

A Case Manager-Led Pneumonia Care Bundle in a Subacute Rehabilitation Facility

Deborah Granata, MSN, RN, CDONA/LTC, Moira Kendra, DNP, MA, ACNP-BC, RN, and
Stephanie H. Chiu, MPH, BS

ABSTRACT

Purpose of the Study: To evaluate the relationship between a case manager-led pneumonia care bundle at skilled nursing facilities (SNFs) and 30-day hospital readmissions for pneumonia.

Primary Practice Settings: The primary practice settings included patients hospitalized with pneumonia at 2 community hospitals between October 2018 and June 2019 and who were subsequently transferred to an SNF.

Methodology and Sample: A retrospective cohort study was completed comparing patients in the preintervention cohort who received pneumonia standard of care versus patients in the postintervention cohort who received a case manager-led evidence-based pneumonia care bundle at an SNF. From October 2018 to June 2019, patients admitted with pneumonia to 2 community hospitals in Northwest New Jersey were enrolled in the preintervention cohort. Patients admitted with pneumonia from January 2020 to June 2021 were enrolled in the postintervention group. The primary outcome was to reduce 30-day readmission rates for all patients discharged from the hospital to an SNF with pneumonia.

Results: Ninety-nine patients were enrolled in the preintervention cohort and 34 patients were enrolled in the postintervention cohort. Thirty-day readmission rates were lower in the postintervention cohort (24.2% vs. 17.7%). This reduction in readmission rates was clinically significant, demonstrating a 27% reduction for all patients discharged from the hospital to an SNF with pneumonia.

Implications for Case Management Practice: Individualized pneumonia self-management education can be easily implemented in SNFs to improve quality-of-care outcomes for patients. Our health care system collaborates with several SNFs to decrease 30-day hospital readmission. The pneumonia care bundle includes specific measures to improve the transition of care for patients with pneumonia by decreasing the variability of patient care after discharge from the hospital to an SNF. It was hypothesized that to decrease readmissions from the SNFs, we needed to address the quality of care provided by the SNFs by using a 2-prong approach; education of SNF staff on the pneumonia care bundle, and in-person weekly follow-up visits in the SNF until discharge from the SNF to the patient's home.

Key words: case management, pneumonia care bundle, skilled nursing facilities, 30-day readmissions, transitions of care

The most common cause of infectious death globally is community-acquired pneumonia (CAP), which occurs frequently and with high mortality, morbidity, and costs (Hortmann et al., 2014; Petersen et al., 2018; Zhu et al., 2018). In the United States, the total costs for pneumonia-related hospitalizations in 2014 were greater than \$84 billion (Hayes et al., 2018). An important quality improvement initiative for hospitals and skilled nursing facilities (SNFs) includes decreasing unplanned inpatient pneumonia readmissions within 30 days of discharge from the index hospitalization (Hatipoğlu et al., 2018; Wasfy et al., 2017). Hatipoğlu et al. reported decreased payments to hospitals with high percentages of pneumonia readmissions that were implemented by the

Centers for Medicare & Medicaid Services (CMS). Rates of hospital readmission within 30 days for CAP range from 15% to 20% (Hadfield & Bennett, 2018).

SNFs and hospitals provide coordinated care to reduce pneumonia readmission (Pandolfi et al., 2017). Studies in nursing home performance demonstrate that when the quality of post-acute care is

Address correspondence to Deborah Granata, MSN, RN, CDONA/LTC, Department of Case Management, Newton Medical Center, 175 High St, Newton, NJ 07860 (Deborah.granata@atlantichealth.org).

The authors report no conflicts of interest.

DOI: 10.1097/NCM.0000000000000589

Studies in nursing home performance demonstrate that when the quality of post-acute care is improved, this care can significantly reduce hospital readmission.

improved, this care can significantly reduce hospital readmissions (Pandolfi et al., 2017).

