A Pilot Study of the Impact of Housing First–Supported Housing for Intensive Users of Medical Hospitalization and Sobering Services

Debra Srebnik, PhD, Tara Connor, PhD, and Laurie Sylla, MHSA, BSW

Objectives. We examined changes in service use in a Housing First (HF) pilot program for adults who were homeless with medical illnesses and high prior acute-care use relative to a similar comparison group.

Methods. We used a 1-year pre–post comparison group design. The 29 participants and 31 comparison group members were adults who were homeless with inpatient claims of at least $10 000 or at least 60 sobering "sleep off" center contacts in the prior year.

Results. Participants showed a significantly greater reduction in emergency department and sobering center use relative to the comparison group. At a trend level, participants had greater reductions in hospital admissions and jail bookings. Reductions in estimated costs for participants and comparison group members were $62 504 and $25 925 per person per year—a difference of $36 579, far outweighing program costs of $18 600 per person per year.

Conclusions. HF participants showed striking reductions in acute-care use relative to the comparison group, demonstrating that HF can be a successful model for people with complex medical conditions and high prior acute-care use. Despite notable methodological limitations, these findings could be used to inform a larger multisite study that would establish greater generalizability. (*Am J Public Health.* 2013;103:316–321. doi:10.2105/AJPH.2012.300867)

Individuals who are homeless and disabled by mental illnesses, chemical dependency, and medical illnesses often cycle among hospitals, jails, emergency care, and institutional settings.[1–5] One driver of high hospital and emergency care is that individuals who are homeless are far more likely than the general population to have chronic medical illnesses and complications from these illnesses because of lack of regular treatment.[6,7]

Permanent supported housing, specifically a Housing First (HF) approach, has been examined as a way to address the needs of people who are homeless, particularly the subset who are homeless for long durations with accompanying disabling health conditions. Many prior program models for such individuals have requirements for participation in mental health or substance abuse treatment or for being clean and sober to obtain or retain housing. These requirements create barriers to housing. The theory behind HF is that a low-barrier approach that removes requirements for treatment and abstinence will more readily engage and retain individuals who are challenging to serve.

HF is characterized by rapid placement from homelessness directly into permanent (rather than transitional) housing, supported by assertive on-site engagement and services but no requirement to participate or to achieve or maintain sobriety. The model emphasizes participants' being good tenants. Interventions target behaviors negatively affecting the ability to remain in the community (e.g., managing day-to-day responsibilities of being in an apartment, conflicts with other tenants). Services focus on harm reduction, relapse prevention, and recovery associated with mental illness, chemical dependency, and medical conditions. Eviction is seen as a last resort. Tenants hold leases and have the full rights and obligations of tenancy.[8]

Previous research on HF has focused on individuals who are chronically homeless and have a mental illness, a chemical dependency disorder, or both.[1,9,10–14] Studies have shown significant reductions in the use of emergency services, hospitalization,[1,9,10] and other high-cost settings such as detoxification, sobering services, and jail.[11,15]

To our knowledge, only 1 published study has examined the impact of HF or other supported housing for individuals selected on the basis of having medical illnesses. Sadowski et al.[16] conducted a randomized controlled trial of individuals with chronic medical conditions being released from a Chicago hospital. Participants were placed in medical respite transitional housing and then rapidly moved to permanent supported housing with a case manager. Participants had contact with the case manager at least biweekly. The control group received usual-care discharge planning and no planned aftercare. This study found significant reductions in emergency department (ED) visits and hospital days compared with usual care. Although Kertesz and Weiner[17] discussed the study in the context of research on HF, the program required some case manager contact, in contrast to the HF philosophy.

In this article, we provide a preliminary examination of a small HF program in downtown Seattle, Washington, designed for individuals who meet the federal definition of chronic homelessness and who have a serious medical illness with an accrual of high medical inpatient claims or who have high use of a sobering "sleep-off" center. The HF program, called Begin at Home (BAH), provides on-site medical care and connections to ancillary services, with the goal of reducing the use of high-cost emergency and inpatient care, jail, and sobering services. We hypothesized that BAH participants would show greater reductions in these high-cost services than a comparison group with similarly high prior service use who did not have access to the BAH program.

METHODS

We used a 1-year pre–post comparison group design. We obtained approval from the Washington State institutional review board for the project.

