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Barriers in Transitioning Patients with Severe Obesity from Hospitals to Nursing Homes

Christine Bradway, PhD, CRNP, FAAN,

Associate Professor of Gerontological Nursing, Department of Biobehavioral and Health Sciences, University of Pennsylvania School of Nursing, Fagin Hall, Room 312, 418 Curie Blvd, Philadelphia, PA 19104-4217, cwb@nursing.upenn.edu / 215-573-3051/215-573-7507 fax

Holly C. Felix, PhD, MPA,

Associate Professor of Health Policy, Department of Health Policy and Management, Fay W. Boozman College of Public Health, University of Arkansas for Medical Sciences, 4301 West Markham Street, Slot 820-12, Little Rock, Arkansas 72205, felixholly@uams.edu / 501-526-6626 / 501-526-6620 fax

Tonya Whitfield, MPH, and

Research/Programmer Analyst, Hornby Zeller Associates, Inc., PO Box 1437/Slot S570, Little Rock, AR 72205, twhitfield@hornbyzeller.com / 501-682-6809 / 501-682-6815 fax

Xiaocong Li, MHA

Graduate Assistant, Department of Health Policy and Management, Fay W. Boozman College of Public Health, University of Arkansas for Medical Sciences, 4301 West Markham Street, Slot 820-12, Little Rock, Arkansas 72205, XLI@uams.edu/ 501-526-6624 / 501-526-6620

Abstract

This cross-sectional, descriptive study explored perspectives of discharge planners regarding transitions of hospitalized patients who are severely obese seeking discharge to a nursing home. Attention has been focused on care transitions regarding high hospital readmission rates, yet specific needs of patients who are severely obese have been largely overlooked. Ninety-seven (response rate 39.8%) discharge planners returned surveys addressing frequency of, and issues encountered when arranging placements. Community and hospital characteristics were also collected. One-third of the respondents from Pennsylvania and Arkansas reported inability to transfer patients; barriers included reimbursement, staffing, and equipment. Respondents perceiving nursing homes to have equipment concerns were nearly seven times more likely to report patient size as a barrier ($p = 0.001$). Given increasing obesity rates, healthcare delivery systems must be prepared to provide necessary resources and all levels of care, including transitions for hospitalized patients who are severely obese needing nursing home care post-discharge.

Correspondence to: Christine Bradway.

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Keywords

transitional care; post-acute care; hospitals; nursing home; obesity

Obesity is a significant public health issue. In 2013–2014 the age-adjusted prevalence of obesity in American adults was 35% for men and 40.4% for women (Flegal, Krumson-Moran, Carroll, Fryar, & Ogden, 2016). Moreover, future projections suggest that in the next 20 years, adults in the United States (U.S.) will experience a 33% increase in obesity prevalence and a 130% increase in severe obesity prevalence (Finkelstein et al., 2012). In addition to the toll excessive weight has on individuals (Jenkins, 2004), obesity results in increased use of health resources as evidenced by significantly higher health care expenditures among persons who are obese versus persons who are not obese (Daviglius et al., 2004; Finkelstein, 2014). Patients who are obese place greater demands on the health care workforce. For example, nurses have reported significant challenges in providing care for these patients (Drake, Dutton, Engelke, McAuliffe, & Rose, 2005). This includes extra time needed to assist with activities of daily living (such as bathing and walking; Markoff & Amsterdam, 2008) and increased physical burden to lift and move patients who are obese (Edlich, et al, 2005; Felix, 2008; Felix et al., 2009; Rose et al., 2007). Furthermore, nursing homes have been described as “underprepared” to take on the increasing numbers of persons with obesity likely to need care (Zhang, Li, & Temkin-Greener, 2013) as these patients often require a different type of care than patients who are not obese including increased staffing, specialized supplies, and expensive bariatric equipment (Bradway, DiResta, Fleshner, & Polomano, 2008; Felix, 2008; Zhang et al., 2013).

Care Transitions, Persons who are Obese, and Healthcare Providers’ Perspectives and Experiences

Significant attention has been focused on transitional care models for improving quality of care and addressing high hospital readmission rates (Naylor et al., 2004; Parrish, O’Malley, Adams, Adams & Coleman, 2009). Care transitions often involve complex processes including movement of patients between healthcare providers or from one setting to another, for example, from a hospital to a nursing home for post-acute care (Parrish et al., 2009). Despite many advances in scholarship and clinical practice, specific transitional care needs of obese patients have been largely overlooked.

