). Assessment methods for alcohol consumption, prevalence of high risk drinking and harm: a sensitivity analysis. <i>Int. J Epidemiol.</i> 28(2), 219-224.</p> <p>Sofi F, Cesari F, Abbate R, Gensini G, Casini A. (2008). Adherence to Mediterranean diet and health status: meta-analysis. <i>BMJ</i> 337, a1344.</p>
Simulation models	<p>"Simulation models are useful for understanding and predicting how changes in specific inputs (e.g., treatment use) lead to changes in outputs (e.g., quit rates) over time in complex social systems.19,20 Modeling helps to reveal relationships by organizing the channels of influence and by making assumptions about the relevant relationships more explicit. This process generally proves more robust than relying on intuition alone and is thereby useful for evaluating hypothetical future scenarios."</p> <p>Levy DT, Mabry PL, Graham AL, Orleans CT, Abrams DB. (2010). Exploring scenarios to dramatically reduce smoking prevalence: a simulation model of the three-part cessation process. <i>American Journal of Public Health</i> 100(7), 1253-9.</p>	<p>Levy DT, Bauer JE, Lee H. (2006). Simulation modeling and tobacco control: creating more robust public health practices. <i>American Journal of Public Health</i> 96(3), 494-498.</p> <p>Liew SM, Jackson R, Mant D, Glasziou P. (2012). Should identical CVD risks in young and old patients be managed identically? Results from two models. <i>BMJ Open</i> 2(2), e000728.</p>

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