The pneumonia care bundle was implemented in the acute care setting and the post-acute care setting (SNF, home care) with a primary objective of preventing pneumonia readmissions based on the *Infectious Diseases Society of American/American Thoracic Society Consensus Guidelines on the Management of Community-Acquired Pneumonia in Adults (IDSA/ATS)*. An interdisciplinary team referred to as the Pulmonary Integrated Care Committee (PICC) assembled to develop and implement an evidence-based pneumonia care bundle. The detailed measures of the pneumonia care bundle include risk stratification according to the IDSA/ATS 2019 guidelines for patients admitted through the emergency department (ED). Additional measures include diagnostic tests such as completion of a chest radiograph in the emergency department (ED) identifying an obvious infiltrate, the first antibiotic dosing in the ED was administered within 4 hr of admission, and antibiotic therapy for CAP should be treated for a minimum of 5 days but may require longer treatment in the SNF if the initial treatment was not effective (Mandell et al., 2007).

Two hospitals in Northwest New Jersey identified risk factors for pneumonia readmission, and these included older age, longer length of stay, comorbidities including cancer, coronary heart disease, chronic heart failure, chronic kidney disease, anticoagulation therapy with warfarin (Coumadin), anemia, hypoalbuminemia, and prior admission to the hospital (Hatipoğlu et al., 2018).

BACKGROUND

In this retrospective cohort study, an evidence-based pneumonia care bundle was implemented at 11 SNFs with a primary outcome to reduce 30-day hospital readmissions. Inclusion criteria were patients hospitalized, aged 18 years and older, carried traditional Medicare insurance, diagnosed with pneumonia, and discharged from an acute care hospital to an SNF. Exclusion criteria included patients unable to participate in patient education for pneumonia, diagnosed with severe sepsis, and discharged against medical advice.

THE PROCESS AND INTERVENTIONS

The post-acute care coordinator (PACC) of the Case Management Department met with the PICC team to

discuss the evidence-based practices for pneumonia that were required to improve patient outcomes and subsequently reducing readmissions. Our health care system collaborates with several SNFs to decrease 30-day hospital readmissions. It was hypothesized that to decrease readmissions from the SNFs, we needed to address the quality of care provided by the SNFs by using a two-step approach:

1. Education was provided by the PACC to the nursing staff at the SNF. The topics included the anatomy and physiology of the respiratory system; pathophysiology of the pneumonia; complications of tube feeds; the pneumonia care bundle and the pneumonia action plan; antimicrobials used to treat pneumonia; and nursing care guidelines to monitor for changes in status. We also included how to use the nomogram information packet with incentive spirometers (ISs) based on the patient's age and height in inches.
2. The PACC completed weekly follow-up visits to the facility to meet with the primary care nurse/unit manager. At this meeting, there was a review of the status of the patient, medication reconciliation, and confirmation that guidelines and bundle elements were being followed. Continuing education was provided to the staff as needed.

The PACC scheduled weekly visits to facilities that had received residents with a diagnosis of pneumonia from the system hospitals. To prepare for the first meeting, the PACC reviewed each individual resident's history and physical, discharge summary, and the after-visit summary. At the first SNF visit, there was a meeting with the primary nurse/unit manager caring for the resident with pneumonia. Elements of the pneumonia bundle were reviewed to ensure that the bundle was adequately implemented, and the *Pneumonia Patient Education Book* was used to educate the residents, which included the importance of the pneumonia action plan, aspiration precautions, and proper oral care. A comparison was completed reviewing the most accurate list of medications that the resident was taking in the SNF to the hospital discharge medication list, including the name of the drug, dosage, frequency, and route. When inhalers were ordered, nurses were educated to assess whether the resident could complete a proper 10-s breath hold. When residents were unable to complete a proper inhaler technique, nurses were educated to request that the provider change the inhaler to nebulized medications. A review of current laboratory diagnostics occurred for abnormalities, and nurses were educated to inform the provider.

During the initial visit, the PACC would review aspiration pneumonia cases to determine whether aspiration precautions were ordered. When aspiration

Thirty-day readmission rates were lower in the postintervention cohort (24.2% vs. 17.7%). This reduction in readmission rates was clinically significant, demonstrating a 27% reduction for all patients discharged from the hospital to an SNF with pneumonia.

precautions were ordered, a meeting was held with the speech therapist to ensure that proper swallow techniques and aggressive oral care were ordered. IS use was continued in the SNF to provide adequate lung expansion, and each resident had their personal best goal calculated by using the IS nomogram. The IS personal best goal was calculated on the basis of the resident's age and height in inches. Dysphagia diets were ordered for residents diagnosed with aspiration pneumonia, and drinks were thickened. Oral care included toothbrushing to remove dental plaque, swabbing to remove oral debris and secretions, and moisturizing to hydrate the lips and oral cavity. In addition, there would be confirmation that all residents had a primary care provider (PCP), or pulmonologist follow-up appointment arranged within 7 days of admission.

