

1/5/2010

2010

Kraschnewski JL, Keyserling TC, Bangdiwala SI, Gizlice, Garcia BA, Johnston LF, Gustafson A, Petrovic L, Glasgow RE, Samuel-Hodge CD. Optimized Probability Sampling of Study Sites to Improve Generalizability in a Multisite Intervention Trial. Preventing Chronic Disease 2010;7(1):1-8.

2009

Bakken S, Ruland CM. Translating clinical informatics interventions into routine clinical care: how can the RE-AIM framework help? J Am Med Inform Assoc. 2009 Nov-Dec;16(6):889-97. Epub 2009 Aug 28.

ABSTRACT

Objective: Clinical informatics intervention research suffers from a lack of attention to external validity in study design, implementation, evaluation, and reporting. This hampers the ability of others to assess the fit of a clinical informatics intervention with demonstrated efficacy in one setting for implementation in their setting. The objective of this model formulation paper is to demonstrate the applicability of the RE-AIM (Reach, Effectiveness, Adoption, Implementation, and Maintenance) framework with proposed extensions to clinical informatics intervention research and describe the framework's role in facilitating the translation of evidence into practice and generation of evidence from practice. Both aspects are essential to reap the clinical and public health benefits of clinical informatics research.

Design: We expanded RE-AIM through the addition of assessment questions relevant to clinical informatics intervention research including those related to predisposing, enabling, and reinforcing factors and validated it with two case studies.

Results: The first case study supported the applicability of RE-AIM to inform real world implementation of a clinical informatics intervention with demonstrated efficacy in randomized controlled trials (RCTs)--the Choice (Creating better Health Outcomes by Improving Communication about Patients' Experiences) intervention. The second, an RCT of a personal digital assistant-based decision support system for guideline-based care, illustrated how RE-AIM can be used to inform the design of an efficacy RCT that captures essential contextual details typically lacking in RCT design and reporting.

Conclusion: The case studies validate, through example, the applicability of RE-AIM to inform the design, implementation, evaluation, and reporting of clinical informatics intervention studies.

Beck A, Bergman DA, Rahm AK, Dearing JW, Glasgow RE. Using Implementation and Dissemination Concept to Spread 21st Century Well-Child Care at a Health Maintenance Organization. Permanente Journal 2009;13(3):10-17.

ABSTRACT

We describe here the use of a conceptual framework for implementing and disseminating in a Health Maintenance Organization an evidence-based model of well-child care (WCC) that includes developmental and preventive services recommended by the American Academy of

Pediatrics. Twenty-first Century WCC is a parent-centered, team-based, primary care model that combines online pre-visit assessments—completed by parents and caregivers regarding clinic-based weight, growth, and development assessments—with vaccinations and anticipatory guidance. Nurses, nurse practitioners, developmental specialists, and pediatricians all play roles in the WCC model. Patient and clinician interaction, health records, and resources are all facilitated through a Web-based diagnostic, management, tracking, and resource information tool. Implementation and dissemination concepts and their attendant practices and tools can reliably be used to augment strategic decisions about how to best disseminate and implement innovations in health care delivery. Unlike innovations that are embedded only in technical systems, validated models of team-based health care have multiple components that must be made compatible with complex sociotechnical systems. Interpersonal communication, work, coordination, and judgment are key processes that affect implementation quality. Implementation can involve tailoring to a particular site and customizing either the model or the organizational context to accommodate it.

Bennett GG, Glasgow RE. The delivery of public health interventions via the Internet: Actualizing their potential. Ann Rev Public Health 2009;30:273-292.

ABSTRACT

The Internet increasingly serves as a platform for the delivery of public health interventions. The efficacy of Internet interventions has been demonstrated across a wide range of conditions. Much more work remains, however, to enhance the potential for broad population dissemination of Internet interventions. In this article, we examine the effectiveness of Internet interventions, with particular attention to their dissemination potential. We discuss several considerations (characterizing reach rates, minimizing attrition, promoting Web site utilization, use of tailored messaging and social networking) that may improve the implementation of Internet interventions and their associated outcomes. We review factors that may influence the adoption of Internet interventions in a range of potential dissemination settings. Finally, we present several recommendations for future research that highlight the potential importance of better understanding intervention reach, developing consensus regarding Web site usage metrics, and more broadly integrating Web 2.0 functionality.

Buis LR, Poulton TA, Holleman RG, Sen A, Resnick PJ, Goodrich DE, Palma-Davis L, Richardson CR. Evaluating Active U: an Internet-mediated physical activity program. BMC Public Health. 2009 Sep 10;9:331.

ABSTRACT

Background: Engaging in regular physical activity can be challenging, particularly during the winter months. To promote physical activity at the University of Michigan during the winter months, an eight-week Internet-mediated program (Active U) was developed providing participants with an online physical activity log, goal setting, motivational emails, and optional team participation and competition.

Methods: This study is a program evaluation of Active U. Approximately 47,000 faculty, staff, and graduate students were invited to participate in the online Active U intervention in the winter of 2007. Participants were assigned a physical activity goal and were asked to record each physical activity episode into the activity log for eight weeks. Statistics for program

reach, effectiveness, adoption, and implementation were calculated using the Re-Aim framework. Multilevel regression analyses were used to assess the decline in rates of data entry and goal attainment during the program, to assess the likelihood of joining a team by demographic characteristics, to test the association between various predictors and the number of weeks an individual met his or her goal, and to analyze server load.

Results: Overall, 7,483 individuals registered with the Active U website (approximately 16% of eligible), and 79% participated in the program by logging valid data at least once. Staff members, older participants, and those with a BMI < 25 were more likely to meet their weekly physical activity goals, and average rate of meeting goals was higher among participants who joined a competitive team compared to those who participated individually (IRR = 1.28, $P < .001$).

CONCLUSION: Internet-mediated physical activity interventions that focus on physical activity logging and goal setting while incorporating team competition may help a significant percentage of the target population maintain their physical activity during the winter months.

Dzewaltowski, D.A., Estabrooks, P.A., Welk, G., Hill, J., Milliken, G., Karteroliotis, K., & Johnston, J.A., (2009). Healthy Youth Places, A randomized controlled trial to determine the effectiveness of facilitating adult and youth leaders to promote physical activity and fruit and vegetable consumption. Health Educ Behav. 2009 June; 36(3): 583–600.

ABSTRACT

The Healthy Youth Places (HYP) intervention targeted increased fruit and vegetable consumption (FV) and physical activity (PA) through building the environmental change skills and efficacy of adults and youth. HYP included group training for adult school site leaders, environmental change skill curriculum, and youth-led FV and PA environment change team. Sixteen schools were randomized to either implement the HYP program or not. Participants ($n = 1582$) were assessed on FV and PA and hypothesized HYP program mediators (e.g., proxy efficacy) at the end of sixth grade (baseline), seventh grade (post intervention year one) and eighth grade (post intervention year two). After intervention, HYP schools did not change in FV but did significantly change in PA compared to control schools. Proxy efficacy to influence school physical activity environments mediated the program effects. Building the skills and efficacy of adults and youth to lead school environmental change may be an effective method to promote youth PA.

Dunton GF, Lagloire R, Robertson T. Using the RE-AIM framework to evaluate the statewide dissemination of a school-based physical activity and nutrition curriculum: "Exercise Your Options." Am J Health Promot. 2009 Mar-Apr;23(4):229-32.

ABSTRACT

Purpose: Examine the reach, efficacy, adoption, implementation, and maintenance of a physical activity and nutrition curriculum for middle-school students.

Design: Non-experimental pilot evaluation of a statewide dissemination trial.

Setting: California middle schools during the 2006 to 2007 school year.

Subjects: Sixteen classes ($N = 668$ students and 16 teachers) sampled from the statewide pool who used the program.

Intervention: An eight-lesson nutrition and physical activity curriculum, "Exercise Your Options" (EYO), including a teacher guide, video clips, a student activity booklet, and ancillary materials was made available to teachers.

Measures: Program records, classroom observations, teacher surveys, and student pre-surveys and postsurveys (assessing physical activity, sedentary behaviors, and dietary intake).

Analysis: Descriptive statistics and multilevel random-coefficient modeling.

Results: The EYO program reached 234,442 middle-school students in California. During the program, total physical activity increased ($p < .001$), whereas watching TV/DVDs and playing electronic games/computer use decreased ($p < .05$). Intake of dairy products increased ($p < .05$), whereas consumption of sugars/sweets decreased ($p < .001$). Forty-two percent of eligible middle-school classrooms ordered the program materials. Eighty-six percent of sampled teachers implemented all of the lessons. Over the past 5 years, 51% of all middle-school students in California were exposed to the program.

Conclusions: The EYO program showed its potential for moderate to high public health impact among California middle-school students.

Eakin E, Reeves M, Lawler S, Oldenburg B, Del Mar C, Wilke K, Winkler E, Barnett A. Telephone counseling for physical activity and diet in primary care patients. Am J Prev Med 2009;36(2):142-149.

ABSTRACT

Background: The delivery of effective interventions to assist patients to improve their physical activity and dietary behaviors is a challenge in the busy primary care setting.

Design: Cluster RCT with practices randomized to telephone counseling intervention or usual care. Data collection took place from February 2005 to November 2007, with analysis from December 2007 to April 2008.

Setting/participants: Four-hundred thirty-four adult patients with type 2 diabetes or hypertension (mean age_{58.2} [SD_{11.8}]; 61% female; mean BMI_{31.1} [SD_{6.8}]) from a disadvantaged community were recruited from ten primary care practices.

Intervention: Twelve-month telephone counseling intervention.

Main outcome measures: Physical activity and dietary intake were assessed by self-report at baseline, 4, and 12 months.

Results: At 12 months, patients in both groups increased moderate-to-vigorous physical activity by a mean of 78 minutes per week (SE₁₀). Significant intervention effects (telephone counseling minus usual care) were observed for: calories from total fat (decrease of 1.17%; $p_{0.007}$), energy from saturated fat (decrease of 0.97%; $p_{0.007}$), vegetable intake (increase of 0.71 servings; $p_{0.039}$), fruit intake (increase of 0.30 servings; $p_{0.001}$), and grams of fiber (increase of 2.23 g; $p_{0.001}$).

Conclusions: The study targeted a challenging primary care patient sample and, using a telephone-delivered intervention, demonstrated modest improvements in diet and in physical activity. Results suggest that telephone counseling is a feasible means of delivering lifestyle intervention to primary care patients with chronic conditions—patients whose need for ongoing support for lifestyle change is often beyond the capacity of primary healthcare practitioners.

Estabrooks P.A., Shoup J.A., Gattshall M.A., Dandamudi P., Shetterly S., & Xu S. The effectiveness of automated telephone counseling for parents of overweight children. Am J Prev Med 2009;36, 35-42.

ABSTRACT

Background: Interactive technologies have the potential to increase the reach and frequency of practical clinical interventions that assist the parents of overweight and at-risk children to promote healthy lifestyle behaviors for their families.

Design: A practical RCT evaluated the relative effectiveness of three interventions to support parents of overweight or at-risk children to change the home environment to foster more healthful child eating and activity behaviors, thereby reducing child BMI and BMI z-scores. A secondary purpose was to determine the patterns of use and potential dose effect for the highest-intensity intervention.

Setting/Participants: Parent-and-child (aged 8-12 years) dyads (N=220) who received care from Kaiser Permanente Colorado were assigned randomly to one of the three Family Connections (FC) interventions: FC-workbook, FC-group, or FC-interactive voice response (IVR) counseling.

Main Outcome Measures: Child BMI z-scores, as well as symptoms of eating disorders and body image, were assessed at baseline, 6 months, and 12 months.

Results: The BMI z-scores of children assigned to the FC-IVR intervention were the only ones that decreased from baseline to 6 months (0.07 SD) and from baseline to 12 months (0.08 SD, $p < 0.05$). Children whose parents completed at least six of the ten FC-IVR counseling calls had decreased BMI z-scores to a greater extent than children in the FC-workbook or FC-group interventions at both 6 months ($p < 0.05$) and 12 months ($p < 0.01$). No intervention increased child symptoms of eating disorders or body dissatisfaction at any time point.

Conclusions: This trial demonstrated that automated telephone counseling can support the parents of overweight children to reduce the extent to which their children are overweight.

Fees, B., Trost, S., Bopp, M., Dzewaltowski, D.A. (2009). Physical activity programming in family child care homes: Providers' perceptions of practices and barriers. Nutri Educ Behav, 41, 268-273.

ABSTRACT

Objective: To examine family child care home (FCCH) providers' perceptions of appropriate physical activity, (PA), current practices, and perceived barriers to inclusion of PA within their programs.

Design: A trained facilitator lead 4 focus group sessions of FCCH providers. Questions addressed providers' planning for PA, resources and barriers, and perceptions of children's engagement.

Setting: Family child care homes.

Participants: 32 FCCH providers (100% female) caring for children 6 weeks to 5 years old in predominantly mixed-age programs. mixed-age programs.

Phenomenon of Interest: Types of and extent to which PA was offered for children and perceived barriers to PA in this setting.

Analysis: Authors coded and analyzed transcriptions based on a socioecological framework using qualitative data analysis software.

Results: Majority of providers reported running and dancing to music as the most common PA, generally in an unstructured context. Frequency varied from none to twice a day. Few providers reported planning intentionally for PA; any plans followed children's interests.

Barriers to inclusion of PA included planning intentionally for PA; any plans followed children's interests. Barriers to inclusion of PA included personal, programming, parent, environmental, and financial reasons. Providers requested training on PA, particularly ideas for experiences in mixed-age groups.

Conclusions and Implications: Type, frequency, consistency, and duration of PA among FCCH homes vary widely. Implications include training on PA and resources tailored to the unique characteristics of family child care homes.

Glasgow RE, Gaglio B, Estabrooks PA, Marcus AC, Ritzwoller DP, Smith TL, Levinson AH, Sukhanova A, O'Donnell C, France EK. Long-Term Results of Smoking Reduction Program. Med Care 2009;47(1):115-120.

ABSTRACT

Introduction: There have been few comprehensive evaluations of smoking reduction, especially in health care delivery systems, and little is known about its cost, maintenance of reduced smoking, or robustness across patient subgroups.

Methods: A generally representative sample of 320 adult smokers from an HMO scheduled for outpatient surgery or a diagnostic procedure was randomized to enhanced usual care or a theory-based smoking reduction intervention that combined telephone counseling and tailored newsletters. Outcomes included cigarettes smoked, carbon monoxide levels, and costs.

Results: Both intervention and control conditions continued to improve from 3- to 12-month assessments. Between-condition differences using intent-to-treat analyses on both self-report and carbon monoxide measures were non-significant by the 12-month follow-up (25% vs. 19% achieved 50% or greater reductions in cigarettes smoked). The intervention was implemented consistently despite logistical constraints and was generally robust across patient characteristics (e.g., education, ethnicity, health literacy, dependence).

Conclusions: In the absence of nicotine replacement therapy, the long-term effects of this smoking reduction intervention seem modest and non-significant. Future research is indicated to enhance intervention effects and conduct more comprehensive economic analyses of program variations.

Glasgow RE. Critical Measure Issues in Translational Research. Res Social Work Pract 2009;19:560-568.

