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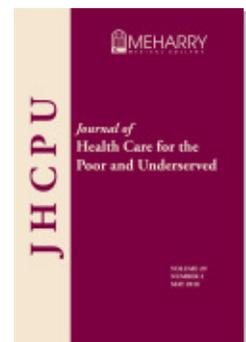
Medical Respite for People Experiencing Homelessness:
Financial Impacts with Alternative Levels of Medicaid
Coverage

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Abstract: Medical respite (MR) programs provide medical care, social services, and a safe place to recuperate for people experiencing homelessness after hospital discharge. We examined the financial impact of MR on hospitals and insurers in states with varying Medicaid coverage. Urban case-study hospitals were selected from a state with Medicaid expansion under the Affordable Care Act (Connecticut) and without expansion (Florida). We calculated costs and savings from MR to hospitals and payers from the hospitals' financial data. These hospitals currently incur losses of 26% (Conn.) to 48% (Fla.) on inpatient care costs of patients experiencing homelessness. Medical respite would reduce these losses by reducing the index length of stay by two days, subsequent emergency department visits by 45%, and subsequent inpatient admissions by 35%, offsetting $1.81 in hospital costs for each dollar invested in MR. With appropriate sharing of costs between hospitals and payers, both would save money from MR.

Key words: Medical respite, homelessness, economic, financial impacts, Affordable Care Act, cost, offsets, hospital.

Homelessness increases use of inpatient and emergency department (ED) care. People experiencing homelessness have high readmission rates: 30-day ED revisit rates are 5.7 times higher, and 30-day inpatient readmission rates are 1.9 times higher than those of their housed counterparts.[1] These patients also stay in the hospital longer than their housed counterparts. Patients in New York City experiencing homelessness stayed 4.1 days (36%) longer and cost an average of $4,094 more than their housed counterparts, adjusted for case mix, demographic characteristics, and socioeconomic characteristics.[2] A Toronto study using administrative data found that admissions of patients experiencing homelessness on average cost $2,559 (Canadian dollars, approximately the same in 2011 U.S. dollars) more than their housed counterparts after adjusting for individual characteristics and resource intensity weights.[3] Among all inpatients experiencing a discharge delay (hospitalization prolonged due to

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non-medical or external causes), patients experiencing homelessness faced four more delay days than their housed counterparts.[4]

Patients experiencing homelessness also tend to use the ED for regular care in lieu of primary care, contributing to both higher hospitalization costs and elevated mortality.[5,6] A national study found patients experiencing homelessness averaged 6.0 ED visits per year compared with 1.6 visits for housed counterparts, and 24.6% encountered barriers to receiving needed medical care within the past year.[7]

An important factor behind these problems is the patients' lack of access to a safe, sanitary space to convalesce and receive post-acute care.[8,9] Medical respite (MR) programs have been developed to provide such a space. They seek to break the cycle of hospital to homelessness, ease the suffering of this vulnerable population, and reduce medical system costs. To date, a randomized trial in Chicago found that MR paired with permanent supportive housing reduced hospital length of stay (LOS) by 2.7 days, reduced hospitalizations by 29%, and reduced ED visits by 24%.[10] A retrospective cohort study in Boston, controlling for individual characteristics, found that MR lowered the odds of hospital readmission by roughly 50%.[11] Interim findings from a national study found that MR reduced subsequent inpatient admissions by 35% and subsequent ED visits by 45%.[12] A comprehensive cost analysis of Chicago patients discharged to MR with subsequent supportive housing saved $6,307 per patient annually compared with discharges to usual care.[13]

While these studies show the potential of MR for improving outcomes and generating savings, they have several limitations. The latest published study dates from 2012, before most provisions of the Affordable Care Act took effect, so they do not reflect the recent health care environment. Furthermore, they examine the health system as a whole. To become a sustainable service, MR would need a long-term payment model. Such models are currently the subject of active discussion by hospitals, health centers, and stakeholder associations.[14] Alternative payment models, particularly Next Generation Accountable Care Organizations (ACOs) and similarly designed Medicaid contracts, can provide a mechanism for hospitals to obtain additional revenue from MR. Medical respite programs may be funded as part of the medical services delivered by a federally qualified health center, reimbursed as fee-for-service, paid on a flat rate by a managed care plan, supported by a grant, or funded by hospitals or payers (private insurers, managed care organizations, and government programs).

