

Bringing Healthy Aging to Scale: A Randomized Trial of a Quality Improvement Intervention to Increase Adoption of Evidence-Based Health Promotion Programs by Community Partners

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ABSTRACT

Objective: To evaluate the effectiveness of a quality improvement intervention to increase delivery of 2 evidence-based health promotion workshops, *Stepping On* and *Chronic Disease Self-Management Program (CDSMP)*, in rural communities.

Design: A cluster-randomized wait-list control group design.

Setting: Rural Wisconsin counties with trained workshop leaders but no workshops in the prior year were eligible to participate.

Intervention: Sixteen counties were randomized to receive the NIATx intervention or wait-list control. The 1-year intervention consisted of training and coaching county aging unit staff to apply NIATx methods to increase and sustain the number of *Stepping On* or CDSMP workshops in their community.

Main Outcomes: Mann-Whitney tests examined effect on workshops held, participants, and workshop completers. The paired Wilcoxon signed rank test explored change in participants' health behaviors and health care utilization.

Results: Counties receiving the NIATx intervention significantly increased the number of workshops per county per year as compared with baseline (1.5 vs 0.19, $P < .001$) and sustained improvements during the year following the intervention. *Stepping On* participants, during the 6 months postintervention, had reduced falls risk behaviors ($P < .001$), 0.43 fewer falls ($P < .01$), and 0.028 fewer medical record-verified emergency department visits for falls-related injuries ($P < .05$) compared with the 6 months before the intervention. CDSMP participants had reduced social isolation ($P = .018$) and improved physician communication skills ($P = .005$).

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There were no financial conflicts. At the time of the study, Dr Mahoney served as the unpaid executive director of the Wisconsin Institute for Health Agency (WIHA) and Dr Abramson was employed by WIHA as the deputy director. The Wisconsin Institute for Healthy Aging is the permanent home for several evidence-based health promotion programs including *Stepping On* and CDSMP, which support its mission to advance the spread of evidence-based health promotion programs that encourage and support healthy aging in Wisconsin.

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Implications: Our study demonstrates that coaching rural service organizations in use of the quality improvement process, NIATx, may increase implementation reach of evidence-based health promotion/disease prevention programs. Initiative findings indicate that this approach may be a new and potentially important strategy to increase reach of health promotion programs for older adults in community settings.

Conclusion: A quality improvement approach effectively increases and sustains delivery of evidence-based health promotion/workshops for older adults in rural communities. Counties or states struggling to engage older adults in evidence-based health promotion workshops could integrate quality improvement into policies and practices to increase workshop availability. Once engaged, older adults experience improved health behaviors from both programs and reduced falls and emergency department utilization from Stepping On.

KEY WORDS: Chronic Disease Self-Management Program, evidence-based health promotion and prevention programs, implementation and sustainability, quality improvement, rural counties, Stepping On

With the aging of the baby boomers, the burden of disease and medical costs of caring for older adults are expected to increase sharply.^{1–3} The population of older adults (aged 65+ years) in the United States is projected to increase by almost 30 million in the next 20 years.⁴ The “graying” of America affects rural areas even more than urban areas, as older adults represent a larger percentage of population in rural settings than in urban settings.⁵ In Wisconsin, the population is aging faster than the national average. According to Wisconsin Department of Health Services (DHS) estimates,⁶ older adults (aged 65+ years) represent 18.5% of the population living in rural counties as compared with 14.3% in urban counties. By 2040, the gap will be even more apparent, as 28.1% of older adults will reside in rural counties versus 22.1% in urban counties.

As of October 1, 2016, the federal Administration for Community Living requires that states use Older Americans Act Title III-D funds only for the highest tier (as determined by the Administration on Aging) evidence-based health promotion/disease prevention programs (henceforth referred to as health promotion) addressing issues such as falls prevention and chronic disease self-management for older adults.^{7–9} Evidence shows that small-group, community-based self-management programs can reduce falls and decrease health care utilization and costs from chronic disease. The *Bringing Healthy Aging to Scale (BHAS)* project focused on 2 such programs: *Stepping On* and Stanford University’s *Chronic Disease Self-Management Program (CDSMP)*, both of which have been designated by the US Administration for Community Living as the highest tier.^{10,11} *Stepping On* is a falls prevention program that empowers older adults to engage in behavior changes that reduce the risk of falls. Promoted by the Center for Disease Control and Prevention (CDC),¹² it is a multifactorial program that uses self-efficacy theory and adult education principles to address 5 critical falls prevention domains: strength and balance exercises, review of medications, home modification, community

