Overview of the pediatric emergent lower respiratory infection episode of care

State of Ohio

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1. CLINICAL OVERVIEW AND RATIONALE FOR DEVELOPING THE PEDIATRIC EMERGENT LRI EPISODE

1.1 Rationale for developing the pediatric emergent LRI episode of care

Lower respiratory infections (LRIs) are a common and potentially serious illness in the pediatric population worldwide. The most common lower respiratory infections among children are pneumonia and bronchiolitis. While these conditions are often diagnosed in an outpatient office setting, there is greater opportunity to address variations in care among patients presenting in an emergent setting. For pediatric patients presenting to the emergency room, pneumonia and bronchiolitis share key sources of value (e.g., the decision to admit, overutilization of imaging and testing). In 2014, over 7,000 cases of emergent pneumonia and over 9,200 cases of emergent bronchiolitis were identified among Medicaid beneficiaries in Ohio under the age of 21. This represents over $22 million of total spend with a median spend of approximately $388.[1]

While pediatric pneumonia and bronchiolitis are both respiratory conditions, they have distinct clinical pathways. Bronchiolitis is typically caused by a virus, while the pathogen underlying a case of pneumonia may be bacterial or viral. The respiratory syncytial virus (RSV) is a common cause of both bronchiolitis and pneumonia in young children.[2] Across several key studies, between 20 and 60 percent of bronchiolitis cases for pediatric patients presenting in ER or inpatient settings were found to be caused by RSV.[3,4] While viral pneumonias are more common in children than in adults, only about 45% of hospitalizations for children with pneumonia were caused by a virus.[5]

Evidence-based clinical guidelines for the treatment of both pediatric bronchiolitis and pediatric pneumonia contain recommendations that clinicians can follow to increase the quality and efficiency of care. The guidelines regarding bronchiolitis

1 Analysis of OH Medicaid claims data from 2014-01-01 to 2014-12-31

2 Krilov LR; Respiratory syncytial virus disease: update on treatment and prevention. Expert Rev Anti Infect Ther. 2011: 27-32.

3 Hall CB, Walsh EE, Schnabel KC, et al. Occurrence of groups A and B of respiratory syncytial virus over 15 years: associated epidemiologic and clinical characteristics in hospitalized and ambulatory children. *J Infect Dis*. 1990 Dec. 162(6):1283-90.

4 Mansbach JM, McAdam AJ, Clark S, Hain PD, Flood RG, Acholonu U. Prospective multicenter study of the viral etiology of bronchiolitis in the emergency department. *Acad Emerg Med*. 2008 Feb. 15(2):111-8.

5 Michelow IC, Olsen K, Lozano J, et al; Epidemiology and clinical characteristics of community-acquired pneumonia in hospitalized children. Pediatrics. 2004: 701-707.

from the American Academy of Pediatrics as well as those regarding pediatric pneumonia from the Pediatric Infectious Disease Society both strongly recommend diagnosing and assessing an LRI on the basis of a patient history and physical examination alone, particularly in the emergency department.[6,7] Emergency physicians may be capable of diagnosing radiographic pneumonia without radiography or blood testing by examining a combination of age, oxygen saturation, and potential nasal flaring.[8] For admitted patients, blood cultures are recommended if pneumonia is suspected; however, other forms of testing, such as urine antigen testing, are often unnecessary.

For bronchiolitis patients, clinical guidelines recommend against the use of antibiotics. Bronchiolitis patients, regardless of setting, should only receive supportive therapy. Clinicians are cautioned against the routine use of antibiotics for infants being treated for pneumonia in an outpatient setting. For older children with pneumonia in an outpatient setting, and for all admitted pediatric pneumonia patients, the Pediatric Infectious Disease Society recommends empiric antibiotic therapy.

Despite these clear guidelines, there exists a great deal of variation in how pediatric patients who present to the emergency department with symptoms of a lower respiratory infection are handled. While clinical guidelines consistently assert that routine use of imaging and labs is not necessary for pediatric LRI patients, approximately 57% of emergent bronchiolitis patients and 90% of emergent pneumonia patients among Medicaid recipients in Ohio in 2014 received chest imaging.[1] Similarly, despite the guidelines recommending against the routine use of lab work to identify underlying pathogens for emergent pediatric LRI patients, 32% of emergent bronchiolitis patients and 43% of emergent pneumonia patients in the same population received some form of lab work to identify underlying pathogens, respectively.[1] Deviations from clinical guidelines are also seen in patterns of antibiotic prescription, with 31% of emergent bronchiolitis cases including a filled prescription for antibiotics.[1] Care provided for both pneumonia and bronchiolitis often deviates from the guidelines, leading to inefficient variations in care. Although unique patient needs may necessitate variation in treatment practice,

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6 SL Ralston, AS Lieberthal, HC Meissner, et al. Clinical practice guideline: the diagnosis, management, and prevention of bronchiolitis. Pediatrics, 134. 2014: 1474–1502.

7 Bradley, J. S., C. Byington L., S. Shah S., B. Alverson, E. Carter R., C. Harrison, S. Kaplan L., S. Mace E., G. Mccracken H., M. Moore R., S. Peter D. St, J. Stockwell A., and J. Swanson T. "The Management of Community-Acquired Pneumonia in Infants and Children Older Than 3 Months of Age: Clinical Practice Guidelines by the Pediatric Infectious Diseases Society and the Infectious Diseases Society of America." Clinical Infectious Diseases 53.7 (2011)

8 Mahabee-Gittens, EM, J. Grupp-Phelan, AS Brody, LF Donnelly, SE Bracey, EM Duma, ML Mallory, and GB Slap. “Identifying children with pneumonia in the emergency department." Clin Pediatr (Phila). 2005:427-35.

variation not related to patient needs may lead to suboptimal patient outcomes, inappropriate utilization of resources, and/or higher than necessary costs.

Implementing the pediatric emergent lower respiratory infection episode of care will incentivize evidence-based, guideline-concordant care through an outcomes-based payment model. Alongside the asthma acute exacerbation episode and other related episodes of care as well as patient centered medical homes, the pediatric emergent LRI episode will contribute to a model of care delivery that benefits patients through improved care quality and clinical outcomes, and a lower overall cost of care.