ABSTRACT

This article summarizes critical evaluation needs, challenges, and lessons learned in translational research. Evaluation can play a key role in enhancing successful application of research-based programs and tools as well as informing program refinement and future research. Discussion centers on what is unique about evaluating programs and policies for implementation impact (or potential for dissemination). Central issues reviewed include the importance of context and local issues, robustness and external validity issues, multiple levels of evaluation, implementation fidelity versus customization, choosing evaluation designs to fit questions, and who participates and characteristics of success at each stage of program recruitment, delivery, and outcome. The use of mixed quantitative and qualitative methods is especially important, and the primary redirection that is needed is to focus on questions of decision makers and potential adoptees rather than the research colleagues.

Glasgow RE, Edwards LL, Whitesides H, Carroll N, Sanders TJ, McCray BL. Reach and effectiveness of DVD and in-person diabetes self-management education. Chronic Illn. 2009 Nov 19. [Epub ahead of print]

ABSTRACT

Objectives: To evaluate the reach and effectiveness of a diabetes self-management DVD compared to classroom-based instruction. **METHODS:** A hybrid preference/randomized design was used with participants assigned to Choice v. Randomized and DVD v. Class conditions. One hundred and eighty-nine adults with type 2 diabetes participated. Key outcomes included self-management behaviours, process measures including DVD implementation and hypothesized mediators and clinical risk factors. **RESULTS:** In the Choice condition, four times as many participants chose the mailed DVD as selected Class-based instruction (38.8 v. 9.4%, $p < 0.001$). At the 6-month follow-up, the DVD produced results generally not significantly different than classroom-based instruction, but a combined Class plus DVD condition did not improve outcomes beyond those produced by the classes alone. **DISCUSSION:** The DVD appears to have merit as an efficient and appealing alternative to brief classroom-based diabetes education, and the hybrid design is recommended to provide estimates of programme reach.

Glasgow RE, King DK. Implications of Active Living by Design for Broad Adoption, Successful Implementation, and Long-term Sustainability. Am J Prev Med 2009;37(6S):S450-S451.

INTRODUCTORY PARAGRAPH

It is clear that there is a need to pay attention to the contextual factors that will promote the broad adoption, successful implementation and long-term sustainability of community-based environment and policy change. Reviews of both clinical and community-based interventions have shown that information about the intervention setting, how a program or policy is implemented, and how it is institutionalized are reported much less often than individual level factors. Thus, as best practices for Active Living are identified, there is an equally important opportunity to identify ways to assure that these best practices will be adopted, implemented and maintained.

Green LW, Glasgow RE, Atkins D, Stange K. The Slips 'twixt Cup and Lip: Getting Evidence from Science to Practice. Am J Prev Med 2009;37(6S1):S187-S191.

INTRODUCTION

The apparent loss of evidence between production and implementation has become a concern of legislators, research funding agencies, academic institutions, and professional associations alike. Researchers and journal reviewers exacerbate this slippage by emphasizing internal validity, often at the expense of the contextual factors that make science relevant to practice. As illustrated by the papers in this supplement to the *American Journal of Preventive Medicine*, 1-15 the contribution to this imbalance from researchers can be offset by their active engagement of the intended users and beneficiaries of the research in applying principles of community-based participatory research (CBPR). From proposed criteria and processes for assessing and reporting external validity, editors of 13 journals considered the tradeoffs in reporting external validity and made recommendations for action for

scientific review and publishing of research summarized here. Giving greater attention to external as well as internal validity, to practice-relevance as well as causal certainty, and to community context as well as rigor in data collection, all have potential to ensure that research improves science, policy, practice, and health outcomes.

Reid RD, Mullen KA, Slovinec D'Angelo ME, Aitken DA, Papadakis S, Haley PM, McLaughlin CA, Pipe AL. Smoking cessation for hospitalized smokers: An evaluation of the "Ottawa Model." Nicotine Tob Res. 2009 Nov 10. [Epub ahead of print]

ABSTRACT

Introduction: Interventions for hospitalized smokers can increase long-term smoking cessation rates. The Ottawa Model for Smoking Cessation (the "Ottawa Model") is an application of the "5 A's" approach to cessation, customized to the hospital setting. This study evaluated the impact of implementing the Ottawa Model in 9 hospitals in eastern Ontario.

Methods: The RE-AIM (Reach, Efficacy, Adoption, Implementation, and Maintenance) framework was used to evaluate the intervention. Trained outreach facilitators assisted 9 hospitals to implement the Ottawa Model; program delivery was then monitored over a 1-year period using administrative data and data from a follow-up database. A before-and-after study was conducted to gauge the effect of the Ottawa Model program on cessation rates 6 months after hospitalization. Self-reports of smoking cessation were biochemically confirmed in a random sample of patients, and all cessation rates were corrected for potential misreporting.

Results: Sixty-nine percent of the expected number of smokers received the Ottawa Model intervention. Controlling for hospital, the confirmed 6-month continuous abstinence rate was higher after, than before, introduction of the Ottawa Model (29.4% vs. 18.3%; odds ratio = 1.71, 95% CI = 1.11-2.64; $Z = 2.43$; $I(2) = 0\%$; $p = .02$). The intervention was more likely to accomplish counseling for smokers than delivery of medications or post-discharge follow-up. Attitudinal, managerial, and environmental challenges to program implementation were identified.

Discussion: Trained outreach facilitators successfully implemented the Ottawa Model in 9 hospitals leading to significantly higher long-term cessation rates. The public health implications of systematic cessation programs for hospitalized smokers are profound.

Smith-Ray R.L., Almeida F.A., Bajaj J., Foland S., Gilson M., Heikkinen S., Seagle H., & Estabrooks P.A. Translating efficacious behavioral principles for diabetes prevention into practice. Health Promo Pract 2009;10, 58-66.

ABSTRACT

This case study describes the process of translating efficacy-based Diabetes Prevention Program principles into a practical format for delivery within a managed care organization. Using Rogers' innovation-decision process model, the authors tracked the adoption, implementation, and short-term effectiveness of a clinical program. Effectiveness was documented using a pre-post design to detect changes in physical activity and dietary habits. Participants ($N = 298$) were Kaiser Permanente of Colorado patients enrolled in diabetes-prevention classes. Changes were analyzed using paired-samples t tests and one-way analysis of variance. Participants significantly increased reported minutes of moderate ($p < .001$, $\mu = 84.52$, $CI: 58.44-110.61$) and vigorous ($t = 2.220$, $p = .028$, $\mu = 19.05$, $CI: 2.10-36.00$) physical activity and their daily servings of fruits and vegetables ($p < .001$, $\mu = 0.20$, $CI:$

0.13-0.27). By identifying the underlying strategies that led to efficacy, professionals can implement sound diabetes-prevention programs that fit within their context.

White SM, McAuley E, Estabrooks PA, Courneya KS. Translating physical activity interventions for breast cancer survivors into practice: an evaluation of randomized controlled trials. Ann Behav Med. 2009 Feb;37(1):10-9. Epub 2009 Mar 3.

ABSTRACT

Background: Although physical activity (PA) interventions have been effective for improving health outcomes in breast cancer survivors, little is known relative to their potential for translation into practice.

Purpose: This review was designed to provide a quantitative estimate of the reporting of both internal and external validity in recent studies of PA in breast cancer survivors (BCS).

Methods: The Reach, Efficacy/Effectiveness, Adoption, Implementation, and Maintenance (RE-AIM) framework was utilized to assess the reporting of internal and external validity in 25 randomized controlled trials (RCTs) of PA and BCS published between 1998 and 2008. Each trial was evaluated relative to the degree it met criteria for each of the above dimensions.

Results: The majority of studies in this review reported dimensions reflecting internal validity. The overall level of detail relative to external validity of PA interventions was rarely reported, limiting the generalizability of study findings.

Conclusions: As with many RCTs of health behavior change, detail relative to contextual elements of published PA interventions in BCS is limited. It is recommended that future physical activity interventions in BCS be designed to facilitate scalable and sustainable interventions for improving health outcomes in this population.

2008

Coleman, K.J., Geller, K.S., Rosenkranz, R.R., Dzewaltowski, D.A.. (2008). Physical activity and healthy eating in the after-school environment. J School Health, 78(12), 633-640.

ABSTRACT

No research to date has extensively described moderate and vigorous physical activity (MVPA) and healthful eating (HE) opportunities in the after-school environment. The current study described the quality of the after-school environment for its impact on children's MVPA and HE.

An alliance of 7 elementary schools and Boys and Girls Clubs who worked with the Cooperative Extension Service in Lawrence, KS, was selected to participate in a larger intervention study. After-school settings were observed for information regarding session type, session context, leader behavior, physical activity, and snack quality using validated instruments such as the System for Observing Fitness Instruction Time. Data presented are baseline measures for all sites.

Participating children (n = 144) were primarily non-Hispanic white (60%) and in fourth grade (69%). After-school sites offered 4 different sessions per day (active recreation, academic time, nonactive recreation, and enrichment activities). Children were provided with a daily

snack. On 36% of the days observed, this snack included fruit, fruit juice, or vegetables. There was significantly more time spent in MVPA during free play sessions (69%) compared to organized adult-led sessions (51%). There was also significantly more discouragement of physical activity during organized adult-led sessions (29%) as compared to the free play sessions (6%).

The quality of after-school programs can be improved by providing fruits and vegetables as snacks; offering more free play activities; training the after-school staff in simple, structured games for use in a variety of indoor and outdoor settings; and training after-school staff to promote and model MVPA and HE in and out of the after-school setting.

de Meij JS, Chinapaw MJ, Kremers SP, van der Wal MF, Jurg MM, van Mechelen W. Promoting physical activity in children: the stepwise development of the primary school-based JUMP-in intervention applying the RE-AIM evaluation framework. Br J Sports Med. 2008 Nov 19. [Epub ahead of print]

ABSTRACT

Background: There is a lack of effective intervention strategies that promote physical activity (PA) in school children. Furthermore, there is a gap between PA intervention research and the delivery of programmes in practice. Evaluation studies seldomly lead to adaptations in interventions which are subsequently evaluated on a wider scale implementation. The stepwise development and study of JUMP-in aims to add knowledge to better understand how, when and for whom intervention effects (or lack of effects) occur.

Methods: This paper describes the stepwise development of JUMP-in, a Dutch school based multi-level intervention programme, aimed at the promotion of PA behaviour in 6 to 12-year-old children. JUMP-in incorporates education, sports, care and policy components. JUMP-in consists of six programme components: 1. Pupil Follow Up Monitoring System; 2. School sports clubs; 3. In-class exercises with "The Class Moves!"; 4. Personal workbook "This is the way you move!"; 5. Parental Information services; 6. Extra lessons physical education, Motor Remedial Teaching and extra care. The process- and effect outcomes of a pilot study were translated into an improved programme and intervention organisation, using the RE-AIM framework (Reach, Efficacy, Adoption, Implementation and Maintenance). This paper presents the process and results of the application of this framework, which resulted in a wide-scale implementation of JUMP-in.

Results: The application of the RE-AIM framework resulted in challenges and remedies for an improved JUMP-in intervention. The remedies required changes at three different levels: 1. the content of the programme components; 2. the organisation and programme management; and 3. the evaluation design.

Conclusions: Considering factors that determine the impact of PA interventions in 'real life' is of great importance. The RE-AIM framework appeared to be a useful guide in which process- and effect outcomes could be translated into an improved programme content and organisation.

Dzewaltowski, D.A. In Smith, A.L., & Biddle, S.J.H. (Eds.). Community out-of-school physical activity promotion. Youth Physical Activity and Inactivity: Challenges and Solutions. Champaign, IL: Human Kinetics Publishers, Inc., 2008.

SUMMARY

The first section of this chapter describes the Organized Community Opportunities Model for physical activity promotion. This model is informed by developmental ecological systems theory and the Reach, Efficacy, Adoption, Implementation and Maintenance Framework (www.reaim.org; Dzewaltowski, Estabrooks, & Glasgow, 2004; Glasgow, Vogt, & Boles, 1999). The Organized Community Opportunities Model provides a tool for planning and evaluating the public health impact of organized community opportunities designed to promote physical activity in youth. In the second section of this chapter this model frames a review of existing research that pertains to the following two hypotheses: 1. Communities that provide organized opportunities for youth that include physical activity sessions will have greater MVPA and less sedentary behavior compared to communities without these opportunities. 2. Youth attending organized opportunities for youth that include quality physical activity promotion programs will increase in personal assets, increase in MVPA and decrease in sedentary behavior compared to youth who do not participate. A quality physical activity promotion program includes a daily physical activity session providing moderate to vigorous intensity activity and a weekly physical activity regulation skill session structured for the promotion of positive youth development. Finally, this chapter will close with conclusions and future research and practice recommendations.

Eakin EG, Reeves MM, Lawler SP, Oldenburg B, Del Mar C, Wilkie K, Spencer A, Battistutta D, Graves N. The Logan Healthy Living Program: a cluster randomized trial of a telephone-delivered physical activity and dietary behavior intervention for primary care patients with type 2 diabetes or hypertension from a socially disadvantaged community--rationale, design and recruitment. Contemp Clin Trials. 2008 May;29(3):439-54. Epub 2007 Nov 4.

ABSTRACT

Background: Physical activity and dietary behavior changes are important to both the primary prevention and secondary management of the majority of our most prevalent chronic conditions (i.e., cardiovascular disease, hypertension, type 2 diabetes, breast, and colon cancer). With over 85% of Australian adults visiting a general practitioner each year, the general practice setting has enormous potential to facilitate wide scale delivery of health behaviour interventions. However, there are also many barriers to delivery in such settings, including lack of time, training, resources and remuneration. Thus there is an important need to evaluate other feasible and effective means of delivering evidence-based physical activity and dietary behaviour programs to patients in primary care, including telephone counseling interventions.

Methods: Using a cluster randomized design with practice as the unit of randomization, this study evaluated a telephone-delivered intervention for physical activity and dietary change targeting patients with chronic conditions (type 2 diabetes or hypertension) recruited from primary care practices in a socially disadvantaged community in Queensland, Australia. Ten practices were randomly assigned to the telephone intervention or to usual care, and 434 patients were recruited. Patients in intervention practices received a workbook and 18 calls over 12 months. Assessment at baseline, 4-, 12- and 18-months allows for assessment of initial

change and maintenance of primary outcomes (physical activity and dietary behavior change) and secondary outcomes (quality of life, cost-effectiveness, support for health behavior change).

Conclusions: This effectiveness trial adds to the currently limited number of telephone-delivered intervention studies targeting both physical activity and dietary change. It also addresses some of the shortcomings of previous trials by targeting patients from a disadvantaged community, and by including detailed reporting on participant representativeness, intervention implementation and cost-effectiveness, as well as an evaluation of maintenance of health behavior change.

Estabrooks PA, Bradshaw M, Dzewaltowski DA, Smith-Ray, RL. Determining the Impact of Walk Kansas: Applying a Team-Building Approach to Community Physical Activity Promotion. Ann Behav Med 2008;36, 1-12.

ABSTRACT

Background: Research and practice partnerships have the potential to enhance the translation of research findings into practice.

Purpose: This paper describes such a partnership in the development of Walk Kansas (WK) and highlights individual and organizational level outcomes.

Method: Phase 1 examined: (a) the reach of WK, (b) physical activity changes, and (c) maintenance of physical activity changes 6 months after the program was completed. Phase 2 explored WK adoption and sustainability over 5 years.

