

Costing Annotated Bibliography of Key Economic Analysis Resources Especially Relevant for Implementation Science

This tool was created by **UC San Diego DISC** and the **ACCORDS D&I Program** to compile resources, tools, and studies about cost/cost-effectiveness research in implementation science. Costing methods and cost-effectiveness analyses are important for measuring and improving the value of healthcare practices.

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Cost and Cost-Effectiveness Studies

Ayadi MF, Adams EK, Melvin CL, Rivera CC, Gaffney CA, Pike J, Rabius V, Ferguson JN. Costs of a smoking cessation counseling intervention for pregnant women: comparison of three settings. Public Health Rep. 2006 Mar-Apr;121(2):120-6. <https://pubmed.ncbi.nlm.nih.gov/16528943/>

This study estimated and compared the costs of a counseling intervention for smoking cessation in pregnant women at three different settings.

Doyle, S.L., Brown, J.L., Rasheed, D. et al. Cost Analysis of Ingredients for Successful Implementation of a Mindfulness-Based Professional Development Program for Teachers. *Mindfulness* 10, 122–130 (2019). doi: 10.1007/s12671-018-0958-4 <https://link.springer.com/article/10.1007/s12671-018-0958-4>

This study was a cost analysis of implementing the Cultivating Awareness and Resilience in Education (CARE) for Teachers professional development program. The authors detail all of the necessary resources needed for project implementation.

Fishman PA, Cook AJ, Anderson M, Ralston JD, Catz SL, Carrell D, Carlson J, Green BB. Improving BP Control through Electronic Communications: An Economic Evaluation. Am J Manag Care. 2013 Sep;19(9):709-16.

<https://pubmed.ncbi.nlm.nih.gov/24304254/>

This article assesses the cost effectiveness of the Electronic Communications and Home Blood Pressure Monitoring to Improve Blood Pressure Control (e-BP) study. Overall, the goal of the study is to better understand the cost effectiveness of web-based approaches to managing chronic illness.

Hoomans T, Severens JL. Economic evaluation of implementation strategies in health care. Implement Sci. 2014 Dec 18;9:168. doi: 10.1186/s13012-014-0168-y.

<https://pubmed.ncbi.nlm.nih.gov/25518730/>

This editorial stresses the importance of economically evaluating implementation strategies. Furthermore, the authors address how these evaluations can be used in decision-making processes about implementation.

Krukowski RA, Pope RA, Love S, Lensing S, Felix HC, Prewitt TE, West D. Examination of costs for a lay health educator-delivered translation of the Diabetes Prevention Program in senior centers. Prev Med. 2013 Oct;57(4):400-2. doi:

10.1016/j.ypmed.2013.06.027. <https://pubmed.ncbi.nlm.nih.gov/23831492/>

The authors evaluated the costs of translating a Diabetes Prevention Program for older adults residing in senior centers. Specifically, the study evaluates the cost effectiveness of this translation when delivered by lay health educators.

Rafia Rasu, Joanie Thelen, Walter Agbor Bawa, Kathy Goggin, Andrea Bradley-Ewing, Delwyn Catley, Motivational Interviewing to Encourage Quit Attempts among Smokers not ready to Quit: A Trial-Based Economic Analysis, *Nicotine & Tobacco Research*, Volume 22, Issue 9, September 2020, Pages 1515–1523, doi: 10.1093/ntr/ntz228.

<https://academic.oup.com/ntr/article-abstract/22/9/1515/5670828?redirectedFrom=fulltext>

The authors assessed and compared the cost effectiveness of motivational interviewing, health education, and brief advice for smoking cessation.

Rhodes W, Ritzwoller DP, Glasgow RE. Stakeholder Perspectives on Costs and Resource Expenditures: Tools for Addressing Economic Issues Most Relevant to Patients, Providers, and Clinics. Translational Behavioral Medicine. In Press 2017
Shoup JA, Madrid C, Koehler C, Lamb C, Ellis J, Ritzwoller DP, Daley MF. Effectiveness and cost of influenza vaccine reminders for adults with asthma or chronic obstructive pulmonary disease. Am J Manag Care. 2015;21(7):e405-413.
<https://pubmed.ncbi.nlm.nih.gov/26295268/>

This study assessed the cost effectiveness of interactive voice reminders to get the influenza vaccine and compared it to that of postcards. Specifically, the authors assessed its cost effectiveness in adults with asthma or chronic obstructive pulmonary disease.

