

**Special Issue of the Health Maintenance Consortium
Behavior Maintenance Programs: Successes, Collaborations, and Future Directions**

Compiled Abstracts

Title: Commonalities and Differences in Measuring Maintenance of Behavior Change

Primary Author: Rachel Seymour, PhD

Objectives: There is little consensus on standard ways of operationalizing maintenance across behaviors. The HMC established a Workgroup to examine and work towards standardizing different ways of measuring “maintenance” of behavior change across and within behaviors. **Methods:** Workgroup members reached consensus on definitions of maintenance and maintenance-related constructs that applied across behaviors. They then designed and implemented a survey to assess how maintenance was operationalized across 16 intervention studies that addressed four behaviors. **Results:** Seventy-five percent are using a criterion to assess maintenance and are tracking maintenance as a continuous measure. Eighty-one percent are assessing facilitators, barriers, and conceptualizing maintenance as both an intermediate and primary outcome measure. All studies are assessing maintenance at the individual level with fewer at the organizational (N=3), environmental (N=3), and policy levels (N=1). **Conclusions:** This survey of 16 studies found similarities and differences within and across behaviors that have important implications for advancing the quality of transbehavioral research.

Title: Long Term Fruit and Vegetable Change in Worksites: EAT 5 for LIFE

Primary Author: Shirley A.A. Beresford, PhD, MA, MSc

Objective: To evaluate the long term change in fruit and vegetable intake in a group randomized trial of worksites. **Methods:** Small to medium sized blue-collar businesses in the Seattle Metropolitan Area were recruited. Fruit and vegetable behavior was assessed using serial cross-sectional samples of current workforce at each time point. The multilevel intervention involved partnership with the companies for 18 months. Statistical analysis of long-term effects used linear mixed models, adjusting for worksite random effects. **Results:** Initially, 45 worksites were randomized, with 29 agreeing to participate in a second study. Fruits and vegetables increased at about 4.5 years, with larger sustained changes in the intervention worksites. The differential change was 0.25 servings per day, 95% confidence interval (0.09 to 0.40). **Conclusions:** The intervention had sustained effects even after two to three years with no contact. Although the effects were not large, this low intensity intervention approach could provide an important model.

Title: Seven-Year Follow-Up of a Multiple-Health-Behavior Diabetes Intervention

Primary Author: Deborah Toobert, PhD

Objective: To examine the maintenance of multiple health-behavior changes from the Mediterranean Lifestyle Program over 7 years. **Methods:** The study targeted postmenopausal women with type 2 diabetes (N = 279) who are at high risk for heart disease. The intervention featured a weekend retreat followed by regular meetings over 24 months to enhance healthful eating, physical activity (PA), stress management, and support behaviors. **Results:** Long-term analyses indicated that significant improvements made in the targeted behaviors during the active treatment phase of the study (at 6, 12, and 24 months) were partially maintained during the non-treatment phase of the study, through 5 years post-treatment for dietary behavior and stress management, and 1 year post-treatment for PA. **Conclusions:** Moderate-intensity individual-level interventions produce health behavior changes that tend to plateau or return to baseline levels after the cessation of treatment. Future research should explore alternative methods for achieving long-term maintenance.

Title: Does Screening and Treatment Influence Behavior 15 Years after a First DWI Conviction?

Primary Author: Sandra C. Lapham, MD, MPH

Objectives: We interviewed 581 offenders convicted of driving while intoxicated (DWI) who were referred to a screening program, reported substance use disorders (SUDs) at the age of screening, and completed 5- and 15-year follow-up (F/U) interviews to determine whether screening and treatment affect long-term outcomes. **Methods:** We compared offender characteristics, psychiatric disorders, treatment received, and 15-year outcomes by screening group. **Results:** 21% reported current SUDs and 11% reported driving over the alcohol limit (DOL) at 15-year F/U. While various factors predicted a current SUD, the only variable associated with DOL was the number of symptoms of alcohol and drug problems at 5-year F/U. **Conclusions:** SUD and DOL persist in a large subgroup of offenders. Screening groups differed in SUD severity, treatment received, and long term outcomes, suggesting that information collected at screening could be used effectively to triage and treat DWI offenders.

Title: Long-term Outcomes for the Promoting CARE Suicide Prevention Program

Primary Author: Carole Hooven, PhD

Objectives: This paper provides a long-term look at suicide risk and emotional distress from adolescence to young adulthood and evaluates Promoting CARE, an indicated suicide prevention program. **Methods:** 530 suicide-vulnerable high school youth were eligible for the long-term follow-up study; 75% (400) participated in young adult follow-up assessments. Latent class growth models are used to identify patterns of change in distress over this period. We examine the effects of the intervention and risk/protective factors in predicting membership in the observed change trajectories. **Results:** Findings suggest there are significant effects of the interventions. In addition, key risk/protective factors are associated with the initial drop in risk and the general pattern of decline in risk observed. **Conclusion:** Overall we see early intervention as successful in promoting and maintaining lower risk status with some concern that individuals at higher levels of initial distress and those involved in drug use may need additional intervention.