Results: WK attracted a large number of participants who were more likely to be female, more active, and older than the adult population within the counties where they resided. Inactive or insufficiently active participants at baseline experienced significant increases in both moderate ($p < 0.001$) and vigorous ($p < 0.001$) physical activity. A random selection of participants who were assessed 6 months post-program did not demonstrate a significant decrease in moderate or vigorous activity between program completion and 6-month follow-up. The number of counties adopting the program increased across years, peaking at 97 in 2006 and demonstrated the sustainability of the WK over 5 years.

Conclusions: WK is effective, has a broad reach, and enables participants to maintain increased activity. It also shows promise for broad adoption and sustainability.

Estabrooks PA, Smith-Ray, RL. Piloting a behavioral intervention delivered through interactive voice response telephone messages to promote weight loss in a pre-diabetic population. Pt Educ Couns 2008;72, 34-41.

ABSTRACT

Objective: To pilot test the feasibility and effectiveness of interactive voice response (IVR) calls targeting physical activity and healthful eating as strategies for weight loss for patients with pre-diabetes.

Methods: Participants (N=77) who engaged in a 90-min diabetes prevention class were randomly assigned to receive IVR support targeting physical activity and nutrition weight loss strategies or to a no-contact control. Physical activity, dietary intake, and body weight were assessed prior to and following the 3-month intervention.

Results: Eighty-five percent of the intervention participants completed at least half of the intervention. Participants assigned to receive the intervention lost an average of 2.6% of body

weight during the 3 months while control participants lost an average of 1.6%. To determine the effect of the calls when used we found that those who used the system lost approximately 3% of body weight which approached significance when compared to controls ($p < .06$).

Conclusion: IVR holds promise for follow-up encounters with patients with pre-diabetes.

Practice Implications: IVR can be used to provide physical activity and nutrition counseling that can enhance the potential reach and effectiveness of health professionals working with patients who have diabetes while placing a minimal burden on financial resources and staff time.

Estabrooks, P.A., Fisher, E.B., Hayman, L. L. What is needed to reverse the trends in childhood obesity? A Call to Action for the Society of Behavioral Medicine. Ann Behav Med 2008;36, 209-216.

ABSTRACT

Background: To address the complexity of issues surrounding childhood obesity, the Society of Behavioral Medicine identified childhood obesity as a special focus of its 2007 Annual Meeting.

Purpose: The purpose of this paper was to provide a brief summary of the content of these sessions, promising practices that were presented, and recommendations for behavioral medicine research and practice professionals to facilitate reversing the current trends in childhood obesity.

Methods and Results: A social-ecological perspective was used to discuss views on biological and genetic perspectives, the need for policy and environmental approaches, and the need to expand the types of research and practice being conducted.

Conclusions: Recommendations included the need to (1) conduct a broader examination of potential policy, program, and practice strategies across social ecological levels, (2) use team approaches to science that include multiple disciplines and perspectives, (3) expand the methods and metrics used to demonstrate the value of childhood obesity treatment or prevention interventions, (4) use integrated research and practice partnerships, and (5) explicitly assess the potential of intervention strategies to reduce health disparities.

Feldstein AC, Glasgow RE, Smith DH. A Practical, Robust Implementation and Sustainability Model (PRISM) for Integrating Research Findings into Practice. Jt Comm J Qual Safety 2008;34(4):228-243.

ABSTRACT

Background: Although numerous studies address the efficacy and effectiveness of health interventions, less research addresses successfully implementing and sustaining interventions. As long as efficacy and effectiveness trials are considered complete without considering implementation in non-research settings, the public health potential of the original investments will not be realized. A barrier to progress is the absence of a practical, robust model to help identify the factors that need to be considered and addressed and how to measure success. A conceptual framework for improving practice is needed to integrate the key features for successful program design, predictors of implementation and diffusion, and appropriate outcome measures.

Developing PRISM: A comprehensive model for translating research into practice was developed using concepts from the areas of quality improvement, chronic care, the diffusion of innovations, and measures of the population-based effectiveness of translation. PRISM—the Practical Robust Implementation and Sustainability Model—evaluates how the health care program or intervention interacts with the recipients to influence program adoption, implementation, maintenance, reach, and effectiveness.

Discussion: The PRISM model provides a new tool for researchers and health care decision makers that integrates existing concepts relevant to translating research into practice.

Glasgow RE. What Types of Evidence are Most Needed to Advance Behavioral Medicine? Ann Behav Med 2008;35(1):19-25.

ABSTRACT

Background: This editorial presents a perspective on the types of evidence most needed to advance behavioral medicine given the current status of the field. **PURPOSE:** The paper argues that the types of evidence most needed at present are evidence that is contextual, practical, and robust.

Methods: Each of the above issues is discussed with attention to characteristics of interventions; representativeness at the multiple levels of setting, clinical staff, and participants; and research design and measures. Arguments are made from philosophy of science, status of the literature, and future directions perspectives.

Results: The current dominant paradigm of reductionistic studies focused predominantly on internal validity using highly homogenous patients and academic settings is not and will not produce the desired translation to real-world practice and policy. Instead, broader "practical" clinical and behavioral trials are needed that address the influence of the context in which programs are conducted, that include outcomes important to decision makers and communities, and that focus on moderating, mediating, and economic issues.

Conclusions: To create programs that will be disseminable, a greater focus is needed on external validity and transparency of reporting. We need to realize that the world is complex and embrace and study this complexity to produce further progress. Such an approach can produce evidence that is both rigorous and relevant.

Glasgow RE, Linnan L. Evaluation of Theory-Based Interventions. In: Health Education: Theory, Research and Practice, 4th Edition, 2008, Chapter 21, pp 487-506. Glanz K, Rimer Bk, Viswanath, K (Eds). Jossey-Bass Publishers.

KEY POINTS

This chapter will:

- Discuss the rationale for and benefits of evaluating theory-based programs.
- Describe different types of validity
- Identify key components of thorough evaluations and leading evaluation models.
- Illustrate the use of evaluation with two theory-based intervention examples.
- Describe challenges to conducting meaningful evaluations and provide recommendations for addressing these issues.

Glasgow RE. Key Evaluation Issues in Facilitating Translation of Research to Practice and Policy. *Eval South Asia*, published by UNICEF South Asia; Sankar M, Williams B (Editors). 2008. http://www.unicef.org/rosa/ROSA_Evaluation_Journal.pdf.

SUMMARY

This article summarizes critical evaluation needs, challenges, and lessons learned in translational research. Evaluation can play a key role in enhancing successful application of research-based programs and tools and lead to efficient and sustainable programs. Discussion centers on what is unique about evaluating programs and policies for dissemination (or potential for dissemination). Central issues reviewed include: the importance of context and local issues; robustness and applicability across a wide range of settings; multiple levels of evaluation; implementation fidelity vs. customization; who participates; and characteristics of "success" at each stage of recruitment, delivery, and outcome. The use of both qualitative and quantitative is especially important and the primary redirection that is needed is to focus on questions of decision makers and potential adoptees rather than the research community.

Glasgow RE, Estabrooks PA, Marcus AC, Smith TL, Gaglio B, Levinson AH, Tong S. Evaluating Initial Reach and Robustness of a Practical Randomized Trial of Smoking Reduction. *Health Psychol* 2008 Nov 27(6):78-788.

ABSTRACT

Objective: This study evaluated the reach, initial effectiveness, and potential moderators and mediators of results of a smoking reduction program. *Design:* A generally representative sample of 320 adult smokers from an HMO, scheduled for outpatient surgery or a diagnostic procedure, were randomized to enhanced usual care or a theory-based smoking reduction intervention that combined telephone counseling and tailored newsletters.

Main Outcome Measures: Self-reported number of cigarettes smoked and carbon monoxide levels.

Results: The intervention enrolled 30% of known eligible smokers and produced reductions of 3 cigarettes per day greater than enhanced usual care. Intervention participants were significantly more likely than control participants to achieve at least a 50% reduction in self-reported number of cigarettes using complete cases, imputation analyses, and intent-to-treat procedures. Similar patterns were seen for carbon monoxide results but were significant only in complete case analyses. The intervention was generally robust across patient characteristics (e.g., education, ethnicity, health literacy, and dependence) and phone counselors.

Conclusion: Initial results suggest that this program has potential to reach and assist smokers who may not participate in cessation programs. Additional research is indicated to enhance intervention effects, assess maintenance, and evaluate public health impact.

Klesges LM, Dzewaltowski DA, Glasgow RE. Review of External Validity Reporting in Childhood Obesity Prevention Research. *Am J Prev Med* 2008;34(3):216-223.

ABSTRACT

Background: The translation and dissemination of prevention intervention evidence into practice is needed to address significant public health issues such as childhood obesity. Increased attention to and reporting of external validity information in research publications

would allow for better understanding of generalizability issues relevant to successful translation. To demonstrate this potential, recent reports of childhood obesity prevention interventions were evaluated on the extent to which external validity dimensions were reported.

Methods: Childhood obesity prevention studies that were controlled, long-term research trials published between 1980 and 2004 that reported a behavioral target of physical activity and/or healthy eating along with at least one anthropometric outcome were identified in 2005. Studies were summarized between 2005 and 2006 using review criteria developed by Green and Glasgow in 2006.

Results: Nineteen publications met selection criteria. In general, all studies lacked full reporting on potential generalizability and dissemination elements. Median reporting over all elements was 34.5%; the mode was 0% with a range of 0% to 100%. Most infrequent were reports of setting level selection criteria and representativeness, characteristics regarding intervention staff, implementation of intervention content, costs, and program sustainability.

Conclusions: The evidence base for future prevention interventions can be improved by enhancing the reporting of contextual and generalizability elements central to translational research. Such efforts face practical hurdles but could provide additional explanation for variability in intervention outcomes, insights into successful adaptations of interventions, and help guide policy decisions.

Levinson AH, Glasgow RE, Gaglio B, Smith TL, Cahoon J, Marcus AC. Tailored Behavioral Support for Smoking Reduction: Development and Pilot Results of an Innovative Intervention. Health Educ Res 2008 Apr;23(2):335-46.

ABSTRACT

Reduction of smoking may increase the likelihood of eventual smoking cessation among those not ready to quit. We describe the development and acceptance of a smoking-reduction intervention that integrates telephone counseling sessions with newsletters. A computer-assisted telephone interviewing program generates real-time-tailored counseling delivered by lay interviewers. Pilot participants (n = 53) were adult smokers scheduled for out-patient procedures in a health maintenance organization, randomized to intervention or a control condition (quarterly mailings).

Smoking levels were measured by self-report and biochemically. Among intervention participants continuing at 3 months, all but one rated their telephone support person positively on all dimensions. Counseling calls were "about right" in number, and newsletters were perceived as quite personal. Intervention recipients reported smoking significantly fewer mean cigarettes per day at 3 months than at baseline, and significantly fewer than control participants. Comparisons were non-significant under intent-to-treat analyses and on biochemical measures. The program was well received by outpatients who were not ready to quit smoking, and was implemented successfully by telephone staff who had no previous smoking cessation counseling experience. An ongoing trial is evaluating effectiveness, cost and relationship to eventual cessation.

Li, F, Harmer P, Glasgow RE, et al. Translation of an Effective Tai Chi Intervention into a Community-Based Falls Prevention Program. Am J Public Health 2008;98(7):1195-1198.

ABSTRACT

Tai Chi—Moving for Better Balance, a falls-prevention program developed from a randomized controlled trial for community-based use, was evaluated with the RE-AIM framework in 6 community centers. The program had a 100% adoption rate and 87% reach into the target older adult population. All centers implemented the intervention with good fidelity, and participants showed significant improvements in health-related outcome measures. This evidence-based tai chi program is practical to disseminate and can be effectively implemented and maintained in community settings.

Planas LG. Intervention design, implementation, and evaluation. Am J Health Syst Pharm. 2008 Oct 1;65(19):1854-63.

ABSTRACT

Purpose: Strategies to improve the design, implementation, and evaluation of interventions in pharmacy practice-based research are discussed.

Summary: Various issues inherent in the clinical research continuum explain the lack of research translation into practice settings. The RE-AIM model is used to frame descriptions of strategies to design, implement, and evaluate practice-based research interventions. A major feature of RE-AIM is the shift in focus from short-term efficacy among restricted samples in controlled settings to longer-term effectiveness among more diverse samples in practice settings. The RE-AIM model consists of five dimensions: reach, effectiveness, adoption, implementation, and maintenance. Various strategies are suggested to optimize an intervention's reach. In addition to clinical measures, economic, humanistic, and process measures are recommended for measuring and optimizing the effectiveness of an intervention. Adoption is considered an assessment of an intervention's reach at the organizational level. Assessment of representativeness among participating settings should also be conducted based on key characteristics relevant to a study. Several strategies are suggested to improve stakeholder buy in, thereby increasing the likelihood of intervention adoption. Intervention fidelity is important for maximizing a study's internal validity and consists of two components: integrity and differentiation. Several factors influence the likelihood and degree of intervention maintenance, including the use of existing personnel to deliver an intervention and evaluation measures that are meaningful to institutional stakeholders.

Conclusion: Application of the RE-AIM model's dimensions can enhance the reach, effectiveness, adoption, implementation, and maintenance of interventions, thus improving the quality and impact of practice-based research.

Rosenkranz, R.R., & Dzewaltowski, D.A. (2008). A model of the home food environment pertaining to childhood obesity. Nutri Rev, 66, 123-140.

Abstract

The home food environment can be conceptualized as overlapping interactive domains composed of built and natural, sociocultural, political and economic, micro-level and macro-level environments. Each type and level of environment uniquely contributes influence through a mosaic of determinants depicting the home food environment as a major setting for shaping child dietary behavior and the development of obesity. Obesity is a multifactorial problem, and the home food environmental aspects described here represent a substantial part of the full environmental context in which a child grows, develops, eats, and behaves.

The present review includes selected literature relevant to the home food environment's influence on obesity with the aim of presenting an ecologically informed model for future research and intervention in the home food environment.

2007

Aittasalo M, Miilunpalo S, Ståhl T, Kukkonen-Harjula K. From innovation to practice: initiation, implementation and evaluation of a physician-based physical activity promotion programme in Finland. *Health Promot Int*. 2007 Mar;22(1):19-27. Epub 2006 Nov 29.

ABSTRACT

In 2001, a collaborative Physical Activity Prescription Programme (PAPP) was started in Finland to increase physical activity (PA) counselling among physicians, especially in primary care. This article describes the initiation, implementation and evaluation of PAPP. Five actions were implemented to reach the programme goal: (i) developing a counselling approach for physicians; (ii) providing easy and open access to counselling material; (iii) facilitating physicians' uptake and adoption of the counselling approach; (iv) disseminating information about the counselling approach to physicians, health and exercise professionals and decision-makers and (v) raising financial resources to cover programme expenses. Evaluation was based on the dimensions of the RE-AIM framework: reach, effectiveness, adoption, implementation and maintenance. Effectiveness and adoption were evaluated with two questions added to the annual survey of the Finnish Medical Association to all practising physicians in the year 2002 (n = 16 692) and 2004 (n = 17 170). The 4-year PAPP was successful in reaching health care units (Reach), accomplishing most of the implementation actions (Implementation) and initiating local projects for institutionalizing the prescription-based counselling approach, 'Prex' (Maintenance). However, at the national level, the programme was not effective in increasing the frequency of asking about patients' PA habits (Effectiveness) or the frequency of using 'Prex' or other written material in PA counselling among physicians (Adoption). To improve the latter two, the duration of the programme would have had to be extended with more effort at strengthening physicians' confidence in PA counselling and knowledge about its effectiveness. Also, a more systematic approach would have been necessary to facilitate inter-sectoral network for adopting 'Prex' as a counselling tool at the local level.

