

Overview of the acute congestive heart failure exacerbation episode of care

State of Ohio

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Overview of the acute CHF exacerbation episode of care

1. CLINICAL OVERVIEW AND RATIONALE FOR DEVELOPMENT OF THE ACUTE CHF EXACERBATION EPISODE

1.1 Rationale for development of the acute congestive heart failure exacerbation episode of care

Heart failure represents a growing and significant burden for individual patients and health systems at large. Heart failure affects an estimated 26 million people worldwide, and more than five million people in the United States.¹ The prevalence of heart failure is increasing, and aging populations and improvements in therapies for coronary artery disease (a leading cause of heart failure²) in the United States and globally suggest the prevalence of heart failure will continue to increase in future.³

Acute exacerbations of congestive heart failure (CHF), one type of heart failure, are responsible for about one million hospitalizations each year in the United States.⁴ Acute CHF exacerbations account for nearly all of the \$39 billion spent on heart failure annually in the United States,⁵ approximately 60 percent of which is due to spend on inpatient care.⁶ At current rates, total direct and indirect national spending on treatment of heart failure is projected to reach \$70 billion by 2030.⁷ Aside from the financial impact of acute CHF exacerbations, longevity and quality of life are also severely impacted in patients admitted with acute exacerbations.⁸ Heart failure is known to adversely affect physical, emotional and social factors that comprise the quality of life metric.⁹ And the current five-year survival rate after a CHF diagnosis

1 Joseph SM, et al. Acute Decompensated Heart Failure. *Tex Heart Inst J*. 2009; 36(6): 510–520.

2 Gheorghiade M, et al. Navigating the crossroads of coronary artery disease and heart failure. *Circulation*. 2006; 114:1202-1213.

3 Joseph SM, et al. 2009

4 Lloyd-Jones D, et al. Heart disease and stroke statistics—2010 update. A report from the American Heart Association. *Circulation*. 2010;121:e46–e215.

5 *Ibid*.

6 Michota FA Jr, Amin A. Bridging the gap between evidence and practice in acute decompensated heart failure management. *J Hosp Med*. 2008;3(suppl):S7–S15.

7 Heidenreich PA, et al. Forecasting the impact of heart failure in the United States. *HHF*.0b013e318291329a.

8 Lloyd-Jones D, et al. 2010.

9 Nieminen et al. The patient perspective: Quality of life in advanced heart failure with frequent hospitalisations. *International Journal of Cardiology*. 2015.

is 35 percent in the United States,¹⁰ notably lower than the combined five-year rate for all cancers (68 percent).¹¹

Each year in Ohio there are about 14,600 acute CHF exacerbation episodes among Medicaid beneficiaries, which represent approximately \$75 million in spend and a median cost of \$5,200 per CHF episode.¹² Although an acute CHF exacerbation is a discrete condition for which there are generally agreed-upon clinical guidelines, diagnosis and treatment practices in Ohio vary widely from one provider to another. An initial analysis indicates that variation in average episode spend between 25th and 75th percentile providers treating acute CHF exacerbations is greater than 100 percent.¹³

Care for acute CHF exacerbations in the United States presents unique challenges to health care providers that result in inefficiencies throughout the entire patient journey.¹⁴ For example, although evidence indicates that early intervention and proper medical management improve survival rates,¹⁵ an estimated 14 to 20 percent of eligible heart failure patients are not on optimal doses of proven life-saving medications such as ACE-inhibitors and beta blockers.¹⁶ A further 63 to 90 percent of eligible heart failure patients do not receive guideline-recommended treatment with aldosterone antagonist or hydralazine/nitrate.¹⁷

Additionally, time lags to diuretic initiation and incorrect titration of diuretics often lead to unnecessary admissions and prolonged ICU stays.¹⁸ Evidence suggests that about 50 percent of acute CHF exacerbation patients who do not need inpatient care are admitted,¹⁹ and about one-third of admitted patients lose only zero to five pounds of body weight upon discharge (suggesting inadequate treatment of fluid retention during the inpatient stay).²⁰ Further, patient education and planned follow-up has

10 Mosterd A, Hoes AW. Clinical epidemiology of heart failure. *Heart*. 2007 Sep; 93(9): 1137–1146.

11 Manrow R, Chasan R. Fact sheet – Cancer. National Institute of Health. 2010. Accessed at <https://report.nih.gov/nihfactsheets/viewfactsheet.aspx?csid=75>.

12 Analysis of Ohio Medicaid claims data for dates between October 1, 2014 and September 30, 2015.

13 Nieminen et al. 2015.

14 Hawkins et al. Heart failure and chronic obstructive pulmonary disease: diagnostic pitfalls and epidemiology. *Eur J Heart Fail*. 2009 Feb; 11(2): 130–139.

15 Grady KL et al. Team Management of Patients With Heart Failure. A report from the American Heart Association. *Circulation*. 2000; 102: 2443-2456.

16 Fonarow G et al. Potential Impact of Optimal Implementation of Evidence-based Heart Failure Therapies on Mortality. *Am Heart J*. 2011;161(6):1024-1030e3.

17 Grady KL et al. 2000.

18 Piano MR et al. Flexible diuretic titration in chronic heart failure: where is the evidence? *J Card Fail*. 2012 Feb;18(2):172.