Title: Use of Signal Detection Analysis to Predict Maintained Smoking Abstinence

Primary Author: Steffani R. Bailey, PhD

Objectives: This study uses signal detection analysis (SDA) to identify distinct subgroups of treatment responders and non-responders to aid in the development of tailored smoking cessation interventions for long-term maintenance. **Methods:** The secondary analyses ($n = 301$) are based on data obtained in our randomized clinical trial designed to assess the efficacy of extended cognitive behavior therapy for cigarette smoking cessation. Model 1 included only pretreatment factors, demographic characteristics, and treatment assignment. Model 2 included all Model 1 variables, as well as clinical data measured during treatment. **Results:** SDA was successfully able to identify smokers with varying probabilities of maintaining abstinence from end-of-treatment to 52-week follow-up; however, the inclusion of clinical data in Model 2 yielded very different partitioning parameters. **Conclusions:** The findings from this study may enable researchers to target underlying factors that may interact to promote maintenance of long-term smoking behavior change.

Title: The long and winding road to physical activity maintenance

Primary Author: A. Lauren Crain, PhD

Objectives: The present work builds upon state-of-the art theory and empirical data to estimate the strength of multiple mediators of the efficacious Keep Active Minnesota (KAM) physical activity (PA) maintenance intervention. **Methods:** The total, direct and indirect effects through which KAM helped participants maintain PA for up to 2 years were estimated using structural equation modeling. **Results:** Self-efficacy was the upstream variable in two endogenously mediated effects, through perceived barriers to PA and incorporation of PA into the self-concept. The self-concept mediator emerged as the strongest predictor of PA and was figural in two indirect

effects (i.e., KAM – self-concept – MVPA; KAM – self-efficacy – self-concept – MVPA). **Conclusions:** KAM positively impacted self-efficacy which promoted integration of PA into the self-concept and PA maintenance. Successful long-term PA maintenance appears to be influenced by a multitude of small inter-related mediational pathways. Future research evaluating maintenance models should specify recursive relationships among mediators and outcomes.

Title: Fit and Strong!: Promoting maintenance to exercise among older adults with lower-extremity osteoarthritis

Primary Author: Susan L. Hughes, DSW

Objectives: Osteoarthritis (OA) is a leading cause of disability among older adults. This study compared the impact of negotiated vs. mainstreamed follow up with and without telephone reinforcement on maintenance of physical activity after the 8-week Fit and Strong! program for older persons with OA ended. **Methods:** A multi-site randomized controlled trial with repeated measures. **Results:** Single group random effects analyses of 2, 6, 12 and 18 month outcomes showed significant improvements on exercise maintenance that were accompanied by decreased lower extremity (LE) pain and stiffness, improved LE function, sit stand, and 6 minute distance walk and decreased anxiety. Analyses by follow-up condition showed benefits associated with negotiated follow up, telephone reinforcement combined with negotiated follow-up and number of reinforcement calls received. **Conclusions:** Findings indicate that the negotiated follow-up contract that Fit and Strong! uses is associated with positive long-term participant outcomes that can be enhanced by telephone reinforcement.

Title: Long-term Effects of a Worksite Health Promotion Program for Firefighters

Primary Author: David P. MacKinnon, PhD

Objective: To describe effects of two worksite health promotion programs for firefighters, both immediate outcomes and the long-term consequences for four years following the interventions. **Methods:** 599 firefighters were assessed at baseline, randomized by fire station to control and two different intervention conditions and re-evaluated with six annual follow-up measurements. **Results:** Both a team-centered peer taught curriculum and an individual motivational interviewing intervention demonstrated positive effects on BMI, with team effects on nutrition behavior and physical activity at one year. Most differences between intervention and control groups dissipated at later annual assessments. However, the trajectory of behaviors across time generally was positive for all groups, consistent with lasting effects and diffusion of program benefits across experimental groups within the worksites. **Conclusions:** Although one year programmatic effects were lost, the long-term pattern of behaviors suggested these worksites as a whole were healthier more than three years following the interventions.