King County, the City of Seattle, United Way of King County, and the Seattle and King County Housing Authorities jointly provide funding for HF projects in the Seattle–King County area, including BAH. BAH was developed and is managed by Plymouth Housing Group, an organization that provides permanent supportive housing across the Seattle–King County area. BAH set aside 20 units at a newly renovated downtown building for people with long-term homelessness coupled with chronic medical conditions, chemical dependency, or both. Consistent with an HF approach, BAH provides low-barrier access to permanent housing and a comprehensive team that provides integrated medical, psychiatric, and chemical dependency services that are voluntary, intensive, and easily accessible. Help with applying for and obtaining income and food assistance benefits and development of self-sufficiency capabilities is also provided. The BAH team includes housing case managers, chemical dependency specialists, and a registered nurse (8 hours per week) with a 1:21 housing case manager-to-participant ratio. The team conducts frequent case staffing and has 24-hour coverage and security, with almost all services provided in the community or at the person's residence.

Participants

Individuals eligible for BAH need to (1) be aged 18 years or older; (2) meet the federal definition of individuals who are chronically homeless, including 12 consecutive months of homelessness or 4 homeless episodes in the prior 3 years with significant disabling physical or psychiatric conditions; and (3) be referred either from Seattle–King County Public Health's REACH homeless outreach team with 60 or more sobering sleep-off center visits within the prior year or from medical respite with incurred inpatient paid claims of at least $10 000 within the prior year. The medical respite program, associated with the region's main public hospital, provides 24-hour shelter and nursing care, social work, and medical linkages for individuals who are homeless and too medically compromised to be released from hospitals to the street without continued daily nursing care.

Participants were recruited on a rolling basis as they were identified by the 2 programs. The first 20 program participants were drawn into the program from June through August 2006. As individuals left the program, 9 individuals were admitted to the program to fill vacant beds through November 2008 for a total of 29 individuals.

A comparison group of 31 individuals was recruited from January through July 2008, using the same selection criteria as the participant group. Despite a recruitment incentive to the comparison group members of $10 Starbucks gift cards, no one from medical respite's very small women's program consented to participate. The program attributed this difficulty to very short lengths of stay and high staff turnover during the study period. No information is available regarding individuals who did not consent.

Measures

BAH program staff collected demographic characteristics of BAH participants. This information was obtained from the referring organization for comparison group members. ED and inpatient episodes and claims data were obtained from Harborview Medical Center, the region's main public hospital. Sobering-center data were obtained from King County's electronic management information system. Jail-use data were also obtained from the management information system via a data-sharing agreement with the King County jail system. Data were entered and cleaned in Excel 2007 (Microsoft Corporation, Redmond, WA). We used SPSS version 19.0 (IBM SPSS Statistics, Armonk, NY) for statistical analyses.

RESULTS

Participants were predominantly male (n = 21; 72%) and had an average age of 51.3 years (SD = 9.2). Two thirds identified as White (n = 18; 62%), 17% (n = 5) as Black or African American, 14% (n = 4) as American Indian/Alaska Natives, and 7% (n = 2) as Hispanic. Comparison group members did not significantly differ from participants with respect to age (mean = 50.0 years; SD = 6.9; $t_1 = 0.61$; $P = .55$) or race ($\chi^2_1 = 3.13$; $P = .54$). The groups did differ by gender, with all comparison group members being men ($\chi^2_1 = 9.88$; $P = .002$), which was the result, as noted, of the lack of comparison group members from the women's medical respite program and of very few women using the sobering center.

Service Use

Changes in ED, sobering center, inpatient, and jail use for participants and the comparison group are presented in the following sections. Participants and comparison group members did not significantly differ at baseline for any analyses.

Emergency department use. Figure 1 shows ED contacts for BAH participants and the comparison group. Of the 29 BAH participants, 28 accrued 234 contacts during the year before program admission, dropping 74% to 60 contacts among 16 people during the year after BAH entry. All 31 comparison group members had at least 1 ED contact for a total of 189 contacts during the year before selection, decreasing 26% to 139 contacts among 25 people during the subsequent year.