mobility, and vision.^{13,14} CDSMP has been widely used internationally, with materials available in 17 languages. Both have shown excellent results from randomized-controlled trials,^{10,11,15} including significant reductions in emergency department visits, hospitalizations, and physician visits; improvements in self-reported health and physician communication; and reduced health distress with dissemination.^{16–18} In addition, each program shows significant net cost savings.^{19,20}

Evidence suggests that the reach of CDSMP is poor; only 100 000 persons nationwide attended a self-management program over a 2-year period.^{21,22} In Wisconsin, dissemination efforts of programs such as CDSMP and *Stepping On* have not yet reached even 2% of the older adult population. A 2011 CDC report concluded that despite evidence of effectiveness, a “wide-scale implementation” effort is needed to reach out to and engage individuals in CDSMPs.²³ While reach for health promotion programs is poor overall, rural areas face unique challenges. The difficulty in engaging older adults in rural areas to participate in evidence-based health promotion programs has been well documented.^{24–26} The Wisconsin Institute for Healthy Aging (WIHA), a nonprofit organization, disseminates high-level evidence-based health promotion programs, including CDSMP and *Stepping On*, to Wisconsin’s 72 counties and 11 tribes. These programs, in Wisconsin, are often offered through the county/tribal aging unit or the Aging and Disability Resource Center (ADRC). Agencies in these governmental entities, especially in rural locations, however, may not have adequate financial or staff resources to implement evidence-based health promotion programs. Furthermore, community-based recruitment efforts in rural areas are not always effective.²⁷

The NIATx model, a tested and proven approach to quality improvement, is built on 5 key organizational change principles.^{28–31} The principles focus on (a) understanding the customer, (b) fixing key problems, (c) choosing the right change leader, (d) getting ideas from outside the field, and (e) using

Plan-Do-Study-Act (PDSA) change cycles. Organizations with support from process improvement coaches are taught how to effectively utilize PDSA cycles to quickly test new ideas designed to meet customer needs without investing time in developing complex changes that later may prove to be ineffective.³²⁻³⁴ Coaching supports are provided in learning sessions, one-on-one coaching, and group coaching calls. The Wisconsin Bureau of Aging and Disability Resources and the Greater Wisconsin Agency on Aging Resources have successfully used the NIATx model to improve services provided by Wisconsin's county and tribal aging units (eg, timeliness of service delivery for home-delivered meals). However, NIATx has not been employed previously either in Wisconsin or nationally to improve implementation of evidence-based health promotion programs for older adults. Given the concerns about reach of Stepping On and CDSMP in rural communities, the BHAS project sought to utilize the NIATx model to increase the rural county aging unit staff's ability to increase the number of Stepping On and CDSMP workshops in their communities.

The primary objective of the BHAS project was to evaluate the effectiveness of the NIATx model in increasing the number of older adults participating in Stepping On and CDSMP in rural Wisconsin counties. The secondary objective was to demonstrate the benefits of Stepping On and CDSMP to reduce falls, improve health-related behaviors, and reduce emergency department visits and hospitalizations for individuals in rural counties at risk for falls or who had a chronic condition.

Methods

Study design

The study utilized a cluster-randomized wait-list control group design. Rural counties that had trained Stepping On or CDSMP leaders but had not implemented a workshop in one or the other program in the year prior to the study were eligible to participate. Rural counties were defined as counties that were not part of a federally designated Metropolitan Statistical Area (MSA), or had part of an MSA, but had fewer than 20 people aged 60+ years per square mile. From the 40 eligible counties, 17 responded to our invitation to participate in the study. Prior to randomization, 1 county withdrew. The remaining 16 counties were randomized using a block design. Counties were blocked by the program that would be the focus of the quality improvement intervention (Stepping On or CDSMP). Within each block, counties ($N = 16$) were assigned randomly into 1 of 2 groups: (1) year 1 BHAS intervention (cohort 1-8 counties); or

(2) wait-list control for 1 year, followed by BHAS intervention in year 2 (cohort 2-8 counties). During their intervention year, counties received funding (\$2500), training in the NIATx model, and 1 year of coaching to implement either Stepping On or CDSMP.