To inform these multi-party decisions, we develop a business case for MR. It estimates the potential costs and financial benefits of MR to hospitals and payers in different insurance markets. As of Nov. 8, 2017, 33 states (including D.C.) had adopted Medicaid expansion under the Affordable Care Act. In those states, most patients experiencing homelessness are eligible for Medicaid. In the remaining 18 states, which have not adopted Medicaid expansion, most patients experiencing homelessness are uninsured.[15] Using two Trinity Health hospitals as case studies, we report findings for states with and without Medicaid expansion.

Methods

Study hospitals. Trinity Health[16] selected two acute care hospitals in its 93-hospital network for site-level analysis: St. Francis Hospital (617 beds, Hartford, Conn.) and Holy Cross Hospital (557 beds, Ft. Lauderdale). These two hospitals represent a range of contexts for this study because Connecticut is a Medicaid expansion state and Florida is not.

Number of care episodes of patients experiencing homelessness. Although some patients who are experiencing homelessness self-identify, many are not recognized. Some patients may choose to keep quiet about their homelessness, while others may not have been asked the appropriate questions to elicit their true housing status (Ferry M, personal communication, July 5, 2016). Without knowing the complete number of care episodes provided to patients experiencing homelessness, any financial analysis would underestimate the full cost of caring for this population. To overcome this obstacle, and benefitting from advice from Yale New Haven Hospital, we employed the capture-recapture methodology, which allows us to estimate the total size of a population based on the size and overlap between two independent samples.[17]

Each hospital created an initial list of treated patients who were experiencing homelessness using information from its medical record system during the year ending April 30, 2016. St. Francis first searched for the word "homeless" in its Epic electronic medical record system[18] and Holy Cross searched for the local code for homelessness (code 17) in its Meditech electronic health record system.[19]

Each hospital then created a second list of its patients experiencing homelessness searching its discharge diagnosis system using the International Classification of Diseases (ICD) diagnosis code (V60 in ICD-9 or Z59 in ICD-10) that represents homelessness. These codes are generally completed by the responsible provider on discharge. Treating the two approaches as independent, we implemented the capture-recapture technique with data from each hospital by episode type (inpatient, ambulatory, or observational stay), and then summed across episode types. These calculations allowed us to estimate the total number of episodes of people experiencing homelessness at each hospital (including those who had not been identified as such).

Potential financial savings. To describe the current costs of treatment and potential savings for patients experiencing homelessness, we grouped care episodes by financial category, such as Medicaid or self-pay. The hospitals reported their charges, revenues, and costs. Next, we defined the index hospitalization for each patient experiencing homelessness as the first hospitalization during this study year that could have led to a discharge to MR. We term the LOS of the index hospitalization the *index LOS*. Based on expert opinion, a review of the literature, and data from Yale New Haven Hospital, we estimated that MR could eliminate two extra days in index hospitalizations of three or more days of patients experiencing homelessness.[2–4,10,20] We assumed no reduction was possible for one- or two-day admissions, as a two-day reduction would have made the index LOS negative or zero.

To quantify the resulting savings, we calculated the cost of the next-to-last day of the index hospitalization. This amount provides a good estimate of the daily costs associated

with a patient who is ready to be discharged but is being kept in the hospital because a safe discharge destination has not been arranged. The use of the next-to-last, rather than the last day of the index hospitalization, reduced the chance of spurious findings due to a partial day or late billing. Multiplying this daily cost times two days estimated the savings that would be realized by shortening the index hospitalization by two days.

The other area of savings rests on interim findings from a federally funded study on a standardized program of MR. Preliminary results across five sites found that the average MR LOS was 45 days. The average rate of hospital admissions for MR participants dropped from 0.13 to 0.08 per person per month from the year before to the year after MR, a 35% decline. Similarly, the average rate of ED visits dropped from 0.33 to 0.18 per person per month from the year before to the year after this period, a 45% decline.[12] Finally, we conducted sensitivity analyses to reflect the possible distribution of the costs of an MR program between the hospital and the funder.

