

Appendix

Article Title: Understanding cost data collection tools to improve economic evaluations of health interventions

Journal: *Stroke and Vascular Neurology*

Authors: John M. Chapel and Guijing Wang

Corresponding Author:

Guijing Wang, PhD

Division for Heart Disease and Stroke Prevention

National Center for Chronic Disease Prevention and Health Promotion

Centers for Disease Control and Prevention

4770 Buford Highway, NE

Atlanta, GA 30341

gbw9@cdc.gov

Literature Scan

Search Strategy

We conducted a literature search to identify cost data collection tools used in studies focused on micro-costing intervention costs of prevention and management interventions targeting noninfectious chronic conditions, including noncommunicable chronic diseases, mental health conditions, and behavioral risk factors (tobacco use, alcohol and other substance abuse, physical inactivity, nutrition, obesity).

We recruited a library specialist to conduct a database search based on our intended literature review. The librarian searched the databases Medline, PsychInfo, and Econ lit on 1/26/18 using the search terms contained in **Appendix Table 1**. Concurrently, we searched PubMed on 1/27/18 using the search terms contained in **Appendix Table 1**.

We combined all records retrieved from all database searches and removed duplicates in EndNote. We did a first round of screening titles and abstracts of all collected records and excluded 1) reviews, commentaries, or theses; 2) study protocols, designs, or rationales; and 3) otherwise obviously irrelevant. In a second round of screening titles and abstracts, we excluded those that 1) did not address noninfectious chronic conditions; 2) were not about a prevention or management intervention (e.g., focused on a specific treatment, clinical procedures, or medications); and 3) did not appear to focus on assessing intervention costs through direct measurement micro-costing, such as those using modeling or lacking adequate focus on intervention cost. We then reviewed the screened articles for inclusion in our review and excluded those that 1) did not use direct measurement micro-costing of intervention costs or did not provide adequate detail to assess data collection; and 2) appeared to use or were described as

using direct measurement micro-costing but did not provide adequate detail on the process by which micro-costing data were collected in order to identify data collection tools.

In all, 2,082 records were returned from the database searches after duplicates were removed. After screening, 306 studies remained, of which 93 studies met the criteria to be included in the review to identify cost data collection tools used (**Appendix Figure 1**).¹⁻⁹³

Abstraction and Analysis

One coder reviewed the 93 studies and abstracted the original descriptions of the cost data collection tools used in each study, as well as information on how each tool was used (e.g., mode, main user) when available. The described cost data collection tools were then listed and combined into emergent categories and sub-categories. Information on the study type, study perspective, intervention setting, intervention type, and health targets was also abstracted and subsequently combined into emergent categories. Frequencies of use of each data collection tool were then calculated for each of these study and intervention characteristics categories (**Appendix Table 2; Appendix Table 3**).

Appendix Table 1. Literature databases and search strategy

Database	Strategy	Run Date	Records
Medline (OVID) 1946-	*"cost allocation"/ OR *cost-benefit analysis/ OR *health expenditures/ OR (Cost analysis OR cost analyses OR cost-benefit analysis OR economic analysis OR economic analyses OR (program* ADJ2 cost*) OR (cost* ADJ2 prevention) OR (cost* ADJ2 intervention*)).ti,ab. AND (Intervention* OR prevention OR (health ADJ2 program*) OR health education OR government program*).ti,ab,sh.	1/26/2018	732