To our knowledge, only one study has explored the experience of hospital staff in the transition of care for patients who are obese and preparing for hospital discharge (Miles et al., 2012). In their survey of hospital discharge staff (defined as discharge planners or case managers), nursing home administrators, and home healthcare agency directors in North Carolina, all three groups reported barriers in moving patients who are obese (which they defined in their study as weighing ≥ 325 pounds and we henceforth refer to as severely obese) to post-acute care settings (Miles et al., 2012). More than half of the hospital discharge staff reported experiencing difficulty finding nursing homes located a reasonable distance from the patient’s home that would admit patients who were severely obese. The two primary transition barriers identified were the availability of equipment and staffing

issues in nursing homes. Hospitals are federally required to maintain bariatric equipment to ensure they can provide care for patients who are severely obese. Such requirements do not extend to nursing homes and as a result, patients who are severely obese may become “stranded in the hospital” because appropriate post-acute care locations cannot be secured (Miles et al., 2012, p. 243). Significant variation in the prevalence of severe obesity among residents of U.S. nursing homes (Felix, Bradway, Chisholm, Pradhan, & Weech-Maldonado, 2015) has also been observed, which may support the concern that some nursing homes are less willing or less prepared to admit these patients.

Additional reports examining the perspectives of hospital discharge planners and nursing home staff are limited. One survey, not specific to the care of patients who were severely obese, focused on New York state nursing home administrators’ (N=229) perspectives regarding organizational and relationship factors that impact the process of hospital to nursing home transfers (Boockvar & Burack, 2007). Communication challenges were identified as one area of concern. For example, only 53% of those surveyed reported receiving a readable and understandable post-hospital plan of care and 14% reported instances of patient harm related to inadequate communication (Boockvar & Burack, 2007). Two hospital-related organizational factors, geriatrics specialization ($r=0.157$; $P=.04$) and fewer beds ($r=0.194$, $P=.01$), were significantly associated with better communication.

A more recent study surveyed 360 nursing home directors of nursing to identify issues they consider when making admission decisions for patients who are severely obese and transitioning from an acute care hospital (Felix, Bradway, Ali, & Li, 2016). Although two-thirds of respondents reported patient size as an admission barrier, only 6% reported that patients who were severely obese were always refused admission. Adjusted analysis showed that nursing homes with adequate staff were significantly ($p = .04$) less likely to report obesity as an admission barrier whereas nursing homes reporting concerns about availability of bariatric equipment were significantly ($p < .0001$) more likely to report obesity as a barrier (Felix et al., 2016).

Purpose, Specific Aims and Study Hypotheses

The purpose of this study was to explore the perspectives of hospital discharge planners regarding the transition of patients who are severely obese and seeking post-hospital care in a Pennsylvania or Arkansas nursing home. Specifically, we aimed to 1) document barriers faced by discharge planners when arranging care transitions for hospitalized patients who are severely obese and seeking discharge to a nursing home for post-acute care and 2) examine these barriers in relationship to hospital, nursing home, and community characteristics. Previous research in related areas suggests that nursing homes in highly competitive (in terms of supply and demand) markets are more likely to innovate (e.g., adopt total quality management practices; open specialty care units) to attract new residents (such as persons who are severely obese) (Banaszak-Holl, Zinn, & Mor, 1996; Zinn, Weech-Maldonado, & Brannon, 1998). Therefore, we hypothesized (H1) that discharge planners in highly competitive nursing home markets would be less likely to report patient size as an admission barrier. Furthermore, caring for persons with severe obesity requires additional staff and specialized equipment (Bradway et al., 2008; Felix et al., 2009), and the lack of

adequate staff and appropriate equipment is associated with nursing homes reporting obesity as an admission barrier (Felix et al., 2016). Therefore, we hypothesized (H2) that discharge planners who perceive nursing homes to have staffing and equipment concerns would be more likely to report patient size as a barrier to successful transition from the hospital to a nursing home setting.

Methods

Design

This cross-sectional descriptive study solicited input via postal mail survey from hospital discharge planners in Arkansas and Pennsylvania to identify challenges with transitioning patients who are severely obese from hospitals to nursing homes for post-acute care. Arkansas and Pennsylvania were chosen for three reasons. First, they both have high obesity rates (Slack, Myers, Martin, & Heymsfeld, 2014). Second, these two states provided variability in rural versus urban populations and in the prevalence of severe obesity among residents of U.S. nursing homes (Felix et al., 2015; U.S. Census Bureau, 2010). Finally, these are states in which the authors are located and have knowledge and experience working with hospitals and nursing homes.

Participants/Sampling

All public hospitals (e.g. those accepting Medicare) in Arkansas and Pennsylvania were included in the survey study. Hospital Compare, the publically-available, online database maintained by the Centers for Medicare and Medicaid Services (CMS, 2016) was used to identify 244 public hospitals, of which 75 were in Arkansas and 169 were Pennsylvania. Discharge planners were targeted to complete the survey as they are often primarily responsible for securing post-acute care for discharging patients. In addition to meeting the position criteria, respondents had to be able to understand and communicate in English in order to complete the English-language survey instrument and be over 18 years in age.