Residents admitted to the SNF with a new percutaneous endoscopic gastrostomy (PEG) feeding tube due to dysphagia were carefully reviewed. The PACC collaborated with the registered nurse to verify the tube feeding formula, calorie count, and rate of flow. When orders were received for "nothing by mouth" (NPO), the PACC reviewed the route of medication administration to verify that all medications were being administered via the PEG tube. Medications that could not be crushed were substituted by medications that could be safely crushed. Nurses were educated and provided strategies on the signs and symptoms of aspiration.

During the second weekly visit, a clinical review of the patient's vital signs, breath sounds, and recent laboratory results would take place. The PACC confirmed the discharge dates, completion of the pneumonia action plan, and the results of pulmonologist follow-up appointment. When indicated, additional follow-up provider appointments were arranged to address comorbidities including diabetes mellitus, congestive heart failure, and end-stage renal disease.

During the third-week PACC visit and extending up to the day of discharge, each resident would be evaluated for respiratory stability and comorbidity stability. A review of the discharge plans included the need for a referral to home care. Patient and family education was completed using the *Pneumonia Patient Education Book* and confirmed it will accompany the resident at the time of discharge. After SNF discharge, the PACC ensured that home care visits were initiated and home medication reconciliation

was accurate. There was also confirmation that the *Pneumonia Care Book* and IS were in use in the resident's home. There was validation with the visiting nurses that residents who required home tube feedings or dysphagia diets were in place as part of the plan of care. In addition, the family caregivers were given education on the importance of home dysphagia diets or home tube feedings.

RESULTS

Ninety-nine patients were enrolled in the preintervention cohort and 34 patients were enrolled in the postintervention cohort. Thirty-day readmission rates were lower in the postintervention cohort (24.2% vs. 17.7%). This reduction in readmission rates was clinically significant, demonstrating a 27% reduction for all patients discharged from the hospital to an SNF with pneumonia (see Figure 1).

Readmissions following an index hospitalization for pneumonia are frequent, and studies demonstrate approximately 16% of patients are readmitted within 30 days (Hatipoglu et al., 2018). The rate of 30-day readmission in the current study is higher in the preintervention cohort than in the postintervention group (24.2% vs. 17.7%). This reduction in readmission rates was clinically significant, demonstrating a 27% reduction for all patients discharged from the hospital to an SNF with pneumonia. The readmission rate is higher in this study than in the national average and may be due to the complexity of patients discharged from the hospital to an SNF. Complex risk factors in this study included large numbers of

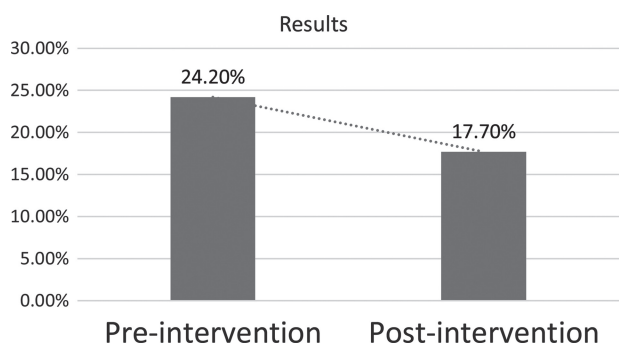


FIGURE 1
Percentage of readmissions.

socioeconomically challenged patients, current smokers, patients diagnosed with both dementia and aspiration pneumonia, frail elderly patients, and large numbers of patients with pneumonia complications including patients with cancer, heart failure, diabetes mellitus, empyema, and end-stage-renal disease.

LIMITATIONS

We acknowledge that the study has limitations. First, the study was a retrospective cohort study comparing patients in the preintervention cohort who received pneumonia standard of care versus patients in the postintervention cohort who received a PACC evidence-based pneumonia care bundle. Second, readmissions outside our health care system may not have been captured. Third, the sample size is small and may not be generalizable to a larger SNF population. Fourth, a large randomized controlled trial (RCT) was not conducted, and it is possible that the results on which we based our interventions will be superseded by larger RCTs.