19 Collins SP et al. Is Hospital Admission for Heart Failure Really Necessary? *J Am Coll Cardiol*. 2013;61(2):121-126.

20 Gheorghide M, Filippatos G. Reassessing treatment of acute heart failure syndromes: the ADHERE Registry. *European Heart Journal*. 2005.

been shown to reduce early readmission rates by up to 25 percent.²¹ Yet patient education and coaching regarding appropriate dosages and medication regimens are typically lacking upon discharge and return home.²²

Despite these guidelines, treatment practices during the period of an acute CHF exacerbation may vary widely from one provider to another. Unique patient needs will necessitate variation in surgical and treatment practice; however, practice variation due to reasons not related to the patient may lead to sub-optimal patient outcomes, higher than necessary costs, or both.

Implementing the acute CHF exacerbation episode will incentivize evidence-based, guideline concordant care through an outcomes-based payment model. As part of a concerted effort aimed at improving overall cardiac care for Ohio Medicaid patients, the acute CHF exacerbation episode is being deployed together with a suite of cardiovascular episodes (including episodes for percutaneous coronary intervention, coronary artery bypass graft, and valve replacement/repair). Alongside these and other episodes of care and patient centered medical homes, the acute CHF exacerbation 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 an acute CHF exacerbation

An acute CHF exacerbation typically is caused by ventricular systolic or diastolic dysfunction, changes in pressure on the walls of the heart, or valvular disease.²³ Symptoms of an acute CHF exacerbation may include cough, dyspnea, fatigue, peripheral edema, chest discomfort, among others.²⁴

As depicted in Exhibit 1 an acute CHF exacerbation episode is triggered when a physician (e.g. typically a cardiologist, emergency department physician, or hospitalist) in the medical intensive care unit, observation unit, emergency department, or other outpatient setting diagnoses a patient with acute CHF as the primary reason the patient presents to the facility.

During the workup of an acute CHF exacerbation patient, the physician takes a patient history, does a physical assessment, and orders the appropriate labs (e.g.

21 Desai AS, Stevenson LW. Rehospitalization for Heart Failure. A report from the American Heart Association. *Circulation*. 2012; 126: 501-506.

22 Collins SP et al. 2013.

23 Pinto DS, Kociol RD. Evaluation of acute decompensated heart failure. *UpToDate*. 2016.

24 Gheorghide M, Filippatos G. 2005.

CBC, BMP) and tests (e.g. chest x-ray, echocardiography).²⁵ Most patients are also given diuretics to reduce hypervolemia. The medication level is titrated to ensure the pace of fluid removal is not too rapid.²⁶ Following diagnosis and initial treatment, patients for whom the episode began in an inpatient setting may remain there for an average of three to seven days, be stepped down to a lower acuity facility, or be discharged home. Alternatively, patients may not be admitted and may remain in an outpatient setting for the duration of the episode. Some patients may develop complications (e.g. electrolyte disturbance, arrhythmias, kidney dysfunction), have another admission, and require follow-up clinician visits.²⁷ Others may only have follow-up visits with a PCP or cardiologist after the initial diagnosis and treatment.

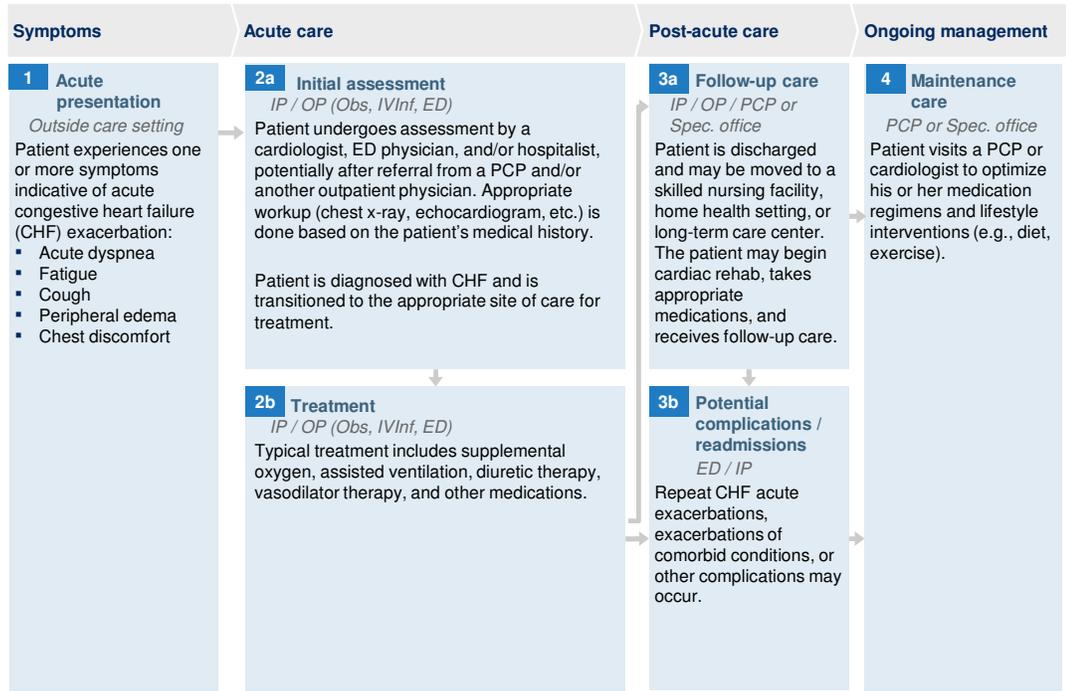
The acute CHF exacerbation episode will be complemented by a patient-centered medical home (PCMH) in Ohio to cover a broad spectrum of care delivery for Medicaid beneficiaries with cardiovascular disease who may have an acute CHF exacerbation. PCMHs will focus on chronic management of cardiovascular disease and other patient comorbidities before and after the acute CHF exacerbation and will handle patient referrals to cardiologists and other specialists as appropriate. To complement PCMHs, the acute CHF exacerbation episode will focus on improving outcomes directly related to the 30-day window following the acute CHF exacerbation diagnosis.