Data Collection/Measures

Primary Data Collection—All identified hospitals (N = 244) were mailed a survey packet containing a paper survey (see Instrument section below); a postage-paid return envelope; and a cover letter that described the purpose of the study, the potential risks and benefits of participation, and the study procedures. Return of the survey signified consent to participate. In order to achieve a high response rate, potential respondents that did not return a completed survey received up to three reminders (e.g. additional survey mailings, postcard reminders) to encourage completion of the surveys (Dillman, 2000). No remuneration was provided.

Instrument—To address specific aim 1, an existing non-psychometrically tested survey instrument developed and piloted with clinical experts by researchers at East Carolina University was modified (with permission) to explore issues related to severe obesity and hospital transitions (Miles et al., 2012). Body mass index is the most frequently used measure for obesity, which estimates a person's weight in relative to height (National Heart Lung and Blood Institute, 1998). Patients' physical size and weight greater than 300 pounds

also pose direct challenges to caregivers (Drake et al., 2005). Therefore, to address both body mass index and individual weight and maintain consistency with the original survey language (Miles et al., 2012; with recognition that since our study was completed, the preferred term for “morbid obesity” is now “severe obesity” [Ward et al., 2016]), discharge planners in our study were instructed to respond to 14 survey items by imagining that “*you have a morbidly obese patient in the hospital. By morbidly obese we mean someone with a body mass index of 35 or more. For simplicity, let’s say the patient weighs about 325 pounds.*”

All survey items reported in this study had defined response options, either in a “yes/no” or “multiple choice” format. For example, one item focused on the frequency of arranging post-discharge placements to nursing homes for patients who are severely obese. Respondents were asked to choose one best answer to the question: “How often would you encounter a patient such as the one described above in your current role: Daily; Weekly; Bi-weekly; Monthly; Other (specify). Another survey item requested a “yes/no” choice regarding specific issues the discharge planner may have encountered such as “Would the patient’s size in itself, i.e., irrespective of the patient’s medical or nursing needs, act as a barrier for placement in a nursing home?”

Secondary Data—To address specific aim 2, data on the characteristics of hospitals, nursing homes, and the community in which they were located were obtained via publicly available data bases. These included: CMS Hospital Compare (2016), Rural Urban Commuting Area (RUCA) codes database (Morrill, Cromartie, & Hart, 2005), County Health Rankings National Data (2014), CMS Nursing Home Compare (2016), individual hospital websites, and the U.S. Census Bureau (2015). In so doing, we collected data on variables to assess: county nursing home beds per 1,000 population (low=<6.5, medium=6.5–9, high= 9), average nursing home occupancy rates (below average=<85%; above average->85%), rurality (RUCA codes based on population density and population work commuting patterns, ranging from “urbanized” to “small isolated rural” designations; Morrill et al., 2005), county obesity rates (low= 29%, medium=29–31.9%, high= 32%) and resources (hospital size; small=10–87 beds; medium=88–213 beds; large=214–1058 beds). Finally, we included state as a variable to consider differences between Arkansas and Pennsylvania.

Human Subjects Protections

The study was approved by the University of Pennsylvania and University of Arkansas for Medical Sciences Institutional Review Boards. An implied consenting process was used for this study. Implied consent exists when a reasonable person would believe consent has been given, even though no direct, expressed or explicit words of agreement have been uttered or written. In this case, survey respondents voluntarily completed and returned the survey. To minimize the risk of identification of the survey respondents, all hospitals were assigned study unique identifiers. These unique identifiers were recorded in the study database and inscribed on the paper surveys so that responding and non-responding facilities could be tracked. Study materials, including the database linking the identifier to the hospital, were

only accessible by study personnel. Data for use in study publications were aggregated to avoid identification of any individual respondents or actual hospitals.

Data Analysis

To examine potential selection bias, non-responding hospitals were compared to responding hospitals on hospital-and county-level characteristics using data available in CMS Hospital Compare (2016). To address specific aim 1, descriptive statistics were used to summarize the responses from discharge planners from both Pennsylvania and Arkansas. Tests of comparison (e.g., chi-square, Fisher's exact, t-test wherever appropriate) were used to assess differences in responses between the states.

To address specific aim 2, bivariate analysis (using chi-square or Fisher's exact tests wherever appropriate) were conducted to assess the relationship between survey responses and hospital-and community-level characteristics. A series of multivariate regression models were then run to identify factors associated with whether patient size was perceived as a challenge to nursing home admission by hospital discharge planners. Model 1 considered geographic variables (state, rurality and county obesity rates). Model 2 considered facility characteristics (hospital size, nursing home beds per 1000 population in the county, and county nursing home occupancy rates). Model 3 considered other perceptions of discharge planners drawn from survey responses related to reimbursement, staffing and equipment concerns. Model 4 included all geographic variables, facility variables, and perception variables used in Models 1–3. Because answering “yes” to the question “Does patient size act as an admission barrier?” was a common outcome (probability > 50%), an increasing differential between the risk ratio and odds ratio with increasing incidence rates was identified. Therefore, for our multivariate analysis, we applied the general linear model using a Poisson model with a robust error variance to estimate the risk ratio (Zou, 2004). All analyses were performed using Stata version 13 (STATA Corp., Texas, USA). All tests of significance were 2-sided; significant results were defined at $p < 0.05$.