BHAS intervention

Preparatory to the BHAS intervention, each county chose 1 change leader who then identified a change team, consisting of stakeholders from within the aging unit and other community organizations that may be instrumental in program implementation. The change team was expected to formulate and carry out multiple PDSA cycles over 1 year to implement at least 1 workshop, and preferably more, in the county. These efforts included building interorganizational networks within their community to provide support to host the workshops.

The BHAS intervention relied primarily on coaching, the most cost-effective NIATx implementation strategy.³⁵ The BHAS coaches were 2 WIHA staff and a Wisconsin DHS public health educator. Coaches received 1-week training by 2 experienced NIATx trainers to coach rural counties to use NIATx to implement workshops. The NIATx trainers supported the BHAS coaches and monitored fidelity to the NIATx model.

The BHAS intervention consisted of 4 components. An introductory webinar educated the change leaders about the NIATx model.³³ A site visit followed where the BHAS coach reviewed the NIATx model and overall project objectives, discussed county prevention efforts, worked with the change team to identify successful and unsuccessful strategies for implementing evidence-based health promotion programs in the past, and coached the team to develop a change project to support implementation of Stepping On or CDSMP workshops in their county. In monthly phone calls (12 in total) between the BHAS coach and the change leader and the change team, the BHAS coach offered individualized assistance with using the NIATx model to increase implementation of workshops. Additional coach-led calls promoted peer-to-peer sharing of ideas across intervention counties and discussed the development of sustainability plans.

Study Protocol and Measures

Implementation outcomes

Implementation outcomes for each county were the number of completed workshops, participants enrolled in workshops, and participants who completed

workshops. Workshop completion was defined as attending 5 of 7 sessions for Stepping On and 4 of 6 sessions for CDSMP. Implementation outcome data were collected in each county at 3 time points: (1) the baseline year prior to study participation; (2) the end of year 1; and (3) the end of year 2.

Participant demographics and outcomes

Participant demographics were collected at the time of workshop enrollment. Stepping On workshop participants completed the 24-item Falls Behavioral Risk Scale,^{11,36} provided data on the number of falls, and reported on the number of emergency department visits and hospitalizations that were falls related. CDSMP participants assessed social/role activity limitations and physician communication comfort level.^{10,37} Participants in both programs also self-reported on the number of emergency department visits, hospitalizations, and overnight hospital stays in the 6 months prior. Outcomes were collected prior to the start of the workshop (pre) and 6 months after workshop completion (post). Upon workshop completion, participants were asked to sign a medical record release to allow the research team to verify emergency department visits and hospitalizations. Data on emergency department and hospitalization outcomes are based on participant self-reports and medical record-verified data.

Analytical approach

The implementation outcomes analysis tested the effectiveness of the BHAS intervention to improve and sustain the number of Stepping On and CDSMP workshops offered and the number of participants enrolling in and completing these workshops for older adults residing in rural Wisconsin counties. The analysis for participant outcomes examined whether workshop participation improves falls risk behaviors (for Stepping On) or social interactions and physician communication about individuals' chronic disease (for CDSMP) among older rural residents. Health care utilization reductions (self-reported and medical record-verified) were evaluated for older adults completing either the Stepping On workshop or the CDSMP workshop.

Differences in participant demographics for Stepping On as compared with CDSMP workshops were explored (see Table, Supplemental Digital Content 1, available at <http://links.lww.com/JPHMP/A260> for details). Descriptive statistics provided information about the average change in the primary outcomes. An intent-to-treat analysis evaluated implementation hypotheses using nonparametric Mann-Whitney tests.

Changes in Falls Behavior Risk, Social Interactions, and Physician Communication Scale were analyzed using paired *t* test, with each pair being the pre- and post assessment for the same rural resident. Distribution of health care utilization and falls indicated that not every participant had a fall, emergency department visit, or overnight hospital stay. Paired Wilcoxon signed rank test examined improvements in these outcomes for older adults who completed the workshops. Significance was set at .05. A comparison of self-reported versus medical record-verified health care utilization was conducted. The UW Health Sciences institutional review board approved the study.