	<p>AND</p> <p>Exp Chronic Disease/pc OR Heart Diseases/pc OR *Community Health Workers/ OR exp Diabetes Mellitus/pc OR Hypertension/ OR Physical Fitness/ OR exercise/ OR obesity/ OR weight loss/ OR Weight Reduction Programs/ OR Smoking Cessation/ OR Early Detection of Cancer/ OR *Registries/ OR exp substance-related disorders/pc OR Mental Health Services/</p> <p>English ; 2008-</p>		
PsycInfo (OVID) 2002-	<p>(Cost analysis OR cost analyses OR cost allocation OR health expenditure* OR cost-benefit analysis OR economic analysis OR economic analyses OR (program* ADJ2 cost*) OR (cost* ADJ2 prevention) OR (cost* ADJ2 intervention*))</p> <p>AND</p> <p>(Intervention* OR prevention OR (health ADJ2 program*) OR health education OR government program*)</p> <p>AND</p> <p>Exp Chronic Illness/ OR Heart Disorders/ OR Community Health/ OR Community Services/ OR Diabetes Mellitus/ OR Hypertension/ OR Physical Fitness/ OR exercise/ OR obesity/ OR weight loss/ OR Weight Control/ OR Smoking Cessation/ OR Cancer Screening/ OR Drug Abuse/ OR Drug Addiction/ OR Alcoholism/ OR Mental Health Services/</p> <p>English ; 2008-</p>	1/26/2018	527
EconLit (Ebsco)	<p>(“Cost analysis” OR “cost analyses” OR “cost allocation” OR “health expenditure*” OR “cost-benefit analysis” OR “economic analysis” OR “economic analyses” OR (program* N2 cost*) OR (cost* N2 prevention) OR (cost* N2 intervention*))</p> <p>AND</p> <p>(Intervention* OR prevention OR (health N2 program*) OR “health education” OR “government program*”)</p> <p>AND</p> <p>“Chronic Illness” OR “Heart Disorders” OR “Community Health” OR “Community Services” OR “Diabetes Mellitus” OR Hypertension OR “Physical</p>	1/26/2018	48

	<p>Fitness” OR exercise OR obesity OR “weight loss” OR “Weight Control” OR “Smoking Cessation” OR “Cancer Screening” OR “Drug Abuse” OR “Drug Addiction” OR Alcoholism OR “Mental Health Services”</p> <p>English ; 2008-</p>		
PubMed	<p>[Title/Abstract](“economic evaluation" OR "cost analysis" OR "budget impact" OR "program* cost" OR "intervention cost" OR "cost study" OR "implementation cost" OR "micro-costing" OR "activity-based cost") AND [Title/Abstract](program OR implementation OR "community intervention" OR "public health intervention" OR "population health intervention") AND (chronic disease OR heart disease OR community health worker OR diabetes OR hypertension OR obesity OR weight loss OR smoking cessation OR asthma OR COPD OR cancer OR stroke OR substance abuse OR mental health OR physical activity)</p> <p>[Date – Publication]: 2008 to present [Language]: English “Best Match” sort</p>	1/27/18	1,023

Appendix Table 2. Distribution of cost data collection tools used in 93 studies from scanned literature, by study characteristics

Cost data collection tools	Study Type		Perspective		Total ^c (n=93)
	Trial (n=48)	Observational (n=45)	Provider ^a (n=72)	Societal ^b (n=31)	
1) Standardized comprehensive templates	10%	53%	35%	16%	31%
1a) Researcher completed, via interview	8%	9%	7%	13%	9%
1b) via survey	2%	47%	29%	3%	24%
2) Targeted questionnaires	35%	33%	33%	42%	34%
2a) via survey	19%	7%	10%	26%	13%
2b) via interview	15%	27%	22%	13%	20%
3) Activity logs	58%	16%	36%	45%	38%
4) Direct observation	6%	13%	13%	0%	10%
5) On-site databases or records	48%	33%	40%	42%	41%
5a) Study-specific database	10%	7%	8%	13%	9%
5b) In-place database	10%	4%	8%	6%	8%
5c) Other routine records	38%	27%	31%	35%	32%

The percentages represent the proportion of studies in that column that used a particular cost data collection tool.

- a. Provider perspective category includes those which focus on the perspective of an entity which would deliver the intervention, including perspectives of the healthcare system, government, and individual providing organizations (e.g., school, employer).
- b. Includes two studies that took the perspective of just the intervention participants and caregivers.
- c. Studies' use of tools was not mutually exclusive; 51 (55%) studies described using only one category of data collection tools, 42 (45%) described using two or more categories of tools. Therefore, column percentages do not sum to 100%.

Appendix Table 3. Distribution of cost data collection tools used in 93 studies from scanned literature, by intervention characteristics