We found significant reductions in average ED contacts for both the participants ($t_{28} = 3.49$; $P = .002$) and the comparison group ($t_{30} = 2.3$; $P = .029$). We would expect reductions in both groups because the tendency would be toward regression to the mean for any group selected on the basis of high service use. Moreover, both participants and comparison group members received either medical respite or REACH services that linked individuals to primary care, dental care, and behavioral health care, which in itself would be expected to reduce ED use. However, after statistically controlling for average preprogram ED visits, we found that average ED visits subsequent to admission or selection differed significantly ($F_1 = 6.49$; $P = .01$) with fewer visits for BAH participants (mean = 2.07; SD = 4.05) relative to the comparison group (mean = 4.48; SD = 6.48).

Sobering center use. Figure 2 shows sobering center use for BAH participants and the comparison group. Of the 29 BAH participants, 13 accrued 533 sobering center visits during the year before program entry, decreasing 93% to 36 visits among 6 people during the subsequent year. The comparison group reduced

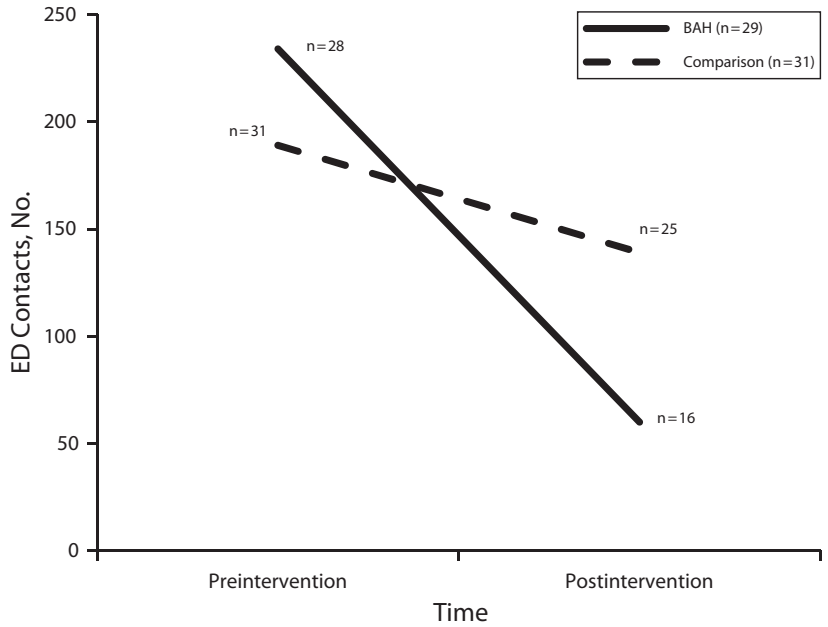

FIGURE 1—Total emergency department (ED) contacts for Begin at Home (BAH) participants (June 2006–November 2008) and the comparison group (January–July 2008); Seattle, WA.

use by 26% from 369 visits among 6 people during the year before selection to 272 visits among 9 people during the following year.

The reduction in the average number of sobering center contacts was statistically significant for participants ($t_{28}=2.35$; $P=.026$) but not for the comparison group ($t_{30}=0.51$; $P=.61$). Moreover, after statistically controlling for preprogram sobering contacts, the average sobering contacts subsequent to admission showed a significant difference ($F_1=4.41$; $P=.04$), with fewer contacts for participants (mean = 1.24; SD = 3.2) relative to the comparison group (mean = 8.8; SD = 24.3).