Ritzwoller DP, Sukhanova AS, Glasgow RE, Strycker LA, King DK, Gaglio B, Toobert DJ. Intervention costs and cost-effectiveness for a multiple-risk-factor diabetes self-management trial for Latinas: economic analysis of ¡Viva Bien! Transl Behav Med. 2011 Sep 1;1(3):427-435. <https://pubmed.ncbi.nlm.nih.gov/22081776/>

Authors assess the cost effectiveness of ¡Viva Bien!, a multiple-risk-factor lifestyle intervention for Latinas with type 2 diabetes.

Ritzwoller DP, Glasgow RE, Sukhanova AY, Bennett GG, Warner ET, Greaney ML, Askew S, Goldman J, Emmons KM, Colditz GA, Be Fit Be Well study i. Economic analyses of the Be Fit Be Well program: a weight loss program for community health centers. J Gen Intern Med. 2013;28(12):1581-1588. <https://pubmed.ncbi.nlm.nih.gov/23733374/>

The authors analyze the cost effectiveness of a two-year weight-loss and blood pressure control intervention.

Systematic Review/Overview of Cost-Effectiveness and Economic Evaluation

Barnett ML, Dopp AR, Klein C, Ettner SL, Powell BJ, Saldana L. Collaborating with health economists to advance implementation science: a qualitative study. Implement Sci Commun. 2020 Sep 29;1:82. doi: 10.1186/s43058-020-00074-w. <https://pubmed.ncbi.nlm.nih.gov/33005901/>

Conducted semi-structured interviews of eight health economists and eight implementation science researchers with the goal of understanding the current capacity for collaborative research. Found that although there was a desire for collaborative research among both groups of researchers, there needs to be a stronger effort to build relationships outside of one's discipline and understand other disciplinary methodologies.

Connell JM, Griffin S. Overview of methods in economic analyses of behavioral interventions to promote oral health. J Public Health Dent. 2011 Winter;71 Suppl 1(Suppl 1):S101-18. doi: 10.1111/j.1752-7325.2011.00236.x. <https://pubmed.ncbi.nlm.nih.gov/21656966/>

An overview of different cost effectiveness terminology and strategies. The authors detail these methods and explain their relevant use in oral health interventions.

Hinde JM, Bray JW, Cowell AJ. Implementation science on the margins: How do we demonstrate the value of implementation strategies? Fam Syst Health. 2020 Sep;38(3):225-231. doi: 10.1037/fsh0000535. <https://pubmed.ncbi.nlm.nih.gov/32955281/>

An editorial presenting the conceptual challenges that come with economic evaluation in implementation science. The authors also address the implications of conducting economic analysis of primary care research.

Neumann PJ, Weinstein MC. Legislating against use of cost-effectiveness information. N Engl J Med. 2010 Oct 14;363(16):1495-7. doi: 10.1056/NEJMp1007168.
<https://pubmed.ncbi.nlm.nih.gov/20942664/>

This article assesses the use of cost effectiveness measures such as cost-per-QALY (quality-adjusted life-years), which were previously banned from being used as thresholds.

Raghavan, Ramesh. (2012). The role of economic evaluation in dissemination and implementation research. doi: 10.13140/2.1.1037.3760.
https://www.researchgate.net/publication/264195232_The_role_of_economic_evaluation_in_dissemination_and_implementation_research

This chapter gives a brief review of economic evaluation, presents examples of economic evaluation in dissemination and implementation science literature, and proposes ways to improve (and promote) economic evaluations in implementation science.

Roberts SLE, Healey A, Sevdalis N. Use of health economic evaluation in the implementation and improvement science fields-a systematic literature review. Implement Sci. 2019 Jul 15;14(1):72. doi: 10.1186/s13012-019-0901-7.
<https://pubmed.ncbi.nlm.nih.gov/31307489/>

A systematic review of thirty studies, including ex-post economic evaluations, cost effectiveness analyses, cost utility analyses, and cost-consequence analyses. The authors used the Quality of Health Economic Studies (QHES) framework to rate these studies and concluded that while overall quality of these studies is good, there still lacks adequate attention and collaboration on this topic.

Sanders GD, Neumann PJ, Basu A, Brock DW, Feeny D, Krahn M, Kuntz KM, Meltzer DO, Owens DK, Prosser LA, Salomon JA, Sculpher MJ, Trikalinos TA, Russell LB, Siegel JE, Ganiats TG. Recommendations for Conduct, Methodological Practices, and Reporting of Cost-effectiveness Analyses: Second Panel on Cost-Effectiveness in Health and Medicine. JAMA. 2016 Sep 13;316(10):1093-103. doi: 10.1001/jama.2016.12195
<https://pubmed.ncbi.nlm.nih.gov/27623463/>

The Second Panel on Cost-Effectiveness in Health and Medicine assess the state of the field and recommend strategies to improve cost-effectiveness analyses.