1.2 Clinical overview and typical patient journey for the treatment of a pediatric emergent LRI

The patient journey for a pediatric lower respiratory infection begins when the patient presents with signs or symptoms of an LRI. The patient may first present in an office setting, however if the symptoms are not resolved, or if the symptoms become more severe, the patient may seek care at an emergency department. The patient may also present directly to an emergency department, if the symptoms are severe or they choose not to seek care in an office setting first. Signs or symptoms of an LRI include respiratory symptoms (e.g., tachypnea, cough), but can also include general signs of an infection (e.g., fever) or upper respiratory tract symptoms (e.g., nasal congestion). The provider will perform a clinical examination and take a patient history, and may also use pulse oximetry to help determine the severity of the condition.

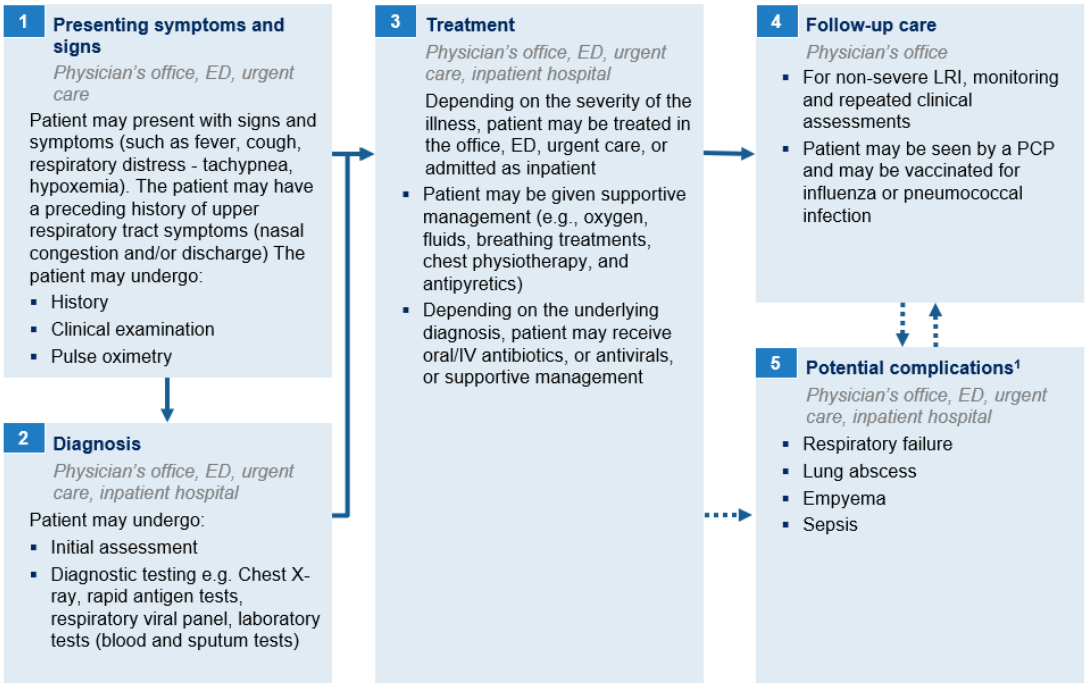
During the initial encounter, diagnostic imaging and testing may be used to confirm the diagnosis of the LRI. This may include chest imaging (e.g., x-ray) as well as labs used to determine the underlying pathogen of the infection (e.g., blood cultures, sputum cultures, respiratory viral panel). However, such measures are not recommend as a matter of routine. After the patient has been diagnosed, the provider may decide to admit the patient depending upon the severity of the condition.

Whether the patient is admitted into the hospital or is treated in an outpatient setting, supportive care may be used. Supportive care may include the administration of oxygen, chest physiotherapy, breathing treatments, or various supportive medications (e.g., antipyretics). Some of these supportive measures, such as chest physiotherapy, are not recommended for pediatric patients. Many patients will be prescribed antibiotics, or in the case of admitted patients, administered IV antibiotics. Antivirals may also be prescribed in some cases to patients where influenza is suspected. Following discharge from the emergency department or

hospital, LRI patients may have repeated clinical assessments and may be monitored during follow-up visits. Clinicians may also use follow-up visits as an opportunity to vaccinate children who have not yet received appropriate vaccinations or who are of higher risk for infection for influenza or pneumococcal infections.

Under certain circumstances, patients may experience complications from the infection. These complications could include respiratory failure, lung abscess, empyema, or sepsis, and may require additional visits to the emergency department or additional inpatient admissions.

EXHIBIT 1 – PEDIATRIC EMERGENT LRI PATIENT JOURNEY



1 List of potential complications is not exhaustive

1.3 Potential sources of value within the patient journey

Within the pediatric emergent lower respiratory infection episode, providers have several opportunities to improve quality of care and reduce unnecessary spend associated with the episode (see Exhibit 2). For example, providers can follow best practice clinical guidelines to reduce unnecessary variation during the episode. This may require coordination between clinicians diagnosing the LRI in an emergency department or observation care setting and those treating patients who are subsequently admitted into an inpatient setting.

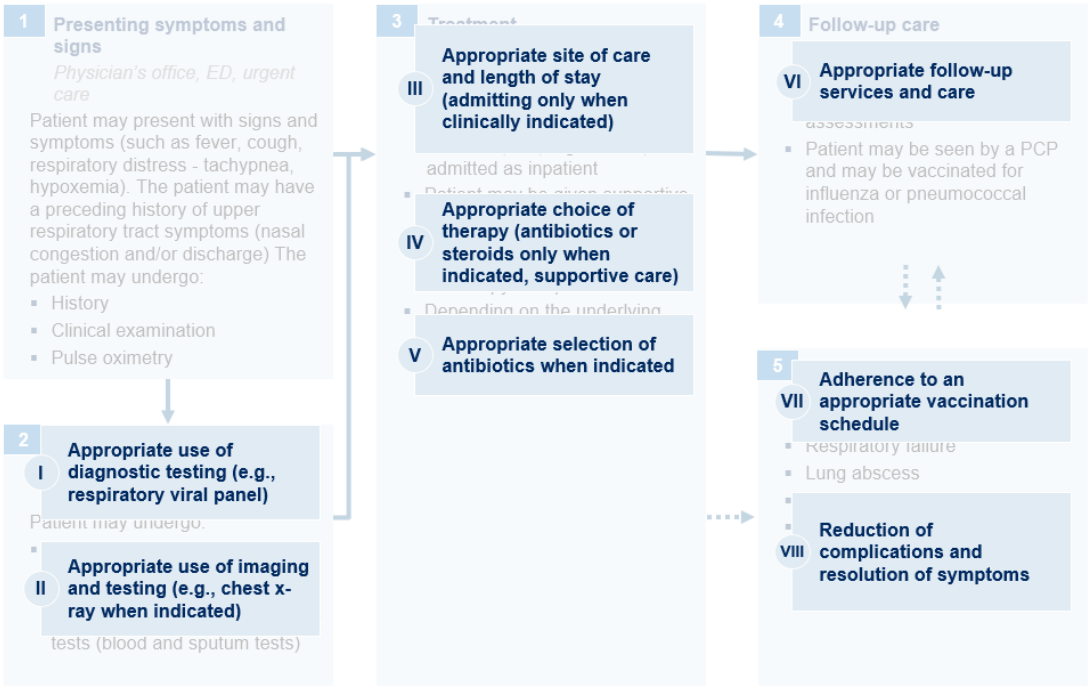
According to clinical guidelines, lower respiratory infections in a pediatric