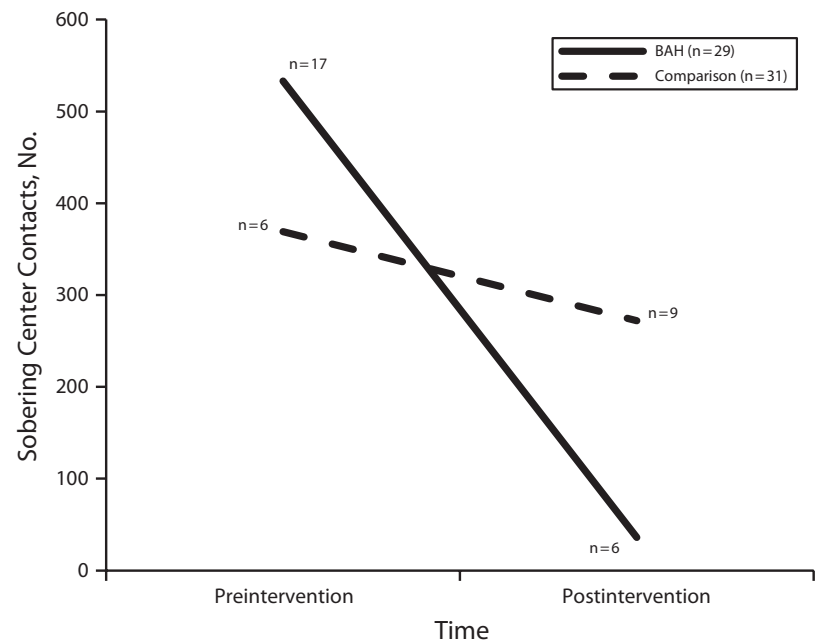

FIGURE 2—Total sobering center contacts for Begin at Home (BAH) participants (June 2006–November 2008) and the comparison group (January–July 2008); Seattle, WA.

Inpatient admissions. Figure 3 shows inpatient admissions for BAH participants and the comparison group. Of the 29 BAH participants, 28 accrued a total of 68 admissions (441 days) during the year before program entry, decreasing by 74% to 18 admissions (123 days) among 10 people during the subsequent year. Of the 31 comparison group members, 29 accrued a total of 50 admissions (231 days) during the year before selection, dropping 48% to 26 admissions (110 days) among 17 people.

We found significant reductions in average admissions for both the participants ($t_{28}=3.91$; $P=.001$) and the comparison group ($t_{30}=3.97$; $P<.001$). We also found significant reductions in average hospital days for the participants ($t_{28}=2.74$; $P=.011$) and the comparison group ($t_{30}=2.23$; $P=.033$). After statistically controlling for average preprogram admissions, we found that average admissions subsequent to starting BAH differed at the trend level ($F_1=2.75$; $P=.1$; $df=58$), with participants having somewhat fewer admissions (mean = 0.62; SD = 1.05) than the comparison group (mean = 0.84; SD = 1.07). The difference in average hospital days between the participant group (mean = 4.24; SD = 11.3) and the comparison group (mean = 3.55; SD = 5.88) was not significant.

Jail use. Figure 4 shows jail use for BAH participants and the comparison group. Of the 29 BAH participants, 7 had at least 1 jail booking during the year before program entry (21 total bookings; 206 jail days) and 11 participants had bookings during the following year (19 bookings; 126 jail days). The comparison group had an identical total number of bookings and a nearly identical number of jail days as the participant group in the year before selection (21 total bookings; 208 jail days among 8 people). During the subsequent year, 10 people had bookings (24 total bookings; 444 jail days).

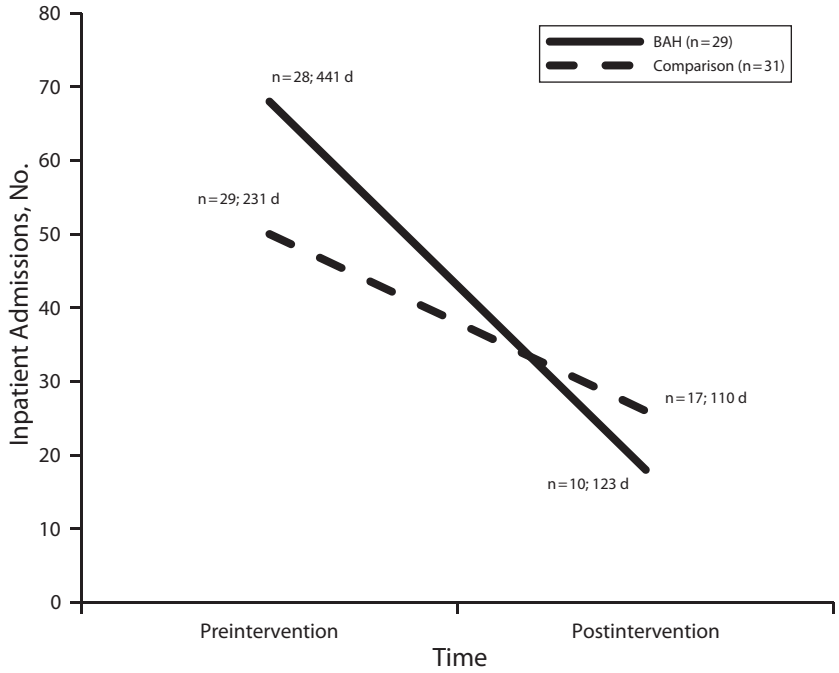

FIGURE 3—Total inpatient admissions for Begin at Home (BAH) participants (June 2006–November 2008) and the comparison group (January–July 2008); Seattle, WA.