²⁵ Ibid.

²⁶ Ibid.

²⁷ Watson RDS, Gibb CR, Lip GHY. Clinical features and complications. *BMJ*. 2000 Jan 22; 320(7229): 236–239.

EXHIBIT 1 – ACUTE CHF EXACERBATION PATIENT JOURNEY



SOURCE: Clinical expert interviews; team analysis; main patient flows shown only

1.3 Potential sources of value within the acute CHF exacerbation patient journey

Within the acute CHF exacerbation episode of care providers have several opportunities to improve quality of care and reduce unnecessary spend associated with the episode (see Exhibit 2). For example, providers can minimize waste and reduce variation during the initial assessment of an acute CHF exacerbation patient with accurate diagnosis, judicious use of diagnostic studies,²⁸ and timely initiation and adequate titration of diuretics.²⁹ There is also an opportunity for improved care coordination during inpatient stays or outpatient ED visits as typical care for a patient during the initial acute CHF exacerbation may be provided by physicians, hospitalists, and/or cardiologists.³⁰ Additionally, by adhering to established clinical guidelines and providing appropriate patient education and follow-up care, providers can prevent unnecessary admissions and readmissions, and reduce the occurrence of prolonged ICU bed stays.³¹ Finally, clinicians can encourage appropriate lifestyle management through exercise, dietary modifications, and smoking cessation consultations.

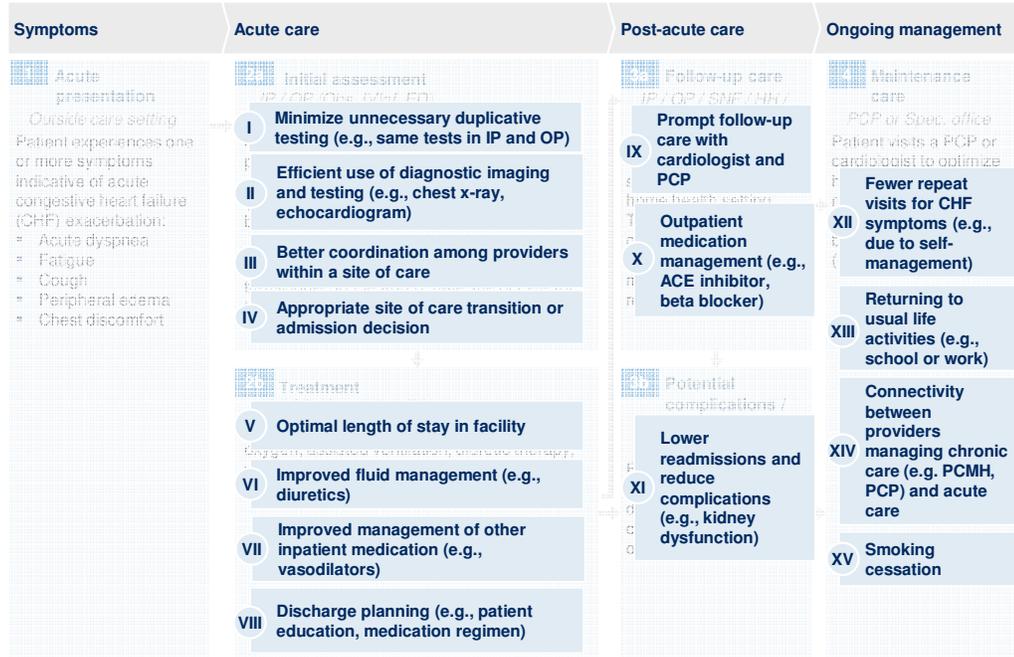
28 Roth GA, Brown J, Malenka DJ. Medical Practice Variations in Heart Failure. Springer Science. 2013.

29 Fonarow G et al. 2011.

30 Pang PS, Schuur JD. Emergency Departments, Acute Heart Failure, and Admissions. JCHF. 2014;2(3):278-280.

31 Collins SP et al.2013.

EXHIBIT 2 – ACUTE CHF EXACERBATION SOURCES OF VALUE



2. OVERVIEW OF THE ACUTE CHF EXACERBATION EPISODE DESIGN

2.1 Episode Trigger

The acute CHF exacerbation episode is triggered by presentation to an emergency department and/or an inpatient admission³² during which acute CHF exacerbation symptoms are evaluated and treated. The range of CHF diagnosis codes that trigger an episode are comprised of three groups of ICD-9 diagnosis codes: *acute CHF*, *chronic CHF*, and *signs and symptoms of CHF*. To ensure that only acute episodes are captured, diagnosis codes within the *chronic CHF* and *signs and symptoms of CHF* groups will trigger an episode only when they appear in conjunction with one or more codes from any of the three lists (*acute CHF*, *chronic CHF*, and *signs and symptoms of CHF*). A complete list of trigger diagnosis codes is included in Table 1 in the Appendix.

32 For the acute CHF exacerbation episode an inpatient admission includes admission to an observation unit and visits to IV infusion clinics that provide specialty heart failure care.

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 acute CHF exacerbation episode, the PAP is the facility diagnosing the acute CHF exacerbation which triggered the episode. This is because multiple providers (e.g. an emergency department physician, cardiologist, or hospitalist) may appropriately care for the patient throughout his or her medical journey.