population should be diagnosed using a patient history and physical examination. Clinicians can reduce the use of radiological imaging and unnecessary lab work in order to decrease spend. Properly diagnosing an LRI early and accurately can have significant impact on spend as well as the quality of care a patient receives. In addition, clinicians can attempt to avoid unnecessary admissions, using observation care or treating the LRI in an outpatient setting whenever possible. After diagnosing the infection, clinicians can use only indicated therapies for treatment or support. For pneumonia patients, antibiotics are often indicated, and clinicians can choose the most guideline-concordant antibiotics to decrease spend. For bronchiolitis patients, clinicians can avoid prescribing antibiotics unless a concurrent bacterial infection has been identified. All pediatric LRI patients should receive only guideline-concordant supportive therapy, and should not routinely be given steroids, analgesics, or other therapies not recommended by the guidelines.

All pediatric LRI patients should receive proper follow-up care, including clinical assessments at a follow-up visit. Vaccination should be performed on patients who meet the criteria for those vaccines, including patients who are higher risk or who have not yet been vaccinated according to schedule. This may help prevent repeat episodes.

Additionally, by adhering to established clinical guidelines and providing appropriate treatment and follow-up care, providers can prevent unnecessary admissions, readmissions, and emergency department visits.

EXHIBIT 2 – PEDIATRIC LRI SOURCES OF VALUE



2. OVERVIEW OF THE PEDIATRIC LRI EPISODE DESIGN

2.1 Episode Trigger

An emergency department visit or admission with a primary diagnosis of pneumonia or bronchiolitis will trigger a pediatric LRI episode. Alternatively, an emergency department visit or admission with a primary diagnosis of sepsis, bacteremia, or septic shock with a secondary diagnosis of pneumonia or bronchiolitis will trigger an episode (see Tables 1 and 2 in Appendix for the lists of trigger ICD-9 Dx codes).

2.2 Principal Accountable Provider

The principal accountable provider (PAP) is the person or entity best positioned to influence the patient journey and the clinical decisions made throughout the course of the episode. For the pediatric emergent LRI episode, the PAP is the facility diagnosing the LRI. This is because multiple different providers within the facility (e.g., an emergency department physician, pediatrician, or hospitalist) may appropriately care for the patient throughout his or her medical journey.

2.3 Episode Duration

The pediatric LRI episode begins with the triggering encounter where the diagnosis of the LRI is made (called the "trigger window") and extends 30 days afterwards (called the "post-trigger window"). The 30-day post-trigger window was deemed an appropriate period of time to capture the majority of the medical and pharmaceutical treatments for LRI. The American Academy of Pediatrics found that for most patients, symptoms will subside after proper treatment within 30 days.[4] The post-trigger window can be extended if the patient is hospitalized on or before the 30th day and the admission extends beyond the 30th day.

2.4 Included Services

The episode model is designed to address spend for care and services directly related to the diagnosis, treatment, and immediate recovery phase for patients with a pediatric LRI diagnosis. Each period of the patient journey, or episode "window," has a distinct claim inclusion logic derived from two major criteria: 1) that the type of included care and services must correspond to that period of the patient journey and 2) that the included care and services are understood to be directly or indirectly influenced by the PAP during that period.

The pediatric LRI episode is comprised of two distinct windows for the purpose of spend inclusions: a trigger window and a post-trigger window. During the trigger period, all medical and pharmaceutical spend is included. During the post-trigger period, spend associated with care and treatment for LRIs is included, as well as care for potential complications. This includes specific associated care (e.g., spend associated with a relevant diagnosis such as pneumonia and bronchiolitis, or with symptoms such as cough or tachypnea), imaging and testing (e.g., chest x-ray, viral panels), pathology, and specific medications (e.g., antibiotics, antipyretics).

The total episode spend is calculated by adding the amounts of all the individual claims included in the episode.

2.5 Episode Exclusions and Risk Factors

To ensure that episodes are comparable across patient panels, select risk factors and exclusions are applied before assessing PAP performance. In the context of episode design, risk factors are attributes or underlying clinical conditions that are likely to impact a patient's course of care and the spend associated with a given episode. Exclusions are attributes or clinical conditions that cannot be adequately risk adjusted

and that indicate either a distinct patient journey or incomparably high or low episode spend.

Risk factors are selected via a standardized and iterative risk-adjustment process based on Ohio-specific regression analysis that gives due consideration to clinical relevance, statistical significance, and other contextual factors.[9] Based on the selected risk factors, each episode is assigned a risk score. The total episode spend and the risk score are used to arrive at an adjusted episode spend, which is the spend on which providers are compared to each other. Table 2 in the Appendix lists potential risk factors, and Exhibit 6 presents an analysis of these risk factors. Note that the final list of risk factors will be determined after feedback from providers and the application of the statistical process described above.

By contrast, an episode is excluded from a patient panel when the patient has clinical factors that suggest he or she has experienced a distinct or different journey and/or that drive very significant increases in spend relative to the average patient. In addition, there are several "business-related" exclusions relating to reimbursement policy (e.g., whether a patient sought care out of state), the completeness of spend data for that patient (e.g., third-party liability or dual eligibility), and other topics relating to episode design and implementation, such as overlapping episodes, during the comparison period. Episodes with no exclusions are known as "valid" and used for provider comparisons. Episodes that have one of any of the exclusions are known as "invalid" episodes.