We used data from Yale New Haven Hospital to estimate the expected use of MR following an inpatient stay. Out of 1,496 inpatient admissions of people identified as experiencing homelessness during 2014–15, 8.0% (120) were eligible for MR. The remainder were not eligible (e.g., did not require daily medical care or needed on-site nursing personnel) or declined to participate (e.g., could not agree to the program's rules such as the inability to come and go from the program at will). We estimated that in order to be efficient, but always have a bed available for an admission when needed, an MR program could operate at an occupancy rate of 80%.[12] This means that over the year, one MR bed allows 6.49 admissions. Based on a daily cost of $136 per occupied bed, the annual cost of one bed would be $39,700. If the hospital paid 50% of this cost, its annual share would be $19,850 per respite bed. Further details on this study's methods and results are available from the corresponding author.

Results

Number of care episodes of patients experiencing homelessness. The Venn diagrams in Figure 1 show the application and results of the capture-recapture technique. The St. Francis results indicate that only about one in three patients experiencing homelessness was being identified as such. These capture-recapture calculations suggest that St. Francis hospital provided 3,328 care episodes to patients experiencing homelessness during the study year—665 hospitalizations and 2,663 outpatient visits (both emergency and ambulatory).

The Holy Cross results indicate that only about half of the episodes of likely patients experiencing homelessness are currently being identified. The capture-recapture calculations suggest that Holy Cross Hospital provided 1,927 care episodes to patients experiencing homelessness (232 inpatient, 1,381 emergency and 314 observation visits). The projected numbers of episodes were 2.2 (St. Francis) to 2.7 (Holy Cross) times the identified episodes.

Projected financial impacts of shorter hospitalizations. At St. Francis hospital, the LOS of the 455 index hospitalizations averaged 5.75 days, with 30 (6.6%) index stays of two days or less (three with one day and 27 with two days). At Holy Cross Hospital, there were 142 index hospitalizations of which 25 (17.6%) were two days or less. Table 1
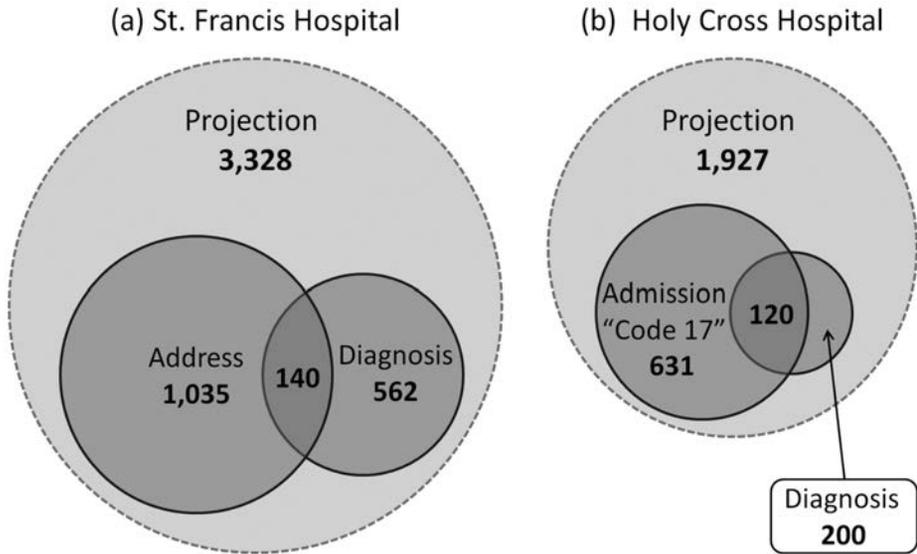
Figure 1: Projected annual numbers of episodes of patients experiencing homelessness using the capture-recapture method.

Legend: At St. Francis Hospital (panel a), care episodes of patients experiencing homelessness were identified through addresses (n=1,035), diagnoses (n=562), both sources (n=140) or either source (n=1,457). The breakdown was 142, 398, 85, and 455, respectively, for inpatients and 893, 164, 55, and 1,002, respectively, for outpatients. Projected episodes from the capture-recapture method were 665 inpatients, 2,663 outpatients, and 3,328 combined.