2.3 Episode Duration

The episode begins with a documented diagnosis of an acute CHF exacerbation (called the “trigger window”). The episode ends 30 days after discharge (called the “post-trigger window”). The use of a single post-trigger window for this episode is to account for complications of acute CHF exacerbations that may occur up to 30 days after the initial period (i.e., “trigger window”) of treatment. The 30-day post-trigger window was also deemed an adequate period of time to capture readmissions, complications, follow-up care and other relevant included claims.

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 of the patient journey. 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 acute CHF exacerbation episode is comprised of two distinct windows for the purposes of spend inclusions: a trigger window, and a post-trigger window. During the trigger window all spend is included (including medical and drug spend). During the post-trigger window (one through 30 days following discharge from hospital), immediate post-discharge complications (e.g. adverse reaction to medications, iatrogenic complications, dialysis, complications of implantable device), related follow-up care (e.g., patient education, select medications, physical therapy and cardiac rehabilitation, contrast echocardiography, and chest CT scan), and associated ED visits and readmissions are all included.

Throughout the episode window spend for transportation and vaccinations are excluded. Vaccination spend is excluded to prevent doctors from withholding

procedures deemed beneficial for patients and transportation spend is excluded since there is variability in transportation costs among patients that falls outside of the purview of the PAP.

The total episode spend is calculated by adding up the spend amounts on all of the individual claims that were included in each of the episode windows.

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. Risk factors are applied to episodes to make spend more comparable across different patient severities, while episode exclusions are applied when a clinical factor deems the patient too severe (and too high spend) for risk adjustment to be possible.

In the context of episode design, risk factors are attributes (e.g., age) or underlying clinical conditions (e.g., coronary artery disease) that are likely to impact a patient's course of care and the spend associated with a given episode. Risk factors are selected via a standardized and iterative risk-adjustment process which gives due consideration to clinical relevance, statistical significance, and other contextual factors.³³ 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. The final list of risk factors is detailed in Table 2 of the Appendix. Other risk factors were inputted into the model because they were clinically relevant to the VALVE episode but did not come out of the model as statistically significant.³⁴

By contrast, an episode is excluded from a patient panel with the patient has clinical factors that suggest she has experienced a distinct or different journey (e.g., heart transplant) and/or which drive significant increases in spend relative to the average patient (e.g., select cancers and HIV). In addition, there are several "business-related" exclusions. These exclusions are factors 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 (e.g. overlapping episodes) during the comparison period. Episodes that have no exclusions are known as "valid" episodes

³³ For a detailed description of the principles and process of risk adjustment for the episode-based payment model see the document, "Supporting documentation on episode risk adjustment." A current version of this document is available here:
<http://medicaid.ohio.gov/Portals/0/Providers/PaymentInnovation/Episode-Risk-Adjustment.pdf>

³⁴ Some of these factors include emphysema, age, diabetes, hyperlipidemia, and AMI

and are the episodes that are used for provider comparisons. In contrast, episodes with one or more exclusions are “invalid” episodes.

For the acute CHF exacerbation episode, both clinical and business exclusion apply. Several of the clinical and business exclusions (e.g., dual Medicare and Medicaid eligibility, patient left against medical advice, cancer diagnoses and treatment) are standard across most episodes while others relate to the scope of the episode design. Some of the episode-specific clinical exclusions (which are in addition to clinical exclusions that are standard across most episodes) include claims with procedures or diagnoses indicating 1) pre-existing pneumonia, 2) ventricular assistance device, and 3) pregnancy and delivery.

In addition, in order to avoid double counting of spend across implemented episodes, acute CHF exacerbation episodes that contain claims with codes that are trigger codes for the VALVE, CABG, or PCI episodes are excluded. A detailed list of business and clinical exclusions is included in Table 3 in the Appendix.

2.6 Quality Metrics

To ensure the episode model incentivizes quality care, the acute CHF exacerbation episode has select quality. Quality metrics are calculated for each PAP meeting the minimum threshold for valid episodes. The acute CHF exacerbation episode has four quality metrics. Three are linked to performance assessment, meaning that performance thresholds on these must be met in order for episodes to be eligible for positive incentive. The specific threshold amount will be determined during the informational reporting period. One of the quality metrics are form informational purposes only.

The metrics tied to positive incentive payments are the 30-day follow-up care rate in the post-trigger window, the beta blocker prescription fill rate, and the ACE inhibitor prescription fill rate. The one information metric is the 30-day readmission rate (excluding inpatient rehab). A complete list of quality metrics is provided in Table 4 in the Appendix.

3. APPENDIX: SUPPORTING INFORMATION AND ANALYSES

Table 1 – Acute CHF exacerbation episode triggers

Trigger group	Trigger codes (ICD-9 Dx)	Description
Acute CHF	39891	Rheumatic heart failure (congestive)
	4280	Congestive heart failure unspecified
	4281	Left heart failure
	42820	Unspecified systolic heart failure
	42821	Acute systolic heart failure
	42823	Acute on chronic systolic heart failure
	42830	Unspecified diastolic heart failure
	42831	Acute diastolic heart failure
	42833	Acute on chronic diastolic heart failure
	42840	Unspecified combined systolic and diastolic heart failure
	42841	Acute combined systolic and diastolic heart failure
	42843	Acute on chronic combined systolic and diastolic heart failure
	4289	Heart failure unspecified
	42983	Takotsubo syndrome
Chronic CHF	40201	Malignant hypertensive heart disease with heart failure
	40211	Benign hypertensive heart disease with heart failure
	40291	Unspecified hypertensive heart disease with heart failure
	40401	Hypertensive heart and chronic kidney disease malignant with heart failure with chronic kidney disease stage I through stage IV or unspecified
	40411	Hypertensive heart and chronic kidney disease benign with heart failure with chronic kidney disease stage I through stage IV or unspecified
	40491	Hypertensive heart and chronic kidney disease unspecified with heart failure with chronic kidney disease stage I through stage IV or unspecified
	4254	Other primary cardiomyopathies
	4257	Nutritional and metabolic cardiomyopathy
	4258	Cardiomyopathy in other diseases classified elsewhere