Bopp M, Wilcox S, Laken M, Hooker SP, Saunders R, Parra-Medina D, Butler K, McClorin L. Using the RE-AIM framework to evaluate a physical activity intervention in churches. *Prev Chronic Dis*. 2007 Oct;4(4):A87. Epub 2007 Sep 15.

ABSTRACT

Introduction: Health-e-AME was a 3-year intervention designed to promote physical activity at African Methodist Episcopal churches across South Carolina. It is based on a community-participation model designed to disseminate interventions through trained volunteer health directors.

Methods: We used the RE-AIM (Reach, Effectiveness, Adoption, Implementation, and Maintenance) framework to evaluate this intervention through interviews with 50 health directors.

Results: Eighty percent of the churches that had a health director trained during the first year of the intervention and 52% of churches that had a health director trained during the second year adopted at least one component of the intervention. Lack of motivation or commitment from the congregation was the most common barrier to adoption. Intervention activities reached middle-aged women mainly. The intervention was moderately well implemented, and adherence to its principles was adequate. Maintenance analyses showed that individual participants in the intervention's physical activity components continued their participation as long as the church offered them, but churches had difficulties continuing to offer physical activity sessions. The effectiveness analysis showed that the intervention produced promising, but not significant, trends in levels of physical activity.

Conclusion: Our use of the RE-AIM framework to evaluate this intervention serves as a model for a comprehensive evaluation of the health effects of community programs to promote health.

Boratgis G, Broderick S, Callahan M, Combes J, Lannon C, Mebane-Sims I, Namie M, Pinã IL, Rabbu R, Robinson J, Snow R, Watt A. Disseminating QI interventions. Jt Comm J Qual Patient Saf. 2007 Dec;33(12 Suppl):48-65.

ABSTRACT

Background: Partnerships contributed to the success of three diverse health care quality improvement (QI) projects. The Partnerships for Quality (PFQ) Dissemination Planning Tool was used to identify the most appropriate partners to disseminate the QI interventions for three projects, that is, partners most likely to reach and influence the target user(s)-(1) the Catholic Healthcare Partners Heart Failure Partnership, a multisite demonstration of the efficacy of a collaborative approach in the management of heart failure, (2) the Center for Value Purchasing, a collaborative study of the effects of quality incentives on the delivery of chronic disease care, and (3) the New York State Information Dissemination project, a collaborative partnership that targeted dissemination of evidence-based practices in the long term care setting.

Results: The RE-AIM model, a construct to aid planning, implementation, and evaluation of health behavior interventions, was used as a framework to examine the impact of partnerships on the three collaborative projects.

Discussion: When carefully selected and nurtured, partnerships can substantially facilitate the dissemination and impact of quality improvement projects. The PFQ Dissemination Planning Tool was helpful in identifying and developing strategies for working with partners who could facilitate dissemination of promising practices. The RE-AIM model was a useful framework for examining the impact of the partnerships on the QI projects.

Charters KG, Nazi K. AMIA Annu Symp Proc. 2007 Oct 11:899. Personal health record evaluation: my HealtheVet and RE-AIM.

ABSTRACT

Evaluation of the U.S. Veterans Health Administration personal health record, My HealtheVet, applies the measures of RE-AIM (reach, effectiveness / efficacy, adoption, implementation, and maintenance) to three areas: program evaluation, program management, and research. The initial three metrics developed address release of information baseline and trends, registrations, and visits (usage). Evaluation of My HealtheVet using the RE-AIM model and

extending resources through collaborative partnerships with researchers and external organizations allows broadly applicable measures.

Eakin EG, Lawler SP, Vandelanotte C, Owen N. Telephone interventions for physical activity and dietary behavior change: a systematic review. Am J Prev Med. 2007 May;32(5):419-34.

ABSTRACT

Background: Given the epidemic of lifestyle-related chronic diseases, building the evidence base for physical activity and dietary behavior change interventions with a wide population reach is of critical importance. For this purpose, telephone counseling interventions have considerable potential.

Purpose: To systematically review the literature on interventions for physical activity and dietary behavior change in which a telephone was the primary method of intervention delivery, with a focus on both internal and external validity.

Methods: A structured search of PubMed, Medline, and PsycInfo was conducted for studies published in English from 1965 to January 2006. Studies targeted primary or secondary prevention in adults, used randomized designs, and included physical activity and/or dietary behavior outcomes.

Results: Twenty-six studies were reviewed, including 16 on physical activity, six on dietary behavior, and four on physical activity plus dietary behavior. Twenty of 26 studies reported significant behavioral improvements. Positive outcomes were reported for 69% of physical activity studies, 83% of dietary behavior studies, and 75% of studies addressing both outcomes. Factors associated with positive outcomes appear to be the length of intervention and the number of calls, with interventions lasting 6 to 12 months and those including 12 or more calls producing the most favorable outcomes. Data on the representativeness of participants, implementation of calls, and costs were reported much less frequently.

Conclusions: There is now a solid evidence base supporting the efficacy of physical activity and dietary behavior change interventions in which the telephone is the primary intervention method. Thus, research studies on broader dissemination are necessary, and should address questions relevant to the translation of this body of work into population health practice.

Estabrooks PA & Glasgow RE. Worksite Interventions. In: Handbook of Psychology, Health & Medicine, Baum A, Newman S, Weinman J, West R, Macmanus C. (Eds) 2nd Edition; Cambridge, UK, Cambridge University Press, 2007, pp 407-413.

OVERVIEW

There are numerous theoretical and practical reasons for delivering health promotion programs in work places. First, the worksite is an environment in which many adults spend a large percentage of their waking hours. Second, interventions conducted in a person's relevant physical and social environment—rather than in clinical settings that are not frequented by most individuals—have fewer problems with generalization. Third, worksites offer the opportunity to combine policy, organizational and individual behaviour change strategies; conceptually the combination of such strategies should be more powerful than any one in isolation (Blair et al. 1986;Glasgow et al. 1990;Sorensen et al. 2000). Fourth, the common and consistent interactions among employees within worksites offers the potential for various social support intervention components such as group rewards, participatory

employee steering committees, coworker support and incentive programs. Fifth, worksite programs can increase the reach of health promotion by getting many persons to take advantage of health promotion offerings who may not otherwise participate (Glasgow, McCaul, & Fisher 1993). Finally, there are also good reasons for employers to offer such programs. Worksite interventions can potentially increase employee recruitment and retention, reduce health care costs and absenteeism, and enhance employee morale and productivity (Pelletier 2001; Riedel et al. 2001).

Farris RP, Will JC, Khavjou O, Finkelstein EA. Beyond effectiveness: evaluating the public health impact of the WISEWOMAN program. Am J Public Health. 2007 Apr;97(4):641-7. Epub 2007 Feb 28.

ABSTRACT

Interventions that are effective are often improperly or only partially implemented when put into practice. When intervention programs are evaluated, feasibility of implementation and effectiveness need to be examined. Reach, effectiveness, adoption, implementation, and maintenance make up the RE-AIM framework used to assess such programs. To examine the usefulness of this metric, we addressed 2 key research questions. Is it feasible to operationalize the RE-AIM framework using women's health program data? How does the determination of a successful program differ if the criterion is (1) effectiveness alone, (2) reach and effectiveness, or (3) the 5 dimensions of the RE-AIM framework? Findings indicate that it is feasible to operationalize the RE-AIM concepts and that RE-AIM may provide a richer measure of contextual factors for program success compared with other evaluation approaches.

Glasgow, R.E., Toobert, D.J. RE-AIM for Program Planning and Evaluation: Overview and Recent Developments. Center for Health Aging: Model Health Programs for Communities/National Council on Aging (NCOA), 2007.

BACKGROUND, HISTORY, AND VISION

The RE-AIM framework was first presented in 1999 (Glasgow, R. E., Vogt, T. M., & Boles, S. M., 1999) as an approach to help improve the quality of research reports and as a way to encourage reporting of information that would help speed translation of research to practice. RE-AIM is an acronym that stands for Reach, Effectiveness, Adoption, Implementation, and Maintenance. These five factors are critically important for practitioners and organizational decision makers when making choices among alternative programs. The overall goal of the RE-AIM model is to encourage program planners, evaluators, readers of journal articles, and policy makers to pay more attention to these issues.

RE-AIM was used initially as a framework for reporting the results of research studies (Glasgow, R. E., Whitlock, E. P., Eakin, E. G., & Lichtenstein, E., 2000), and later to review the existing literature on health promotion and disease prevention in different settings (Glasgow, R. E., Klesges, L. M., Dzewaltowski, D. A., Bull, S. S., & Estabrooks, P., 2004). The information in these articles provided estimates of the chances that programs being studied could:

- Reach large numbers of persons, especially those most in need and at highest risk. Stated differently, what percent of one's target population will participate in a given program.

- Be Effective in producing important improvements in health behaviors and quality of life.
- Be widely Adopted by a large number of settings, especially those with few resources and underserved populations.
- Be consistently Implemented by a variety of staff, without requiring high levels of expertise or cost.
- Be Maintained at the setting level and produce lasting improvements among participants.

More recently, RE-AIM has been used to help plan realistic programs that have better chances of working in “real-world” settings (Klesges, L. M., Estabrooks, P. A., Glasgow, R. E., & Dziewaltowski, D., 2005). (See section on “Applying RE-AIM.”) The framework has also been used to understand the relative strengths and weaknesses of different approaches to health promotion and chronic illness self-management—such as in-person counseling, group education classes, telephone counseling, and Internet resources (Glasgow, R. E., McKay, H. G., Piette, J. D., & Reynolds, K. D., 2001).

Glasgow RE, Nelson CC, Kearney KA, Reid R, Ritzwoller DP, Strecher VJ, Couper M, Green B, Wildenhaus K. Reach, Engagement, and Retention in an Internet-Based Weight Loss Program in Three Healthcare Systems. J Internet Med Res 2007 (<http://www.jmir.org/2007/2/e11>).

ABSTRACT

Background: Research increasingly supports the conclusion that well-designed programs delivered over the Internet can produce significant weight loss compared to randomized control conditions. Much less is known about four important issues addressed in this study: 1) which recruitment methods produce higher e-Health participation rates, 2) what patient characteristics are related to enrollment, 3) which characteristics are related to level of user engagement in the program, and 4) which characteristics are related to continued participation in project assessments.

Methods: We recruited overweight members of three HMOs to participate in an entirely Internet-mediated weight loss program developed by HealthMedia, Inc. Two different recruitment methods were used: personal letters from prevention directors in each HMO, and general notices in member newsletters. The personal letters were sent to members diagnosed with diabetes or heart disease and, in one HMO, to a general membership sample in particular geographic location. Data were collected in the context of a 2x2 randomized control trial, with participants assigned to receive or not receive a goal setting intervention and a nutrition education intervention in addition to the basic program.

Results: A total of 2,311 members enrolled. Bivariate analyses on aggregate data revealed that personalized mailings produced higher enrollment rates than member newsletters, and that members with diabetes or heart disease were more likely to enroll than those without these diagnoses. In addition, those over age 60, smokers, those estimated to have higher medical expenses, and males were less likely to enroll (all $P < .001$). Males and those in combined intervention conditions were less likely to engage initially, or to continue to be engaged with their Web program, than other participants. In terms of retention, multiple logistic regressions revealed that enrollees under age 60 ($P < .001$) and those with higher baseline self-efficacy were less likely to be present ($P = .03$), but that with these exceptions, those present were very similar to those not participating in the 12-month follow-up.

Conclusions: A single, personalized mailing increases enrollment in Internet-based weight loss. E-Health programs offer great potential for recruiting large numbers, but may not reach those at highest risk. Patient characteristics related to each of these important factors may be different, and more comprehensive analyses of determinants of enrollment, engagement, and retention in e-Health programs are needed.

Glasgow RE, Green LW, Ammerman A. (2007) A Focus on External Validity – Guest Editorial. *Eval Health Professions* 30(2):115-117. **(No Abstract)**

Glasgow, R.E. eHealth Evaluation and Dissemination Research *Am J Prev Med* 2007;32(S5):S110-S126.

ABSTRACT

This paper reviews key challenges in evaluating eHealth intervention and behavior change programs, and makes recommendations for the types of designs, measures, and methods needed to accelerate the integration of proven eHealth programs into practice. Key issues discussed include evaluation approaches that answer questions that consumers, potential adoptees, and policymakers have. These include measures of participation and representativeness at both patient and healthcare setting levels, consistency of outcomes across different subgroups, tendency of an eHealth program to ameliorate versus exacerbate health disparities, implementation and program adaptation, cost, and quality-of-life outcomes. More practical eHealth trials are needed that use rigorous but creative designs compatible with eHealth interventions and theory. These evaluations should address key dissemination issues, such as appeal, use, and robustness of eHealth programs across different subgroups, settings, conditions, outcomes, and time.

Glasgow, R.E., Emmons, K.M. How can we increase translation of research into practice? Types of evidence needed. *Annu Rev Public Health* 2007;28:413-433.

ABSTRACT

This review summarizes key factors that have interfered with translation of research to practice and what public health researchers can do to hasten such transfer, focusing on characteristics of interventions, target settings, and research designs. The need to address context and to utilize research, review, and reporting practices that address external validity issues—such as designs that focus on replication, and practical clinical and behavioral trials—are emphasized. Although there has been increased emphasis on social-ecological interventions that go beyond the individual level, interventions often address each component as if it were an independent intervention. Greater attention is needed to connectedness across program levels and components. Finally, examples are provided of evaluation models and current programs that can help accelerate translation of research to practice and policy.

Jilcott, S., Ammerman, A., Sommers, J., Glasgow, R.E. Assessing the Public Health Impact of Policy Change: Upstream Applications of the RE-AIM Framework. *Ann Behav Med* 2007;34(2):105-114.

ABSTRACT

Background and Purpose: Planning and evaluation models have been developed to assess the public health impact of health promotion interventions. However, few have been applied to health policies. There is an important need for models to help design and evaluate health policies.

Methods: This paper applies the RE-AIM (Reach, Effectiveness, Adoption, Implementation, Maintenance) planning and evaluation framework to health policies. We provide definitions and application examples for different policies.

Results: As demonstrated by a case study, the RE-AIM dimensions and definitions can also apply to policies. Considerations regarding compliance and enforcement are presented to clarify the complex implementation dimension.

Conclusions: The RE-AIM framework can be useful in estimating public health impact, comparing different health policies, planning policies designed for increased likelihood of success, and identifying areas for integration of policies with other health promotion strategies.

Ory MG, Mier N, Sharkey JR, Anderson LA. Translating science into public health practice: Lessons from physical activity interventions. *Alzheimers Dement.* 2007 Apr;3(2 Suppl):S52-7. **(No abstract)**

Toobert DJ, Glasgow RE, Strycker LA, Barrera M Jr, Ritzwoller D, Weidner G. (2007) Long-Term Effects of the Mediterranean Lifestyle Program: A Randomized Clinical Trial for Postmenopausal Women with Type 2 Diabetes. *International Journal of Behavioral Nutrition and Physical Activity (IJBNPA)*; 4:1 (17 January 2007).