At Holy Cross Hospital (panel b) care episodes of patients experiencing homelessness were identified through admission "Code 17" (n=631), diagnoses (n=200), both sources (n=120) or either source (n=711). The breakdown was 76, 110, 36, and 150, respectively, for inpatients. Based on the data reported from Holy Cross Hospital, the calculations for outpatients separated emergency and observational patients. The breakdown was 518, 168, 63, and 623, respectively, for emergency patients, and 157, 42, 21, and 178, respectively, for observational patients. Projected episodes from the capture-recapture method were 232 inpatients, 1,381 emergency patients, 314 observational patients, and 1,927 combined.

shows that the shorter stay would reduce the losses in each hospital from hospitalizing patients experiencing homelessness, thereby saving the hospitals money. The hospital's potential savings per admission averaged $1,933 at St. Francis and $2,934 at Holy Cross. However, almost all inpatient care is paid based on the discharge diagnosis for the episode, so the hospitals' net revenues would not be affected by the estimated two-day reduction in the index LOS.

Potential downstream impacts on health system costs. Along with the savings associated with reducing the index LOS, MR programs have the potential to generate savings by reducing the number of hospitalizations in the year following an MR admission.[11] Table 2 merges the savings from the index LOS reduction from Table 1 and reduced subsequent hospitalizations and ED episodes to assess the one-year savings to the two major health system stakeholders: the hospital treating the patient and the primary payer (i.e., Medicaid) for the patient's care. Under this projection, the hospital will experience fewer inpatient and outpatient episodes in the subsequent year. As the hospital would have incurred a loss on each of these episodes, averting some episodes

Table 1

PROJECTED IMPACT OF A TWO-DAY REDUCTION IN LENGTH OF STAY ON AN AVERAGE INDEX HOSPITALIZATION OF THREE OR MORE DAYS

Financial class	Eligible inpatient stays	Avg. LOS	Complete cost*	Charges	Net Revenue	Loss on full stay	Savings from 2-day reduction
St. Francis							
Medicaid	329	7.0	$11,795	$26,211	$8,841	$2,953	$1,967
Medicare	77	9.3	$14,139	$31,421	$9,244	$4,896	$1,577
All Payers	**425**	**7.4**	**$12,069**	**$26,820**	**$8,894**	**$3,175**	**$1,933**
Holy Cross							
Medicaid	25	11.6	$28,014	$87,134	$8,452	$19,562	$3,489
Medicare	38	8.7	$18,904	$79,564	$13,765	$5,139	$2,885
All Payers	**117**	**11.9**	**$18,368**	**$67,849**	**$9,568**	**$8,800**	**$2,934**

Notes:

Eligible hospitalizations are those with length of stay (LOS) of three or more days. Avg. denotes average.

*At St. Francis Hospital, where complete costs (which include indirect costs) were not available, complete costs were estimated from the finding that complete cost averaged 45.0% of charges.

represents a reduction in the hospital's loss—an effective savings. This base case financial analysis assumes that the MR stay is funded half by the hospital and half by the payer.

In the previously mentioned respite study, the median cost per day was $136 with a wide range of $60 to $388.[12] Using the median value, a 45-day admission to MR would cost $6,120 for an MR stay that is split between the hospital and the payer. In this base case, St. Francis Hospital saves $1,575 per respite episode, while the payer saves $1,254 per respite stay. Similarly, for Holy Cross Hospital, the hospital saves $5,208 per respite episode, while the payer saves $1,885 per respite episode.

If St. Francis Hospital or a partner organization wished to set up an MR program to meet the hospital's needs and followed the pattern from Yale New Haven Hospital, we estimate that it would have 117 MR admissions annually (1,457 identified homeless episodes x 8.0%) and need 18 MR beds (117 admissions / 6.49 admissions per bed). The annual cost of this respite program to the hospital and payers would each be $357,000 (i.e., 18 x $19,850). After paying these contributions, however, the hospital and payers would still realize a yearly net savings of $279,000 (i.e., 177 x $1,575) and $222,000 (i.e., 177 x $1,254), respectively. The 8.0% estimate from Yale New Haven Hospital's experience is a conservative estimate for a new MR program. The eligible share of episodes of patients experiencing homelessness could rise over time if the MR program employs on-site medical staff. The MR program would then be able to manage more complex patients and might generate even greater savings.