Results

Implementation outcomes

Sixteen rural Wisconsin counties participated in the BHAS initiative (see Table, Supplemental Digital Content 2, available at: <http://links.lww.com/JPHMP/A261>, for details). The BHAS intervention was delivered to 8 counties in year 1 (cohort 1) and 8 counties in year 2 (cohort 2) (see Table, Supplemental Digital Content 3, available at: <http://links.lww.com/JPHMP/A262>, for details on actual workshop and participant counts). Receipt of the BHAS intervention (Table 1) was associated with a significant pre-post increase in the number of workshops (average change = 1.31 workshops per county per year, $P < .001$), older adults participating in the workshops (average increase per county per year = 12.81 participants, $P < .001$), and older adults completing the workshops (average increase per county per year = 9.75 completers, $P < .001$).

The intervention counties implemented more workshops on average than the wait-list control counties (Table 2), resulting in a significant increase in the number completing (7.62, $P = .05$) the workshops per year. These results suggest that the BHAS intervention is more effective than usual practice in increasing the number of older adults completing Stepping On or CDSMP workshops in a county.

We also examined whether cohort 1 counties could sustain the improvements made in year 1 into year 2. Results suggest that the intervention effects were sustained into year 2 (see Table, Supplemental Digital Content 4, available at: <http://links.lww.com/JPHMP/A263>).

The counties implemented PDSA change cycles to increase workshops and workshop attendance. The PDSA change cycles self-reported by the counties focused on marketing, health care provider and ADRC staff engagement, identification and training of new leaders, or project-specific activities (see Table,

TABLE 1
Impact of Implementing the BHAS Intervention on BHAS Outcomes

BHAS Outcome (Number of)	Baseline Year, Mean (SD)	Intervention Year, Mean (SD)	Change Baseline vs Intervention Year ^a	N per Group	Paired Mann-Whitney U Test
Workshops	0.19 (0.40)	1.50 (0.73)	1.31	16	Z = -4.35 (P < .001)
Participants	2.44 (5.69)	15.25 (9.34)	12.81	16	Z = -3.90 (P < .001)
Completers	1.56 (3.56)	11.31 (7.49)	9.75	16	Z = -3.96 (P < .001)

Abbreviation: BHAS, Bringing Healthy Aging to Scale.

^aBaseline year is from August 1, 2011, to July 31, 2012, for cohort 1 and August 1, 2012, to July 31, 2013, for cohort 2. Intervention year for cohort 1 is from August 1, 2012, to July 31, 2013, and from August 1, 2013, to July 31, 2014, for cohort 2.

Supplemental Digital Content 5, available at: <http://links.lww.com/JPHMP/A264>, for complete details).

Participant outcomes

We examined the change in participants' falls risk behavior (Stepping On) and perceived social role activity limitations, as well as physician communication comfort level (CDSMP), in association with workshop attendance. We found significant improvements in all 3 measures. (see Table Supplemental Digital Content 6, available at: <http://links.lww.com/JPHMP/A265>).

Stepping On workshop participants reported a significant reduction in the number of falls ($\Delta = -0.429$, $P < .001$) during the 6 months after completion of the workshop compared with the 6 months before. Self-reported and medical record-verified emergency department visits related to a fall significantly declined for Stepping On participants (Table 3). The average per person reduction in falls-related emergency department visits was -0.05 visits per 6-month period ($P < .01$) by participant self-report and -0.03 visits ($P < .05$) by medical record verification.

A secondary analysis used a related-sample Kendall coefficient of concordance test to compare the distribution of the changes in self-reported versus medical record-verified emergency department visits

and hospitalization. The results (not shown) found no significant difference between the 2 distributions.

Discussion

Study results indicate that the BHAS intervention (training and coaching in use of the NIATx quality improvement model, and funding) helped rural counties increase the number of workshops in Stepping On or CDSMP and, as a result, provided greater opportunity for older adults to participate in and complete these evidence-based health promotion programs. Participants reported improvements in their falls risk behavior with fewer self-reported falls, as well as fewer falls resulting in an emergency department visit. This is the first study to show a reduction in emergency department utilization due to falls in association with Stepping On workshop participation. CDSMP workshop participants benefited through improved social interactions and physician communication.