Cost data collection tools	Intervention Setting ^a		Intervention Type ^b		Health Targets		Total ^c (n=93)
	Community-based ^c (n=66)	Healthcare-based ^d (n=43)	Prevention (n=79)	Management (n=36)	Chronic diseases (n=54)	Risk factors, behavioral health (n=49)	
1) Standardized comprehensive templates	30%	47%	32%	33%	35%	27%	31%
1a) via interview	8%	9%	8%	14%	6%	16%	9%
1b) via survey	23%	40%	25%	22%	31%	12%	24%
2) Targeted questionnaires	32%	33%	37%	31%	33%	43%	34%
2a) via survey	12%	14%	13%	11%	9%	20%	13%
2b) via interview	18%	19%	24%	17%	22%	22%	20%
3) Activity logs	41%	28%	37%	42%	31%	43%	38%
4) Direct observation	5%	14%	10%	6%	13%	6%	10%
5) On-site databases or records	44%	30%	43%	44%	39%	47%	41%
5a) Study-specific database	9%	5%	9%	6%	11%	4%	9%
5b) In-place database	6%	9%	8%	8%	4%	10%	8%
5c) Other routine records	35%	23%	34%	36%	33%	37%	32%

The percentages represent the proportion of studies in that column that used a particular cost data collection tool.

- Settings are not mutually exclusive. For example, if an intervention was first delivered in a healthcare setting and then followed up with telephone counseling or home visits, the intervention was counted as being in both a healthcare and community setting.
- Intervention types are not mutually exclusive. Some studies examined programs that targeted both the prevention and management of chronic conditions.

- c. Studies' use of tools was not mutually exclusive; 51 (55%) studies described using only one category of data collection tools, 42 (45%) described using two or more categories of tools. Therefore, column percentages do not sum to 100%.
- d. Community-based setting includes all interventions delivered outside a healthcare setting, including in-person interventions in a community setting, telephone-based, or web-based interventions.
- e. Healthcare-based setting includes hospital, hospital clinics, community clinics, academic medical centers.

Case Examples

Appendix Table 4. Example cost analysis results table from Case I (Mirambeau et al. 2013)**Table 4A. One-year program cost (in dollars) of CoCo team, St. Johnsbury, Vermont (October 2010-September 2011)**

Labor	Wages	Benefits	Total
Community health workers (n=3)	106,995	40,658	147,653
Chronic integration coordinator (n=1, 70 %)	53,475	20,320	73,795
Management leadership (n=1, 20 %)	19,600	7,447	27,047
Volunteers (n=2)	5,085	1,932	7,017
Subtotal	185,155	70,357	255,512
10 % overhead			25,551
Total labor cost			25,551
Capital	Description	Cost	
Start-up	CHW recruitment, furniture, computer, etc.	5,089	
Direct program cost			
Office space (1,500 sf)	Rental fee	113,625	
Program operation activities	Mileage, promotional material, participant transportation, education/marketing material, office supplies, utilities, IT support, etc.	16,801	
Training (n=4)	Registration fee and travel/lodging costs for attending training, conferences, networking, etc.	4,062	
Total capital cost		139,577	
Total program cost			420,640

(1) Total program cost: \$420,640 [\$281,063 for labor (66.8 %), \$139,577 for capital (33.2 %)]

(2) The cost of volunteer labor was calculated using the 2011 minimum wage of \$8.15 in Vermont. Office space was valued at the average commercial lease rate (\$75.75/sf) in the area in 2011

(3) A real-world scenario based on no payment for volunteers and free in-kind support (no overhead for personnel, time of volunteers, and no payment for office space) indicated that the 1-year program cost (actual funds needed) could be just \$274,447 [\$248,495 for labor (90.5 %) and \$25,952 for capital (9.5 %)]

IT, information technology; *CHW*, community health worker

Table 4B. Sensitivity analysis of program cost of CoCo team, St. Johnsbury, Vermont, October 2010–September 2011

Items	Most-expensive case (\$)	Least-expensive case (\$)
Labor		
Community health workers	163,613	137,779
Chronic integration coordinator	73,795	73,795
Management leadership	27,047	27,047
Volunteers	13,247	0
Subtotal	277,702	238,621
10 % overhead	27,770	23,862
Total labor cost	305,472	262,483
Capital		
Start-up	5,089	5,089
Direct program cost		
Office space	151,125	76,125
Program operational activity	16,801	16,801
Training	6,886	4,062
Total capital cost	179,901	102,077
Total program cost	485,373	364,560
	62.9 % labor	72.0 % labor
	37.1 % capital	28.0 % capital

For the most-expensive case we used the highest salary for CHWs, volunteers got paid at the same wage rate as CHWs, rental for office space was increased by \$25/sf (about one-third), trainings with no expenses (n = 7) were assigned a cost equal to the average expenses of those with expenses (\$406). For the least-expensive case, we used the lowest salary for CHWs, volunteers got no pay, and the rental fee for office space was decreased by \$25/sf (about one-third)