Results

Respondent / Non-Respondent Comparison

Overall, 244 surveys were mailed to 75 hospitals in Arkansas and 169 in Pennsylvania. A total of 97 responses were received, resulting in a 39.8% overall response rate. There were no significant differences in responding and non-responding hospitals on hospital size, county obesity rate category, or the number of nursing home beds per 1000 population in the county. However, significantly fewer urban hospitals and significantly fewer hospitals from counties with high nursing home occupancy rates responded to the survey ($p < 0.05$). When the two states were analyzed separately, no differences in the characteristics of responding and non-responding hospitals were identified from the Pennsylvania data; however, significantly fewer urban versus rural hospitals in Arkansas responded to the survey ($p < 0.05$).

Hospital and Community Characteristics of Respondents

Overall, the 97 respondent hospitals from Pennsylvania and Arkansas were evenly mixed between rural (n=52; 53.6%) and urban areas (n=45; 46.4%). However, hospitals of respondents in Arkansas were more likely to be in rural areas (n=32/42; 76.2%) compared to hospitals of respondents in Pennsylvania (n=20/55; 36.4%). Most (n=38/97; 39.2%) respondent hospitals in both Pennsylvania and Arkansas were small (10–87 beds) and nearly half (n=47/97; 48.5%) were located in counties with high obesity rates. Overall, respondent hospitals in both states were nearly evenly distributed across the three county nursing home bed categories (low; medium; high). Respondent hospitals from both states (n=50/97; 51.6%) were divided almost equally between those with low (n=47/97; 48.5%) and high (n=50/97; 51.6%) nursing home occupancy rates; however, the states differed on this characteristic. More than 90% of the respondent hospitals in Arkansas were located in counties with an overall low nursing home occupancy rate (n=38/42). Conversely, respondent hospitals in Pennsylvania were primarily located in counties with an overall high nursing home occupancy rate (n=46/55; 83.6%).

Barriers in Transitioning Patients with Severe Obesity from Hospitals to Nursing Homes

Thirty-nine (40.2%) of the responding hospital discharge planners from both Arkansas and Pennsylvania reported that they encounter discharging patients who are severely obese and need to be transferred to nursing homes for post-acute care on at least a weekly basis (See Table 1). In addition, one-third of the discharge planners in Pennsylvania and Arkansas (n=34/97; 35.4%) reported there were times when they were unable to transfer patients with severe obesity to nursing homes. Significantly more respondents in Pennsylvania reported the inability to transfer these patients (n=27/55; 50%) compared to respondents in Arkansas (n=7/42; 16.7%; $p=0.001$). One-third of all respondents (n=31/97; 32.6%) reported that nursing homes often or always refuse to admit patients who are severely obese. Half of all respondents (n=48/97; 49.5%) reported that some nursing homes are more like to accept patients who are severely obese than other nursing homes. Reimbursement, staffing and equipment were perceived to be concerns of nursing homes when considering admitting patients who are severely obese by 26.8% (n=26/97), 59.8% (n=58/97) and 72.2% (n=70/97) of respondents, respectively. Respondents from Pennsylvania were significantly more likely to perceive nursing homes as being concerned about staffing (n=37/55; 68.5%; $p=0.05$) and equipment (n=45/55; 83.3%; $p=0.01$) compared to respondents from Arkansas.

Two-thirds (n=64; 66.0%) of all respondents reported patient size alone acts as an admission barrier, with respondents in Pennsylvania significantly more likely (n=42/55; 77.8%) to report that than respondents in Arkansas (n=22/42; 51.2%; $p=0.01$). Two-thirds (n=63; 66.3%) of all respondents reported patient independence level as an admission barrier. Slightly less than half of all (n=41; 42.3%) the responding discharge planners reported financing or reimbursement issues. Just over one-quarter (n=28; 29.8%) of all respondents reported other patient care needs acts as an admission barrier when patients with severe obesity are transitioning from a hospital to a nursing home setting.

Bivariate Analysis

Several variables were significantly associated with respondent views that patient size alone acts as a nursing home admission barrier. These included: respondent hospitals from Pennsylvania; respondents viewing nursing homes as having reimbursement concerns, staffing concerns, and equipment concerns; large hospitals; and respondent hospitals from counties with low nursing home occupancy rates. There was no association between rurality, county obesity rates, and nursing home beds per 1000 county population and the view that patient size alone acts as an admission barrier (See Table 2).