For the pediatric LRI episode, both business and clinical exclusions apply. Several of the business and clinical exclusions are standard across most episodes, while others are specific to this pediatric LRI episode. The episode-specific clinical exclusions include both ventilator-associated pneumonias and pneumonias with fungal etiology, congenital anomalies of the lung, and select immunodeficiency conditions. The final list of exclusions will be determined based on feedback from providers and the risk-adjustment process. A list of business and clinical exclusions is in Table 3, and analysis of these exclusions is in Exhibit 7 in the Appendix.

9 Garrett B., et al. (2014). Risk adjustment for retrospective episode-based payment: Guiding principles and proposed methodology. McKinsey Healthcare Systems and Services Practice. Available at http://healthcare.mckinsey.com/risk-adjustment-retrospective-episode-based-payment Accessed June 13, 2016

2.6 Quality Metrics

To ensure the episode model incentivizes quality care, the pediatric LRI episode has quality metrics. These are calculated for each PAP meeting the minimum threshold for valid episodes.

The pediatric LRI episode has seven proposed quality metrics. One is linked to performance assessment, meaning that performance thresholds on these metrics must be met for the episodes to be eligible for positive incentive payments within the episode model. The specific threshold amount will be determined during the informational reporting period. Six of the quality metrics are for informational purposes only.

The metric tied to positive incentive payments is the percentage of episodes with follow-up care visits within the first 7 days of the post-trigger window. Informational metrics include the percentage of valid episodes that were triggered in an inpatient setting, the percentage of valid episodes with an emergency department visit in the post-trigger window, the percentage of valid episodes with an inpatient admission in the post-trigger window, the percentage of valid episodes triggered by bronchiolitis that contain a filled prescription for antibiotics, the percent of valid episodes triggered by a diagnosis of bronchiolitis that contain a prescription for bronchodilators during the episode window, and the percentage of valid episodes triggered by a diagnosis of bronchiolitis where the patient receives a chest x-ray during the episode window. Detailed descriptions of these metrics are in Table 4, and analysis of these quality metrics is in Exhibit 8 in the Appendix.

3. APPENDIX: SUPPORTING ANALYSES

Table 1 – Episode triggers

Trigger category	Trigger codes	Code type	Description
Pneumonia	A3701	ICD-10 Dx	Whooping cough due to Bordetella pertussis with pneumonia
	A3711	ICD-10 Dx	Whooping cough due to Bordetella parapertussis w pneumonia
	A3781	ICD-10 Dx	Whooping cough due to oth Bordetella species with pneumonia
	A3791	ICD-10 Dx	Whooping cough, unspecified species with pneumonia
	J1000	ICD-10 Dx	Flu due to oth ident flu virus w unsp type of pneumonia
	J1001	ICD-10 Dx	Flu due to oth ident flu virus w same oth ident flu virus pn
	J1008	ICD-10 Dx	Influenza due to oth ident influenza virus w oth pneumonia
	J1100	ICD-10 Dx	Flu due to unidentified flu virus w unsp type of pneumonia
	J1108	ICD-10 Dx	Flu due to unidentified flu virus w specified pneumonia
	J120	ICD-10 Dx	Adenoviral pneumonia
	J121	ICD-10 Dx	Respiratory syncytial virus pneumonia
	J122	ICD-10 Dx	Parainfluenza virus pneumonia
	J123	ICD-	Human metapneumovirus pneumonia

		10 Dx	
	J1289	ICD-10 Dx	Other viral pneumonia
	J129	ICD-10 Dx	Viral pneumonia, unspecified
	J129	ICD-10 Dx	Viral pneumonia, unspecified
	J13	ICD-10 Dx	Pneumonia due to Streptococcus pneumoniae
	J14	ICD-10 Dx	Pneumonia due to Hemophilus influenzae
	J150	ICD-10 Dx	Pneumonia due to Klebsiella pneumoniae
	J151	ICD-10 Dx	Pneumonia due to Pseudomonas
	J1520	ICD-10 Dx	Pneumonia due to staphylococcus, unspecified
	J15211	ICD-10 Dx	Pneumonia due to methicillin suscep staph
	J15212	ICD-10 Dx	Pneumonia due to Methicillin resistant Staphylococcus aureus
	J1529	ICD-10 Dx	Pneumonia due to other staphylococcus
	J153	ICD-10 Dx	Pneumonia due to streptococcus, group B
	J154	ICD-10 Dx	Pneumonia due to other streptococci
	J154	ICD-10 Dx	Pneumonia due to other streptococci

	J154	ICD-10 Dx	Pneumonia due to other streptococci
	J155	ICD-10 Dx	Pneumonia due to Escherichia coli
	J156	ICD-10 Dx	Pneumonia due to other aerobic Gram-negative bacteria
	J157	ICD-10 Dx	Pneumonia due to Mycoplasma pneumoniae
	J158	ICD-10 Dx	Pneumonia due to other specified bacteria
	J158	ICD-10 Dx	Pneumonia due to other specified bacteria
	J159	ICD-10 Dx	Unspecified bacterial pneumonia
	J160	ICD-10 Dx	Chlamydial pneumonia
	J168	ICD-10 Dx	Pneumonia due to other specified infectious organisms
	J17	ICD-10 Dx	Pneumonia in diseases classified elsewhere
	J180	ICD-10 Dx	Bronchopneumonia, unspecified organism
	J181	ICD-10 Dx	Lobar pneumonia, unspecified organism
	J188	ICD-10 Dx	Other pneumonia, unspecified organism
	J189	ICD-10 Dx	Pneumonia, unspecified organism
	J8409	ICD-	Other alveolar and parieto-alveolar

		10 Dx	conditions
	481	ICD-9 Dx	Pneumococcal Pneumonia
	485	ICD-9 Dx	Bronchopneumonia Organism Unspec
	486	ICD-9 Dx	Pneumonia Organism Unspecified
	4800	ICD-9 Dx	Pneumonia Adenovirus
	4801	ICD-9 Dx	Pneumonia Respiratory Syncy Virus
	4802	ICD-9 Dx	Pneumonia Parainfluenza Virus
	4808	ICD-9 Dx	Pneumonia Oth Virus Other
	4809	ICD-9 Dx	Uns Viral Pneumonia
	4820	ICD-9 Dx	Pneumonia Klebsiella Pneumoniae
	4821	ICD-9 Dx	Pneumonia Pseudomonas
	4822	ICD-9 Dx	Pneumonia Hemophilus Influenzae
	4829	ICD-9 Dx	Uns Bacterial Pneumonia
	4830	ICD-9 Dx	Pneumonia Mycoplasma Pneumoniae
	4831	ICD-9 Dx	Pneumonia Chlamydia