Improvement of the limitations includes implementation of our pneumonia care bundle at SNFs nationally and globally. Limitations may be improved by conducting national and global RCTs studying the effects of an evidence-based pneumonia care bundle at SNFs.

CONCLUSION

Although interventions to reduce 30-day readmissions for pneumonia are few, this study focused on an evidence-based pneumonia care bundle directed at patients who are at high risk for a hospital readmission from an SNF (Adamuz et al., 2015; Borzecki et al., 2015; McLeod-Sordjan et al., 2011). The pneumonia care bundle is an evidence-based intervention aimed at preventing readmissions and is affordable, not complicated to use, and easy to replicate in an SNF and has proved beneficial in this study.

REFERENCES

- Adamuz, J., Viasus, D., Simonetti, A., Jiménez-Martínez, E., Molero, L., González-Samartino, M., Castillo, E., Juvé-Udina, M.-E., Alcocer, M.-J., Hernández, C., Buera, M.-P., Roel, A., Abad, E., Zabalegui, A., Ricart, P., Gonzalez, A., Isla, P., Dorca, J., Garcia-Vidal, C., & Carratalà, J. (2015). Impact of an educational program to reduce healthcare resources in community-acquired pneumonia: The EDUCAP randomized controlled trial. *PLoS One*, *10*(10), e0140202. <https://doi.org/10.1371/journal.pone.0140202>
- Borzecki, A. M., Chen, Q., Restuccia, J., Mull, H. J., Schwartz, M., Gupta, K., Hanchate, A., Strymish, J., & Rosen, A. (2015). Do pneumonia readmissions flagged as potentially preventable by the 3M PPR software have more process of care problems? A cross-sectional observational study. *BMJ Quality & Safety*, *24*(12), 753–763. <https://doi.org/10.1136/bmjqs-2014-003911>
- Hadfield, J., & Bennett, L. (2018). Determining best outcomes from community acquired pneumonia and how to achieve them. *Respirology*, *23*(2), 138–147. <https://doi.org/10.1111/resp.13218>
- Hatipoğlu, U., Wells, B. J., Chagin, K., Joshi, D., Milinovich, A., & Rothberg, M. B. (2018). Predicting 30-day all-cause readmission risk for subjects admitted with pneumonia at the point of care. *Respiratory Care*, *63*(1), 43–49. <https://doi.org/10.4187/respcare.05719>
- Hayes, B., Haberling, D., Kennedy, J., Varma, J., Fry, A., & Vora, N. (2018). Burden of pneumonia-associated hospitalization: United States, 2001–2014. *Chest*, *153*(2), 427–437. <https://doi.org/10.1016/j.chest.2017.09.041>
- Hortmann, M., Heppner, H.-J., Popp, S., Lad, T., & Christ, M. (2014). Reduction of mortality in community-acquired pneumonia after implementing standardized care bundles in the emergency department. *European Journal of Emergency Medicine*, *21*(6), 429–435. <https://doi.org/10.1097/mej.000000000000106>
- Mandell, L., Wunderink, R., Anzueto, A., Bartlett, J., Campbell, G., Dean, N., Dowell, S., File, T., Musher, D., Niederman, M., Torres, A., & Whitney, C. (2007). Infectious Diseases Society of America/American Thoracic Society consensus guidelines on the management of community-acquired pneumonia in adults. *Clinical Infectious Diseases*, *44*(Suppl. 2), S27–S72. <https://doi.org/10.1086/511159>
- McLeod-Sordjan, R., Krajewski, B., Jean-Baptiste, P., Barone, J., & Worrall, P. (2011). Effectiveness of patient-caregiver dyad discharge interventions on hospital readmissions of elderly patients with community acquired pneumonia: A systematic review. *JBI Library of Systematic Reviews*, *9*(14), 437–463. <https://doi.org/10.11124/jbisrir-2011-127>
- Pandolfi, M. M., Wang, Y., Spenard, A., Johnson, F., Bonner, A., Ho, S.-Y., Elwell, T., Bakullari, A., Galusha, D., Leifheit-Limson, E., Lichtman, J. H., & Krumholz, H. M. (2017). Associations between nursing home performance and hospital 30-day readmissions for acute myocardial infarction, heart failure and pneumonia at the healthcare community level in the United States. *International Journal of Older People Nursing*, *12*(4), e12154. <https://doi.org/10.1111/opn.12154>
- Petersen, P., Egelund, G., Jensen, A., Andersen, S., Pedersen, M., Rohde, G., & Ravn, P. (2018). Associations between biomarkers at discharge and co-morbidities and risk of readmission after community-acquired pneumonia: A retrospective cohort study. *European Journal of Clinical Microbiology & Infectious Diseases*, *37*(6), 1103–1111. <https://doi.org/10.1007/s10096-018-3224-8>
- Wasfy, J. H., Zigler, C., Choirat, C., Wang, Y., Dominici, F., & Yeh, R. W. (2017). Readmission rates after passage of the hospital readmissions reduction program. *Annals of Internal Medicine*, *166*(5), 324. <https://doi.org/10.7326/m16-0185>