Multivariate Analysis

Results of Model 1 revealed no association between views that patient size acts as an admission barrier and the three geographic variables (state, rurality, and county obesity rates). Results of Model 2 examining the three facility characteristics revealed a significant association between high county nursing home occupancy rates and the view that patient size acts as an admission barrier (RR=1.37, 95% CI: 1.00–1.87; $p=0.05$). Results of Model 3 examining respondent perceptions of nursing home concerns found a significant association between equipment concerns and reports that patient size acts as a nursing home admission barrier (RR=7.40, 95% CI: 2.52–21.78; $p=0.00$). The final Model included all geographic variables, facility characteristics, and respondent perceptions. After controlling for other covariates in the final Model, only one characteristic (equipment concerns; RR=6.81, 95% CI: 2.33–19.92, $p=0.001$) was significantly associated with reports that discharge planners perceive patient size acts as an admission barrier to nursing homes (see Table 3).

Discussion

Our survey indicates that at least one in three hospitals in Arkansas and one in four hospitals in Pennsylvania are currently experiencing the frequent (at least weekly) need for discharge planning of patients who are severely obese coupled with the inability to transition many of these individuals to nursing homes for post-acute care. Two in three respondents reported that patient size alone acts as an admission barrier to nursing homes. Furthermore, discharge planners perceive nursing home staffing levels and available bariatric equipment as concerns for nursing homes when making decisions about whether or not to admit patients who are severely obese. However, when all available hospital and community characteristics and other survey responses of discharge planners regarding possible nursing home concerns were taken into account, only the availability of bariatric equipment in the nursing home was significantly associated with reporting patient size as an admission barrier.

Thus, we failed to find support for our first hypothesis that discharge planners in highly competitive markets would be less likely to perceive patient size as a barrier to finding nursing home placement for patients with severe obesity. This finding is in contrast to early studies examining market demand (Banaszak-Holl et al., 1996; Zinn et al., 1998). A more recent study (Boockvar & Burack, 2007) examined organizational relationships between hospitals and nursing homes. While not specific to persons with obesity, results support certain hospital characteristics (e.g., teaching status; geriatrics specialization; fewer beds) that are positively associated with a more effective transfer process (Boockvar & Burack,

2007). Future studies are recommended to continue to explore how, or if, organizational characteristics and other market factors influence care transitions for persons with obesity.

We did find support for our second hypothesis regarding equipment concerns and this is congruent with previous studies. Specifically, concerns about equipment pose a significant barrier to the successful transition of patients with severe obesity from a hospital to nursing home setting (Felix et al., 2016; Miles et al., 2012). Direct care of patients with severe obesity who often require more expensive and specialized equipment such as larger beds, hydraulic lift-assistance devices, plus-size commodes, chairs, and shower stretchers (Bradway, Miller, Heivly, & Fleshner, 2010; Lapane & Resnick, 2006) are a daily challenge for staff and may influence a nursing home's willingness or ability to admit patients with severe obesity post-hospital discharge. Our results also add to those reported for the state of North Carolina where investigators identified as a study limitation the inability to address similarities or differences between urban and rural facilities (Miles et al., 2012). By collecting similar data in two additional states (one of which, Arkansas, included participants identified to be primarily from rural locations, small size hospitals, and with high obesity rates) our study provides additional support for the continued need for research, funding and policy changes to prevent and treat obesity in varied geographic locations, hopefully before these individuals need nursing home care (Marihart, Brunt, & Geraci, 2015).

This study has additional implications for nurses and healthcare systems particularly those implementing models of care focused on achieving positive patient outcomes that span the entire healthcare continuum. First, failure to move patients who are severely obese out of hospitals into post-acute care has the potential to lead to poor outcomes associated with extended hospital stays. These include an elevated risk for hospital adverse events (e.g. hospital-acquired infections; gradual decline in overall functional status) and increased cost. Specifically, studies have documented that the risk of contracting a hospital-acquired infection increases by 16% for each one additional day in the hospital (Dulworth & Pyenson, 2004). Hospital-acquired infections alone have been estimated to add more than \$10,000 to the cost of each hospital stay, and increase the length of stay by more than three days, resulting in more than \$16.6 billion in avoidable healthcare expenses each year (Hassan, Tuckman, Patrick, Kountz, & Kohn, 2010). Although these studies were not specific to patients with severe obesity, they highlight common negative outcomes associated with an extended hospital stay. Patients with severe obesity are likely to be extremely challenging for hospital case managers, discharge planners, and nursing home staff as they prepare to transfer and provide care for persons with multiple co-morbidities and a prolonged acute care stay. In some cases, an additional challenge includes finding placement only in a nursing home facility located a long distance from the patient's home and support system (Miles et al., 2012). Organizational factors and effective communication between hospital discharge planners and nursing home admissions coordinators and other staff is critical (Boockvar & Burack, 2007) and an area in need of increased attention.