If Holy Cross Hospital or a partner wished to set up or expand an MR program to meet the hospital's needs, we estimate that it would have 57 admissions annually

Table 2.

PROJECTED FINANCIAL IMPACT OF ONE MEDICAL RESPITE (MR) EPISODE

Source of impact	Annual Reduction	Economic loss per MR episode to:		Annual savings to:	
		Hospital	Payer	Hospital	Payer
St. Francis					
Savings from two-day reduction*				$1,933	$0
Fewer subsequent inpatient episodes	0.60	$3,322	$6,215	$1,993	$3,729
Fewer subsequent emergency episodes	1.80	$394	$325	$709	$585
Subtotal, gross savings				$4,635	$4,314
Medical respite stay (50% each party)				−$3,060	−$3,060
Net savings at St. FrancisHospital				**$1,575**	**$1,254**
Holy Cross					
Savings from two-day reduction*				$2,934	$0
Fewer subsequent inpatient episodes	0.60	$7,421	$7,928	$4,453	$4,757
Fewer subsequent emergency episodes	1.80	$490	$104	$881	$188
Subtotal, gross savings				$8,268	$4,945
Medical respite stay (50% each party)				−$3,060	−$3,060
Net savings at Holy CrossHospital				**$5,208**	**$1,885**

*In inpatient index length of stay (from Table 1).

(711 identified homeless episodes x 8.0%) and need nine MR beds (57 admissions / 6.49 admissions per bed). The annual cost of this respite program to the hospital and payers would each be $179,000 (i.e., 9 x $19,850). After paying these contributions, however, the hospital and payers would still realize yearly net savings of $297,000 and $107,000, respectively. If St. Francis or Holy Cross created an MR program with greater on-site medical capabilities than those in New Haven, more patients might have been eligible for MR.

   Sensitivity analyses. Our base-case scenario assumed the hospital and payer each funded 50% of the costs of MR. Examining alternative allocations of costs of MR between the hospital and payers, we found that if the hospital's share is between 30% and 75% of the costs (so the payer's share is 70% to 25%), then both parties still realize financial savings from MR.

   As Holy Cross Hospital is in a non-Medicaid expansion state, the hospital loses more money than does St. Francis Hospital on each hospitalized episode of care for a person experiencing homelessness. Therefore, Holy Cross Hospital could afford to pay more towards an MR stay and still benefit financially. The threshold analysis shows that the payer saves provided the hospital pays at least 19% of the cost of MR. As the hospital pays a higher share of the costs of MR, its savings fall but still remain positive. Notably, Holy Cross Hospital would realize savings even if it paid for the full cost of the MR care episode.
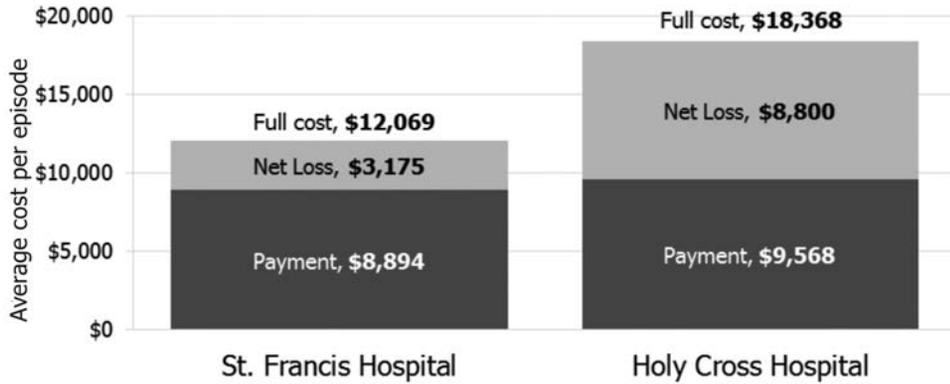
Figure 2. Hospital's cost and financing per average inpatient episode of a patient experiencing homelessness.