References

1. Archer E, Groessl EJ, Sui X, et al. An economic analysis of traditional and technology-based approaches to weight loss. *Am J Prev Med.* 2012;43(2):176-182.
2. Bai Y, Zhao Y, Wang G, Wang H, Liu K, Zhao W. Cost-effectiveness of a hypertension control intervention in three community health centers in China. *Journal of Primary Care & Community Health.* 2013;4(3):195-201.
3. Barbosa C, Cowell AJ, Landwehr J, Dowd W, Bray JW. Cost of Screening, Brief Intervention, and Referral to Treatment in Health Care Settings. *J Subst Abuse Treat.* 2016;60:54-61.
4. Barnett PG, Wong W, Hall S. The cost-effectiveness of a smoking cessation program for out-patients in treatment for depression. *Addiction.* 2008;103(5):834-840.
5. Barrett B, Waheed W, Farrelly S, et al. Randomised controlled trial of joint crisis plans to reduce compulsory treatment for people with psychosis: economic outcomes. *PLoS One.* 2013;8(11):e74210.
6. Beets MW, Brazendale K, Glenn Weaver R, et al. Economic evaluation of a group randomized controlled trial on healthy eating and physical activity in afterschool programs. *Prev Med.* 2018;106:60-65.
7. Braam K, van Dijk-Lokkart E, van Dongen J, et al. Cost-effectiveness of a combined physical exercise and psychosocial training intervention for children with cancer: Results from the Quality of Life in Motion Study. *European Journal of Cancer Care.* 2017;26(6):1-11.

8. Brownson CA, Hoerger TJ, Fisher EB, Kilpatrick KE. Cost-effectiveness of diabetes self-management programs in community primary care settings. *The Diabetes Educator*. 2009;35(5):761-769.
9. Connor KL, Breslau J, Finnerty MT, Leckman-Westin E, Pritam R, Yu H. Integrating physical health: What were the costs to behavioral health care clinics? *Gen Hosp Psychiatry*. 2017;51:41-45.
10. Corso PS, Ingels JB, Kogan SM, Foster E, Chen Y-F, Brody GH. Economic analysis of a multi-site prevention program: Assessment of program costs and characterizing site-level variability. *Prevention Science*. 2013;14(5):447-456.
11. Costa S, Regier DA, Meissner B, et al. A time-and-motion approach to micro-costing of high-throughput genomic assays. *Curr Oncol*. 2016;23(5):304-313.
12. Cowper PA, Peterson MJ, Pieper CF, et al. Economic Analysis of Primary Care-Based Physical Activity Counseling in Older Men: The VA-LIFE Trial. *Journal of the American Geriatrics Society*. 2017;65(3):533-539.
13. Cradock AL, Barrett JL, Carter J, et al. Impact of the Boston active school day policy to promote physical activity among children. *American Journal of Health Promotion*. 2014;28(3, Suppl):S54-S64.
14. Dennis ML, French MT, McCollister KE, Scott CK. The economic costs of quarterly monitoring and recovery management checkups for adults with chronic substance use disorders. *Journal of Substance Abuse Treatment*. 2011;41(2):201-207.
15. Donaldson EA, Holtgrave DR, Duffin RA, Feltner F, Funderburk W, Freeman HP. Patient navigation for breast and colorectal cancer in 3 community hospital settings: an economic evaluation. *Cancer*. 2012;118(19):4851-4859.

16. Donnelly JE, Goetz J, Gibson C, et al. Equivalent weight loss for weight management programs delivered by phone and clinic. *Obesity (Silver Spring)*. 2013;21(10):1951-1959.
17. Edwards RT, Linck P, Hounsome N, et al. Cost-effectiveness of a national exercise referral programme for primary care patients in Wales: results of a randomised controlled trial. *BMC Public Health*. 2013;13:1021.
18. Ekwueme DU, Gardner JG, Subramanian S, Tangka FK, Bapat B, Richardson LC. Cost analysis of the National Breast and Cervical Cancer Early Detection Program: selected states, 2003 to 2004. *Cancer*. 2008;112(3):626-635.
19. Ekwueme DU, Subramanian S, Trogdon JG, et al. Cost of services provided by the National Breast and Cervical Cancer Early Detection Program. *Cancer*. 2014;120 Suppl 16:2604-2611.
20. Elkin EB, Shapiro E, Snow JG, Zauber AG, Krauskopf MS. The economic impact of a patient navigator program to increase screening colonoscopy. *Cancer*. 2012;118(23):5982-5988.
21. Fischl AF, Herman WH, Sereika SM, et al. Impact of a preconception counseling program for teens with type 1 diabetes (READY-Girls) on patient-provider interaction, resource utilization, and cost. *Diabetes Care*. 2010;33(4):701-705.
22. Granados-Garcia V, Flores YN, Perez R, Rudolph SE, Lazcano-Ponce E, Salmeron J. Cost of the Cervical Cancer Screening Program at the Mexican Social Security Institute. *Salud Publica Mex*. 2014;56(5):502-510.
23. Hamilton-West K, Hotham S, Yang W, Hedayioglu J, Brigden C. Evaluation of a pilot service to facilitate discharge of patients with stable long-term mental health needs from