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Wagner TH, Dopp AR, Gold HT. Estimating Downstream Budget Impacts in Implementation Research. *Med Decis Making*. 2020 Nov;40(8):968-977. doi: 10.1177/0272989X20954387. <https://pubmed.ncbi.nlm.nih.gov/32951506/>

The authors explain key considerations that should be made for downstream health care costs and budget impact analysis. Specifically, the authors present considerations for the implementation of evidence-based programs aimed to reduce a quality gap.

WEBINAR on Economic evaluation and Implementation Science from the NCI: <https://cancercontrol.cancer.gov/is/training-education/webinars/details/65>

Dr. Ramesh Raghavan and Dr. Heather Gold explain the cost effectiveness analyses play in implementation science. They assess health economics within the field currently and propose next steps for the field.

Wilson DK, Christensen A, Jacobsen PB, Kaplan RM. Standards for economic analyses of interventions for the field of health psychology and behavioral medicine. *Health Psychol*. 2019 Aug;38(8):669-671. doi: 10.1037/hea0000770. <https://pubmed.ncbi.nlm.nih.gov/31368750/>

This article explains the variability in behavioral and public health interventions (as discussed in two working meetings among the Society for Health Psychology, the National Cancer Institute (NCI), and the Office for Behavioral and Social Sciences Research (OBSSR) at the National Institutes of Health), discusses standardizing methods for evaluating cost effectiveness, and provides examples.

Yoon, J. Including Economic Evaluations in Implementation Science. *J GEN INTERN MED*, 2020 Jan; 35(4):985–987. doi: 10.1007/s11606-020-05649-w. <https://rdcu.be/ccr0k>

Short article calling for more economic evaluation in implementation science. The author details a study that can be used as an example for future evaluation of economic outcomes of implementation science.

Cost Dimensions/Data Collection Tools and Guides

Appendix A. Key Characteristics of Estimating Costs Grants. Agency for Healthcare Research and Quality, Rockville, MD.

<https://www.ahrq.gov/ncepcr/research-transform-primary-care/transform/cost/app-a.html>

A list of projects that have identified and evaluated the transformation costs for patient-centered medical homes (PCMH). Each project has a short description of its methods and the costs it estimated.

Appendix B. Example Data Collection Tools (continued). Agency for Healthcare Research and Quality, Rockville, MD.

<https://www.ahrq.gov/ncepcr/research-transform-primary-care/transform/cost/app-b-pt2.html>

A compiled list of three cost dimensions tools developed. Includes screenshots of each tool with a short overview.

Basu R, Ory MG, Towne SD Jr, Smith ML, Hochhalter AK, Ahn S. Cost-effectiveness of the chronic disease self-management program: implications for community-based organizations. Front Public Health. 2015 Apr 27;3:27. doi: 10.3389/fpubh.2015.00027. eCollection 2015. <https://www.frontiersin.org/articles/10.3389/fpubh.2015.00027/full>

This study estimates the cost-effectiveness of the Chronic Disease Self-Management Program (CDSMP) and estimates the cost-effectiveness ratios based on depression status.

D2V Costing Resource Hub - Costing and Data Collection

<https://medschool.cuanschutz.edu/accords/cores-and-programs/economic-analysis/pv-resource-hub>

Online resource that details the reasons for measuring cost and different methods that can be used to evaluate cost effectiveness of an intervention.

Dodoo MS, Krist AH, Cifuentes M, Green LA. Start-up and incremental practice expenses for behavior change interventions in primary care. Am J Prev Med. 2008 Nov;

35(5 Suppl):S423-30. doi: 10.1016/j.amepre.2008.08.007.

<https://pubmed.ncbi.nlm.nih.gov/18929990/>

This study collected expenditure data for ten interventions using a standardized instrument. This was used in ten practice-based research networks across the United States.

Eisman AB, Kilbourne AM, Dopp AR, Saldana L, Eisenberg D. Economic evaluation in implementation science: Making the business case for implementation strategies.

Psychiatry Res. 2020 Jan;283:112433. doi: 10.1016/j.psychres.2019.06.008.

<https://pubmed.ncbi.nlm.nih.gov/31202612/>

This article provides an overview of different cost evaluation methods, presents different approaches to economic evaluation of implementation, and details a specific example for a cognitive-behavioral therapy program.

Krist AH, Cifuentes M, Dodoo MS, Green LA. Measuring primary care expenses.