Trigger group	Trigger codes (ICD-9 Dx)	Description
Chronic CHF	4259	Secondary cardiomyopathy unspecified
	42822	Chronic systolic heart failure
	42832	Chronic diastolic heart failure
	42842	Chronic combined systolic and diastolic heart failure
Signs and symptoms of CHF	27669	Other fluid overload
	3940	Mitral stenosis
	3941	Rheumatic mitral insufficiency
	3942	Mitral stenosis with insufficiency
	3949	Other and unspecified mitral valve diseases
	3950	Rheumatic aortic stenosis
	3951	Rheumatic aortic insufficiency
	3952	Rheumatic aortic stenosis with insufficiency
	3959	Other and unspecified rheumatic aortic diseases
	3960	Mitral valve stenosis and aortic valve stenosis
	3961	Mitral valve stenosis and aortic valve insufficiency
	3962	Mitral valve insufficiency and aortic valve stenosis
	3963	Mitral valve insufficiency and aortic valve insufficiency
	3968	Multiple involvement of mitral and aortic valves
	3969	Mitral and aortic valve diseases unspecified
	3970	Diseases of tricuspid valve
	3971	Rheumatic diseases of pulmonary valve
	3979	Rheumatic diseases of endocardium valve unspecified
	4010	Malignant essential hypertension
	4011	Benign essential hypertension
	4019	Unspecified essential hypertension
40200	Malignant hypertensive heart disease without heart failure	
40210	Benign hypertensive heart disease without heart failure	
40290	Unspecified hypertensive heart disease without heart failure	

Trigger group	Trigger codes (ICD-9 Dx)	Description
Signs and symptoms of CHF	40300	Hypertensive chronic kidney disease malignant with chronic kidney disease stage I through stage IV or unspecified
	40310	Hypertensive kidney disease benign with chronic kidney disease stage I through stage IV or unspecified
	40390	Hypertensive chronic kidney disease unspecified with chronic kidney disease stage I through stage IV or unspecified
	40400	Hypertensive heart and chronic kidney disease malignant without heart failure with chronic kidney disease stage I through stage IV or unspecified
	40410	Hypertensive heart and chronic kidney disease benign without heart failure with chronic kidney disease stage I through stage IV or unspecified
	40490	Hypertensive heart and chronic kidney disease unspecified without heart failure with chronic kidney disease stage I through stage IV or unspecified
	4168	Other chronic pulmonary heart diseases
	4241	Aortic valve disorders
	4242	Tricuspid valve disorders specified as non-rheumatic
	4243	Pulmonary valve disorders
	42731	Atrial fibrillation
	42732	Atrial flutter
	42760	Premature beats unspecified
	42761	Supraventricular premature beats
	42769	Other premature beats
	42789	Other specified cardiac dysrhythmias
	4580	Orthostatic hypotension
	4581	Chronic hypotension
	45829	Other iatrogenic hypotension
	4588	Other specified hypotension
	4589	Hypotension unspecified
	45989	Other specified circulatory system disorders
	514	Pulmonary congestion and hypostasis
	7823	Edema
	7850	Tachycardia unspecified
	7852	Undiagnosed cardiac murmurs

Trigger group	Trigger codes (ICD-9 Dx)	Description
Signs and symptoms of CHF	78602	Orthopnea
	78605	Shortness of breath
	78606	Tachypnea
	78607	Wheezing
	78609	Respiratory abnormality other

Table 2 – Acute CHF exacerbation episode risk factors

Risk factor	Description	Relevant time period
Cardiac circulatory congenital anomalies	Patient has diagnosis of cardiac circulatory congenital anomalies	During the episode window or during the 365 days before the episode window
Chronic kidney disease	Patient has diagnosis of chronic kidney disease	During the episode window or during the 365 days before the episode window
Coagulation and hemorrhagic disorders	Patient has diagnosis of coagulation and hemorrhagic disorders	During the episode window or during the 365 days before the episode window
Conduction disorders	Patient has diagnosis of conduction disorders	During the episode window or during the 365 days before the episode window
Coronary artery disease	Patient has diagnosis of coronary artery disease	During the episode window or during the 365 days before the episode window
Heart valve disorders	Patient has diagnosis of heart valve disorders	During the episode window or during the 365 days before the episode window
Nutritional deficiency	Nutritional deficiency	During the episode window or during the 365 days before the episode window