ABSTRACT

Background: Multiple-risk-factor interventions offer a promising means for addressing the complex interactions between lifestyle behaviors, psychosocial factors, and the social environment. This report examines the long-term effects of a multiple-risk-factor intervention.

Methods: Postmenopausal women ($N = 279$) with type 2 diabetes participated in the Mediterranean Lifestyle Program (MLP), a randomized, comprehensive lifestyle intervention study. The intervention targeted healthful eating, physical activity, stress management, smoking cessation, and social support. Outcomes included lifestyle behaviors (i.e., dietary intake, physical activity, stress management, smoking cessation), psychosocial variables (e.g., social support, problem solving, self-efficacy, depression, quality of life), and cost analyses at baseline, and 6, 12, and 24 months.

Results: MLP participants showed significant 12- and 24-month improvements in all targeted lifestyle behaviors with one exception (there were too few smokers to analyze tobacco use effects), and in psychosocial measures of use of supportive resources, problem solving, self-efficacy, and quality of life.

Conclusion: The MLP was more effective than usual care over 24 months in producing improvements on behavioral and psychosocial outcomes. Directions for future research include replication with other populations.

2006

Besculides M, Zaveri H, Farris R, Will J. Identifying best practices for WISEWOMAN programs using a mixed-methods evaluation. Prev Chronic Dis. 2006 Jan;3(1):A07. Epub 2005 Dec 15.

ABSTRACT

Introduction: Recommendations on best practices typically are drawn from unique settings; these practices are challenging to implement in programs already in operation. We describe an evaluation that identifies best practices in implementing lifestyle interventions in the Center for Disease Control and Prevention's WISEWOMAN program and discuss our lessons learned in using the approach.

Methods: We used a mixed-methods evaluation that integrated quantitative and qualitative inquiry. Five state or tribal WISEWOMAN projects were included in the study. The projects were selected on the basis of availability of quantitative program performance data, which were used to identify two high-performing and one low-performing site within each project. We collected qualitative data through interviews, observation, and focus groups so we could understand the practices and strategies used to select and implement the interventions. Data were analyzed in a multistep process that included summarization, identification of themes and practices of interest, and application of an algorithm.

Results: Pilot testing data collection methods allowed for critical revisions. Conducting preliminary interviews allowed for more in-depth interviews while on site. Observing the lifestyle intervention being administered was key to understanding the program. Conducting focus groups with participants helped to validate information from other sources and offered a more complete picture of the program.

Conclusion: Using a mixed-methods evaluation minimized the weaknesses inherent in each method and improved the completeness and quality of data collected. A mixed-methods evaluation permits triangulation of data and is a promising strategy for identifying best practices.

Estabrooks, P.A., Glasgow, R.E. Translating Effective Clinic-Based Physical Activity Interventions into Practice. Am J Prev Med 2006;31(4S):S45-S56.

ABSTRACT

An increasing number of studies report on the efficacy of physical activity interventions conducted in, or in conjunction with, clinical settings. This article reviews the status of the literature with regard to translation to practice and describes methods that will heighten the likelihood of translation. In general, few physical activity programs have been designed for translation, and the diffusion models underlying most reported programs have relied on an assumption of linear diffusion into practice. However, recent developments are encouraging and examples are provided of programs that utilize relationship or systems approaches to translation.

Glasgow, R.E. RE-AIMing Research for Application: Ways to Improve Evidence for Family Practice. J Am Bd Fam Pract 2006;19(1):11-19.

ABSTRACT

Objective: To outline changes in clinical research design and measurement that should enhance the relevance of research to family medicine.

Methods: Review of the traditional efficacy research paradigm and discussion of why this needs to be expanded. Presentation of practical clinical and behavioral trials frameworks, and of the RE-AIM model for planning, evaluating, and reporting studies.

Results: Recommended changes to improve the external validity and relevance of research to family medicine include studying multiple clinical practices, realistic alternative program choices, heterogeneous and representative patients, and multiple outcomes including cost, behavior change of patients and staff, generalization, and quality of life.

Conclusions: The methods and procedures discussed can help program planners, evaluators and readers of research articles to evaluate the replicability, consistency of effects, and likelihood of widespread adoption of interventions.

Glasgow, R.E., France, E.K., Marcus, A., Riley, K.M., Levinson, A., Bischoff, K. Do Behavioral Harm Reduction Approaches Reach More or Different Smokers? Addict Behav 2006;31(3):509-518.

ABSTRACT

There is a need for innovative approaches capable of reaching smokers who would not otherwise participate in efforts to modify their smoking. This paper reports on two studies to determine whether a smoking reduction intervention would appeal to additional or different types of smokers than do cessation interventions. Study 1 attempted to contact 160 HMO smokers scheduled for outpatient surgeries. In Study 2, actual pilot reduction and cessation programs were offered to 531 smokers about to undergo out-patient surgeries or procedures. In Study 1, 39% of those eligible elected smoking reduction; and 38% selected cessation. In Study 2 of those eligible, 22% began participation in the smoking reduction program; 12% preferred a cessation approach; and 65% declined. There were few demographic or smoking history differences among those who elected smoking reduction, cessation, or declined. Among this understudied population, a sizable proportion in both studies agreed to participate in smoking reduction. If replicated, this suggests that comprehensive programs that include a smoking reduction component could substantially increase their reach.

Glasgow, R.E., Klesges, L.M., Dzewaltowski, D.A., Estabrooks, P.A., Vogt, T.M. Evaluating the Impact of Health Promotion Programs: Using the RE-AIM Framework for Decision Making Involving Complex Issues. Health Educ Res 2006;21(3):688-694.

ABSTRACT

Current public health and medical evidence rely heavily on efficacy information to make decisions regarding intervention impact. This evidence base could be enhanced by research studies that evaluate and report multiple indicators of internal and external validity such as Reach, Effectiveness, Adoption, Implementation and Maintenance (RE-AIM) as well as their combined impact. However, indices that summarize the combined impact of, and complex interactions among, intervention outcome dimensions are not currently available. We propose

and discuss a series of composite metrics that combine two or more RE-AIM dimensions, and can be used to estimate overall intervention impact. Although speculative and, at this point, there have been limited empirical data on these metrics, they extend current methods and are offered to yield more integrated composite outcomes relevant to public health. Such approaches offer potential to help identify interventions most likely to meaningfully impact population health.

Glasgow, R.E., Nelson, C.C., Strycker, L.A., King, D.K. Using RE-AIM Metrics to Evaluate Diabetes Self-Management Support Interventions. Am J Prev Med 2006;30(1):67-73.

ABSTRACT

Background: Current healthcare evidence relies on relatively narrow efficacy data to make decisions about program impact. This paper illustrates the application of impact indices derived from the RE-AIM (reach, effectiveness, adoption, implementation, and maintenance) framework that takes a broader perspective and includes issues important to decision makers, such as reach, adoption, and cost.

Methods: Composite RE-AIM indices that summarize impact and cost efficiency at the individual participant and setting levels are used to compare two different diabetes self-management support approaches. One study, the Diabetes Priority (DP) program, involved 886 diabetes patients from 30 primary care offices, and relied on usual clinical staff for program implementation. The other study, Diabetes Health Connection (DHC), involved 335 diabetes patients in both HMO and fee-for-service settings, and used health education staff.

Results: The DP performed better on the setting-level impact index, but the programs produced similar results on individual-level impact. The DP had a greater reach (50% vs 38%); was more effective at the initial follow-up (median effect size [ES] 0.23 vs 0.17); and had greater impact consistency across various populations. The DHC performed better on several indices, including higher physician office adoption (20% vs 6%) and staff adoption (79% vs 70%), and there was less variability among intervention staff on protocol implementation (median ES 0.0 vs 0.50).

Conclusions: Greater use of indices focused on public health and external validity criteria could help identify programs most likely to have a meaningful impact on population health and to fit local settings and priorities.

Glasgow, R.E., Nutting, P.A., Toobert, D.J., King, D.K., Strycker, L.A., Jex, M., O'Neill, C., Whitesides, H., Merenich, J. Effects of a Brief Computer-Assisted Diabetes Self-Management Intervention on Dietary, Biological, and Quality-of-Life Outcomes. Chronic Illn 2006;2:27-38.

ABSTRACT

Objective: There is a need for practical, efficient and broad-reaching diabetes self-management interventions that can produce changes in lifestyle behaviours such as healthy eating and weight loss. The objective of this study was to evaluate such a computer-assisted intervention.

Methods: Type 2 diabetes primary care patients ($n=335$) from fee-for-service and health maintenance organization settings were randomized to social cognitive theory-based tailored self-management (TSM) or computer-aided enhanced usual care (UC). Intervention consisted

of computer-assisted self-management assessment and feedback, tailored goal-setting, barrier identification, and problem-solving, followed by health counsellor interaction and follow-up calls. Outcomes were changes in dietary behaviours (fat and fruit/vegetable intake), haemoglobin A1c (HbA1c), lipids, weight, quality of life, and depression.

Results: TSM patients reduced dietary fat intake and weight significantly more than UC patients at the 2-month follow-up. Among patients having elevated levels of HbA1c, lipids or depression at baseline, there were consistent directional trends favouring intervention, but these differences did not reach significance. The intervention proved feasible and was implemented successfully by a variety of staff.

Conclusions: This relatively low-intensity intervention appealed to a large, generally representative sample of patients, was well implemented, and produced improvement in targeted behaviours. Implications of this practical clinical trial for dissemination are discussed.

Glasgow, R.E., Strycker, L.A., King, D.K., Toobert, D.J., Kulchak Rahm, A., Jex, M., Nutting, P.A. Robustness of a Computer-Assisted Diabetes Self-Management Intervention across Patient Characteristics, healthcare Settings, and Intervention Staff. Am J Managed Care 2006;12:137-145.

ABSTRACT

Background: A major problem in the dissemination of most interventions found to be efficacious is that they are of limited or unknown generalizability.

Objective: To document the "robustness," or external validity, of a computer-assisted diabetes self-management program across different patient characteristics, healthcare settings (mixed payer vs health maintenance organization), intervention staff, and outcomes.

Study Design: A randomized controlled trial evaluating a computer-assisted behavior change program for adult patients with type 2 diabetes mellitus (n = 217) vs a computerized health risk assessment.

Methods: Outcomes were identified using the RE-AIM framework and included program adoption among physicians, reach across patient groups, implementation, and behavioral (fat intake and physical activity) and biological (glycosylated hemoglobin and lipid levels) effectiveness measures.

Results: The program achieved 41% patient participation, variable adoption across healthcare settings (76% of health maintenance organization physicians vs 18% of non-health maintenance organization physicians participated), good implementation, and improvement in behavioral outcomes. There were few significant interactions between treatment condition and patient characteristics, type of healthcare setting, or interventionist experience on effectiveness measures.

Conclusions: Patients and physicians were willing to participate in a computer-assisted dietary and physical activity goal-setting intervention, although participation varied by healthcare setting. Interventionists from different backgrounds successfully delivered the intervention, and the results appear robust across various patient and delivery characteristics.

Glasgow RE, Davidson KW, Dobkin PL, Ockene J, Spring B. Practical behavioral trials to advance evidence-based behavioral medicine. *Practical behavioral trials to advance evidence-based behavioral medicine. Ann Behav Med 2006 Feb;31(1):5-13.*

ABSTRACT

There is a well-documented gap between research and practice in many areas of behavioral medicine. This gap is due in part to limitations in the capacity of the research database to address questions that are of central concern to clinicians, administrative decision makers, and policymakers. Thus, there has been a call for "practical clinical trials" that compare clinically viable alternative interventions and assess multiple outcomes important for clinical and policy decisions in diverse patient populations and settings. Such trials offer great potential, and they raise interesting challenges regarding optimal research design and source of funding. We discuss issues related to practical clinical trials in behavioral medicine, propose a need for practical behavioral trials (PBTs), and describe design features that will facilitate clinical and policy decision making. This type of PBT can help to close the gap between research and practice and advance the field of evidence-based behavioral medicine. We discuss potential challenges and objections to PBTs and conclude by providing recommendations for the design, conduct, reporting, and review of practical trials.

Green, L.W., Glasgow, R.E. Evaluating the Relevance, Generalization, and Applicability of Research: Issues in Translation Methodology and External Validity. *Eval Health Professions 2006;29(1):126-153.*

ABSTRACT

Starting with the proposition that "if we want more evidence-based practice, we need more practice-based evidence," this article (a) offers questions and guides that practitioners, program planners, and policy makers can use to determine the applicability of evidence to situations and populations other than those in which the evidence was produced (generalizability), (b) suggests criteria that reviewers can use to evaluate external validity and potential for generalization, and (c) recommends procedures that practitioners and program planners can use to adapt evidence-based interventions and integrate them with evidence on the population and setting characteristics, theory, and experience into locally appropriate programs. The development and application in tandem of such questions, guides, criteria, and procedures can be a step toward increasing the relevance of research for decision making and should support the creation and reporting of more practice-based research having high external validity.

Gyurcsik NC, Brittain DR. Partial examination of the public health impact of the People with Arthritis Can Exercise (PACE) program: reach, adoption, and maintenance. *Public Health Nurs. 2006 Nov-Dec;23(6):516-22.*

ABSTRACT

Objective: To partially evaluate the public health impact (i.e., reach, adoption, maintenance) of People with Arthritis Can Exercise (PACE) programs, which were initiated as a result of two PACE instructor-training workshops.

Design: The study design involved a one-time only, cross-sectional assessment of reach, adoption, and maintenance, conducted 6 months after the workshops. **Sample:** Participants

were 11 adults (n(females)=10) trained to be PACE instructors at one of the workshops.

Measurements: One-on-one phone interviews, developed using the RE-AIM framework, assessed reach, adoption, and maintenance.

Results: Eight of the 11 individuals trained as instructors subsequently began PACE in one of 10 organizations across various communities, indicating high program adoption. However, on average, only 7 individuals with arthritis participated in each PACE program, indicating a low program reach. Within 6 months of beginning PACE, only 3 organizations continued to offer PACE, indicating low program maintenance. Two primary challenges to initiating PACE included recruiting a sufficient number of people to participate in the program and in finding a convenient time to offer it so more individuals could join.

Conclusion: The public health impact, as assessed by reach, adoption, and maintenance, of PACE programs initiated as a result of 2 instructor-training workshops was low.

Marang-van de Mheen PJ, Stadlander MC, Kievit J. Adverse outcomes in surgical patients: implementation of a nationwide reporting system. Qual Saf Health Care. 2006 Oct;15(5):320-4.

ABSTRACT

Problem: Lack of comparable data on adverse outcomes in hospitalised surgical patients.

Design: A Plan-Do-Study-Act (PDSA) cycle to implement and evaluate nationwide uniform reporting of adverse outcomes in surgical patients. Evaluation was done within the Reach Efficacy-Adoption Implementation Maintenance (RE-AIM) framework.

Setting: All 109 surgical departments in The Netherlands.

Key Measures for Improvement: Increase in the number of departments implementing the reporting system and exporting data to the national database.