- secondary to primary care: The role of Primary Care Mental Health Specialists. *Primary Health Care Research and Development*. 2017;18(4):344-353.
24. Hendriks ME, Bolarinwa OA, Nelissen HE, et al. Costs of cardiovascular disease prevention care and scenarios for cost saving: a micro-costing study from rural Nigeria. *J Hypertens*. 2015;33(2):376-684.
 25. Higashi H, Truong KD, Barendregt JJ, et al. Cost effectiveness of tobacco control policies in Vietnam: The case of population-level interventions. *Applied Health Economics and Health Policy*. 2011;9(3):183-196.
 26. Hollingworth W, Cohen D, Hawkins J, et al. Reducing smoking in adolescents: Cost-effectiveness results from the cluster randomized ASSIST (A Stop Smoking In Schools Trial). *Nicotine & Tobacco Research*. 2012;14(2):161-168.
 27. Honeycutt AA, Khavjou OA, Bradley C, et al. Intervention Costs From Communities Putting Prevention to Work. *Preventing Chronic Disease*. 2016;13:E98.
 28. Hoover S, Subramanian S, Tangka FKL, et al. Patients and caregivers costs for colonoscopy-based colorectal cancer screening: Experience of low-income individuals undergoing free colonoscopies. *Eval Program Plann*. 2017;62:81-86.
 29. Hopkins RB, Garg AX, Levin A, et al. Cost-effectiveness analysis of a randomized trial comparing care models for chronic kidney disease. *Clinical Journal of The American Society of Nephrology: CJASN*. 2011;6(6):1248-1257.
 30. Ingels JB, Corso PS, Kogan SM, Brody GH. Cost-effectiveness of the strong African American families-teen program: 1-year follow-up. *Drug & Alcohol Dependence*. 2013;133(2):556-561.

31. Ingels JB, Walcott RL, Wilson MG, et al. A Prospective Programmatic Cost Analysis of Fuel Your Life: A Worksite Translation of DPP. *J Occup Environ Med.* 2016;58(11):1106-1112.
32. Jandorf L, Stossel LM, Cooperman JL, et al. Cost analysis of a patient navigation system to increase screening colonoscopy adherence among urban minorities. *Cancer.* 2013;119(3):612-620.
33. Janssen EM, Jerome GJ, Dalcin AT, et al. A cost analysis of implementing a behavioral weight loss intervention in community mental health settings: Results from the ACHIEVE trial. *Obesity.* 2017;25(6):1006-1013.
34. Khavjou OA, Honeycutt AA, Hoerger TJ, Trogdon JG, Cash AJ. Collecting costs of community prevention programs: communities putting prevention to work initiative. *American Journal of Preventive Medicine.* 2014;47(2):160-165.
35. Kilmer B, Burgdorf JR, D'Amico EJ, Miles J, Tucker J. Multisite cost analysis of a school-based voluntary alcohol and drug prevention program. *Journal of Studies on Alcohol & Drugs.* 2011;72(5):823-832.
36. Kimman ML, Dirksen CD, Voogd AC, et al. Economic evaluation of four follow-up strategies after curative treatment for breast cancer: results of an RCT. *Eur J Cancer.* 2011;47(8):1175-1185.
37. Knealing TW, Roebuck MC, Wong CJ, Silverman K. Economic cost of the therapeutic workplace intervention added to methadone maintenance. *Journal of Substance Abuse Treatment.* 2008;34(3):326-332.