Our study provides an important contribution to the scant literature on the challenges of transitioning persons who are severely obese to a nursing home after an acute care stay and specifically, the experiences of hospital discharge planners. Results are limited by a

relatively low response rate and data collection that occurred in only two states, which in turn, results in low power and potential selection bias. Additionally, because we retained the same non-validated survey instrument and language as used in a previous study (Miles et al., 2012), respondents considering the case of a patient weighing 325 pounds may have been thinking of a person who was more or less extreme in terms of body mass index or obesity classification. Finally, although we found only two significant differences between responding and non-responding hospitals (rural/urban location and high/low county nursing home occupancy rates), it is possible that those differences or characteristics of the discharge planners (e.g., years of experience; responsibilities for primarily surgical or medical patients) may have impacted our results.

Optimizing the transitional care experiences of hospitalized patients who are severely obese is an increasingly relevant area of study and one that requires additional emphasis and consideration. A significant body of research has investigated root causes of hospital discharge failures and developed prevention and treatment interventions to ensure optimal transitional care needs of patients with certain medical conditions (e.g. congestive heart failure) from acute care back to the community (Naylor et al., 2004; Parrish et al., 2009). Similar efforts are needed to understand the unique nursing and transitional care needs of patients who are severely obese discharging from hospitals to nursing homes. Further research is also warranted to then develop specific interventions focused on ensuring appropriate and timely post-acute care given our results that challenges in the transitional care of persons with severe obesity already are being experienced.

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References

- Banaszak-Holl J, Zinn J, Mor V. The impact of market and organizational characteristics on nursing care facility service innovation: A resource dependency perspective. *Health Services Research*. 1996; 31(1):97–117. [PubMed: 8617612]
- Boockvar KS, Burack OR. Organizational relationships between nursing homes and hospitals and quality of care during hospital-nursing home patient transfers. *Journal of the American Geriatrics Society*. 2007; 55:1078–1084. [PubMed: 17608882]
- Bradway C, DiResta J, Fleshner I, Polomano R. Obesity in nursing homes: A critical review. *Journal of the American Geriatrics Society*. 2008; 56:1528–1535. [PubMed: 18662208]
- Bradway C, Miller E, Heivly A, Fleshner I. Continence care for obese nursing home residents. *Urologic Nursing*. 2010; 30(2):121–129. [PubMed: 20469571]
- Centers for Medicare and Medicaid Services Hospital Compare. 2016. Retrieved from <https://data.medicare.gov/data/hospital-compare>
- Centers for Medicare and Medicaid Services Nursing Home Compare. 2016. Retrieved from <https://data.medicare.gov/data/nursing-home-compare>

- County Health Rankings National Data. 2014. Retrieved from <http://www.countyhealthrankings.org/rankings/data>
- Daviglus M, Lui K, Yan L, Pirzada A, Manheim L, Manning W, Stamler J. Relation of body mass index in young adult and middle age to Medicare expenditures in older age. *Journal of the American Medical Association*. 2004; 292(22):2743–2749. [PubMed: 15585734]
- Dillman, D. Mail and internet surveys: The Tailored Design Method. 2nd. New York, NY: John Wiley & Sons; 2000.
- Drake D, Dutton K, Engelke M, McAuliffe M, Rose MA. Challenges that nurses face in caring for the morbidly obese patient in the acute care setting. *Surgery for Obesity and Related Diseases*. 2005; 1(5):462–466. [PubMed: 16925271]
- Dulworth S, Pyenson B. Healthcare-associated infections and the length of hospital stay in the Medicare population. *American Journal of Medical Quality*. 2004; 19(3):121–127. [PubMed: 15212317]
- Edlich R, Hudson M, Buschbacher R, Winters K, Britt L, Cox M, Falwell R. Devastating injuries in healthcare workers: Description of the crisis and legislative solution to the epidemic of back injury from patient lifting. *Journal of Long Term Effects of Medical Implants*. 2005; 15(2):225–241. [PubMed: 15777173]
- Felix HC. Personal care assistance needs of obese elders entering nursing homes. *Journal of the American Medical Directors Association*. 2008; 9(5):319–326. [PubMed: 18519112]
- Felix HC, Bradway C, Ali MM, Li X. Nursing home perspectives on the admission of morbidly obese patients from hospitals to nursing homes. *Journal of Applied Gerontology*. 2016; 35:286–302. [PubMed: 25515758]
- Felix HC, Bradway C, Chisholm L, Pradhan R, Weech-Malonado R. Prevalence of moderate to severe obesity among US nursing home residents, 2000–2010. *Research in Gerontological Nursing*. 2015; 8:173–178. [PubMed: 25751850]
- Felix, HC., Bradway, C., Miller, E., Heivly, A., Fleshner, I., Powell, LS. Staff time and estimated labor costs to bathe obese nursing home residents: A case report. *Obesity and Nursing Home Working Paper Series No 1*. 2009. Retrieved from Social Science Research Network <http://ssrn.com/abstract=1492703>
- Flegal KM, Krumson-Moran D, Carroll MD, Fryar CD, Ogden CL. Trends in obesity among adults in the United States, 2005–2014. *Journal of the American Medical Association*. 2016; 315:2284–2291. [PubMed: 27272580]
- Finkelstein EA. How big of a problem is obesity? *Surgery for Obesity and Related Diseases*. 2014; 10:569–570. <http://dx.doi.org/10.1016/j.soard.2014.02.028>. [PubMed: 24958649]
- Finkelstein EA, Khavjou OA, Thompson H, Trogdon JG, Pan L, Sherry B, Dietz W. Obesity and severe obesity forecasts through 2030. *American Journal of Preventive Medicine*. 2012; 42:563–570. [PubMed: 22608371]
- Hassan M, Tuckman H, Patrick R, Kountz D, Kohn J. Cost of hospital-acquired infections. *Hospital Topics*. 2010; 88(3):86–89.
- Jenkins K. Obesity's effects on the onset of functional impairment among older adults. *The Gerontologist*. 2004; 44(2):206–216. [PubMed: 15075417]
- Lapane K, Resnick L. Weighing the relevant issues: Obesity in nursing homes. *Journal of Aging and Social Policy*. 2006; 18(2):1–9.
- Marihart CL, Brunt AR, Geraci AA. The high price of obesity in nursing homes. *Care Management Journals*. 2015; 16(1):14–19. [PubMed: 25918773]
- Markoff B, Amsterdam A. Impact of obesity on hospitalized patients. *Mount Sinai Journal of Medicine*. 2008; 75:454–459. [PubMed: 18828168]
- Miles J, Anderson D, Engelke M, Kirkpatrick M, Pories M, Waters W, Rose M. Barriers to transition of obese patients from hospital to community. *American Journal of Managed Care*. 2012; (18):e234–e237. [PubMed: 22775075]
- Morrill, R., Cromartie, J., Hart, G. Rural urban commuting area data. 2005. Retrieved from <http://depts.washington.edu/uwruca/index.php>