Strategies for Change: The intervention included (1) a coordinator who could mediate in case of problems; (2) participation of an opinion leader; (3) a predefined plan of action communicated to all departments (including feedback of results during implementation); (4) connection with existing hospital databases; (5) provision of software and a helpdesk; and (6) an instrument based on nationwide standards.

Effects of Change: Implementation increased from 18% to 34% in 1.5 years. The main reason for not implementing the system was that the Information Computer Technology (ICT) department did not link data with the hospital information system (lack of time, finances, low priority). Only 5% of the departments exported data to the national database. Export of data was hindered mainly by slow implementation of the reporting system (so that departments did not have data to export) and by concerns regarding data quality and public availability of data from individual hospitals.

Lessons Learned: Hospitals need incentives to realise implementation. Important factors are financial support, sufficient manpower, adequate ICT linkage of data, and clarity with respect to public availability of data.

2005

Bull, S.S., McKay, H.G., Gaglio, B., Glasgow, R.E. Harnessing the Potential of the Internet to Promote Diabetes Self-Management: How Well Are We Doing? Chronic Illn 2005;1(2):143-155.

ABSTRACT

Objectives: Given the potential for the Internet to be used as a dynamic, interactive medium for providing information, changing attitudes and behaviour and enhancing social support, it is important to consider whether what is currently available online for chronic illness self-management adequately harnesses this potential. The

objective of this paper was to review the content of diabetes self-management websites and to identify strengths and limitations of online diabetes self-management.

Methods: We reviewed and coded features of 87 publicly available diabetes websites hosted by governmental, health plan, commercial, pharmaceutical, and not-for-profit organizations. We assessed whether each website was using online opportunities in the areas of interactivity, theory-based interventions, social support, and evidence-based care.

Results: The majority of sites provided information, essentially using an electronic newspaper or pamphlet format. Few sites offered interactive assessments, social support or problem-solving assistance, although there were some significant differences in these characteristics across the types of site.

Discussion: Current diabetes websites fall short of their potential to help consumers. Suggestions are made for ways to improve the helpfulness and interactivity of these resources.

Gary TL, Hill-Briggs F, Batts-Turner M, Brancati FL. Translational research principles of an effectiveness trial for diabetes care in an urban African American population. Diabetes Educ. 2005 Nov-Dec;31(6):880-9.

ABSTRACT

Purpose: Large-scale effectiveness trials designed to translate evidence-based diabetes care to community settings are few. Studies describing these methods among high-risk minority populations are particularly limited.

Methods: The authors describe Project Sugar, a randomized controlled trial conducted in 2 phases: Project Sugar 1 (1994-1999), which piloted a 4-arm clinic and home-based intervention using nurse case management and community health workers in 186 urban African Americans with type 2 diabetes, and Project Sugar 2 (2000-2005), which examined effectiveness of this intervention among 542 diabetic, urban African Americans.

Results and Conclusions: Project Sugar had success with regard to recruitment and retention, both in phase 1 (80% rate at 24 months) and phase 2 (>90% at 24 months). Using the RE-AIM framework, planning and research design for Project Sugar 2 is described in detail for elements that contributed to the reach, effectiveness, adoption, implementation, and maintenance of this study within a minority community setting. In addition to successful strategies, challenges to conducting effectiveness trials in an inner-city African American community are identified.

Glasgow, R.E., Nutting, P.A., King, D.K., Nelson, CC, Cutter, G., Gaglio, B., Kulchak Rahm, A., Whitesides, H. A Randomized Effectiveness Trial to Improve Diabetes Care. Diabetes Care 2005;28(1):33-39.

ABSTRACT

Objective: There is a well-documented gap between diabetes care guidelines and the services received by patients in most health care settings. This report presents 12-month follow-up results from a computer assisted, patient-centered intervention to improve the level of recommended services received by patients from a variety of primary care settings.

Design and Settings: Eight-hundred-eighty-six patients with type 2 diabetes under the care of 52 primary care physicians participated in the Diabetes Priority Program. Physicians were stratified and randomized to intervention or control conditions and evaluated on two primary outcomes: number of recommended laboratory screenings and recommended patient-centered care activities completed from the NCQA/ADA Provider Recognition Program (PRP). Secondary outcomes were evaluated using the PAID quality-of-life scale, lipid and hemoglobin HgA_{1c} levels, and the PHQ-9 depression scale.

Results: The program was well implemented and significantly improved both number of laboratory assays and patient-centered aspects of diabetes care patients received compared to those in the control condition. There was overall improvement on secondary outcomes of lipids, HgA_{1c}, quality of life, and depression scores; but between-condition differences were not significant.

Conclusions: Staff in small, mixed payer primary care offices can consistently implement a patient-centered intervention to improve PRP measures of quality of diabetes care. Alternative explanations for why these process improvements did not lead to improved outcomes, and suggested directions for future research are discussed.

Glasgow RE, Magid DJ, Beck A, Ritzwoller D, Estabrooks PA. Practical clinical trials for translating research to practice: design and measurement recommendations. Med Care. 2005 Jun;43(6):551-7.

ABSTRACT

Rationale: There is a pressing need for practical clinical trials (PCTs) that are more relevant to clinicians and decision-makers, but many are unaware of these trials. Furthermore, such trials can be challenging to conduct and to report.

Objective: The objective of this study was to build on the seminal paper by Tunis et al (Practical clinical trials. Increasing the value of clinical research for decision making in clinical and health policy. *JAMA*. 2003;290:1624-1632.) and to provide recommendations and examples of how practical clinical trials can be conducted and the results reported to enhance external validity without sacrificing internal validity.

Key Issues: We discuss evaluating practical intervention options, alternative research designs, representativeness of samples participating at both the patient and the setting/clinician level, and the need for multiple outcomes to address clinical and policy implications.

Conclusions: We provide a set of specific recommendations for issues to be reported in PCTs to increase their relevance to clinicians and policymakers, and to help reduce the gap between research and practice.

Klesges, L.M., Estabrooks, P.A., Glasgow, R.E., Dzewaltowski, D.A. Beginning with the Application in Mind: Designing and Planning Health Behavior Change Interventions to Enhance Dissemination. Ann Behav Med 2005;29:66S-75S.

ABSTRACT

Dissemination of behavior change interventions can be enhanced by considering key elements related to public health impact in the study design and planning phases of research projects. In this article we describe a framework of reach, efficacy/effectiveness, adoption, implementation, and maintenance known as RE-AIM and how it can be used to plan and design studies with features that can strengthen the potential translation of interventions. In describing how RE-AIM concepts were introduced to and adopted by 15 behavior change intervention studies as part of the Behavioral Change Consortium (BCC), we provide an example of practical application of the framework. Recommendations for applying the framework to study planning are based on literature reviews conducted by the RE-AIM workgroup and on discussions with investigators who participated in BCC. Utilizing RE-AIM as a planning framework may have increased attention to issues of external validity among BCC studies and enhanced the potential translation and dissemination of intervention findings into practice.

Toobert, D.J., Strycker, L.A., Glasgow, R.E., Barrera M., Jr., Angell, K. Effects of Mediterranean Lifestyle Program on Multiple Risk Behaviors among Women at Risk for Heart Disease. Ann Behav Med 2005;29(2):128-137.

ABSTRACT

Background: The Mediterranean Lifestyle Program was evaluated for its effects on multiple behavioral risk factors for coronary heart disease (CHD) among postmenopausal women with diabetes.

Purpose: Our purpose is to test a comprehensive lifestyle management intervention to reduce CHD risk in postmenopausal women with type 2 diabetes.

Methods: Participants (N = 279) were randomized to usual care (UC) or Mediterranean Lifestyle Program, a lifestyle change intervention aimed at the behavioral risk factors (eating patterns, physical activity, stress management, and social support) affecting risk for CHD in postmenopausal women with type 2 diabetes.

Results: In original and intent-to-treat analyses, Mediterranean Lifestyle Program participants showed significantly greater improvement in dietary behaviors, physical activity, stress management, perceived support, and weight loss at 6 months compared to UC.

Conclusions: This study demonstrated the effectiveness of the Mediterranean Lifestyle Program in improving self-care among women with type 2 diabetes, showed that postmenopausal women could make comprehensive lifestyle changes, and provided evidence that a program using social-cognitive strategies and peer support can be used to modify multiple lifestyle behaviors.

2004

Dzewaltowski, D.A., Estabrooks, P.A., Glasgow, R.E. The Future of Physical Activity behavior Change Research: What is Needed to Improve Translation Research into Health Promotion Practice? Exer Sport Sci Rev 2004;32(2):63.

ABSTRACT

There is a gap between physical activity intervention research and the delivery of evidence-based programs in practice. We describe individual and setting level factors important for translation that moderate the impact of interventions and often are not reported in the literature. The Reach, Efficacy/Effectiveness, Adoption, Implementation, and Maintenance (RE-AIM) framework provides a useful way of organizing and reporting these factors.

Dzewaltowski, D.A., Estabrooks, P.A., Klesges, L.M., Bull, S.S., Glasgow, R.E. Behavior Change Intervention Research in Community Settings: How Generalizable are the Results? Health Promo Intl 2004;19(2):235-245.

SUMMARY

This review examines the extent to which recent behavioral intervention studies conducted in community settings reported on elements of internal and external validity, with an emphasis on whether research has been conducted in representative settings with representative populations. A targeted review was conducted on community-based intervention studies that promoted good nutrition, physical activity or smoking cessation/prevention, and were published in 11 leading health behavior journals between 1996 and 2000. The RE-AIM framework (reach, efficacy, adoption, implementation and maintenance) was used to evaluate the extent to which each paper reported on elements of reach, efficacy/effectiveness, adoption, implementation and maintenance. A total of 27 publications were reviewed.

Although most studies (88%) reported participation rates among eligible members of the target audience ("reach"), only 11% of studies reported the participation rate ('adoption') among eligible community-based organizations or settings. Few studies reported if participating individuals or settings were representative of those found in the broader population. Although a majority of studies (59%) reported whether the intervention was delivered ("implementation"), few reported whether individuals maintained behavior change (30%) or whether organizations maintained or institutionalized interventions (0%). To increase the potential to translate community research findings to practice, studies should place a greater emphasis on obtaining and reporting external validity information, such as representativeness. The lack of external validity information limits researchers' and practitioners' ability to judge the generalizability of effects and the comparative utility of interventions. Improved reporting will facilitate implementation of proven and broadly applicable intervention strategies in communities. To make significant progress, all parties, including researchers, reviewers, editors and funders, need to take responsibility for increased emphasis on external validity information and ask what role they can best play to facilitate this process.

Dzewaltowski, D.A., Glasgow, R.E., Klesges, L.M., Estabrooks, P.A., Brock, E. RE-AIM: Evidence-Based Standards and a Web Resource to Improve Translation of Research into Practice. Ann Behav Med 2004;28(2):75-80.

ABSTRACT

Background: Health services data indicate that under present conditions evidence-based medical and preventive practices are not consistently implemented in clinical practice and affect the quality of care provided to patients. Operating with similar conditions and resources, it is unlikely that evidence-based behavioral medicine (EBBM) practices will be more successfully implemented.

Purpose: In this article we propose ways to help improve the implementation of EBBM practice.

Methods: This article describes the RE-AIM (Reach, Efficacy/Effectiveness, Adoption, Implementation, and Maintenance) framework that is available on a free-use web site (<http://www.re-aim.org>), which offers practical research translation tools, resources, and support for program planners, community leaders, and researchers. The material located at www.re-aim.org can be used to help anticipate and overcome likely barriers to dissemination and to estimate eventual public health impact.

Results: Data on website utilization and lessons learned thus far in its implementation are presented.

Conclusions: Scientists and public health leaders should devote greater attention to reporting practice-oriented issues such as generalizability, breadth of application, and pragmatic and setting or contextual issues in addition to the current focus on internal validity issues. We hope that this and similar efforts will assist EBBM interventions to have broader applications, be consistently implemented, and be sustained.

Eakin EG, Brown WJ, Marshall AL, Mummery K, Larsen E. Physical activity promotion in primary care: bridging the gap between research and practice. Am J Prev Med. 2004 Nov;27(4):297-303. Comment in: Am J Prev Med. 2005 Oct;29(3):242.

ABSTRACT

Background: While a growing literature supports the effectiveness of physical activity interventions delivered in the primary care setting, few studies have evaluated efforts to increase physician counseling on physical activity during routine practice (i.e., outside the context of controlled research). This paper reports the results of a dissemination trial of a primary care-based physical activity counseling intervention conducted within the context of a larger, multi-strategy, Australian community-based, physical activity intervention, the 10,000 Steps Rockhampton Project.

Methods: All 23 general practices and 66 general practitioners (GPs, the Australian equivalent of family physicians) were invited to participate. Practice visits were made to consenting practices during which instruction in brief physical activity counseling was offered, along with physical activity promotion resources (print materials and pedometers). The evaluation, guided by the RE-AIM framework, included collection of process data, as well as pre- and post-intervention data from a mailed GP survey, and data from the larger project's random-digit-dialed, community-based, cross-sectional telephone survey that was conducted in Rockhampton and a comparison community.

Results: Ninety-one percent of practices were visited by 10,000 Steps staff and agreed to participate, with 58% of GPs present during the visits. General practitioner survey response rates were 67% (n =44/66 at baseline) and 71% (n =37/52, at 14-month follow-up). At follow-

up, 62% had displayed the poster, 81% were using the brochures, and 70% had loaned pedometers to patients, although the number loaned was relatively small. No change was seen in GP self-report of the percentage of patients counseled on physical activity. However, data from the telephone surveys showed a 31% increase in the likelihood of recalling GP advice on physical activity in Rockhampton (95% confidence interval [CI]=1.11-1.54) compared to a 16% decrease (95% CI=0.68-1.04) in the comparison community.

Conclusions: This dissemination study achieved high rates of GP uptake, reasonable levels of implementation, and a significant increase in the number of community residents counseled on physical activity. These results suggest that evidence-based primary care physical activity counseling protocols can be translated into routine practice, although the initial and ongoing investment of time to develop partnerships with relevant healthcare organizations, and the interest generated by the overall 10,000 Steps program should not be underestimated.

Glasgow, R.E., Boles, S.M., Lichtenstein, E., Lee, M.E., Foster, L. Adoption, Reach, and Implementation of a Novel Smoking Control Program: Analysis of a Public Utility—Research Organization Partnership. Nicotine Tob Res 2004;6(2):269-274.

ABSTRACT

Interventions to reach and assist smokers and families of smokers have generally reached a plateau in terms of participation and success rates. This study reports on recruitment and implementation issues involved in a novel partnership with public utilities. The goal of the project is to use information on the synergistic risks of smoking and home radon exposure to motivate and assist smoking families to create smoke-free homes or to stop smoking. We report on recruitment, participation rates, and representativeness at both the utility and the individual or family level. This project recruited 55% of utilities approached and an estimated 11% of smoking families served by these utilities. Lessons learned for recruitment and implementation activities are discussed, and recommendations are made for the conduct and evaluation of future programs using innovative partnerships with public and population-based organizations to reach smokers and reduce exposure to environmental tobacco smoke.

Glasgow, R.E., Klesges, L.M., Dzewaltowski, D.A., Bull, S.S., Estabrooks, P. The Future of Health Behavior Research: What is Needed to Improve Translation of Research into Health Promotion Practice? Ann Behav Med 2004;27(1):3-12.