To our knowledge, the BHAS initiative represents the first use of the NIATx quality improvement model, which was originally developed for quality improvement in addiction treatment agencies,³² as a strategy to increase adoption and implementation of evidence-based health promotion programs for older adults in

TABLE 2
Cohort 1 vs Cohort 2 Counties: Difference in BHAS Outcome Improvements (Hypothesis B)

BHAS Outcome (Change in Number of)	Cohort 1 Counties, ^a Mean (SD)	Cohort 2 Counties, ^b Mean (SD)	Cohort 1 – Cohort 2 Difference	N per Group	2-Sample Mann-Whitney U Test
Workshops	1.38 (0.92)	0.50 (0.76)	0.88	8	Z = -1.95 (P = .065)
Participants	14.13 (11.19)	3.00 (7.87)	11.13	8	Z = -1.87 (P = .065)
Completers	10.25 (7.85)	2.63 (4.78)	7.62	8	Z = -1.98 (P = .050)

Abbreviations: BHAS, Bringing Healthy Aging to Scale; CDSMP, Chronic Disease Self-Management Program.

^aCohort 1 counties included Columbia, Marquette, and Oneida/Vilas counties (CDSMP) and Bayfield, Iowa, Richland, Sawyer, and St Croix counties (Stepping On).

^bCohort 2 counties included Buffalo/Pepin, Jackson, Juneau, Pierce, Sauk, and Vernon (CDSMP) and Kewaunee and Rusk (Stepping On).

TABLE 3
Stepping On and CDSMP Workshop Participants Prior 6 Months Falls and Health Care Utilization: Self-report vs Medical Record

	Participant Self-reported				Participant Medical Record–Verified ^a			
	Baseline, Mean (SD)	Intervention, Mean (SD)	Change Baseline vs Intervention	Paired Wilcoxon Signed Rank Test	Baseline, Mean (SD)	Intervention, Mean (SD)	Change Baseline vs Intervention	Paired Wilcoxon Signed Rank Test
Stepping On								
Falls	0.87 (1.54)	0.45 (1.05)	– 0.429	Z = 3.98 ^b				
ED visits for a fall	0.07 (0.25)	0.02 (0.17)	– 0.052	Z = 2.50 ^c	0.028 (0.16)	0.000 (0.00)	– 0.028	Z = 2.24 ^d
Hospitalizations	0.02 (0.13)	0.01 (0.15)	0.006	Z = 0.38	0.005 (0.08)	0.00 (0.00)	– 0.005	Z = 1.00
Number of overnight hospital stays	0.21 (1.69)	0.06 (0.77)	0.148	Z = 0.94	0.032 (0.44)	0.00 (0.00)	– 0.032	Z = 1.00
CDSMP								
ED visits	0.36 (0.77)	0.27 (0.72)	– 0.09	Z = 1.07	0.088 (0.35)	0.048 (0.21)	– 0.04	Z = 1.35
Hospitalizations	0.18 (0.53)	0.08 (0.29)	– 0.10	Z = 1.93	0.068 (0.42)	0.048 (0.21)	– 0.02	Z = 0.37
Number of overnight hospital stays	0.46 (2.09)	0.18 (1.02)	– 0.28	Z = 1.45	0.299 (1.77)	0.163 (0.84)	– 0.136	Z = 0.85

Abbreviations: CDSMP, Chronic Disease Self-Management Program; ED, emergency department.
^aParticipant falls (non-ED visit) were only self-reported by the Stepping On workshop participants.
^bp < .001; ^cp < .01; ^dp < .05.

the community setting. The results complement existing research that shows that engaging and supporting health care organizations within a quality improvement collaborative through coaching constitute an effective implementation strategy³⁸⁻⁴³ and extends these findings to community-based service organizations. In addition, our study demonstrates the first published use of the NIATx model to implement interorganizational (across), rather than intraorganizational (within), change. The BHAS intervention highlights the importance of training and coaching county aging unit staff both in building interorganizational networks and in addressing organizational and community barriers to implementation through use of PDSA cycles.

Results also provide empirical evidence that engaging county aging units in a quality improvement collaborative supports the sustainment of improvements for a 12-month period after the intervention ends.⁴⁴ Future research should seek to understand what internal and external factors influence sustainability beyond the implementation period.