38. Korir A, Gakunga R, Subramanian S, et al. Economic analysis of the Nairobi Cancer Registry: Implications for expanding and enhancing cancer registration in Kenya. *Cancer Epidemiol.* 2016;45 Suppl 1:S20-s29.
39. Kruger J, Brennan A, Strong M, Thomas C, Norman P, Epton T. The cost-effectiveness of a theory-based online health behaviour intervention for new university students: an economic evaluation. *BMC Public Health.* 2014;14:1011.
40. Lairson DR, Chan W, Chang YC, del Junco DJ, Vernon SW. Cost-effectiveness of targeted versus tailored interventions to promote mammography screening among women military veterans in the United States. *Evaluation & Program Planning.* 2011;34(2):97-104.
41. Lairson DR, Chung TH, Smith LG, Springston JK, Champion VL. Estimating development cost of an interactive website based cancer screening promotion program. *Evaluation & Program Planning.* 2015;50:56-62.
42. Lairson DR, Dicarlo M, Deshmuk AA, et al. Cost-effectiveness of a standard intervention versus a navigated intervention on colorectal cancer screening use in primary care. *Cancer.* 2014;120(7):1042-1049.
43. Lairson DR, Huo J, Ricks KA, Savas L, Fernandez ME. The cost of implementing a 2-1-1 call center-based cancer control navigator program. *Eval Program Plann.* 2013;39:51-56.
44. Larsen B, Marcus B, Pekmezi D, Hartman S, Gilmer T. A Web-Based Physical Activity Intervention for Spanish-Speaking Latinas: A Costs and Cost-Effectiveness Analysis. *Journal of Medical Internet Research.* 2017;19(2):e43.

45. Lawlor MS, Blackwell CS, Isom SP, et al. Cost of a group translation of the Diabetes Prevention Program: Healthy Living Partnerships to Prevent Diabetes. *American Journal of Preventive Medicine*. 2013;44(4 Suppl 4):S381-389.
46. Le HN, Gold L, Abbott G, et al. Economic evaluation of price discounts and skill-building strategies on purchase and consumption of healthy food and beverages: The SHELF randomized controlled trial. *Soc Sci Med*. 2016;159:83-91.
47. McCollister KE, Scott CK, Dennis ML, Freitas DM, French MT, Funk RR. Economic costs of a postrelease intervention for incarcerated female substance abusers: Recovery management checkups for women offenders (RMC-WO). *Journal of Offender Rehabilitation*. 2014;53(7):543-561.
48. Meenan RT, Anderson ML, Chubak J, et al. An economic evaluation of colorectal cancer screening in primary care practice. *American Journal of Preventive Medicine*. 2015;48(6):714-721.
49. Meenan RT, Stumbo SP, Yarborough MT, Leo MC, Yarborough BJ, Green CA. An Economic Evaluation of a Weight Loss Intervention Program for People with Serious Mental Illnesses Taking Antipsychotic Medications. *Administration & Policy in Mental Health*. 2016;43(4):604-615.
50. Mirambeau AM, Wang G, Ruggles L, Dunet DO. A cost analysis of a community health worker program in rural Vermont. *Journal of Community Health*. 2013;38(6):1050-1057.
51. Ngalesoni F, Ruhago G, Mayige M, et al. Cost-effectiveness analysis of population-based tobacco control strategies in the prevention of cardiovascular diseases in Tanzania. *PLoS One*. 2017;12(8):e0182113.

52. Oti SO, van de Vijver S, Gomez GB, et al. Outcomes and costs of implementing a community-based intervention for hypertension in an urban slum in Kenya. *Bull World Health Organ.* 2016;94(7):501-509.
53. Page TF, Batra A, Ghouse MM, Palmer RC. Implementation cost analysis of a community-based exercise program for seniors in South Florida. *Health Promot Pract.* 2014;15(4):585-591.
54. Peterson C, Grosse SD, Glidewell J, et al. A public health economic assessment of hospitals' cost to screen newborns for critical congenital heart disease. *Public Health Rep.* 2014;129(1):86-93.
55. Radcliff TA, Bobroff LB, Lutes LD, et al. Comparing Costs of Telephone vs Face-to-Face Extended-Care Programs for the Management of Obesity in Rural Settings. *Journal of the Academy of Nutrition & Dietetics.* 2012;112(9):1363-1373.
56. Reed SD, Li Y, Oddone EZ, et al. Economic evaluation of home blood pressure monitoring with or without telephonic behavioral self-management in patients with hypertension. *American Journal of Hypertension.* 2010;23(2):142-148.
57. Ritzwoller DP, Glasgow RE, Sukhanova AY, et al. 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.
58. 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;9:46.
59. Ruger JP, Weinstein MC, Hammond S, Kearney MH, Emmons KM. Cost-effectiveness of motivational interviewing for smoking cessation and relapse prevention among low-