ABSTRACT

Background: It is well documented that the results of most behavioral and health promotion studies have not been translated into practice.

Purpose: In this article, reasons for this gap, focusing on study design characteristics as a central contributing barrier, are discussed.

Methods: Four reviews of recent controlled studies in worksites, health care, school, and community settings are briefly discussed and summarized. Their implication for future research and for closing the gap between research and practice are then discussed.

Results: These reviews come to consistent conclusions regarding key internal and external validity factors that have and have not been reported. It is very clear that moderating variables and generalization issues have not been included or reported in the majority of investigations, and that as a consequence little is known about the representativeness or the robustness of results from current studies.

Conclusion: To significantly improve the current state of affairs, substantial changes will be required on the part of researchers, funding agencies, and review and editorial boards. In conclusion, recommendations for each of these entities is provided.

Glasgow, R.E., Marcus, A., Bull, S.S., Wilson, K. Disseminating Effective Cancer Screening Interventions. Cancer 2004;101 (Suppl 5): 1239-1250.

ABSTRACT

A large gap exists between the results of research concerning efficacious cancer screening programs and the programs delivered in practice. In this article, the authors discuss issues in, barriers to, and lessons learned regarding the dissemination of interventions. They summarize previous reviews, exemplary studies, and theories regarding the diffusion and dissemination of cancer screening interventions. Six lessons learned address the involvement of key stakeholders, factors influencing diffusion, the need for different types of efficacy and effectiveness studies with greater attention to external validity, replication, the use of theoretical and evaluation models, and the importance of policy infrastructure. In this article, the authors make recommendations for future research and practice, including improving the understanding of the intervention process and changing the types of grants funded and review criteria used. Also needed are an enhanced infrastructure, including policies to support dissemination, and the involvement of researchers, health care administrators, clinicians, and funding organizations in dissemination if the gap between research and practice in cancer screening is to be reduced. *Cancer* 2004. Published 2004 by the American Cancer Society.

Glasgow, R.E., Nutting, P.A., King, D.K., Nelson, C.C., Cutter, G., Gaglio, B., Kulchak Rahm, A. A Practical Randomized Trial to Improve Diabetes Care. J Gen Int Med 2004;19(12):1167-1174.

ABSTRACT

Objective: There is a well-documented gap between diabetes care guidelines and the services received by patients in almost all health care settings. This project reports initial results from a computer-assisted, patient-centered intervention to improve the level of recommended services received by patients from a wide variety of primary care providers.

Design and Settings: Eight hundred eighty-six patients with type 2 diabetes under the care of 52 primary care physicians participated in the Diabetes Priority Program. Physicians were stratified and randomized to intervention or control conditions and evaluated on 2 primary outcomes: number of recommended laboratory screenings and recommended patient-centered care activities completed. Secondary outcomes were evaluated using the Problem Areas in Diabetes scale and the Patient Health Questionnaire (PHQ)-9 depression scale, and the RE-AIM framework was used to evaluate potential for dissemination.

Results: The program was well-implemented and significantly improved both number of recommended laboratory assays (3.4 vs 3.1; $P < .001$) and patient-centered aspects of diabetes care patients received (3.6 vs 3.2; $P < .001$) compared to those in randomized control practices. Activities that were increased most were foot exams (follow-up rates of 80% vs 52%; $P < .003$) and nutrition counseling (76% vs 52%; $P < .001$).

Conclusions: Patients are very willing to participate in a brief computer-assisted intervention that is effective in enhancing quality of diabetes care. Staff in primary care offices can

consistently deliver an intervention of this nature, but most physicians were unwilling to participate in this translation research study.

2003

Bull, S.S., Gillette, C., Glasgow, R.E., Estabrooks, P. Worksite Health Promotion Research: To What Extent Can We Generalize the Results and What is Needed to Translate Research to Practice? Health Educ Behav 2003;30:537-549.

ABSTRACT

Information on external validity of work site health promotion research is essential to translate research findings to practice. The authors provide a literature review of work site health behavior interventions. Using the RE-AIM framework, they summarize characteristics and results of these studies to document reporting of intervention reach, adoption, implementation, and maintenance. The authors reviewed a total of 24 publications from 11 leading health behavior journals. They found that participation rates among eligible employees were reported in 87.5% of studies; only 25% of studies reported on intervention adoption. Data on characteristics of participants versus nonparticipants were reported in fewer than 10% of studies. Implementation data were reported in 12.5% of the studies. Only 8% of studies reported any type of maintenance data. Stronger emphasis is needed on representativeness of employees, work site settings studied, and longer term results. Examples of how this can be done are provided.

Estabrooks, P., Dzewaltowski, D.A., Glasgow, R.E., Klesges, L.M. Reporting of Validity from School Health Promotion Studies Published in 12 Leading Journals, 1996-2000. J School Health 2003;73:21-28.

ABSTRACT

A targeted review was conducted of school-based, controlled intervention studies that promoted good nutrition, physical activity, or smoking cessation/prevention, and were published in one of 12 leading health behavior journals between 1996 and 2000. The RE-AIM framework was used to evaluate the extent to which each paper reported on elements of reach, efficacy, adoption, implementation, and maintenance. Thirty-two publications were reviewed. Reporting rates across the RE-AIM dimensions varied substantially: Reach = 59.3%; Efficacy = 100%; Adoption = 14.8%; Implementation = 37%; Maintenance = 25.9% for individuals, 0% for schools. Few studies reported if characteristics of the study sample were representative of those found in the broader population of students or schools. Among studies reporting on the RE-AIM dimensions, participation rates generally were high (median 82%), adoption rates were moderate (median 72.5%), and reports of implementation were high (87%). To increase the potential to translate controlled research to "real-world" practice conditions, a stronger emphasis should be placed on reporting the representativeness of the sample of students and schools.

Estabrooks, P., Glasgow, R.E., Dzewaltowski, D.A. Physical Activity Promotion through Primary Care. JAMA 2003;289(22):2913-2916.

INTRODUCTION

Despite the many benefits of physical activity, initiation and maintenance rates in the general population are disappointing. The majority of US adults are either completely inactive or do not meet the recommended guidelines of 30 minutes of moderate activity 5 times per week or at least 20 minutes of vigorous activity 3 times per week. Recent estimates from the Centers for Disease Control and Prevention (CDC) Behavioral Risk Factor Surveillance Survey suggest that 27.6% of adults perform no activity, 46.2% perform some activity, and 26.2% meet recommendations.

Physical activity levels of US adolescents also are problematic. About 14% of adolescents report no recent physical activity and nearly half are not active enough to gain the benefits of regular physical activity. Furthermore, physical activity declines significantly as age and school grade increase. For example, 69% of children between the ages of 12 to 13 years are active at a vigorous intensity 3 days during a typical week, whereas only 38% of young adults 18 to 21 years are active at the same level. As a result, the promotion of regular physical activity for all age groups has been designated a national health priority.

Glasgow, R.E. Translating Research to Practice: Lessons Learned, Areas for Improvement, and Future Directions. Diabetes Care 2003;26(8):2451-2456.

ABSTRACT

Objectives: 1) to make recommendations for researchers, funding agencies and review groups that would further diabetes translation and help focus attention on public health impact, and 2) to identify areas of special opportunity for such research.

Research Methods: The RE-AIM framework (Reach, Effectiveness, Adoption, Implementation, and Maintenance) is used to identify research questions, methods, measures and actions that can help to close the gap between research and practice.

Results: Diabetes translation efforts to date have been sparse and diabetes care research has generally been conducted with unrepresentative patients in unrepresentative settings using interventions that would be difficult to implement in real world settings. It is recommended that future research devote more attention to external validity and to reporting measures that will allow the evaluation of potential for translation along the RE-AIM dimensions.

Conclusions: Actions by researchers, funding agencies and review groups to increase attention to RE-AIM related issues of representativeness, widespread acceptability, intervention delivery and sustainability would help reduce the chasm between diabetes research and care.

Glasgow, R.E., Boles, S.M., McKay, H.G., Barrera, M. The D-Net Diabetes Self-Management Program: Long-Term Implementation, Outcomes, and Generalization Results. Prev Med 2003;36(4):410-419.

ABSTRACT

Background. A prerequisite to translating research findings into practice is information on consistency of implementation, maintenance of results, and generalization of effects. This

follow-up report is one of the few experimental studies to provide such information on Internet-based health education.

Methods. We present follow-up data 10 months following randomization on the “Diabetes Network (D-Net)” Internet-based self-management project, a randomized trial evaluating the incremental effects of adding (1) tailored self-management training or (2) peer support components to a basic Internet-based, information-focused comparison intervention.

Participants were 320 adult type 2 diabetes patients from participating primary care offices, mean age 59 (SD = 9.2), who were relatively novice Internet users.

Results. All intervention components were consistently implemented by staff, but participant website usage decreased over time. All conditions were significantly improved from baseline on behavioral, psychosocial, and some biological outcomes; and there were few differences between conditions. Results were robust across on-line coaches, patient characteristics, and participating clinics.

Conclusions. The basic D-Net intervention was implemented well and improvements were observed across a variety of patients, interventionists, and clinics. There were, however, difficulties in maintaining usage over time and additions of tailored self-management and peer support components generally did not significantly improve results.

Glasgow, R.E., Lichtenstein, E., Marcus, A.C. Why Don't We See More Translation of Health Promotion Research to Practice? Rethinking the Efficacy to Effectiveness Transition. Am J Public Health 2003;93(8):1261-1267.

ABSTRACT

The gap between research and practice is well documented. We address one of the underlying reasons for this gap: the assumption that effectiveness research naturally and logically follows from successful efficacy research. These 2 research traditions have evolved different methods and values; consequently, there are inherent differences between the characteristics of a successful efficacy intervention versus those of an effectiveness one. Moderating factors that limit robustness across settings, populations, and intervention staff need to be addressed in efficacy studies, as well as in effectiveness trials. Greater attention needs to be paid to documenting intervention reach, adoption, implementation, and maintenance. Recommendations are offered to help close the gap between efficacy and effectiveness research and to guide evaluation and possible adoption of new programs.

2002

Eakin, E.G., Bull, S.S., Glasgow, R.E., Mason, M. Reaching those most in need: A review of diabetes self-management interventions in disadvantaged populations. Diabetes Metab Res Rev 2003;18(1):26-35.

SUMMARY

There has been increased recognition of the importance of developing diabetes self-management education (DSME) interventions that are effective with under-served and minority populations. Despite several recent studies in this area, there is to our knowledge no systematic review or synthesis of what has been learned from this research. An electronic literature search identified five formative evaluations and ten controlled SME intervention trials focused on under-served (low-income, minority or aged) populations. The RE-AIM

(Reach, Efficacy, Adoption, Implementation, Maintenance) evaluation framework was used to evaluate the controlled studies on the dimensions of reach, efficacy, adoption, implementation, and maintenance. Fifty percent of the studies identified reported on the percentage of patients who participated, and the percentages were highly variable. The methodological quality of the articles was generally good and the short-term results were encouraging, especially on behavioral outcomes. Data on adoption (representativeness of settings and clinicians who participate) and implementation were almost never reported. Studies of modalities in addition to group meetings are needed to increase the reach of DSME with under-served populations. The promising formative evaluation work that has been conducted needs to be extended for more systematic study of the process of intervention implementation and adaptation with special populations. Studies that explicitly address the community context and that address multiple issues related to public health impact of DSME interventions are recommended to enhance long-term results.

Glasgow, R.E., Bull, S.S., Gillette, C., Klesges, L.M., Dzewaltowski, D.A. Behavior Change Intervention Research in Health Care Settings: A Review of Recent Reports, with Emphasis on External Validity. Am J Prev Med 2002;23(1):62-69.

ABSTRACT

This review examines the extent to which recent behavioral intervention studies conducted in community settings reported on elements of internal and external validity, with an emphasis on whether research has been conducted in representative settings with representative populations. A targeted review was conducted on community-based intervention studies that promoted good nutrition, physical activity or smoking cessation/prevention, and were published in 11 leading health behavior journals between 1996 and 2000. The RE-AIM framework (reach, efficacy, adoption, implementation and maintenance) was used to evaluate the extent to which each paper reported on elements of reach, efficacy/effectiveness, adoption, implementation and maintenance. A total of 27 publications were reviewed. Although most studies (88%) reported participation rates among eligible members of the target audience ('reach'), only 11% of studies reported the participation rate ('adoption') among eligible community-based organizations or settings. Few studies reported if participating individuals or settings were representative of those found in the broader population. Although a majority of studies (59%) reported whether the intervention was delivered ('implementation'), few reported whether individuals maintained behavior change (30%) or whether organizations maintained or institutionalized interventions (0%). To increase the potential to translate community research findings to practice, studies should place a greater emphasis on obtaining and reporting external validity information, such as representativeness. The lack of external validity information limits researchers' and practitioners' ability to judge the generalizability of effects and the comparative utility of interventions. Improved reporting will facilitate implementation of proven and broadly applicable intervention strategies in communities. To make significant progress, all parties, including researchers, reviewers, editors and funders, need to take responsibility for increased emphasis on external validity information and ask what role they can best play to facilitate this process.

Glasgow, R.E., Toobert, D.J., Hampson, S.E., Strycker, L.A. Implementation, Generalization, and Long-Term Results of the "Choosing Well" Diabetes Self-management Intervention. Pt Educ Couns 2002;48:115-122.

ABSTRACT

Prerequisites for translating intervention research findings into practice are maintenance of results, generalization of effects and consistency of implementation. This report presents 12 months follow-up information on a randomized 2x2 factorial trial evaluating the incremental effects of adding (1) telephone follow-up or (2) a community resources utilization component to a basic touchscreen computer-assisted dietary goal-setting intervention for 320 type 2 diabetes patients. All conditions evidenced significant improvement from baseline to the 12 months follow-up across behavioral, biological and psychosocial measures. There were few consistent differences between conditions, but results were robust across interventionists and clinics. The telephone follow-up component appeared to enhance long-term results on some measures. When considered along with earlier results from a randomized trial that included a control condition without goal setting, it is concluded that this basic goal-setting intervention can be consistently implemented by a variety of interventionists and produce lasting improvements.

Toobert, D.J., Strycker, L.A., Glasgow, R.E., Bagdade, J.D. If You Build It, Will They Come? Reach and Adoption of a Comprehensive Lifestyle Management Program for Women with Type 2 Diabetes. Pt Educ Couns 2002;43:99-105.

ABSTRACT

This paper describes recruitment and participation of physicians and patients in a randomized study to evaluate the effects of a moderately intensive (2-year) lifestyle management intervention for post-menopausal women with type 2 diabetes at risk for coronary heart disease (CHD). The purpose of this report is to answer two practical public health questions: (1) "Will physicians refer their patients with type 2 diabetes to such an intensive lifestyle change program?" and, if so, (2) "Will these patients participate?" Results showed high (70%) acceptance among physicians. About 51% of eligible patients agreed to participate, which was encouraging given the substantial time commitment involved. Main reasons for refusal were lack of eligible patients (among physicians) and lack of time (among patients). Patient participants and non-participants did not differ significantly on age, body mass, and other demographic and medical variables. Based on these results, it appears that appropriate recruitment procedures will yield a representative sample of women willing to participate in intensive lifestyle management programs.