	4838	ICD-9 Dx	Pneumonia Other Organism
	4843	ICD-9 Dx	Pneumonia Whooping Cough
	4848	ICD-9 Dx	Pneumonia Oth Infectious Disease
	4870	ICD-9 Dx	Influenza With Pneumonia
	5168	ICD-9 Dx	Other Alveolar Pneumonopathy
	48230	ICD-9 Dx	Pneumonia Uns Streptococcus
	48231	ICD-9 Dx	Pneumonia Streptococcus Group A
	48232	ICD-9 Dx	Pneumonia Streptococcus Group B
	48239	ICD-9 Dx	Pneumonia Oth Streptococcus
	48240	ICD-9 Dx	Pneumonia Uns Staphylococcus
	48241	ICD-9 Dx	Meth Susc Pneumonia Staph Aureus
	48242	ICD-9 Dx	Meth Resis Pneumonia Staph Aureus
	48249	ICD-9 Dx	Oth Staphylococcus Pneumonia
	48281	ICD-9 Dx	Pneumonia Anaerobes
	48282	ICD-9	Pneumonia Escherichia Coli

Bronchiolitis		Dx	
	48283	ICD-9 Dx	Pneumonia Oth Gram Negative Bact
	48289	ICD-9 Dx	Pneumonia Other Bacteria
	J210	ICD-10 Dx	Acute bronchiolitis due to respiratory syncytial virus
	J211	ICD-10 Dx	Acute bronchiolitis due to human metapneumovirus
	J218	ICD-10 Dx	Acute bronchiolitis due to other specified organisms
	J219	ICD-10 Dx	Acute bronchiolitis, unspecified
	46611	ICD-9 Dx	Acute Bronchiolitis Rsv
	46619	ICD-9 Dx	Acute Bronchiolitis Ot Infect Org

Table 2 – Potential episode risk factors

Risk factor	Relevant time period
Asthma	Up to 365 days before the start of the episode or during the episode window
Bronchiolitis	Up to 30 days before the start of the episode
Bronchopulmonary dysplasia	Up to 365 days before the start of the episode or during the episode window
Pneumonia	Up to 30 days before the start of the episode
Pleurisy; pneumothorax; pulmonary collapse	Up to 60 days before the start of the episode

Risk factor	Relevant time period
Respiratory failure; insufficiency; arrest	Up to 60 days before the start of the episode
Cardiac and circulatory congenital anomalies	Up to 365 days before the start of the episode or during the episode window
Peri-; endo-; and myocarditis; cardiomyopathy (except that caused by tuberculosis or sexually transmitted disease)	Up to 365 days before the start of the episode or during the episode window
Fluid and electrolyte disorders	Up to 30 days before the start of the episode
Anemia (sickle cell and other)	Up to 365 days before the start of the episode or during the episode window
Diabetes (with and without complications)	Up to 365 days before the start of the episode or during the episode window
Genetic disorders	Up to 365 days before the start of the episode or during the episode window
Neurological disorders	Up to 365 days before the start of the episode
Short gestation; low birth weight; and fetal growth retardation	Up to 365 days before the start of the episode
Substance abuse (including alcohol)	Up to 365 days before the start of the episode

Table 3 – Potential episode exclusions

Exclusion type	Episode exclusion	Description	Relevant time period
Business exclusion	Out of state	PAP operates out of state	N/A
	No PAP	An episode is excluded if the PAP cannot be identified	During the episode window
	Enrollment	Patient is not enrolled in	During the

Exclusion type	Episode exclusion	Description	Relevant time period
		Medicaid	episode window
	Third party liability	An episode is excluded if third-party liability charges are present on any claim or claim detail line or if the patient has relevant third-party coverage at any time	During the episode window
	Multi payer	An episode is excluded if a patient changes enrollment between FFS and an MCP or between MCPs	During the episode window
	Dual	An episode is excluded if the patient had dual coverage by Medicare and Medicaid	During the episode window
	No DRG	An episode is excluded if a DRG-paid inpatient claim is missing the APR-DRG and severity of illness	During the episode window
	Left against medical advice	Patient has discharge status of "left against medical advice"	During the episode window
	Death	An episode is excluded if the patient has a discharge status of "expired" on any inpatient or outpatient claim	During the episode window
	Long admission	An episode is excluded if the patient has one or more hospital admissions for a duration greater than 30 days	During the episode window
	Long term care	An episode is excluded if the patient has one or more long-term care claim detail lines which overlap the episode window	During the episode window
Standard clinical exclusion	Cancer treatment	Patient has diagnosis of cancer and procedures for active management of cancer	During the episode or up to 90 days before the start of the episode
	ESRD	Patient has diagnosis or procedure for end stage renal disease	During the episode or up to 365 days before