J Am Board Fam Med. 2010 May-Jun;23(3):376-83. doi:

10.3122/jabfm.2010.03.090089. <https://pubmed.ncbi.nlm.nih.gov/20453184/>

This article describes a field trial for a expenditure data collection tool. The tool was tested on 10 practice-based research networks.

Prescription for Health, Guide for Collecting Expenditure Data in a Clinical Intervention in a Primary Care Practice

http://www.prescriptionforhealth.org/results/P4H_exp_template/hndt3_dtacolgd.pdf

An extensive guide that goes over the process for collecting expenditure data. The authors cover research design and give examples for how to fill out tables to keep track of expenditure data.

Ritzwoller DP, Sukhanova A, Gaglio B, Glasgow RE. Costing behavioral interventions: a practical guide to enhance translation. Ann Behav Med. 2009 Apr;37(2):218-27. doi:

10.1007/s12160-009-9088-5. <https://pubmed.ncbi.nlm.nih.gov/19291342/>

<https://pubmed.ncbi.nlm.nih.gov/19291342/>

This paper recommends steps to evaluate the cost and cost effectiveness of interventions. The authors emphasize distinguishing intervention costs from

R&D/recruitment costs and also including sensitivity analyses. The authors use a smoking reduction clinical trial to illustrate the procedures they outlined.

Time-Driven Activity-Based Costing/Microcosting

Akhavan S, Ward L, Bozic KJ. Time-driven Activity-based Costing More Accurately Reflects Costs in Arthroplasty Surgery. Clin Orthop Relat Res. 2016 Jan;474(1):8-15. doi: 10.1007/s11999-015-4214-0. <https://pubmed.ncbi.nlm.nih.gov/25721575/>

This study measures and compares the costs of different arthroplasty surgeries using two methods: time-driven activity-based costing and traditional hospital accounting.

Anzai Y, Heilbrun ME, Haas D, Boi L, Moshre K, Minoshima S, Kaplan R, Lee VS. Dissecting Costs of CT Study: Application of TDABC (Time-driven Activity-based Costing) in a Tertiary Academic Center. Acad Radiol. 2017 Feb;24(2):200-208. doi: 10.1016/j.acra.2016.11.001. <https://pubmed.ncbi.nlm.nih.gov/27988200/>

In this study, the authors used time-driven activity-based costing (TDABC), to assess the costs of performing an abdomen and pelvis computed tomography (AP CT) in an academic radiology department. The authors also identified opportunities to improve the efficiency at which this service is delivered.

Cidav Z, Mandell D, Pyne J, Beidas R, Curran G, Marcus S. A pragmatic method for costing implementation strategies using time-driven activity-based costing. Implement Sci. 2020 May 5;15:28. doi: 10.1186/s13012-020-00993-1 <https://implementationscience.biomedcentral.com/articles/10.1186/s13012-020-00993-1>

This article presents a new method for economic evaluation, combining time-driven activity-based costing and Proctor implementation framework. Use of this method is demonstrated with synthetic data.

Findorff MJ, Wyman JF, Croghan CF, Nyman JA. Use of time studies for determining intervention costs. Nurs Res. 2005 Jul-Aug;54(4):280-4. doi: 10.1097/00006199-200507000-00011. <https://pubmed.ncbi.nlm.nih.gov/16027571/>

This study assesses the use of time studies in determining the cost of personnel for evaluating the cost effectiveness of an intervention.

Helmerts RA, Kaplan RS. TDABC in primary care: Results of a Harvard/Mayo Clinic collaboration. *Healthc Financ Manage.* 2016 Jul;70(7):35-41.

In this cover story, the authors assess the use of time-driven activity-based costing (TDABC) in a primary care setting. Explains the results of a Harvard Business School and Mayo Clinic collaboration.

Hilsenrath P, Eakin C, Fischer K. Price-transparency and cost accounting: challenges for health care organizations in the consumer-driven era. *Inquiry.* 2015 Apr 10;52:0046958015574981. doi: 10.1177/0046958015574981.

<https://pubmed.ncbi.nlm.nih.gov/25862425/>

Hilsenrath et al. discuss the use of activity-based costing (ABC) to better evaluate the cost of healthcare and improve pricing models.

Kaplan RS, Witkowski M, Abbott M, Guzman AB, Higgins LD, Meara JG, Padden E, Shah AS, Waters P, Weidemeier M, Wertheimer S, Feeley TW. Using time-driven activity-based costing to identify value improvement opportunities in healthcare. *J Healthc Manag.* 2014 Nov-Dec;59(6):399-412.

<https://pubmed.ncbi.nlm.nih.gov/25647962/>

This article describes the use of time-driven activity-based costing in healthcare organizations in the United States and Europe, and the authors describe the opportunities for improvement found using this method.