Toobert DJ, Strycker LA, Glasgow RE, Barrera M, Bagdade JD. Enhancing support for health behavior change among women at risk for heart disease: the Mediterranean Lifestyle Trial. Health Educ Res 2002 Oct;17(5):574-85.

ABSTRACT

This paper describes a randomized study to evaluate the effects of a comprehensive lifestyle management intervention for 279 postmenopausal women with type 2 diabetes who are at elevated risk for coronary heart disease (CHD). The intervention, called the Mediterranean Lifestyle Trial, is focused on dietary factors, physical activity, social support and stress

management. The Mediterranean Lifestyle Trial relies on a synthesis of Social Cognitive Theory and Social Ecologic Theory, as well as goal-systems theory, to explicitly inform the lifestyle intervention and to address maintenance. Thus, the trial should help illuminate the theoretical mechanisms responsible for lifestyle change. Primary outcome variables are dietary, stress management and physical activity behavior change, quality of life, and CHD-related biological risk factors. Hypothesized mediating variables include self-efficacy, coping, and social and environmental support. Following the initial 6-month intervention, participants in the intervention condition are randomized to one of two groups designed to enhance maintenance of effects: either a peer-led support group or a personalized multilevel community resources maintenance condition. Unlike the peer group, the personalized approach focuses on multiple levels of community resources to promote healthful lifestyle change. Because this research focuses on issues of generalization and translation to practice, the RE-AIM evaluation framework is being used to evaluate Reach, Effectiveness, Adoption, Implementation and Maintenance. This framework will help to translate research into practice by directing researchers' attention to important but seldom-investigated strategies for enhancing longer-term maintenance. Specifically, the study tests how long-term maintenance may be improved through the use of existing community resources, an intervention based on multiple environmental factors and multiple lifestyle behaviors, and lay leaders versus personalized professional support.

2001

France EK, Glasgow RE, Marcus AC. Smoking cessation interventions among hospitalized patients: what have we learned? Prev Med 2001 Apr;32(4):376-88.

ABSTRACT

BACKGROUND: We conducted a structured review of controlled studies on inpatient hospital-based smoking cessation interventions. **METHODS:** Electronic searches were conducted with two different search engines, and reference sections of articles located were also reviewed. The RE-AIM framework was used to organize the review around the issues of reach, efficacy, adoption, implementation, and maintenance of interventions. **RESULTS:** Thirty-one intervention articles were located, 20 of which included a comparison condition and were included in the review. Overall, a moderate number of studies (13/20) reported on reach, which was highly variable and limited (30-50% in most studies), while few reported on implementation (7/20). Longer term cessation results produced relative risk ratios of 0.9-2.3, with a median of 1.5. Increases in quit rates above the control condition ranged from -1 to 10% (median 4%) among general admission patients and from 7 to 36% (median 15%) among cardiac admission patients. Studies with a dedicated smoking cessation counselor and 3-5 months of relapse prevention had a significant impact on cessation rates. Study settings (adoption) were limited to university, Veterans affairs, and HMO hospitals. Maintenance at the individual level was variable and related to the presence of a relatively intensive initial intervention and a sustained relapse prevention intervention. **CONCLUSIONS:** Efficacious inpatient smoking programs have been developed and validated. The challenge now is to translate these interventions more widely into practice, given changing hospitalization patterns. Copyright 2001 American Health Foundation and Academic Press.

Glasgow, R.E., Bull, S.S. Making a Difference with Interactive Technology: Considerations in using and Evaluating Computerized Aids for Diabetes Self-Management Education. Diabetes Spectrum 2001;14(2):99-106.

ABSTRACT

This article provides a discussion of the strengths and limitations of interactive technologies (e.g., Internet, CD-ROM) as supplements to and extensions of diabetes self-management education. Examples are provided, and the RE-AIM framework is used to consider how different interactive technologies have been used to enhance the Reach, Effectiveness, Adoption, Implementation, and Maintenance of interventions. Appropriate use of these technologies (e.g., computer administration, scoring, and feedback on assessment instruments; modeling optional coping strategies) should help diabetes educators reach and support more people in a more tailored manner and should free up educators' time to focus on the creative problem identification and problem-solving that humans do best.

Glasgow, R.E., McKay, H.G., Piette, J.D., Reynolds, K.D. The RE-AIM Framework for Evaluating Interventions: What Can It Tell Us about Approaches to Chronic Illness Management? Pt Educ Couns 2001;44:119-127.

ABSTRACT

Background: The RE-AIM framework is used as a method of systematically considering the strengths and weaknesses of chronic illness management interventions in order to guide program planning.

Method: The RE-AIM dimensions of Reach, Efficacy, Adoption, Implementation, and Maintenance are used to rate one-on-one counseling interventions, group sessions, interactive computer-mediated interventions, telephone calls, mail interventions, and health system policies.

Results: The RE-AIM ratings suggest that, although often efficacious for those participating, traditional face-to-face intervention modalities will have limited impact if they cannot be delivered consistently to large segments of the target population. Interventions using new information technologies may have greater reach, adoption, implementation, and maintenance, and thereby greater public health impact. Policy changes received high ratings across a variety of RE-AIM dimensions.

Conclusions: Program planners should make decisions regarding implementing and funding health services based on multiple dimensions, rather than only considering efficacy in randomized clinical trials. Doing so may improve the resulting public health impact. Directions for future chronic illness management research related to RE-AIM, and implications for decision making, are described.

Lando, H.A., Valanis, B.G., Lichtenstein, E.L., et al. Promoting smoking abstinence in pregnant and postpartum patients: A comparison of 2 approaches. Am J Managed Care 2001;7:685-693.

ABSTRACT

Objective: To compare the implementation, delivery, and implications for dissemination of 2 different maternal smoking-cessation/relapse-prevention interventions in managed care environments.

Study Design: Healthy Options for Pregnancy and Parenting (HOPP) was a randomized, controlled efficacy trial of an intervention that bypassed the clinical setting. Stop Tobacco for Our Kids (STORK) was a quasi-experimental effectiveness study of a point-of-service intervention. Both incorporated prenatal and postnatal components.

Patients and Methods: Subjects in both studies were pregnant women who either smoked currently or had quit recently. The major intervention in HOPP was telephone counseling delivered by trained counselors, whereas the STORK intervention was delivered by providers and staff during pre-partum, in-patient post-partum, and well-baby visits.

Results: In HOPP, 97% of telephone intervention participants reported receiving 1 or more counselor calls. The intervention delayed but did not prevent postpartum relapse to smoking. Problems with intervention delivery related primarily to identification of the target population and acceptance of repeated calls. STORK delivered 1 or more cessation contacts to 91% of prenatal smokers in year 1, but the rate of intervention delivery declined in years 2 and 3. Modest differences were obtained in sustained abstinence between 6 and 12 months postpartum, but not in point prevalence abstinence at 12 months.

Conclusions: The projects were compared using 4 of the 5 dimensions of the RE-AIM model including reach, adoption, implementation, and maintenance. It was difficult to apply the fifth dimension, efficacy, because of the differences in study design and purpose of the interventions. The strengths and limitations of each project were identified, and it was concluded that a combined intervention that incorporates elements of both HOPP and STORK would be optimal if it could be implemented at reasonable cost.

2000

Eakin, E.G., Glasgow, R.E., Riley, K.M., Review of Primary Care-Based Physical Activity Intervention Studies: Effectiveness and Implications for Practice and Future Research. J Fam Pract 2000;49(2):158-168.

ABSTRACT

Objective: To summarize the literature on primary care-based interventions for increasing physical activity and make recommendations for future research and for integrating successful strategies into practice.

Search Strategies: We searched MEDLINE (1980 to 1998), psychological abstracts, ERIC and HealthStar databases, the website for *The Journal of Family Practice*, bibliographies of selected studies, and previous reviews for relevant articles. The search was limited to the English language. Three experts in the field of physical activity were contacted for leads on unpublished trials.

Selection Criteria: Inclusion criteria were: randomized controlled trial or quasi-experimental study using a comparison group, intervention delivered or initiated in a primary care setting, and reported results on at least 1 measure of physical activity. Studies that focused solely on patients with cardiovascular disease were excluded.

Main Results: Primary care-based physical activity counseling is moderately effective in the short term, although there is considerable variability across studies. Studies in which the interventions were tailored to participant characteristics and which offered written materials to patients produced stronger results. Unlike many types of health promotion, the reach of primary care-based physical activity interventions is high. Questions remain about the consistency of implementation and long-term maintenance of outcomes.

Conclusions: Despite the need for further research, enough is known to recommend integration of key strategies of physical activity counseling into routine practice. We recommend incorporating these strategies into primary care and prioritizing them for further research.

Feil, E.G., Glasgow, R.E., Boles, S.M., McKay, H.G. Who participates in Internet-based self-management programs? A study among novice computer users in a primary care setting. Diabetes Educ 2000;26:806-811.

ABSTRACT

Purpose: The purpose of this study was to evaluate the participation rates and factors associated with nonparticipation among primary care patients who were invited to join an Internet-based self-management research program.

Methods: Primary care providers invited their patients with type 2 diabetes to participate in an Internet-based diabetes self-management support program. Research staff contacted these patients by phone to assess their eligibility and interest in participating. Reasons for declining were assessed and demographic/medical status information was collected.

Results: Of the eligible patients, 60% participated in the program. No significant differences were found between participants and decliners in gender, insulin use, computer familiarity, or computer ownership. There were significant differences in age and years since diagnosis. Participants were slightly younger and had diabetes for a fewer number of years than non-participants. Nonparticipation was not related to computer or Internet issues.

Conclusions: Most older diabetes patients without previous Internet experience will take part in Internet-based self-management support programs if barriers to participation are addressed.

Glasgow, R. E. and Toobert, D. J. Brief, computer-assisted diabetes self-management counseling: Effects on behavioral, physiological and quality of life outcomes. Med Care 2000;38(11):1062-1073.

ABSTRACT

Objectives: The objective of this work was to evaluate the reach, effectiveness, adoption, and implementation of a brief behavioral dietary intervention and 2 supplemental components of diabetes self-management support: telephone follow-up calls and community resources enhancement.

Design and Subjects: This was a 2 x 2 randomized, controlled trial investigating the incremental effects of telephone follow-up and community resources enhancement with 320 adult type 2 diabetes outpatients.

Methods: Key outcomes included behavioral (dietary patterns, fat intake), physiologic (HbA1c, lipids), and quality-of-life/patient satisfaction measures and were collected at baseline and 3- and 6-month follow-up.

Results: Despite high reach (76% patient participation), excellent adoption (all 12 primary care practices approached participated), and good implementation, there were few outcome differences among treatment conditions. There was significant improvement across conditions in most outcomes in each category at both follow-ups.

Conclusions: A brief, computer-assisted, dietary goal-setting intervention basic treatment condition was moderately successful in producing dietary improvements but less so in

producing biologic or quality-of-life outcomes. Additions of follow-up phone calls or a community resources enhancement component did not produce incremental improvements over this basic intervention.

Glasgow, R. E., Eakin, E. G., Whitlock, E. P. & Lichtenstein, E. L. A Brief Smoking Cessation Intervention for Women in Low-Income Planned Parenthood Clinics. Am J Public Health 2000;90(5):786-789.

ABSTRACT

Objectives: The purpose of this study was to evaluate a brief smoking cessation intervention for women 15 to 35 years of age attending Planned Parenthood clinics.

Methods: Female smokers (n = 1154) were randomly assigned either to advice only or to a brief intervention that involved a 9-minute video, 12 to 15 minutes of behavioral counseling, clinician advice to quit, and follow-up telephone calls.

Results: Seventy-six percent of those eligible participated. Results revealed a clear, short-term intervention effect at the 6-week follow-up (7-day self-reported abstinence: 10.2% vs 6.9% for advice only, $P < .05$) and a more ambiguous effect at 6 months (30-day biochemically validated abstinence: 6.4% vs 3.8%, NS).

Conclusions: This brief, clinic-based intervention appears to be effective in reaching and enhancing cessation among female smokers, a traditionally underserved population.

Glasgow, R.E., Eakin, E.G. Medical Office-Based Interventions. In: Snoek, F. and C. Skinner (Eds) Psychology in Diabetes Care, 2000, Ch. 6, pp. 141-168.

ABSTRACT

There is an important need for psychologists to be more involved in the diabetes care that takes place in medical offices for three primary reasons. First, many patients will not or cannot avail themselves of psychological assistance offered via the traditional referral system. Patients frequently have many barriers to following through on referrals, including cost, lack of familiarity with behavioural science, inconvenience, the time commitment required and anticipated stigma associated with "seeing a shrink". Second, the quality of care provided for diabetes patients in most medical settings is substantially suboptimal. Almost all population-based studies of the level of recommended 'best practices' received by patients have revealed much lower than desired rates of screening and clinical services. The rates of preventive services and especially lifestyle change interventions are even lower. Third, patient-centered, motivational interviewing and patient activation/empowerment approaches have been found to produce beneficial effects, yet such strategies are seldom employed in either primary care or specialty endocrinological settings. Thus, there is a compelling need and great opportunity to apply behavioural science in medical office settings.

1999

Glasgow RE. Outcomes of and for diabetes education research. Diabetes Educ 1999 Nov-Dec;25(6 Suppl):74-88.

ABSTRACT

Purpose: The purpose of this paper is to review outcome measures used to evaluate diabetes self-management education and make recommendations for future research. **METHODS:** Three perspectives were used: (1) the frequency with which different measures were collected prior to 1990 was compared with a sample of the 1997 to 1999 literature, (2) a multilevel pyramid model of psychosocial-environmental factors was used to evaluate the level of outcomes assessed, and (3) the RE-AIM evaluation framework was used to assess the public health impact of studies reported in the literature. **RESULTS:** Knowledge and HbA1c measures are often collected to the exclusion of other, possibly more appropriate outcomes. Research has focused almost exclusively on individual or family level outcomes and paid little attention to effects at systems levels, such as neighborhoods, communities, or healthcare systems. More recent studies have been evaluating the reach of interventions, but more practice-oriented research needs to be conducted with representative patients, providers, and settings. **CONCLUSIONS:** Much has been learned about the efficacy of diabetes self-management and about measurement issues. Future research should now focus on effectiveness and generalization issues.

Glasgow, R. E., Vogt, T. M., & Boles, S. M. Evaluating the public health impact of health promotion interventions: The RE-AIM framework. Am J Public Health 1999;89:1323-1327.

ABSTRACT

Objectives and Rationale: Progress in public health and community-based interventions has been hampered by the lack of a comprehensive evaluation framework appropriate to such programs. Multi-level interventions that incorporate policy, environmental, and individual components should be evaluated using measurements suited to their settings, goals and purpose.

Methods and Results: This paper proposes a RE-AIM model for evaluating public health interventions: RE-AIM assesses five dimensions: Reach, Efficacy, Adoption, Implementation, and Maintenance. These dimensions occur at multiple levels (e.g., individual, clinic or organization, community), and interact to determine the public health or population-based impact of a program or policy.

Discussion: We discuss issues in evaluating each of these dimensions, and for combining them to determine overall public health impact. Failure to adequately evaluate programs on all five dimensions can lead to a waste of resources, discontinuities between stages of research, and failure to improve public health to the limits of our capacity. The conclusion summarizes strengths and limitations of the RE-AIM model and recommends areas for future research and application.