Neither group showed a statistically significant change in jail use on its own. However, after controlling for average pre-program jail days, average jail days subsequent to admission differed at the trend level ($F_1 = 3.29$; $P = .08$), with somewhat fewer days for participants ($\chi^2 = 4.34$; SD = 13.24) than for the comparison group (mean = 14.32; SD = 36.28). Average jail bookings did not significantly differ between the participants (mean = 0.66; SD = 1.14) and comparison group (mean = 0.77; SD = 1.50).

Cost Offsets

On the basis of the reductions in service use just described, we estimated associated reductions in costs to put the cost of providing BAH in context. We used paid claims figures to estimate costs for hospital and ED visits, understanding that claims do not adequately represent actual costs. Basic jail booking and bed night rates were provided by the jail. They did not include any additional costs that may have been incurred for medical or psychiatric support, including any suicide watch monitoring while incarcerated. We based sobering center costs on the total annual funding provided to the program divided by the number of people who used the service. We detail the limitations of these methods of estimating costs in the Discussion section.

BAH participants reduced inpatient and ED claims by $1 467 126. At $234 per booking and $122 per jail night, participants reduced jail use by $10 228. With a sobering visit rate of $48, participants reduced sobering center use by $23 856. Additionally, participants reduced medical respite use by $311 420 (based on $230 per night) because they became ineligible for this service after becoming housed. Total reduction in estimated costs for participants was therefore $1 812 630, or $62 504 per person. Comparison group members reduced inpatient and ED claims by $689 834, sobering center use by $4656, and medical respite by $138 690, while jail costs increased by $29 495, for a total reduction of $803 685, or $25 925 per person. The difference in service use–associated cost reductions between the participants and comparison group of $36 579 would appear to far outweigh the program operating cost of $18 600 per person per year.

DISCUSSION

The BAH program successfully implemented an HF model with no readiness criteria to access housing, providing assertive engagement and integrated voluntary on-site primary care, mental health, and chemical dependency services with a 1:21 housing case manager-to-participant ratio. Participants and comparison group members met the federal definition of people who are chronically homeless coupled with high incurred hospital claims or high use of the sobering center before program entry.

BAH participants showed significantly greater reductions in use of high-cost emergency medical, sobering center, and medical respite services relative to the comparison group. Jail days increased for the comparison group and remained largely steady for participants, a difference between groups at a trend level. The difference between groups in estimated cost reductions associated with reductions in acute care use was far greater than program costs.

This pilot study has significant methodological limitations that hamper generalizability to other locales, including its small sample size, lack of a totally comparable comparison group, lack of randomization, and a focus on a single program in 1 city. Our results, particularly trends, should be viewed with caution. The study should ideally be used to inform a fully powered multisite controlled trial that could establish greater generalizability.

The small sample resulted in limited power to detect statistically significant differences, making the significant findings more notable. Moreover, the project did not restrict comparison group members from using other services or entering other supported housing programs, nor did we have the ability to track whether this occurred. As such, it is remarkable to find group differences indicating the HF program's incremental value added.

The lack of randomization resulted in the participants and comparison group differing in gender composition. Although gender is a key demographic variable that might suggest that the groups differ in important, unexamined ways, research is mixed as to whether homeless