Comparative summary of financial impact. Figure 2 depicts the full cost of an average episode of inpatient care of a patient experiencing homelessness at each of the hospitals. It shows that the episode costs more at Holy Cross Hospital. Additionally, being located in a state without Medicaid expansion, the net loss of the hospital in Florida is higher in both dollar and percentage terms (48%) than its Connecticut counterpart (26%).

Figure 3 shows the estimated savings and reallocation from initiating MR. Each hospital saves money from three sources: fewer subsequent ED episodes after discharge, a two-day reduction in the index LOS, and fewer subsequent inpatient admissions after discharge.

Due to limited coverage and reimbursements, these hospitals currently incur losses of 26% (Conn.) to 48% (Fla.) on inpatient care of patients experiencing homelessness. Medical respite would reduce these losses by reducing the index LOS by two days, subsequent ED visits by 45% (saving 1.8 visits per patient per year), and subsequent inpatient admissions by 35% (saving 0.6 admissions per patient per year). The gross economic savings to the health system (hospital plus payer) would be $8,949 (Conn.) to $13,203 (Fla.) with a midpoint of $11,076 per MR stay. An average MR stay lasts 45 days at an average cost of $136 per day, totaling $6,120 per stay. Thus, on average each dollar invested in MR generates $1.81 in health system savings (i.e., $11,076 / $6,120).

Discussion

Both of the hospitals studied serve their social missions by treating a substantial number of patients experiencing homelessness. The first challenge in serving patients experiencing homelessness is determining their identity and number with available data. Of the two data sources, address-based information (address given as homeless, the address of the hospital, or the address of a shelter), generally gathered on admission or intake, identified the larger number. Diagnosis-based information (including "homelessness" among the discharge diagnoses) occurred about half as often. Combined, over the study years these two sources identified 1,457 care episodes at St. Francis and 711 at Holy
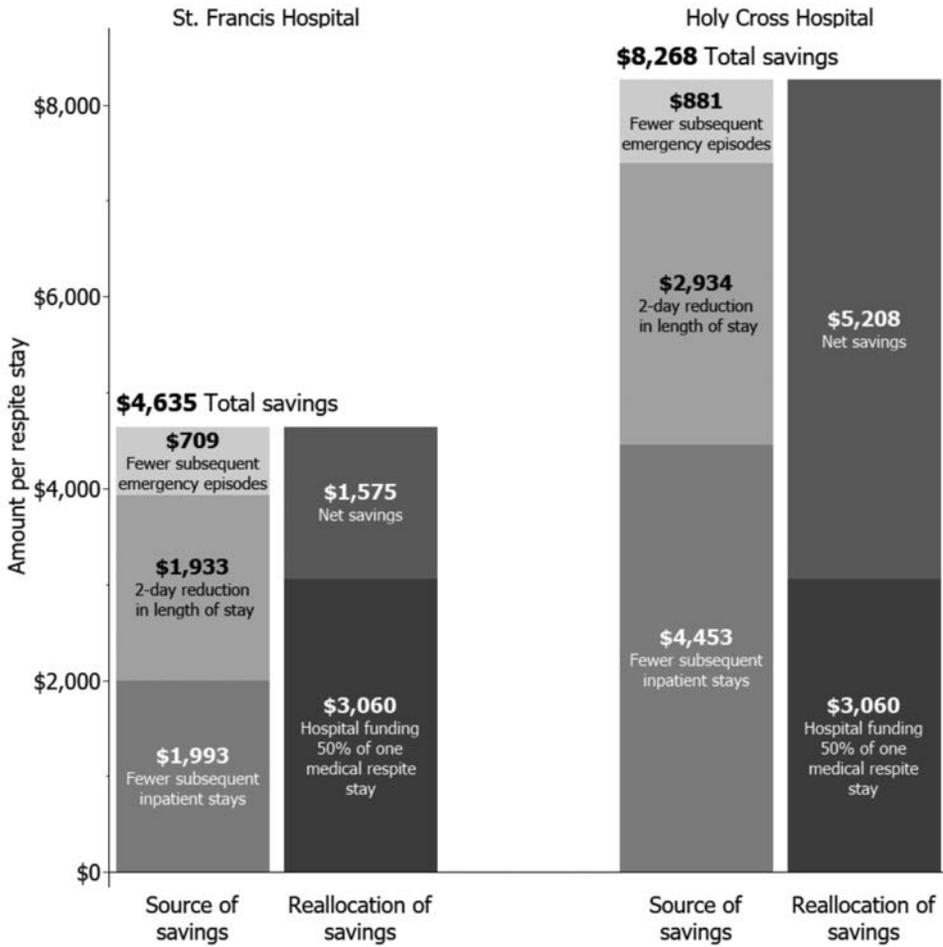
Figure 3. Estimated savings to the hospital and their reallocation per medical respite admission.