Table 3 – CHF episode exclusions

Exclusion type	Episode exclusion	Description	Relevant time period
Business Exclusions	Concurrent scope	Patient has a valve procedure, a CABG procedure, or a percutaneous coronary intervention	During the trigger window
	Dual	Patient had dual coverage by Medicare and Medicaid	During the episode window
	FQHC/RHC	PAP is classified as a federally qualified health center (FQHC) or a rural health clinic (RHC)	During the episode window
	Incomplete episode	Non-risk-adjusted episode spend is less than the incomplete episode threshold	During the episode window
	Inconsistent enrollment	Patient has gaps in full Medicaid coverage	During the episode window
	Long hospitalization	Hospitalization is longer than (>) 30 days	During the episode window
	Long-term care	Patient has one or more long-term care claim detail lines	During the episode window
	Missing APR-DRG	A DRG-paid inpatient claim is missing the APR-DRG and severity of illness	During the episode window
	Multiple payers	Patient changes enrollment between FFS and an MCP or between MCPs	During the episode window
	PAP out of state	The principle accountable provider operates out of state	During the episode window
No PAP	An episode's billing provider number is not available	During the episode window	

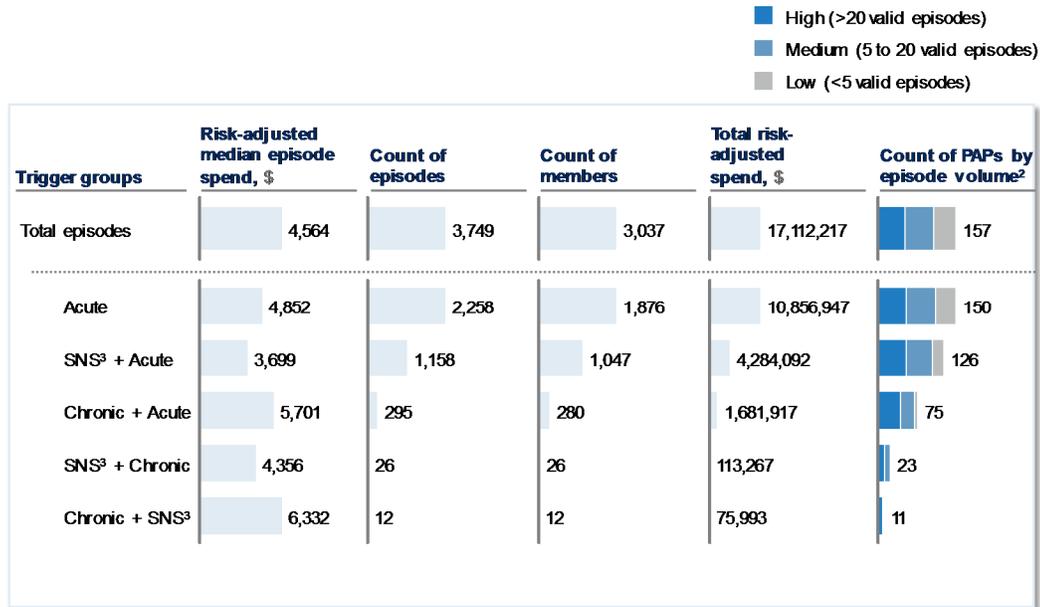
Exclusion type	Episode exclusion	Description	Relevant time period
Business Exclusions	Third-party liability	Third-party liability charges are present on any claim or claim detail line, or the patient has relevant third-party coverage at any time	During the episode window
Standard clinical exclusion	Cancer diagnoses and treatment	Patient is diagnosed with or received treatment for active cancer	During the episode or up to 90 days before the start of the episode
	Coma	Patient is diagnosed with coma	During the episode or up to 365 days before the start of the episode
	Cystic fibrosis	Patient is diagnosed with cystic fibrosis	During the episode or up to 365 days before the start of the episode
	Death	Patient had a discharge status of "expired" on any inpatient or outpatient claim during the episode window or has a date of death before the end of the episode window	During the episode window
	End stage renal disease	Patient has diagnosis or procedure for end stage renal disease	During the episode or up to 365 days before the start of the episode
	HIV	Patient is diagnosed with HIV	During the episode or up to 365 days before the start of the episode
	Left against medical advice	Patient has a discharge status of "left against medical advice or discontinued care"	During the episode window
	Multiple other comorbidities	Patient has too many risk factors to reliably risk adjust the episode spend	During the episode window
	Multiple sclerosis	Patient is diagnosed with multiple sclerosis	During the episode window or during the 365 days

Exclusion type	Episode exclusion	Description	Relevant time period
Standard clinical exclusion	Paralysis	Patient has diagnosis of paralysis	During the episode or up to 365 days before the start of the episode
	Transplant	Patient has an organ transplant	During the episode or up to 365 days before the start of the episode
Episode-specific clinical exclusion	Age	Patient is younger than eighteen (<18) or older than sixty-four (>64) years of age	During the episode window
	DKA or Hyperosmolarity	Patient is diagnosed with diabetes with ketoacidosis or hyperosmolarity	During the episode or up to 365 days before the start of the episode
	Emergent CABG	CABG procedure happens in an emergent setting	During the trigger window
	High-outlier exclusion	Risk-adjusted episode spend is greater than the high outlier threshold	During the episode window
	Low-outlier exclusion	Non-risk-adjusted episode spend is less than the low outlier threshold	During the episode
	Non-acute episodes	Episode is a non-acute CHF case	During the episode window
	Pneumonia	Patient is diagnosed with pre-existing pneumonia	During the first day of the trigger window
	Pregnancy and/or Delivery	Patient is pregnant or delivers	During the episode or up to 90 days before the start of the episode
	Resuscitation	Patient receives a resuscitation procedure	During the trigger window
	Ventricular Assistance Device	Patient receives a ventricular assistance device procedure	During the episode or up to 365 days before the start of the episode