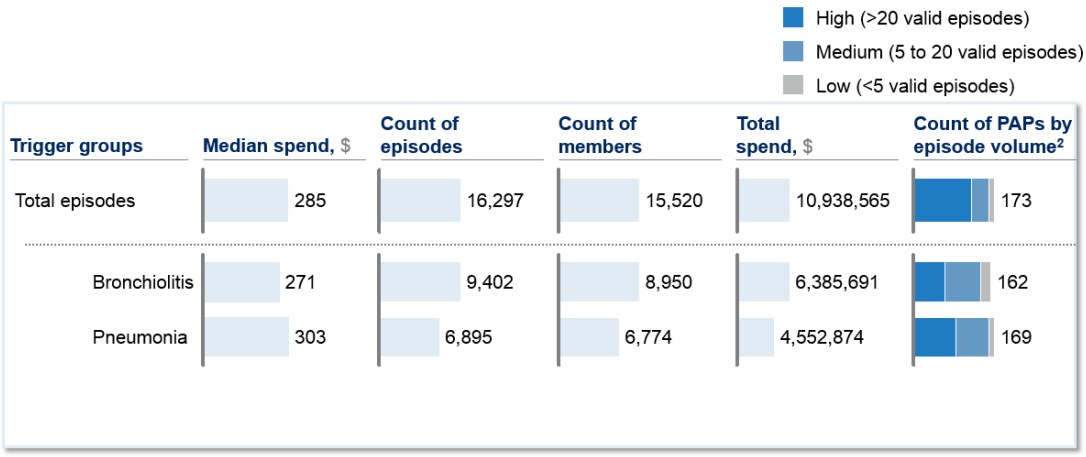
Exclusion type	Episode exclusion	Description	Relevant time period
			the start of the episode
	Cystic fibrosis	Patient has diagnosis of cystic fibrosis during the episode	During the episode or up to 365 days before the start of the episode
	Multiple sclerosis	Patient has diagnosis of multiple sclerosis	During the episode window or during 365 days before the start of the episode
	Coma	Patient has diagnosis of coma during the episode	During the episode or up to 365 days before the start of the episode
	Transplant	An episode is excluded if a patient has an organ transplant	During the episode or up to 365 days before the start of the episode
	Paralysis	Patient has diagnosis of paralysis	During the episode or up to 365 days before the start of the episode
	HIV	Patient has diagnosis of HIV	During the episode or up to 365 days before the start of the episode
Episode-specific clinical exclusion	Age	Patient is older than 20 years	During the episode window
	Ventilator-associated pneumonia	Patient is diagnosed with ventilator associated pneumonia	During the episode
	Fungal pneumonia	Patient is diagnosed with a fungal pneumonia	During the episode
	Non-infectious pneumonia	Patient is diagnosed with a non-infectious pneumonia	During the episode

Exclusion type	Episode exclusion	Description	Relevant time period
	Severe immune disorders	Patient is diagnosed with a severe immune disorder	During the episode or up to 365 days before the start of the episode
	Certain ICU care	Certain ICU care occurs during the episode	During the episode
	Burns	Patient is diagnosed with burns	During the episode or up to 365 days before the start of the episode
	Pulmonary congenital anomalies	Patient has a specific pulmonary congenital anomaly	During the episode or up to 365 days before the start of the episode

Table 4 – Episode quality metrics (PAP level)

Metric type	Quality metric	Description	Relevant time period
Tied to incentive payments	Follow-up care within the first 7 days of the post-trigger window	Percent of valid episodes with relevant follow-up care in the first 7 days of the post-trigger window (higher rate indicative of better performance)	During the episode window
Informational	Inpatient triggered episodes	Percent of valid episodes triggered in an inpatient setting (lower rate indicative of better performance)	During the episode window
Informational	Emergency department visit	Percent of valid episodes with an emergency department visit within the post-trigger window (lower rate indicative of better performance)	During the episode window
Informational	Admission within the post-trigger window	Percent of valid episodes with an admission within the post-trigger window (lower rate indicative of better performance)	During the episode window
Informational	Antibiotics prescribed to bronchiolitis patients	Percentage of valid episodes triggered by a diagnosis of bronchiolitis that include the prescription of antibiotics (lower rate indicative of better performance)	During the episode window
Informational	Bronchodilators in bronchiolitis	Percent of valid episodes triggered by a diagnosis of bronchiolitis that contain a prescription for bronchodilators during the episode window	During the episode window
Informational	Chest x-ray in bronchiolitis	Percentage of valid episodes triggered by a diagnosis of bronchiolitis where the patient receives a chest x-ray during the episode window	During the episode window

EXHIBIT 3 – PEDIATRIC EMERGENT LRI TRIGGER GROUPS[1]

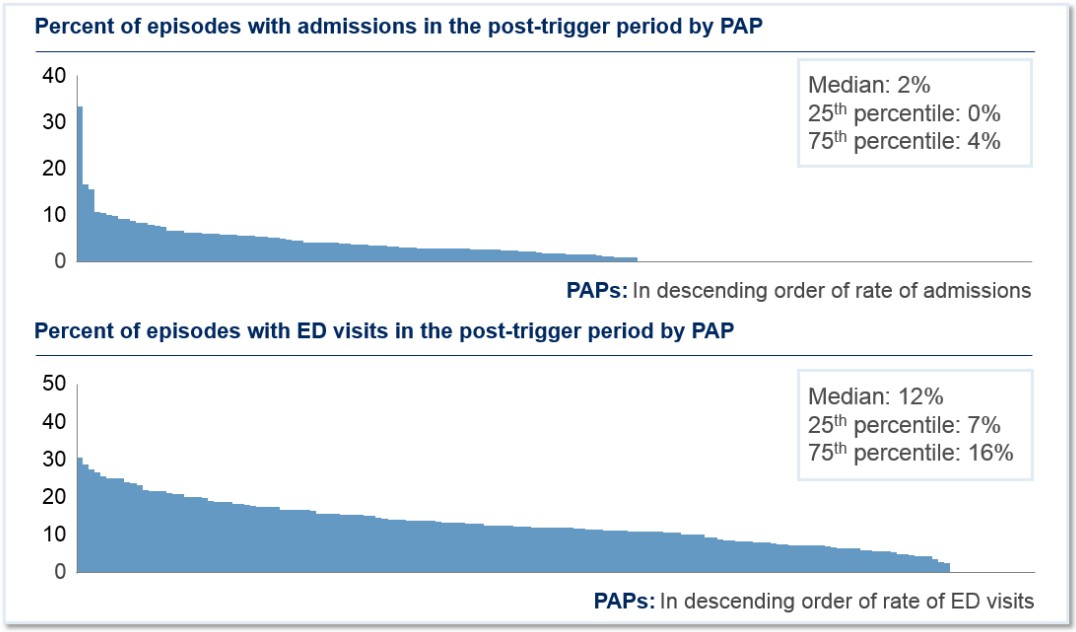


Trigger groups	Median spend, $	Count of episodes	Count of members	Total spend, $	Count of PAPs by episode volume[2]
Total episodes	285	16,297	15,520	10,938,565	173
Bronchiolitis	271	9,402	8,950	6,385,691	162
Pneumonia	303	6,895	6,774	4,552,874	169

1 For valid episodes (16,297) across all PAPs; valid episodes do not include those with business (e.g., third-party liability, dual eligibility) or clinical exclusions (e.g., cancer, ESRD)