Zhu, L., Bai, J., Chen, Y., & Xue, D. (2018). Effects of a clinical pathway on antibiotic use in patients with community-acquired pneumonia: A multi-site study in china. *BMC Infectious Diseases*, 18(1), 471. <https://doi.org/10.1186/s12879-018-3369-1>

Deborah Granata, MSN, RN, CDONA/LTC, has a master's in prepared nursing, specializing in case management in post-acute care facilities. She has 15-years experience in post-acute care and is certified as a Long-Term Care Director of Nursing. Her role is to decrease 30-day readmissions for pneumonia between the subacute facilities and the hospital settings.

Moira Kendra, DNP, MA, ACNP-BC, RN, specializes in the management of inpatient pulmonary medicine directly to decrease 30-day pneumonia readmission rates.

Stephanie H. Chiu, MPH, BS, is a master's prepared biostatistician with over fifteen years of experience. At present, Stephanie is a biostatistician at Atlantic Health System and developed the education, training, and research support framework for researchers and research coordinators to access, store, and analyze data at AHS. Stephanie holds a master's degree in Biostatistics and is currently working an advanced degree in Biomedical Informatics.

For more than 50 additional continuing education articles related to Case Management topics, go to NursingCenter.com/CE.



Nursing Continuing Professional Development

INSTRUCTIONS

A Case Manager-Led Pneumonia Care Bundle in a Subacute Rehabilitation Facility

Instructions:

- Read the article. The test for this CE activity can only be taken online at www.nursingcenter.com/ce/PCM.
- You will need to create (its free!) and login to your personal CE Planner account before taking online tests. Your planner will keep track of all your Lippincott Professional Development online CE activities for you.
- There is only one correct answer for each question. A passing score for this test is 7 correct answers. If you pass, you can print your certificate of earned contact hours and access the answer key. If you fail, you have the option of taking the test again at no additional cost.
- For questions, contact Lippincott Professional Development: 1-800-787-8985.

Continuing Education Information for Certified Case Managers:

This Continuing Education (CE) program is provided by Lippincott Professional Development and has been preapproved by the Commission for Case Manager Certification (CCMC) to provide CE credit to Certified Case Managers (CCMs) for 1.0 contact hours. This CE program is approved for meeting the requirements for certification renewal.

Registration Deadline: March 1, 2024

Continuing Education Information for Certified Professionals in Healthcare Quality (CPHQ):

This continuing education (CE) activity is provided by Lippincott Professional Development and has been approved by the National Association for Healthcare Quality (NAHQ) for 1.5 CE Hours. CPHQ

CE Hours are based on a 60-minute hour. This CE is approved for meeting requirements for certification renewal.

This CPHQ CE activity expires on March 1, 2024.

Continuing Education Information for Nurses:

Lippincott Professional Development will award 1.5 contact hours for this continuing nursing education activity.

LPD is accredited as a provider of continuing nursing education by the American Nurses Credentialing Center's Commission on Accreditation.

This activity is also provider approved by the California Board of Registered Nursing, Provider Number CEP 11749. LPD is also an approved provider by the District of Columbia, Georgia, West Virginia, New Mexico, South Carolina, and Florida CE Broker #50-1223.

Registration Deadline for Nurses: March 1, 2024

Disclosure Statement:

The author and planners have disclosed no potential relevant financial relationships or otherwise.

Payment and Discounts:

- The registration fee for this test is \$17.95
- CMSA members can save 25% on all CE activities from *Professional Case Management* ! Contact your CMSA representative to obtain the discount code to use when payment for the CE is requested.

DOI: 10.1097/NCM.0000000000000646