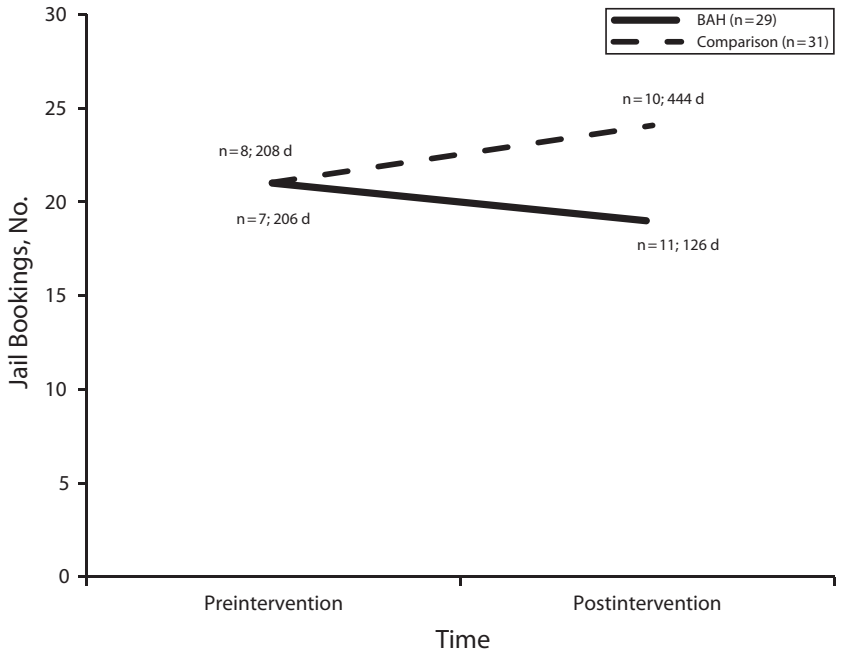

FIGURE 4—Total jail bookings for Begin at Home (BAH) participants (June 2006–November 2008) and the comparison group (January–July 2008); Seattle, WA.

women or homeless men are more likely to experience high acute care use.[18–20] Furthermore, the groups were initially matched on prior service use, which would presumably serve as the strongest predictor of future use and control for regression to the mean.

We should note that the cost data we report do not represent true costs. First, paid claims data do not represent what it actually costs to produce and deliver a service, including administrative and overhead costs and costs inadequately covered by publicly funded health care plans. Moreover, the costs of running a hospital or jail are not reduced if a small proportion of people use it less—the facility staffing and overhead costs remain the same. However, hospitals bill for each person admitted, so those publicly borne costs are indeed reduced. In addition, sobering center costs are fixed, and therefore the per-person rate we report inappropriately varies on the basis of the number of people using the service. Our cost estimates also do not account for use of shelters, courts, ambulances, and police, and, as with other studies,[11] they include only operating costs, not capital costs. That said, finding reductions in use averts the need to build and supply an ever-increasing amount of service, and such reductions offer opportunities for other people to use existing services.

Kertesz and Weiner[17] point out that, not surprisingly, service use (and cost) reductions are greatest for programs targeting individuals who have high prior service use. As such, providing HF to just such individuals may be most economically justifiable, although the level of prior service use high enough to justify high-intensity HF programs is not clear. However, service use should arguably not be the only criterion for HF admission. Many individuals do not frequently use acute care services but nevertheless have medical, mental health, or chemical dependency problems that leave them vulnerable to predation, illness, and death if they remain on the streets. These individuals may not present the same economic rationale for HF, but they should not be ignored.

Although we examined one small program, we have demonstrated that people with complex medical conditions can be successfully housed using an HF model, with resulting marked reductions in the use of high-cost acute care services. Our results, along with those of other HF studies, suggest that an HF approach may be particularly worthwhile to stabilize individuals with intensive service needs, high prior service use, or both. ■

About the Authors

Debra Srebnik and Laurie Sylla are with the King County Mental Health and Chemical Abuse and Dependency Services, Seattle, WA. Tara Connor is with the Plymouth Housing Group, Seattle, WA.

Correspondence should be sent to Debra Srebnik, PhD, King County Mental Health and Chemical Abuse and Dependency Services, 401 5th Avenue, Suite 400, Seattle, WA 98104 (e-mail: debra.srebnik@kingcounty.gov). Reprints can be ordered at http://www.ajph.org by clicking the "Reprints" link.

This article was accepted April 17, 2012.

Contributors

D. Srebnik designed the study. T. Connor designed the study and intervention, monitored data collection, collected and analyzed the data, drafted the article, and was involved in interpretation of results and article revision. L. Sylla was involved in interpretation of results and article revision.

Acknowledgments

We thank Amnon Shoenfeld, director of King County Mental Health and Chemical Abuse and Dependency Services, for his support and valuable contributions to this study.

Human Participant Protection

Approval for this study was obtained from the Washington State institutional review board.

References

1. Culhane D, Metraux S, Hadley T. Public service reductions associated with placement of homeless persons with severe mental illness in supportive housing. *Housing Policy Debate.* 2002;13(1):107–162.