When a rural county successfully hosted a workshop, the participants clearly benefited. Older adults completing the Stepping On workshop experienced improved falls risk behaviors and reduced falls. Our findings are consistent with studies examining the impact and cost-effectiveness of Stepping On.^{11,19,45,46} Our data are the first to demonstrate a reduction in emergency department utilization for falls. The reduction in emergency department utilization was shown for both self-reported and medical record–verified visits, strengthening the evidence that completion of Stepping On reduces emergency department utilization for falls.

Our findings are consistent with other evidence that participation by older adults in CDSMP reduces social isolation and improves physician communication skills.^{47,48} The impact of CDSMP workshop completion on health care utilization, hospitalizations and emergency department visits, is mixed. In some studies, CDSMP completion leads to reduced health care utilization,^{10,16,18,49} whereas our study like others found no evidence of an impact on health care utilization.^{50,51}

The study had several limitations. The overall sample size was small (N = 16 counties). Some counties needed to train new leaders. The wait for training opportunities delayed workshop implementation, potentially limiting the number of workshops delivered. We expected that control counties would show some increase in workshops and participants during their wait-list year, potentially through lessons learned either directly or indirectly from cohort 1 counties. The study design accounted for this “diffusion

Implications for Policy & Practice

- Beginning in 2016, the Administration for Community Living has mandated that Older Americans Act Title III-D funds be used only to implement highest-tier evidence-based health promotion/disease prevention programs.
- These programs have traditionally had poor reach.
- Our study demonstrates that coaching service organizations in use of the quality improvement process, NIATx, may increase program reach.
- The Bringing Healthy Aging to Scale initiative provides evidence that county staff participation in a quality improvement intervention with financial and coaching support is an effective implementation strategy to help rural counties increase and sustain the number of workshops, participants, and completers.
- While our study examined use of NIATx model in the context of 2 specific health promotion programs, Stepping On and CDSMP, our findings may be generalizable to other highest-tier health promotion programs, suggesting that coaching organizations to use NIATx may be a new and potentially important strategy to increase reach of health promotion programs for older adults in community settings.

or imitation of treatment” effect by comparing the change for the intervention (cohort 1) versus wait-list (cohort 2) counties across the same 12-month period. If diffusion to the cohort 2 counties existed during their wait-list control year, then the true effect would have been even larger than that seen in our analysis. The study did not explore the cost benefit of the BHAS intervention. While evidence showed that sustainable improvement was achievable for 1 year, the long-term impact and cost benefit of the BHAS initiative are unclear. While pre-post analysis showed that participants benefited from Stepping On and CDSMP, in the absence of a control group, causality cannot be definitively inferred. Finally, regarding outcomes associated with the workshops, participant loss to follow-up for medical record verification (30% nonresponse rate) or 6-month postworkshop survey (40% nonreturn rate) may have masked potentially significant changes in health care utilization.