- income pregnant women: A randomized controlled trial. *Value in Health*. 2008;11(2):191-198.
60. Sari N, Muhajarine N, Froehlich Chow A. The Saskatchewan/New Brunswick Healthy Start-Depart Sante intervention: implementation cost estimates of a physical activity and healthy eating intervention in early learning centers. *BMC Health Services Research*. 2017;17(1):57.
61. Schechter CB, Walker EA, Ortega FM, Chamany S, Silver LD. Costs and effects of a telephonic diabetes self-management support intervention using health educators. *J Diabetes Complications*. 2016;30(2):300-305.
62. Sevick MA, Miller GD, Loeser RF, Williamson JD, Messier SP. Cost-effectiveness of exercise and diet in overweight and obese adults with knee osteoarthritis. *Medicine & Science in Sports & Exercise*. 2009;41(6):1167-1174.
63. Shepard DS, Daley MC, Neuman MJ, Blaakman AP, McKay JR. Telephone-based continuing care counseling in substance abuse treatment: Economic analysis of a randomized trial. *Drug and Alcohol Dependence*. 2016;159:109-116.
64. Shi JF, Chen JF, Canfell K, et al. Estimation of the costs of cervical cancer screening, diagnosis and treatment in rural Shanxi Province, China: a micro-costing study. *BMC Health Services Research*. 2012;12:123.
65. Shireman TI, Svarstad BL. Cost-effectiveness of Wisconsin TEAM model for improving adherence and hypertension control in black patients. *Journal of the American Pharmacists Association: JAPhA*. 2016;56(4):389-396.

66. Shokar NK, Byrd T, Lairson DR, et al. Against colorectal cancer in our neighborhoods, a community-based colorectal cancer screening program targeting low-income Hispanics: Program development and costs. *Health Promotion Practice*. 2015;16(5):656-666.
67. Simpson SH, Lier DA, Majumdar SR, et al. Cost-effectiveness analysis of adding pharmacists to primary care teams to reduce cardiovascular risk in patients with Type 2 diabetes: results from a randomized controlled trial. *Diabetic Medicine*. 2015;32(7):899-906.
68. Slade I, Hanson H, George A, et al. A cost analysis of a cancer genetic service model in the UK. *J Community Genet*. 2016;7(3):185-194.
69. Subramanian S, Ekwueme DU, Gardner JG, Bapat B, Kramer C. Identifying and controlling for program-level differences in comparative cost analysis: lessons from the economic evaluation of the National Breast and Cervical Cancer Early Detection Program. *Eval Program Plann*. 2008;31(2):136-144.
70. Subramanian S, Ekwueme DU, Gardner JG, Trogdon J. Developing and testing a cost-assessment tool for cancer screening programs. *Am J Prev Med*. 2009;37(3):242-247.
71. Subramanian S, Tangka FK, Beebe MC, Trebino D, Weir HK, Babcock F. The cost of cancer registry operations: Impact of volume on cost per case for core and enhanced registry activities. *Eval Program Plann*. 2016;55:1-8.
72. Subramanian S, Tangka FK, Hoover S, et al. Costs of planning and implementing the CDC's Colorectal Cancer Screening Demonstration Program. *Cancer*. 2013;119 Suppl 15:2855-2862.