SOURCE: OH claims data with episodes ending between 01/01/2014 and 12/31/2014

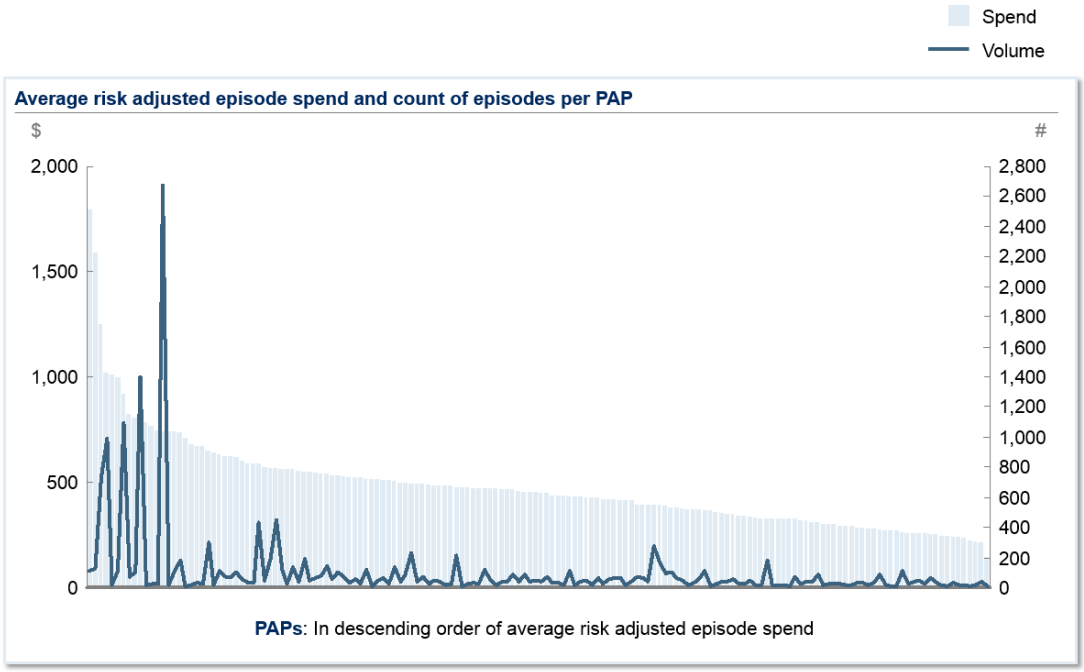
EXHIBIT 4 – VARIATION IN POST-TRIGGER ADMISSION AND ED VISIT RATES BY PAP[1]



1 For valid episodes (16,297) across PAPs with 5 or more valid episodes (160); valid episodes for PAPs with 4 or less episodes are not included in this analysis; valid episodes do not include those with business (e.g., third-party liability, dual eligibility) or clinical exclusions (e.g., cancer, ESRD). 66 PAPs have zero episodes with admissions in the post-trigger window and 14 PAPs have zero episodes with ED visits in the post-trigger window.

SOURCE: OH claims data with episodes ending between 01/01/2014 and 12/31/2014

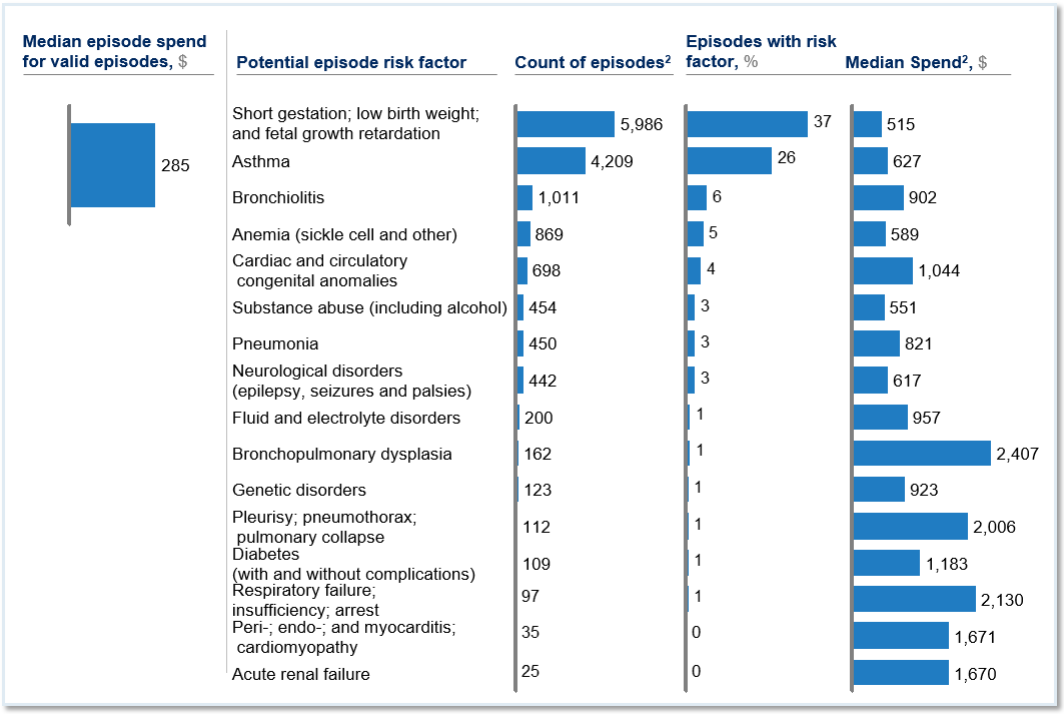
EXHIBIT 5 – DISTRIBUTION OF NON-RISK ADJUSTED AVERAGE EPISODE SPEND AND COUNT BY PAP[1]



1 For valid episodes (16,297) across PAPs with 5 or more valid episodes (160); valid episodes for PAPs with 4 or less episodes are not included in this analysis; valid episodes do not include those with business (e.g., third-party liability, dual eligibility) or clinical exclusions (e.g., cancer, ESRD)

SOURCE: OH claims data with episodes ending between 01/01/2014 and 12/31/2014

EXHIBIT 6 – EPISODE COUNT AND SPEND BY POTENTIAL EPISODE RISK FACTOR[1]