References

1. Stevens JA, Corso PS, Finkelstein EA, Miller TR. The costs of fatal and non-fatal falls among older adults. *Inj Prev*. 2006;12(5):290-295.
2. Centers for Disease Control and Prevention. *The State of Aging and Health in America 2013*. Atlanta, GA: Centers for Disease Control and Prevention; 2013.
3. Hoffman C, Rice D, Sung HY. Persons with chronic conditions. Their prevalence and costs. *JAMA*. 1996;276(18):1473-1479.
4. Vincent GK, Velkoff VA. The next four decades, the older population in the United States: 2010 to 2050. In: *Current Population Reports*. Washington, DC: US Census Bureau; 2011:25-1138.
5. Ortman JM, Velkoff VA, Hogan H. *An Aging Nation: The Older Population in the United States*. Washington, DC: US Census Bureau; 2014:25-1140.
6. Demographics of aging in Wisconsin. <http://www.dhs.wisconsin.gov/aging/demographics/index.htm>. Published 2015. Accessed May 1, 2015.
7. Wiener J, Gage B, Rabiner D, Brown D, Maier J, Mitchell N. *Assessment of Title III-D of the Older Americans Act: Disease Prevention and Health Promotion Services*. Waltham MA: RTI International; 2006.
8. Kramer BJ, Vivrette RL, Rubenstein LZ. Engaging community-based organizations in fall prevention education. *Gerontol Geriatr Educ*. 2011;32(2):182-196.
9. Tilly J. The Administration on Aging's experiences with health, prevention, and wellness. *Generations*. 2010;34(1):20-25.
10. Lorig KR, Sobel DS, Stewart AL, et al. Evidence suggesting that a Chronic Disease Self-Management Program can improve health status while reducing hospitalization: a randomized trial. *Med Care*. 1999;37(1):5-14.
11. Clemson L, Cumming RG, Kendig H, Swann M, Heard R, Taylor K. The effectiveness of a community-based program for reducing the incidence of falls in the elderly: a randomized trial. *J Am Geriatr Soc*. 2004;52(9):1487-1494.
12. Stevens JA. *A CDC Compendium of Effective Fall Interventions: What Works for Community-Dwelling Older Adults*. Atlanta, GA: Division of Unintentional Injury Prevention, National Center for Injury Prevention and Control, Centers for Disease Control and Prevention; 2010.
13. Chase CA, Mann K, Wasek S, Arbesman M. Systematic review of the effect of home modification and fall prevention programs on falls and the performance of community-dwelling older adults. *Am J Occup Ther*. 2012;66(3):284-291.
14. Sleet DA, Moffett DB, Stevens J. CDC's research portfolio in older adult fall prevention: a review of progress, 1985-2005, and future research directions. *J Saf Res*. 2008;39(3):259-267.
15. Guse CE, Peterson DJ, Christiansen AL, Mahoney J, Laud P, Layde PM. Translating a fall prevention intervention into practice: a randomized community trial. *Am J Public Health*. 2015;105(7):1475-1481.
16. Ory MG, Ahn S, Jiang L, et al. Successes of a national study of the Chronic Disease Self-Management Program: meeting the triple aim of health care reform. *Med Care*. 2013;51(11):992-998.
17. Mahoney J, Clemson L, Lovarini M. Stepping On, a community-based falls prevention program. In: Malone M, Capezuti E, Palmer RM, eds. *Geriatrics Models of Care*. New York, NY: Springer; 2015:193-198.
18. Ahn S, Basu R, Smith ML, et al. The impact of chronic disease self-management programs: healthcare savings through a community-based intervention. *BMC Public Health*. 2013;13(1):1141.
19. Carande-Kulis V, Stevens JA, Florence CS, Beattie BL, Arias I. A cost-benefit analysis of three older adult fall prevention interventions. *J Saf Res*. 2015;52:65-70.
20. Ory MG, Smith ML, Patton K, Lorig K, Zenker W, Whitelaw N. Self-management at the tipping point: reaching 100,000 Americans with evidence-based programs. *J Am Geriatr Soc*. 2013;61(5):821-823.
21. Green T, Bertold J. NACCHO's national community of practice support for local evidenced-based Chronic Disease Self-Management Program. *J Public Health Manage Pract*. 2014;20(5):551-553.
22. Woodcock C. Building sustainable systems for the distribution and delivery of the Chronic Disease Self-Management Program. Paper presented at: 141st APHA Annual Meeting; November 2-6, 2013; Boston, MA.
23. Jacobs JA, Jones E, Gabella BA, Spring B, Brownson RC. Tools for implementing an evidence-based approach in public health practice. *Prev Chronic Dis*. 2012;9:E116.
24. Ory MG, Smith ML. Research, practice, and policy perspectives on evidence-based programming for older adults. *Front Public Health*. 2015;3:136.