Title: Moderators of Response to Extended Telephone Continuing Care for Alcoholism

Primary Author: James R. McKay, PhD

Objectives: The study evaluated potential benefits of adding 18 month telephone interventions—monitoring and feedback only (TM) or monitoring and feedback plus counseling (TMC)—to standard care for alcoholic patients in intensive outpatient programs (IOP). This article examines potential moderator effects in the comparisons of TAU to TM and to TMC. TM and TMC were hypothesized to be most effective for patients with more severe substance abuse, a poor initial response to IOP, and other risk factors for relapse. **Methods:** Alcohol use outcomes were obtained quarterly for 18 months. Collateral data were also obtained to substantiate self-reports. **Results:** None of the 12 variables examined was a significant moderator of main effects favoring TMC over TAU. Conversely, TM was more effective than TAU only for women and for those with lower readiness to change. **Conclusions:** TMC is effective for patients, regardless of severity of alcohol use history, early response to treatment, or other risk factors for relapse. TM can be recommended for women and for less motivated patients.

Title: Extended Voucher-Based Reinforcement Therapy for Long-Term Drug Abstinence

Primary Author: Carolyn M. Carpenedo, MHS

Objective: To determine whether longer durations of voucher-based reinforcement therapy (VBRT) increase long-term abstinence compared to standard durations of VBRT. **Methods:** Cocaine abusing or dependent methadone-maintenance patients (N=130) were randomized to receive either Standard (12-week; n=62) or Extended (36-week; n=68) VBRT. Participants provided urine samples thrice weekly during VBRT and each cocaine-negative sample immediately produced a voucher exchangeable for goods and services. **Results:** Extended VBRT produced significantly longer durations of self-reported continuous abstinence during study Year 1, but not during Year 2. Longer durations of abstinence during Year 1 were associated with longer-term abstinence during Year 2, regardless of study condition. **Conclusions:** Longer duration VBRT can increase the duration of abstinence during VBRT, but may not maintain it afterwards. However, longer periods of abstinence during the first year following VBRT entry can predict abstinence during the second year, suggesting that abstinence begets abstinence, independently of how it is attained.

Title: Modeling Infrequent, Repeated Health Behaviors

Primary Author: Jennifer M. Gierisch, PhD, MPH

Objective: While modeling the practice of recommended daily health behaviors has received substantial attention, infrequent, repeated health behaviors present unique conceptual and methodological challenges. **Methods:** We illustrate methodological and conceptual issues using data from a project related to HPV vaccination and a mammography maintenance trial. These behaviors are at different points on the diffusion curve. **Results:** We advocate adopting common language to define adherence levels of infrequent, repeated behaviors: initiating behavior (initiation), adherence to most recent opportunity (on-schedule), and timely adherence across multiple opportunities (maintenance or completion). Estimates of adherence to infrequent, repeated behaviors varied widely depending on how adherence was defined and measured. **Conclusions:** The proposed framework has cross-cutting implications for research and practice. Standardizing adherence metrics may facilitate comparisons across studies of health behaviors practiced at infrequent but repeated intervals.

Title: Culturally Speaking!

Primary Author: Nelda Mier, Ph.D.

Objective: Processes of cultural tailoring and adaption in behavioral research are significant in addressing health disparities. This study examined issues of cultural tailoring specifically for ethnic minority groups based on the views and research experiences of Health Maintenance Consortium (HMC) members. **Methodology:** A cross-sectional survey (n=17 principal investigators) was used in combination with qualitative methods. Descriptive statistics and a content analysis technique were used for data analyses. **Results:** The HMC projects included ethnic minorities, at least to some degree, and a majority used tailoring strategies to meet characteristics and needs of the target population. However, findings indicate that intervention tailoring specifically for ethnic minorities was scarcely conducted in HMC projects. **Conclusion:** Further research actions for HMC members and behavioral researchers in general should explore the extent to which tailoring or adapting long-term maintenance behavior interventions for ethnic minorities can reduce health disparities.

Title: Intervention Taxonomy (ITAX): Describing Essential Features of Interventions

Primary Author: Richard Schulz, Ph.D.

Objectives: Existing guidelines for describing randomized and non-randomized intervention trials provide minimal guidance for describing interventions. To address this need, we sought to identify key features of interventions that need to be considered in the design, execution, and reporting of intervention studies. **Methods:** Based on prior work on decomposing psychosocial and clinical interventions and a review of current intervention practices, we

developed a comprehensive intervention taxonomy. **Results:** Specific recommendations, rationales, and definitions of intervention delivery and content characteristics including mode, materials, location, schedule, scripting, and sensitivity to participant characteristics, interventionist characteristics, adaptability, implementation, content strategies, and mechanisms of action are provided. **Conclusions:** Applying this taxonomy will advance intervention science by: (a) improving intervention designs; (b) enhancing replication and follow-up of intervention studies; (c) facilitating systematic exploration of the efficacy and effectiveness of intervention components through cross-study analysis; and (d) informing decisions about the feasibility of implementation in broader community settings.