Pneumonia Management in Nursing Homes: Findings from a CMS Demonstration Project

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INTRODUCTION

For nursing facility residents, potentially avoidable hospitalizations (PAHs) can lead to adverse outcomes such as delirium, nosocomial infections, and decline in function. PAHs are also costly to the Medicare program.^{1, 2} The Indiana-based Optimizing Patient Transfers, Impacting Medical Quality and Improving Symptoms: Transforming Institutional Care (OPTIMISTIC) project is one of six demonstration projects across the country awarded a contract from the Centers for Medicare and Medicaid (CMS) to reduce PAHs for long-stay nursing facility residents.¹ All OPTIMISTIC nursing home residents have Medicare; approximately 2/3 also have Medicaid coverage.

OPTIMISTIC is targeting six specific diagnoses associated with PAHs: dehydration, cellulitis, exacerbations of heart failure or obstructive pulmonary disease, urinary tract infection, and pneumonia.¹ Project facilities are eligible for enhanced reimbursement through Medicare Part B codes when one of the six conditions is treated in the facility, instead of transferring the resident to the hospital. In addition to the enhanced reimbursement, 17 of the facilities also have dedicated project clinical staff on-site to support facility staff (clinical + payment) and 23 only receive the enhanced reimbursement (payment only). In analyses of the OPTIMISTIC nursing facilities with on-site support, PAHs were reduced by 1/3.³

More than 30% of PAHs of nursing facility residents are for pneumonia, making pneumonia one of the top five PAH-associated diagnoses.² Using OPTIMISTIC data, we are uniquely positioned to describe current treatment for episodes of pneumonia in nursing facilities. The goal of this case series is to describe the management of episodes of pneumonia in nursing facilities participating in the OPTIMISTIC project.

CASE SERIES

Methods

To be eligible for this study, selected cases had to meet the OPTIMISTIC project inclusion criteria (length of stay >

100 days; Medicare fee-for-service coverage). Of the 40 participating nursing facilities, the monthly pneumonia incidence ranged from 0 to 9 cases. Those with high incidence of pneumonia episodes treated in house (5 or more episodes) were reviewed, and 3–4 cases from each facility were randomly selected for review (<https://www.random.org/>). Data sources included electronic and paper medical records, lab results, chest x-ray readings, and OPTIMISTIC project data managed in REDCap.

Results

Cases for review were drawn from 7 facilities from November 2017 to April 2018, for a total of 41 episodes of pneumonia. Most residents (Table 1) were over the age of 65 (90.2%), female (63.4%), and Caucasian (92.7%). None of the cases of nursing facility acquired pneumonia had sputum or blood cultures submitted to laboratories (Table 2 part a). 58.3% of the cases had a CURB-65 score that was greater than or equal to 2, which is a score used to estimate need for inpatient-level care.⁴ Among cases reviewed, 70.7% of the residents had 3 or more comorbidities that increased their risk for developing pneumonia while 95.1% of them were on a medication that increases the risk for pneumonia (Table 1).

All pneumonia cases were treated with antibiotics and more than half (53.7%) were treated with a fluoroquinolone (Table 2). The duration of antibiotic administration was greater than 7 days in 39.0% of cases reviewed. Supportive medical care was implemented in all cases in both the clinical and the clinical plus payment buildings including more frequent nursing assessments, vital sign monitoring, and support for oral hydration. Most (87.8%) of the residents were able to remain in place in the facility for treatment although 3 residents (7.3%) were hospitalized, one (2.4%) was transferred to hospice, and one person who did not have aggressive goals of care died.

DISCUSSION

This study demonstrates that despite their multi-morbidity and frailty, nursing facility residents can be safely treated for pneumonia in a nursing facility when supportive medical care is provided. This includes more frequent monitoring and assessments during the episode of acute illness. Limitations of

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Table 1 Population and Facility Demographics

Patients			
N = 41			
	% (N)	Clinical + payment	Payment only
Age ≥ 65	90.2 (37)		
Gender (female)	63.4 (26)		
Race (Caucasian)	92.7 (38)		
3 or more risk-related comorbidities	70.7 (29)		
Pneumonia recurrence (previous 6 months)	51.2 (21)		
Taking at least 1 medication that may increase risk of pneumonia [†]	95.1 (39)		
Nursing facilities			
n = 7 (3 facilities = payment only; 4 = payment plus clinical support)			
	# (range)	Clinical + payment	Payment only
Mean number of certified beds	149.86 (111–192)	156.75	140.67
Proportion of OPTIMISTIC eligible residents	0.44 (0.29–0.56)	0.45 (0.29–0.56)	0.43 (0.32–0.53)
Average Medicare star rating during the study period	4.0	3.8	4.3
Mean number of pneumonia cases during study period	12.43	10.00	15.67

[†]Proton pump inhibitors, H₂ receptor antagonists, inhaled glucocorticoids, sedatives, typical/atypical antipsychotics, warfarin, immunosuppressive medication

this case series include review of a limited number of cases and lack of context such as the antibiogram of the facilities.