Table 4 – Acute CHF exacerbation episode quality metrics (PAP level)

Metric type	Field name	Description	Relevant time period
Tied to incentive payments - Quality	Follow-up care rate within 30 days	Percent of valid episodes where patient receives relevant follow-up care	During the post-trigger window (30-days)
Tied to incentive payments - Quality	Beta blocker prescription fill rate	Percent of valid episodes where patient fills a beta blocker prescription	During the episode or up to 30 days before the start of the episode
Tied to incentive payments - Quality	ACE inhibitor prescription fill rate	Percent of valid episodes where patient fills an ACE inhibitor prescription	During the episode or up to 30 days before the start of the episode
Informational - Quality	Readmission rate within 30 days	Percent of valid episodes with an included admission or relevant observation care (excluding inpatient rehab facilities)	During the post-trigger window (30-days)

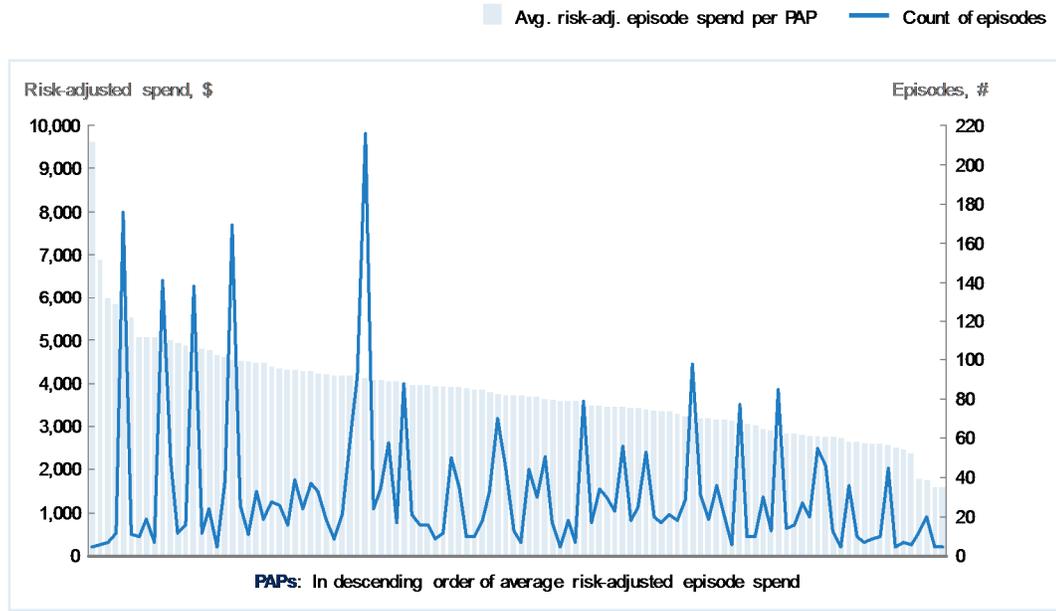
EXHIBIT 3 – ACUTE CHF EXACERBATION EPISODE TRIGGER GROUPS¹



1. For valid episodes (3,749 episodes) across 157 PAPs; valid episodes do not include episodes with business (e.g., third-party liability, dual eligibility) or clinical exclusions (e.g., cancer, ESRD); count of PAPs includes valid PAPs (e.g. ≥ 5 valid episodes) and invalid PAPs (e.g. < 5 valid episodes)
2. Low volume is defined as PAPs with less than five valid episodes, Medium volume as PAPs with five to 20 valid episodes and High volume as PAPs with more than 20 valid episodes
3. Signs and symptoms of acute CHF exacerbation

SOURCE: OH claims data, episodes ending between 10/1/2014 and 9/30/2015

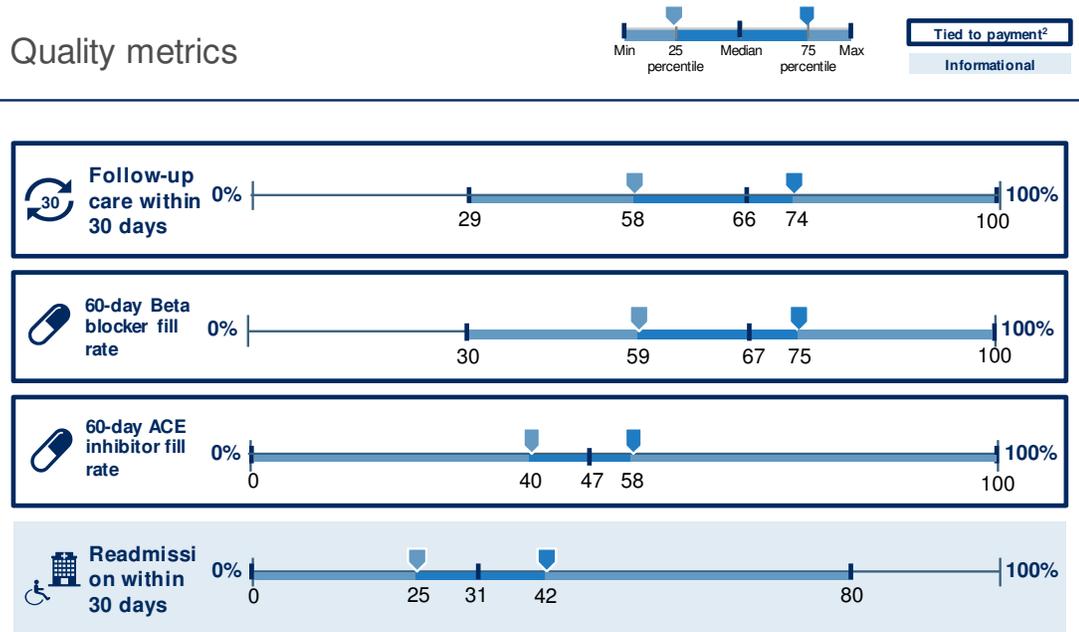
EXHIBIT 4 - DISTRIBUTION OF AVERAGE RISK-ADJUSTED EPISODE SPEND AND COUNT BY PAP¹