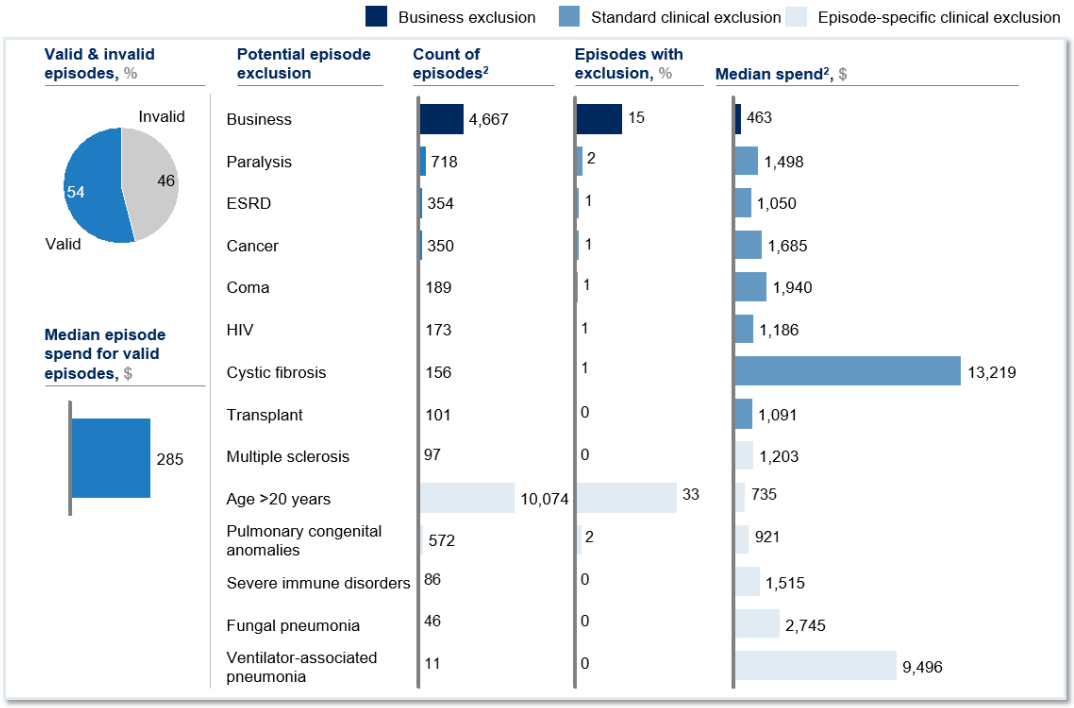


1 Showing the 16 factors that were statistically significant in the risk model for this episode; 16,297 valid episodes across all PAPs; valid episodes do not include those with business (e.g., third-party liability, dual eligibility) or clinical exclusions (e.g., cancer, ESRD)

2 For episodes with this potential risk factor; one episode can have multiple risk factors

SOURCE: OH claims data with episodes ending between 01/01/2014 and 12/31/2014

EXHIBIT 7 – EPISODE COUNT AND SPEND BY POTENTIAL EPISODE EXCLUSION[1]

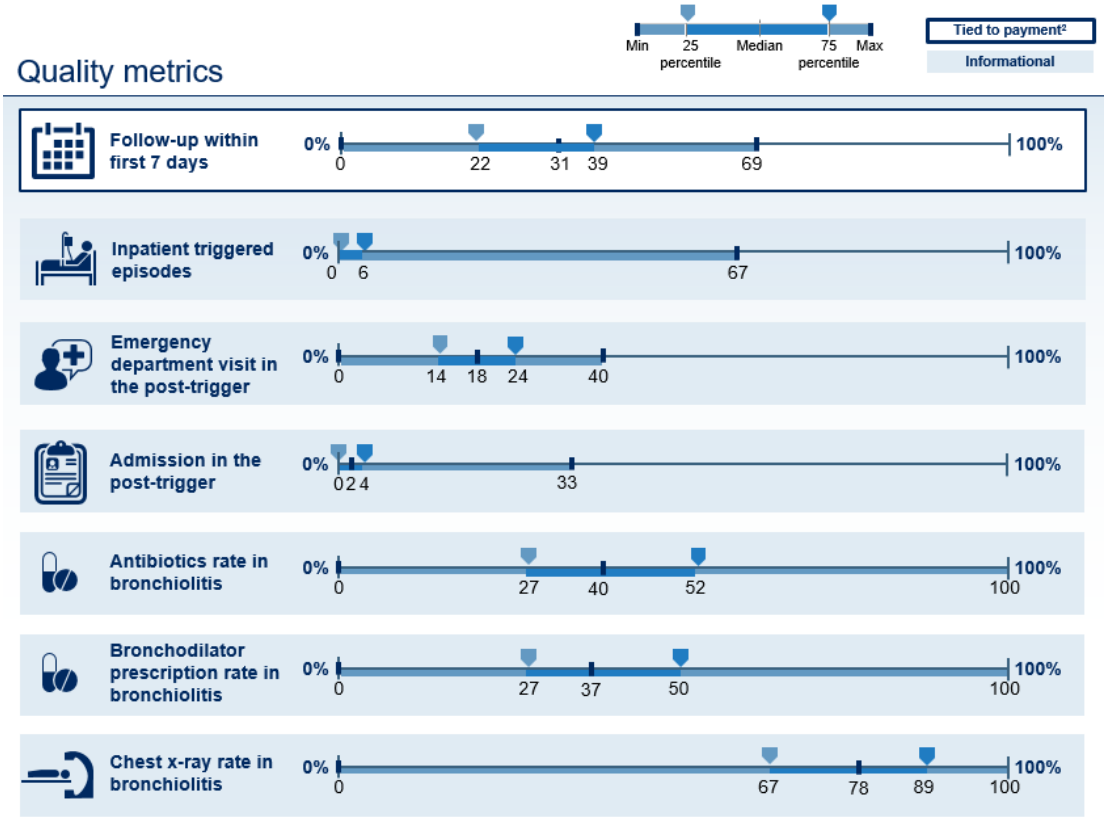


1 Showing a selection of potential exclusions

2 For episodes with this potential exclusion; one episode can have multiple exclusions

SOURCE: OH claims data with episodes ending between 01/01/2014 and 12/31/2014

EXHIBIT 8 - PAP PERFORMANCE ON PROPOSED EPISODE QUALITY METRICS[1]



1 For valid episodes (16,297) across PAPs with 5 or more valid episodes (160); valid episodes for PAPs with 4 or less episodes are not included in this analysis; valid episodes do not include those with business (e.g., third-party liability, dual eligibility) or clinical exclusions (e.g., cancer, ESRD)

SOURCE: OH claims data with episodes ending between 01/01/2014 and 12/31/2014