

# Designing, Implementing and Assessing a Novel Text-Messaging Intervention for an Adolescent Mobile Health Clinic: A Collaborative Approach

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platform and its popularity with adolescents, text messaging would seem to have great potential as a means of providing relevant health care education to adolescents. We collaborated with the adolescent patients of our mobile health clinic to develop a TMI to disseminate health information relevant to adolescents to support change in health-related behaviors. A pilot study of the program was undertaken to test our hypotheses that: 1) TMI are feasible with an underserved adolescent population, and 2) health information disseminated in an SMS format could be engaging for adolescent patients. Additionally, we expected to find evidence that involving adolescents in the program development process would result in a more engaging intervention.

An overview of our study is shown in Figure 1. A multidisciplinary team of mobile health clinic providers (including a physician, a nurse

40 adolescents were recruited for the pilot intervention. Gender of participants was reported as female for 32 (80%) and male for 8 (20%). Ethnicity of participants was reported as Hispanic for 32 (80%), White/Non-Hispanic for 4 (10%), African-American for 3 (7.5%) and Asian for 1 (2.5%). participants ranged in age from 14 to 25 years of age, with a mean of 15.7 years. 34 (85%) of 40 participants completed the 14-week TMI, and 36 (90%) gave feedback in focus groups or individual interviews. results for each functional domain are as follows:

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expanded our pilot TMI program into an ongoing intervention available to all patients of the Teen Health Van. Our goals for our current study will be to assess engagement in a more quantitative fashion and to attempt to capture and quantify both knowledge gain and behavior change. In future interventions, it would be optimal to expand TMIs to utilize two-way communication between patients and health providers, with individual questions serving as springboards to prompt participants to reach out to clinic medical with any personal questions or concerns.

TMIs allow health care providers to connect to teen patients on a more regular and less formal basis via a broadly accessible medium with which teens are generally very comfortable and more easily engaged. As a result, they show great promise as a means of increasing dissemination of health-related information to adolescents (and by extension, supporting them in making more positive health behavior choices) while simultaneously increasing their engagement with healthcare interventions and their medical home. Furthermore, they are an ideal venue for building a more collaborative (and thus more relationship between patients and their medical home.

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1. Murphy DC, I, Fernandez-Wilson JB, Rosenberg L (2000) Mobile health units: Design and implementation considerations. *AAOHN J* 48: 526-532.
2. Redlener I, Redlener KB (1994) System-based mobile primary pediatric care for homeless children: the anatomy of a working program. *Bull N Y Acad Med* 71: 49-57.
3. Cole-Lewis H, Kershaw T (2010) Text messaging as a tool for behavior change in disease prevention and management. *Epidemiol Rev* 32: 56-69.
4. Hall AK, Cole-Lewis H, Bernhardt JM (2015) Mobile text messaging for health: a systematic review of reviews. *Annu Rev Public Health* 36: 393-415.
5. Militello LK, Kelly SA, Melnyk BM (2012) Systematic review of text-messaging interventions to promote healthy behaviors in pediatric and adolescent populations: implications for clinical practice and research. *Worldviews Evid Based Nurs* 9: 66-77.
6. Lau PW, Lau EY, Wong DP, Ransdell L (2011) A systematic review of information and communication technology-based interventions for promoting physical activity behavior change in children and adolescents. *J Med Internet Res* 13: e48.
7. Haug S, Schaub MP, Venzin V (2013) A pre-post study on the appropriateness and of a Web- and text messaging-based intervention to reduce problem drinking in emerging adults. *J Med Internet Res* 15: e196.
8. etto B, Callaway CW, Kristan J (2013) Mobile phone text message intervention to reduce binge drinking among young adults: study protocol for a randomized controlled trial. *Trials* 14: 93.
9. Haug S, Meyer C, Dymalski A, Lippke S, John U (2012) of a text messaging (SMS) based smoking cessation intervention for adolescents and young adults: study protocol of a cluster randomised controlled trial. *BMC Public Health* 12: 51.
10. Britto MT, Munafò JK, Schoettker PJ, Vockell AL, Wimberg JA, et al. (2012) Pilot and feasibility test of adolescent-controlled text messaging reminders. *Clin Pediatr (Phila)* 51: 114-121.
11. Stewart TC, Harrington J, Batey B, Merritt NH, Parry NG (2015) From M li I, o-n