Kaplan RS. Improving value with TDABC. *Healthc Financ Manage.* 2014 Jun;68(6):76-83. <https://pubmed.ncbi.nlm.nih.gov/24968629/>

This article explains how TDABC can be used to identify and document the costs and time spent in providing for patients going through a continuum of care.

Keel G, Savage C, Rafiq M, Mazzocato P. Time-driven activity-based costing in health care: A systematic review of the literature. Health Policy. 2017 Jul;121(7):755-763. doi: 10.1016/j.healthpol.2017.04.013. <https://pubmed.ncbi.nlm.nih.gov/28535996/>

In this review, the authors explain why TDABC is relevant in health care, discuss how its application reflects a method developed for value-based health care, and present implications for TDABC use.

Lee VS, Kawamoto K, Hess R, Park C, Young J, Hunter C, Johnson S, Gulbransen S, Pelt CE, Horton DJ, Graves KK, Greene TH, Anzai Y, Pendleton RC. Implementation of a Value-Driven Outcomes Program to Identify High Variability in Clinical Costs and Outcomes and Association With Reduced Cost and Improved Quality. JAMA. 2016 Sep 13;316(10):1061-72. doi: 10.1001/jama.2016.12226. <https://pubmed.ncbi.nlm.nih.gov/27623461/>

In this article, the authors attempt to measure the relationship a value-driven outcomes tool has with quality measures to individual patient encounters with cost reduction and health outcome optimization.

Porter, Michael E., and Thomas H. Lee. "The Strategy That Will Fix Health Care." Harvard Business Review 91, no. 10 (October 2013): 50–70. <https://www.hbs.edu/faculty/Pages/item.aspx?num=45614>

In this article, the authors discuss how cost effectiveness analyses can be used to improve healthcare and provide high-value care.

Ruger JP, Emmons KM, Kearney MH, Weinstein MC. Measuring the costs of outreach motivational interviewing for smoking cessation and relapse prevention among low-income pregnant women. BMC Pregnancy Childbirth. 2009 Sep 23;9:46. doi: 10.1186/1471-2393-9-46. <https://pubmed.ncbi.nlm.nih.gov/19775455/>

In this study, the authors developed a micro-costing methodology to estimate the costs of “outreach motivational interviewing for smoking cessation and relapse prevention among low-income pregnant women.” The authors test this methodology with a randomized controlled trial (RCT), and report the results.

Schutzer ME, Arthur DW, Anscher MS. Time-Driven Activity-Based Costing: A Comparative Cost Analysis of Whole-Breast Radiotherapy Versus Balloon-Based Brachytherapy in the Management of Early-Stage Breast Cancer. J Oncol Pract. 2016 May;12(5):e584-93. doi: 10.1200/JOP.2015.008441.

<https://pubmed.ncbi.nlm.nih.gov/27006360/>

The authors used time-driven activity-based costing to compare the costs of different therapies for management of early-stage breast cancer.

Smith MW, Barnett PG, Phibbs CS, Wagner TH. Microcost methods of determining VA healthcare costs. Menlo Park, CA: Health Economics Resource Center, 2010.

https://www.herc.research.va.gov/files/BOOK_458.pdf

In this book, Smith et al. present a guide to microcosting as a way of determining the cost of healthcare.

Smith MW, Barnett PG. Direct measurement of health care costs. Med Care Res Rev. 2003 Sep;60(3 Suppl):74S-91S. doi: 10.1177/1077558703257001.

<https://pubmed.ncbi.nlm.nih.gov/15095547/>

This article explains how direct measurement can be used to determine health care costs. The authors also describe the advantages and drawbacks of using direct measurement.

Xu X, Grossetta Nardini HK, Ruger JP. Micro-costing studies in the health and medical literature: protocol for a systematic review. Syst Rev. 2014 May 21;3:47. doi: 10.1186/2046-4053-3-47. <https://pubmed.ncbi.nlm.nih.gov/24887208/>

A review of current literature on microcosting studies of health and medical interventions.

Yun BJ, Prabhakar AM, Warsh J, Kaplan R, Brennan J, Dempsey KE, Raja AS. Time-Driven Activity-Based Costing in Emergency Medicine. Ann Emerg Med. 2016 Jun;67(6):765-772. doi: 10.1016/j.annemergmed.2015.08.004.

<https://pubmed.ncbi.nlm.nih.gov/26365921/>

The authors assess the current costing mechanisms used in the emergency department and detail how time-driven activity-based costing (TDABC) may replace these mechanisms.