1. For valid episodes (3,749) across valid PAPs (114); valid episodes do not include episodes with business (e.g., third-party liability, dual eligibility) or clinical exclusions (e.g., cancer, ESRD); valid PAPs are physicians with five or more episodes.

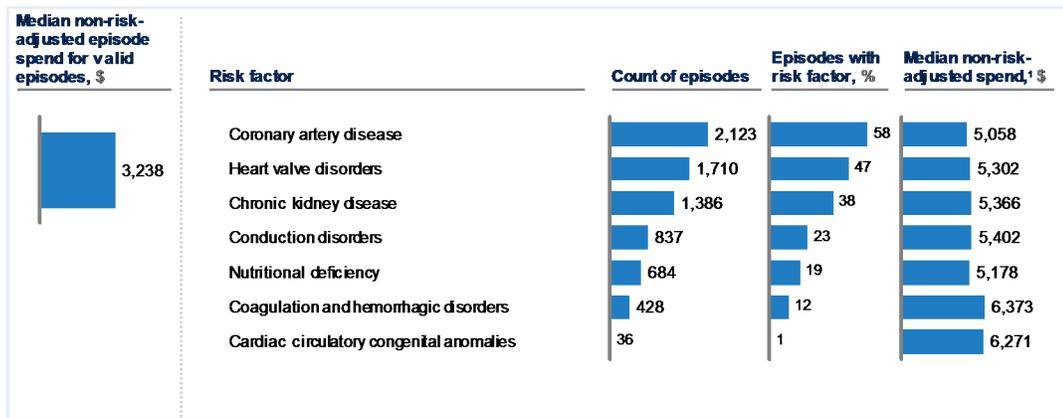
SOURCE: OH claims data, episodes ending between 10/1/2014 and 9/30/2015

EXHIBIT 4 - PAP PERFORMANCE ON EPISODE QUALITY METRICS¹



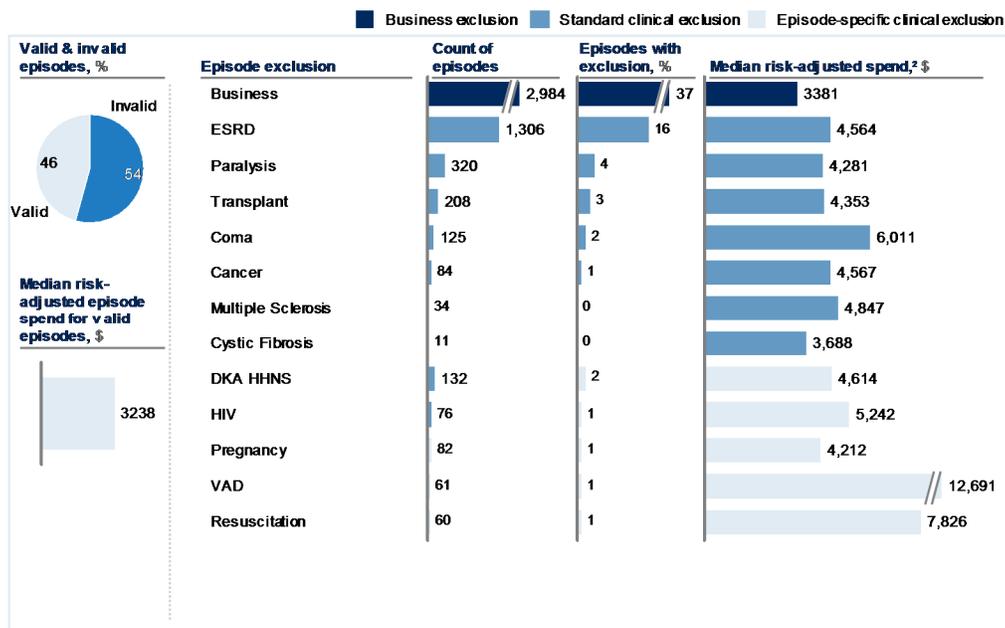
1. For valid episodes (3,749) across valid PAPs (114); valid episodes do not include episodes with business (e.g., third-party liability, dual eligibility) or clinical exclusions (e.g., stroke, head trauma)
 2. Metric is tied to positive incentive payments
 SOURCE: OH claims data, episodes ending between 10/1/2014 and 9/30/2015

EXHIBIT 6 - EPISODE COUNT AND SPEND BY RISK FACTORS



1. For episodes with this risk factor; one episode can have multiple risk factors
 SOURCE: OH claims data, episodes ending between 10/1/2014 and 9/30/2015

EXHIBIT 7 - EPISODE COUNT AND SPEND BY EXCLUSIONS¹



1. Showing top five (by volume) episode exclusions only for standard clinical and episode-specific clinical exclusions
2. For episodes with this exclusion; one episode can have multiple exclusions

SOURCE: OH claims data, episodes ending between 10/1/2014 and 9/30/2015