73. Subramanian S, Tangka FK, Hoover S, Degroff A, Royalty J, Seeff LC. Clinical and programmatic costs of implementing colorectal cancer screening: evaluation of five programs. *Evaluation & Program Planning*. 2011;34(2):147-153.
74. Subramanian S, Tangka FK, Hoover S, et al. Recommendations From the International Colorectal Cancer Screening Network on the Evaluation of the Cost of Screening Programs. *J Public Health Manag Pract*. 2016;22(5):461-465.
75. Subramanian S, Tangka FKL, Hoover S, Royalty J, DeGroff A, Joseph D. Costs of colorectal cancer screening provision in CDC's Colorectal Cancer Control Program: Comparisons of colonoscopy and FOBT/FIT based screening. *Eval Program Plann*. 2017;62:73-80.
76. Tangka F, Subramanian S, Beebe MC, Trebino D, Michaud F. Economic assessment of central cancer registry operations, Part III: Results from 5 programs. *Journal of Registry Management*. 2010;37(4):152-155.
77. Tangka FK, Subramanian S, Bapat B, et al. Cost of starting colorectal cancer screening programs: results from five federally funded demonstration programs. *Prev Chronic Dis*. 2008;5(2):A47.
78. Tangka FK, Subramanian S, Beebe MC, et al. Cost of Operating Central Cancer Registries and Factors That Affect Cost: Findings From an Economic Evaluation of Centers for Disease Control and Prevention National Program of Cancer Registries. *J Public Health Manag Pract*. 2016;22(5):452-460.
79. Tangka FKL, Subramanian S, Hoover S, et al. Costs of promoting cancer screening: Evidence from CDC's Colorectal Cancer Control Program (CRCCP). *Eval Program Plann*. 2017;62:67-72.

80. Tani K, Exavery A, Baynes CD, et al. Unit cost analysis of training and deploying paid community health workers in three rural districts of Tanzania. *BMC Health Services Research*. 2016;16:237.
81. Trogdon JG, Ekwueme DU, Subramanian S, Crouse W. Economies of Scale in Federally-Funded State-Organized Public Health Programs: Results from the National Breast and Cervical Cancer Early Detection Programs. *Health Care Management Science*. 2014;17(4):321-330.
82. Troyer JL, McAuley WJ, McCutcheon ME. Cost-effectiveness of medical nutrition therapy and therapeutically designed meals for older adults with cardiovascular disease. *Journal of the American Dietetic Association*. 2010;110(12):1840-1851.
83. van Eeden M, Kootker JA, Evers SM, van Heugten CM, Geurts AC, van Mastrigt GA. An economic evaluation of an augmented cognitive behavioural intervention vs. computerized cognitive training for post-stroke depressive symptoms. *BMC Neurol*. 2015;15:266.
84. van Wier MF, Dekkers JC, Bosmans JE, et al. Economic evaluation of a weight control program with e-mail and telephone counseling among overweight employees: a randomized controlled trial. *Int J Behav Nutr Phys Act*. 2012;9:112.
85. Wafula CO, Edwards N, Kaseje DC. Contextual variations in costs for a community health strategy implemented in rural, peri-urban and nomadic sites in Kenya. *BMC Public Health*. 2017;17(1):224.
86. Wang H, Li T, Siahpush M, Chen LW, Huberty J. Cost-Effectiveness of Ready for Recess to Promote Physical Activity in Children. *Journal of School Health*. 2017;87(4):278-285.

87. Wansink HJ, Drost R, Paulus ATG, et al. Cost-effectiveness of preventive case management for parents with a mental illness: a randomized controlled trial from three economic perspectives. *BMC Health Serv Res.* 2016;16:228.
88. Wilson KJ, Brown H, Bastida E. Cost-effectiveness of a community-based weight control intervention targeting a low-socioeconomic-status Mexican-origin population. *Health Promotion Practice.* 2015;16(1):101-108.
89. Xu X, Yonkers KA, Ruger JP. Costs of a motivational enhancement therapy coupled with cognitive behavioral therapy versus brief advice for pregnant substance users. *PLoS One.* 2014;9(4):e95264.
90. Yang J, Wei WQ, Niu J, et al. Estimating the costs of esophageal cancer screening, early diagnosis and treatment in three high risk areas in China. *Asian Pacific Journal of Cancer Prevention: Apjcp.* 2011;12(5):1245-1250.
91. Young L, Zimmerman L, Pozehl B, Barnason S, Wang H. Cost-effectiveness of a symptom management intervention: improving physical activity in older women following coronary artery bypass surgery. *Nursing Economics.* 2012;30(2):94-103.
92. Zarkin G, Bray J, Hinde J, Saitz R. Costs of screening and brief intervention for illicit drug use in primary care settings. *J Stud Alcohol Drugs.* 2015;76(2):222-228.
93. Zhang SX, Shoptaw S, Reback CJ, Yadav K, Nyamathi AM. Cost-effective way to reduce stimulant-abuse among gay/bisexual men and transgender women: a randomized clinical trial with a cost comparison. *Public Health.* 2018;154:151-160.