- National Heart Lung and Blood Institute. Clinical guidelines on the identification, evaluation and treatment of overweight and obesity in adults: The evidence report. Washington DC: National Institutes of Health; 1998.
- Naylor MD, Broton DA, Campbell RL, Maislin GM, McCauley KM, Schwartz JS. Transitional care of older adults hospitalized with heart failure: A randomized clinical trial. *Journal of the American Geriatrics Society*. 2004; 52:675–684. [PubMed: 15086645]
- Parrish MM, O'Malley K, Adams RI, Adams SR, Coleman EA. Implementation of the care transitions intervention. *Professional Case Management*. 2009; 14(6):282–293. [PubMed: 19935345]
- Rose M, Baker G, Drake D, Engelke M, McAuliffe M, Pokorny M, Watkins F. A comparison of nurse staffing requirements for the care of morbidly obese and non-obese patients in the acute care setting. *Bariatric Nursing and Surgical Patient Care*. 2007; 2(1):53–56.
- Slack T, Myers CA, Martin CK, Heymsfeld SB. The geographic concentration of US adult obesity prevalence and associated social, economic, and environmental factors. *Obesity*. 2014; 22:868–874. [PubMed: 23630100]
- U.S. Census Bureau. 2010 census urban and rural classification and urban area criteria. 2010. Retrieved from <http://www.census.gov/geo/reference/ua/urban-rural-2010.html>
- U.S. Census Bureau. 2015. Retrieved from <http://quickfacts.census.gov/qfd/states/>
- Ward ZJ, Long MW, Resch SC, Gortmaker SL, Cradock AL, Giles C, Wang C. Redrawing the US obesity landscape: Bias corrected estimates of state-specific adult obesity prevalence. *PLoS ONE*. 2016; 11(3):1–13.
- Zhang N, Li Y, Temkin-Greener H. Prevalence of obesity in New York nursing homes: Associations with facility characteristics. *The Gerontologist*. 2013; 53:567–581. [PubMed: 23480892]
- Zinn J, Weech-Maldonado R, Brannon D. Resource dependence and institutional elements in nursing home TQM adoption. *Health Services Research*. 1998; 33(i2, Part 1):261–273. [PubMed: 9618671]
- Zou G. A modified poisson regression approach to prospective studies with binary data. *American Journal of Epidemiology*. 2004; 159(7):702–706. [PubMed: 15033648]