25. Towne SD Jr, Smith ML, Ahn S, et al. National dissemination of multiple evidence-based disease prevention programs: reach to vulnerable older adults. *Front Public Health*. 2015;2:156.
26. Smith ML, Ory MG, Ahn S, et al. Reaching diverse participants utilizing a diverse delivery infrastructure: a replication study. *Front Public Health*. 2015;3:77.
27. Risendal B, Dwyer A, Seidel R, et al. Adaptation of the Chronic Disease Self-Management Program for cancer survivors: feasibility, acceptability, and lessons for implementation. *J Cancer Educ*. 2014;29(4):762-771.
28. Ford JH II, Green CA, Hoffman KA, et al. Process improvement needs in substance abuse treatment: admissions walk-through results. *J Subst Abuse Treat*. 2007;33(4):379-389.
29. Hoffman KA, Ford JH II, Choi D, Gustafson DH, McCarty D. Replication and sustainability of improved access and retention within the Network for the Improvement of Addiction Treatment. *Drug Alcohol Depend*. 2008;98(1/2):63-69.
30. Hoffman KA, Ford JH, Tillotson CJ, Choi D, McCarty D. Days to treatment and early retention among patients in treatment for alcohol and drug disorders. *Addict Behav*. 2011;36(6):643-647.
31. McCarty D, Gustafson DH, Wisdom JP, et al. The Network for the Improvement of Addiction Treatment (NIATx): enhancing access and retention. *Drug Alcohol Depend*. 2007;88(2/3):138-145.
32. Capoccia VA, Cotter F, Gustafson DH, et al. Making "Stone Soup": improvements in clinic access and retention in addiction treatment. *Jt Comm J Qual Patient Saf*. 2007;33(2):95-103.
33. Gustafson D, Johnson K, Capoccia V, et al. *The NIATx Model: Process Improvement in Behavioral Health*. Madison, WI: University of Wisconsin; 2011.
34. Hoffman KA, Green CA, Ford JH II, Wisdom JP, Gustafson DH, McCarty D. Improving quality of care in substance abuse treatment using five key process improvement principles. *J Behav Health Serv Res*. 2012;39(3):234-244.
35. Gustafson DH, Quanbeck AR, Robinson JM, et al. Which elements of improvement collaboratives are most effective? A cluster-randomized trial. *Addiction*. 2013;108(6):1145-1157.
36. Clemson L, Cumming RG, Heard R. The development of an assessment to evaluate behavioral factors associated with falling. *Am J Occup Ther*. 2003;57(4):380-388.
37. Lorig K. *Outcome Measures for Health Education and Other Health Care Interventions*. Thousand Oaks, CA: Sage; 1996.
38. Cornett A, Thomas M, Davis MV, et al. Early evaluation results from a statewide quality improvement training program for local public health departments in North Carolina. *J Public Health Manage Pract*. 2012;18(1):43.
39. Franco LM, Marquez L. Effectiveness of collaborative improvement: evidence from 27 applications in 12 less-developed and middle-income countries. *BMJ Qual Saf*. 2011;20(8):658-665.
40. MacLaurin A, McConnell H. Utilizing quality improvement methods to prevent falls and injury from falls: enhancing resident safety in long-term care. *J Saf Res*. 2011;42(6):525-535.
41. Sales AE, Bostrom A-M, Bucknall T, et al. The use of data for process and quality improvement in long term care and home care: a systematic review of the literature. *J Am Med Dir Assoc*. 2012;13(2):103-113.
42. Siminerio L, Zgibor J, Solano FX. Implementing the chronic care model for improvements in diabetes practice and outcomes in primary care: the University of Pittsburgh Medical Center experience. *Clin Diabetes*. 2004;22(2):54-58.
43. Wagner EH, Glasgow RE, Davis C, et al. Quality improvement in chronic illness care: a collaborative approach. *Jt Comm J Qual Improv*. 2001;27(2):63-80.
44. Mahoney JE. "Stepping On": stepping over the chasm from research to practice. *Front Public Health*. 2014;2:148.
45. Ory MG, Smith ML, Jiang L, et al. Fall prevention in community settings: results from implementing Stepping On in three states. *Front Public Health*. 2015;2:232.
46. Haas R, Haines TP. Twelve month follow up of a falls prevention program in older adults from diverse populations in Australia: a qualitative study. *Arch Gerontol Geriatr*. 2014;58(2):283-292.
47. Jonker AA, Comijs HC, Knipscheer KC, Deeg DJ. Benefits for elders with vulnerable health from the Chronic Disease Self-management Program (CDSMP) at short and longer term. *BMC Geriatr*. 2015;15(1):1.
48. 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;3:27.
49. Lorig KR, Ritter P, Stewart AL, et al. Chronic Disease Self-Management Program: 2-year health status and health care utilization outcomes. *Med Care*. 2001;39(11):1217-1223.
50. Lorig KR, Sobel DS, Ritter PL, Laurent D, Hobbs M. Effect of a self-management program on patients with chronic disease. *Eff Clin Pract*. 2000;4(6):256-262.
51. Brady TJ. A meta-analysis of health status, health behaviors, and health care utilization outcomes of the Chronic Disease Self-Management Program. *Prev Chronic Dis*. 2013;10:120112.