Cross Hospital, respectively. Applying the capture-recapture method suggested that these hospitals had 3,328 and 1,927 episodes of care to people experiencing homelessness, respectively. Comparing these counts indicates that the hospitals were identifying only 44% and 24% of the care episodes of patients experiencing homelessness, respectively. Said differently, homelessness is a bigger challenge than realized, with the estimated number of care episodes two to four times the number identified.

Both hospitals lose money on treating patients experiencing homelessness. This analysis found that a well-coordinated program of MR would achieve several types of savings (i.e., reduced losses and cost avoidance) throughout the health care system. First, it would plausibly achieve a two-day reduction in index LOS. For example, staff at Yale New Haven Hospital and its associated MR program at Columbus House have coordinated and streamlined discharge procedures so that the average index LOS of patients experiencing homelessness discharged to MR is on par with a comparable group of housed patients discharged to homecare.[20] With the estimated two days of the index

stay eliminated, MR could save an estimated $1,933 at St. Francis and $2,934 at Holy Cross on the index hospitalization of patients experiencing homelessness.

Experience from pilot programs suggests that MR would also reduce subsequent hospital admissions and ED visits. In each state, both payers and hospitals would benefit financially if the costs of an MR program were shared roughly equally between these stakeholders. In addition to savings realized directly by hospitals from MR, some risk-based payment models can share the payers' savings with the hospitals that help generate them. Next Generation ACOs, for example, will pay providers 80% to 100% of generated savings as additional revenue.[21] As only a small portion of people experiencing homelessness are Medicare beneficiaries, the revenue generated from a Medicare Next Generation ACO is likely relatively small. Some Medicaid contracts may have similar arrangements, thereby generating greater additional revenue. The savings and revenue are in addition to the contribution of MR to the health and social wellbeing of people experiencing homelessness and the community service goals of hospitals and payers.

As our results are based on projections, several limitations should be acknowledged. The projected downstream effects of MR on subsequent inpatient and outpatient episodes involve considerable uncertainty. Actual savings could be higher or lower than estimated. Greater savings might occur because the impact of an MR program may extend beyond one year. Besides addressing the current illness, a structured MR program seeks to connect clients to a medical home for primary care (shifting long-term utilization habits from inappropriate ED visits to preventative primary care visits), engage clients in smoking cessation, strengthen their self-confidence and care management skills, and try to get them placed in permanent supportive housing. Successes along these dimensions would likely persist for many years if patients quit smoking or strengthen linkages with primary care, as found with related programs.[22–27] On the other hand, our before-and-after comparisons may be overstated due to regression to the mean, as clients generally entered MR at a point of high utilization. For the present analysis, we have assumed that these two concerns would offset one another.

The aggregate savings from MR depend not only on the amounts per episode, but also on the number of patients experiencing homelessness admitted to MR programs. Experience from existing MR programs suggests that several factors can maximize this number.[12] First, acute care hospitals need effective systems to identify patients experiencing homelessness. This requires sensitizing staff, particularly in admissions and social service departments to ask about patients' housing status, check addresses against those of area shelters, and promptly scanning text and codes in medical records for clues. Second, MR programs must have sufficient capacity to be able to admit patients when they are ready for hospital discharge. Third, hospital discharge staff and MR personnel need good working relations so that transfers to MR programs occur smoothly and promptly.

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