Table 1

Survey Responses, Overall and by State

Question descriptor	Overall				State				P
	AR		PA						
	n	%	n	%					
Discharging obese patients at least weekly	39	40.2	14	33.3	25	45.5	0.23		
Unable to transfer obese patients at times	34	35.4	7	16.7	27	50.0	0.001		
Some NH more likely to accept obese patients	48	49.5	17	39.5	31	57.4	0.08		
NH often / always refuse admission to the obese	31	32.6	9	22.0	22	40.7	0.08		
Perceived NH concerns regarding obese patient care									
Reimbursement	26	26.8	12	27.9	14	25.9	0.83		
Staffing	58	59.8	21	48.8	37	68.5	0.05		
Equipment	70	72.2	25	58.1	45	83.3	0.01		
Perceived NH admission barriers for the obese									
Patient size	64	66.0	22	51.2	42	77.8	0.01		
Patient independence level	63	66.3	24	57.1	39	73.6	0.09		
Financing / reimbursement	41	42.3	19	45.2	22	40.0	0.61		
Other patient care needs	28	29.8	10	23.3	18	35.3	0.20		

Notes: AR=Arkansas, PA=Pennsylvania, n=number, NH=Nursing Home. Comparisons made using chi-square or Fisher's exact tests, wherever appropriate.

Table 2

Associations between Hospital Discharge Planners' Perception that Patient Size Acts as a Nursing Home Admission Barrier and Respondent Characteristics

	Not an Admission Barrier		Admission Barrier		P
	n	%	n	%	
State					
Pennsylvania	12	37.5	42	65.6	0.009
Arkansas	20	62.5	22	34.4	
Reimbursement concerns					
No	29	90.6	41	64.1	0.007
Yes	3	9.4	23	35.9	
Staffing concerns					
No	24	75.0	14	21.9	0.000
Yes	8	25.0	50	78.1	
Equipment concerns					
No	23	71.9	3	4.7	0.000
Yes	9	28.1	61	95.3	
Rurality					
Rural	20	62.5	32	50.0	0.247
Urban	12	37.5	32	50.0	
Hospital size					
Small	18	56.3	19	29.7	0.027
Medium	9	28.1	21	32.8	
Large	5	15.6	24	37.5	
County obesity rates					
Low	9	28.1	20	31.3	0.094
Medium	3	9.4	17	26.6	
High	20	62.5	27	42.2	
NH beds per 1000 county population					
Low	9	28.1	23	35.9	0.272

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	Not an Admission Barrier		Admission Barrier		P
	n	%	n	%	
Medium	8	25.0	22	34.4	0.004
High	15	46.9	19	29.7	
County NH occupancy rates					
Low	10	31.3	40	62.5	0.004
High	22	68.8	24	37.5	

Notes: AR=Arkansas, PA=Pennsylvania, n=number, NH=Nursing Home. Comparisons made using chi-square or Fisher's exact tests, wherever appropriate.

Table 3

Characteristics Predicting Hospital Discharge Planners' Perception that Patient Size Acts as a Nursing Home Admission Barrier, Results of Multivariate Regression Analysis for Respondent

	Model 1				Model 2				Model 3				Full Model			
	RR	95%	CI	P	RR	95%	CI	P	RR	95%	CI	P	RR	95%	CI	P
State																
Pennsylvania	ref	--	--	--									ref	--	--	--
Arkansas	0.73	0.51	1.06	0.10									1.08	0.76	1.53	0.67
Rural																
Rural	ref	--	--	--									ref	--	--	--
Urban	1.06	0.78	1.45	0.69									0.91	0.72	1.16	0.46
County Obesity Rates																
Low	ref	--	--	--									ref	--	--	--
Medium	1.24	0.89	1.74	0.20									1.13	0.88	1.47	0.33
High	0.97	0.67	1.41	0.86									0.96	0.65	1.43	0.85
Hospital Size																
Small					ref	--	--	--					ref	--	--	--
Medium					1.21	0.82	1.79	0.34					1.13	0.88	1.54	0.45
Large					1.35	0.92	1.99	0.13					1.05	0.76	1.45	0.76
NH beds per 1000 county population																
Low					ref	--	--	--					ref	--	--	--
Medium					1.14	0.82	1.58	0.43					1.11	0.83	1.48	0.49
High					1.02	0.70	1.49	0.92					1.05	0.76	1.45	0.76
County NH occupancy rates					ref	--	--	--					ref	--	--	--
Low					ref	--	--	--					ref	--	--	--
High					1.37	1.00	1.87	0.05					1.29	0.93	1.78	0.13
Reimbursement concerns																
No									ref	--	--	--	ref	--	--	--
Yes									1.14	0.93	1.42	0.21	1.17	0.91	1.49	0.22
Staffing Concerns																
No									Ref	--	--	--				
Yes									0.98	0.75	1.27	0.87	1.00	0.78	1.27	0.99

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	Model 1			Model 2			Model 3			Full Model		
	RR	95% CI	P	RR	95% CI	P	RR	95% CI	P	RR	95% CI	P
Equipment Concerns												
No							ref	--	--	ref	--	--
Yes							7.40	2.52	21.78	0.00	6.81	2.33
											19.92	0.00

Notes: AR=Arkansas; CI=Confidence Interval, n=number, NH=Nursing Home, P=p value, PA=Pennsylvania, Ref=Referent, RR=Risk Ratio.