2. Hwang S, Henderson M. Health Care Utilization in Homeless People: Translating Research into Policy and Practice. Working paper 10002. Rockville, MD: Agency for Healthcare Research and Quality; 2010. Available at: http://www.meps.ahrq.gov/mepsweb/data_files/publications/workingpapers/wp_10002.pdf. Accessed August 23, 2011.

3. Kushel MB, Perry S, Bangsberg D, Clark R, Moss AR. Emergency department use among the homeless and marginally housed: result from a community-based study. *Am J Public Health.* 2002;92(5):778–784.

4. O'Connell J. *Utilization and Costs of Medical Services by Homeless Persons: A Review of the Literature and Implications for the Future.* Nashville, TN: National Healthcare for the Homeless Council; 1999. Available at: http://www.nhchc.org/Publications/utilization.html. Accessed November 1, 2011.

5. Salit SA, Kuhn EM, Hartz AJ, Vu JM, Mosso AL. Hospitalization costs associated with homelessness in New York City. *N Engl J Med.* 1998;338(24):1734–1740.

6. Health care and homelessness. National Coalition for the Homeless Website. Available at: http://www.nationalhomeless.org/factsheets/Health.pdf. Published July 2009. Accessed August 23, 2011.

7. Zerger S. A preliminary review of literature: Chronic medical illness and homeless individuals. 2002. National Healthcare for the Homeless Council Website. Available at: http://homeless.samhsa.gov/Resource/A-Preliminary-Review-of-Literature-Chronic-Medical-Illness-and-Homeless-Individuals-23426.aspx. Accessed September 20, 2012.

8. Pearson C, Locke G, Montgomery A, Buron L. The applicability of Housing First models to homeless persons with serious mental illness. Washington, DC: US Department of Housing and Urban Development; 2007.

9. Martinez TE, Burt MR. Impact of permanent supportive housing on the use of acute care health services by homeless adults. *Psychiatr Serv.* 2006;57(7):992–999.

10. Gilmer TP, Manning WG, Ettner SI. A cost analysis of San Diego County's REACH program for homeless persons. *Psychiatr Serv.* 2009;60(4):445–450.

11. Larimer ME, Malone DK, Garner MD, et al. Health care and public service use and costs before and after provision of housing for chronically homeless persons with severe alcohol problems. *JAMA.* 2009;301(13):1349–1357.

12. Padgett DK, Stanhope V, Henwood BF, Stefancic A. Substance use outcomes among homeless clients with serious mental illness: comparing Housing First with Treatment First programs. *Community Ment Health J.* 2011;47(2):227–232.

13. Rosenheck R, Kasprow W, Frisman L, et al. Cost-effectiveness of supported housing for homeless persons with mental illness. *Arch Gen Psychiatry.* 2003;60(9):940–951.

14. Stefancic A, Tsemberis S. Housing First for long-term shelter dwellers with psychiatric disabilities in a suburban county: a four-year study of housing access and retention. *J Prim Prev.* 2007;28(3–4):265–279.

15. Perlman J, Parvensky J. *Denver Housing First Collaborative Cost Benefit and Program Outcomes Report.* Denver, CO: Colorado Coalition for the Homeless; 2006.

16. Sadowski LS, Kee RA, VanderWeele TJ, Buchanan D. Effect of a housing and case manager program on emergency department visits and hospitalization among chronically ill homeless adults: a randomized trial. *JAMA.* 2009;301(17):1771–1778.

17. Kertesz SG, Weiner SJ. Housing the chronically homeless: high hopes, complex realities. *JAMA.* 2009;301(17):1822–1824.

18. Hwang SW, Henderson MJ. *Health Care Utilization in Homeless People: Translating Research into Policy and Practice.* Agency for Healthcare Research and Quality Working Paper No. 10002. Available at: http://meps.ahrq.gov/mepsweb/data_files/publications/workingpapers/wp_10002.pdf. Published October 2010. Accessed November 1, 2011.

19. Ku BS, Scott KC, Kertesz SG, Pitts, SR. Factors associated with use of urban emergency departments by the U.S. homeless population. *Public Health Rep.* 2010;125(3):398–405.

20. Padgett DK, Struening EL, Andrews H, Pittman J. Predictors of emergency room use by homeless adults in New York City: the influence of predisposing, enabling and need factors. *Soc Sci Med.* 1995;41(4):547–556.