Despite FDA warnings and treatment recommendations, fluoroquinolone use was high and treatment duration was longer than recent guidelines recommend. Increasing use of

rapid testing may enable nursing facility providers to better tailor treatments to pathogens.⁵ Nursing facility quality improvement initiatives should target antibiotic stewardship and employ clinical practice guidelines to treat this highly vulnerable population in place.

Table 2 Diagnosis, Treatment, and Outcomes: Mean (Percent)

a: Signs and symptoms present at diagnosis			
CMS diagnostic criteria for pneumonia			
	Total % (N)	Clinical + payment	Payment only
Fever > 100 °F or ≥ 2 ⁰ above baseline	17.1 (7)	14.6 (6)	2.4 (1)
Oxygen saturation < 92% on room air or on resident's usual oxygen settings	63.4 (26)	41.5 (17)	22.0 (9)
Respiratory rate > 24 breaths/min	4.9 (2)	2.4 (1)	2.4 (1)
Evidence of at least one focal pulmonary consolidation on exam*	97.6 (40)	53.7 (22)	43.9 (18)
Chest X-ray confirming new pulmonary infiltrate	80.5 (33)	39.0 (16)	41.5 (17)
Symptoms			
Cough	85.4 (35)	51.2 (21)	34.1 (14)
Sputum production	51.2 (21)	29.3 (12)	22.0 (9)
Shortness of breath	39.0 (16)	19.5 (8)	19.5 (8)
Other diagnostic criteria			
Sputum culture, blood culture or PCR performed	0.0 (0)	0.0 (0)	0.0 (0)
CURB-65 scores 0–1**	41.5 (17)	24.4 (10)	17.1 (7)
CURB-65 score = 2	34.1 (14)	17.1 (7)	17.1 (7)
CURB-65 score ≥ 3	24.2 (10)	14.6 (6)	9.8 (4)
Diagnosis by physician	39.0 (16)	19.5 (8)	19.5 (8)
Diagnosis by advanced practice provider	61.0 (25)	36.6 (15)	24.4 (10)
b: Treatment and outcomes			
Antibiotic treatment			
	Total % (N)	Clinical + payment	Payment only
Fluoroquinolone	53.7 (22)	29.3 (12)	24.4 (10)
Penicillin combination	26.8 (11)	19.5 (8)	7.3 (3)
Cephalosporin (any generation)	24.4 (10)	12.2 (5)	12.2 (5)
Tetracycline	12.2 (5)	7.3 (3)	4.9 (2)
Macrolide	12.2 (5)	7.3 (3)	4.9 (2)
Duration of antibiotic treatment (7 days or less)	61.0 (25)	36.6 (15)	24.4 (10)
Other treatments			
Bronchodilator	82.9 (34)	48.8 (20)	34.1 (14)
Corticosteroids	22.0 (9)	14.6 (6)	7.3 (3)
Oxygen supplementation	70.7 (29)	46.3 (19)	24.4 (10)
Supportive cares for pneumonia***	100.0 (41)	100.0 (23)	100.0 (18)
Supportive care treatment longer than billing episode length	78.0 (32)	39.0 (16)	39.0 (16)
Outcomes			
Stabilized in the nursing facility	87.8 (36)	51.2 (21)	36.6 (15)
Hospitalized	7.3 (3)	0.0 (0)	7.3 (3)
Transferred to hospice	2.4 (1)	2.4 (1)	0.0 (0)
Died	2.4 (1)	2.4 (1)	0.0 (0)

*Rales, rhonchi, decreased breath sounds, and dullness to percussion

**CURB-65 score between 0 and 1 outpatient care is recommended, score = 2 indicates hospital stay may be indicated, score ≥ 3 indicates severe pneumonia that should be managed in the hospital

***Hydration, frequent vitals, and close monitoring

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Compliance with Ethical Standards:

Conflict of Interest: Dr. Kathleen Unroe is the CEO and Founder of Probari, a business intended to disseminate the OPTIMISTIC clinical care model.

Disclaimer: The contents are those of the authors and do not necessarily represent the official views of, nor an endorsement, by CMS, HHS, or the US government.

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