

Selected Analytic Findings: Denominators, Risk Adjustment, and Attribution Testing Sinusitis, Pneumonia, and Asthma

QASC Episodes Workgroup Meeting:
December 18, 2009

General Project Updates

- Rapid testing and validation of measures
 - Focus on measures likely to be included in NQF “call for measures” – to take place in early 2010
- Continuous feedback loop with physician workgroups, TAC, and QASC to refine measures
- CMS conducted Listening Session on November 11 to discuss the development of an Episode Logic for Medicare Physician Resource Use Measurement
- National Quality Forum “Call for Measures” expected March 2010 at earliest
- Concluded work with CMS to test AMI measures on Medicare data sample
 - Results largely comparable to Marketscan findings

Overview of Measure Testing and Validation Process

- Size of, and attrition from episode denominator
- “Level 1” analyses of resource use
 - Total episode spending by type of service
 - Top 20 “condition-related” & “non-condition-related” E&M, procedures, imaging, tests, inpatient admissions (by ICD-9 and DRG) and drugs, by service counts and dollar volume
- Test proposed attribution logic
 - Examine variability in per-episode resource use at individual provider level (as relevant) and by provider specialty
- “Level 2” analyses of resource use
 - Incorporate risk adjustment
 - Identify specific drivers of resource use variation
 - Analyze observed variability across states, regions, provider specialties

***Note: analytic results are preliminary and subject to change*

Document for internal discussion purposes

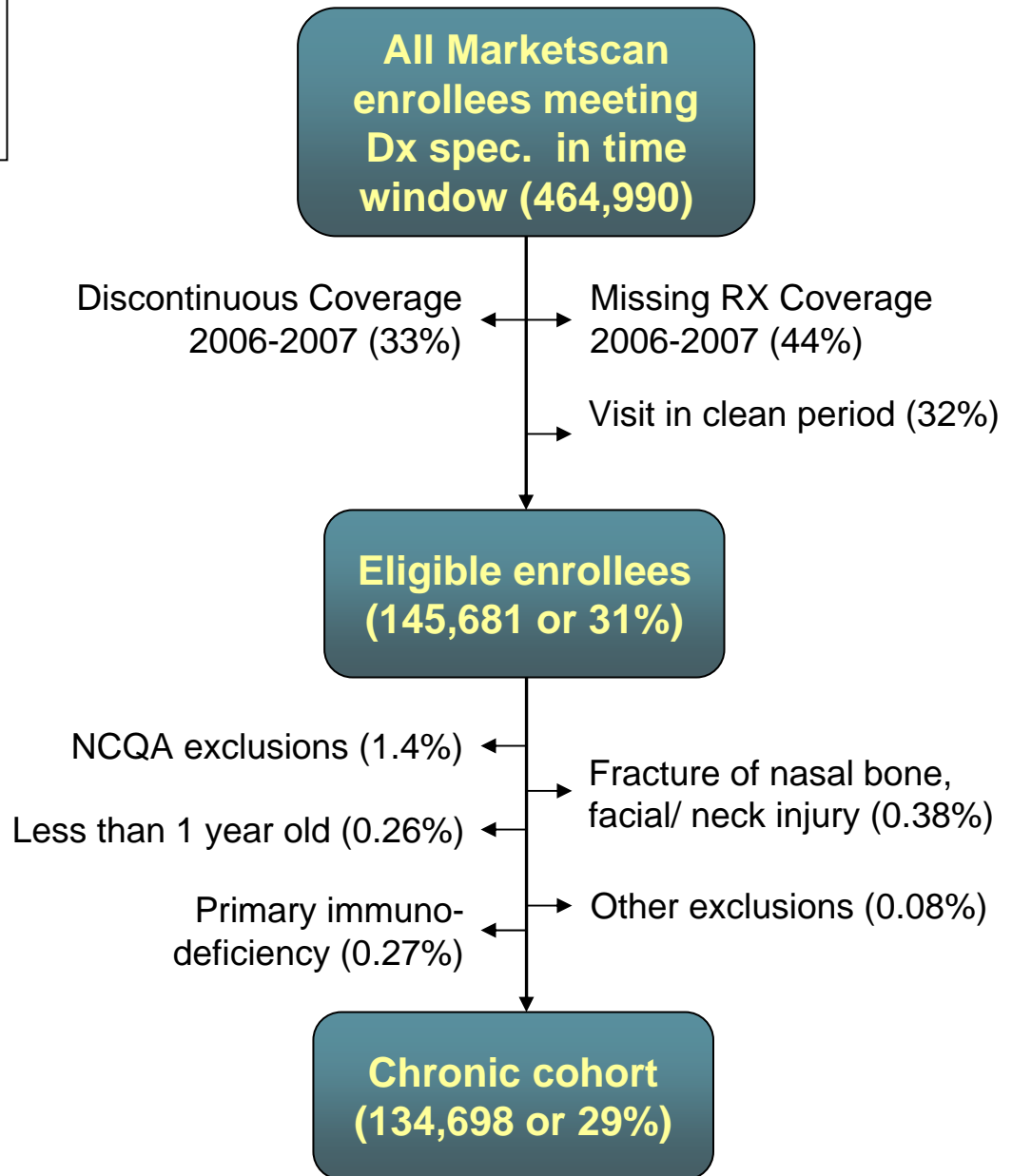
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Initial Findings from Measure Testing and Validation

- Observed resource use generally meets ‘face validity’ thresholds for physician workgroups
 - Identifying significance of workgroup concerns regarding our capacity to capture outpatient facility costs accurately
- For several episodes (e.g., AMI, CHF, COPD), the Marketscan database contains only small samples
 - Continuous Medical and Rx coverage requirements have large impact on attrition from denominator (testing impact of relaxing requirement using low back pain episodes)
 - Medicare population will likely have larger samples
- Marketscan data permit only limited testing of attribution models (due to sample size & missing provider IDs)

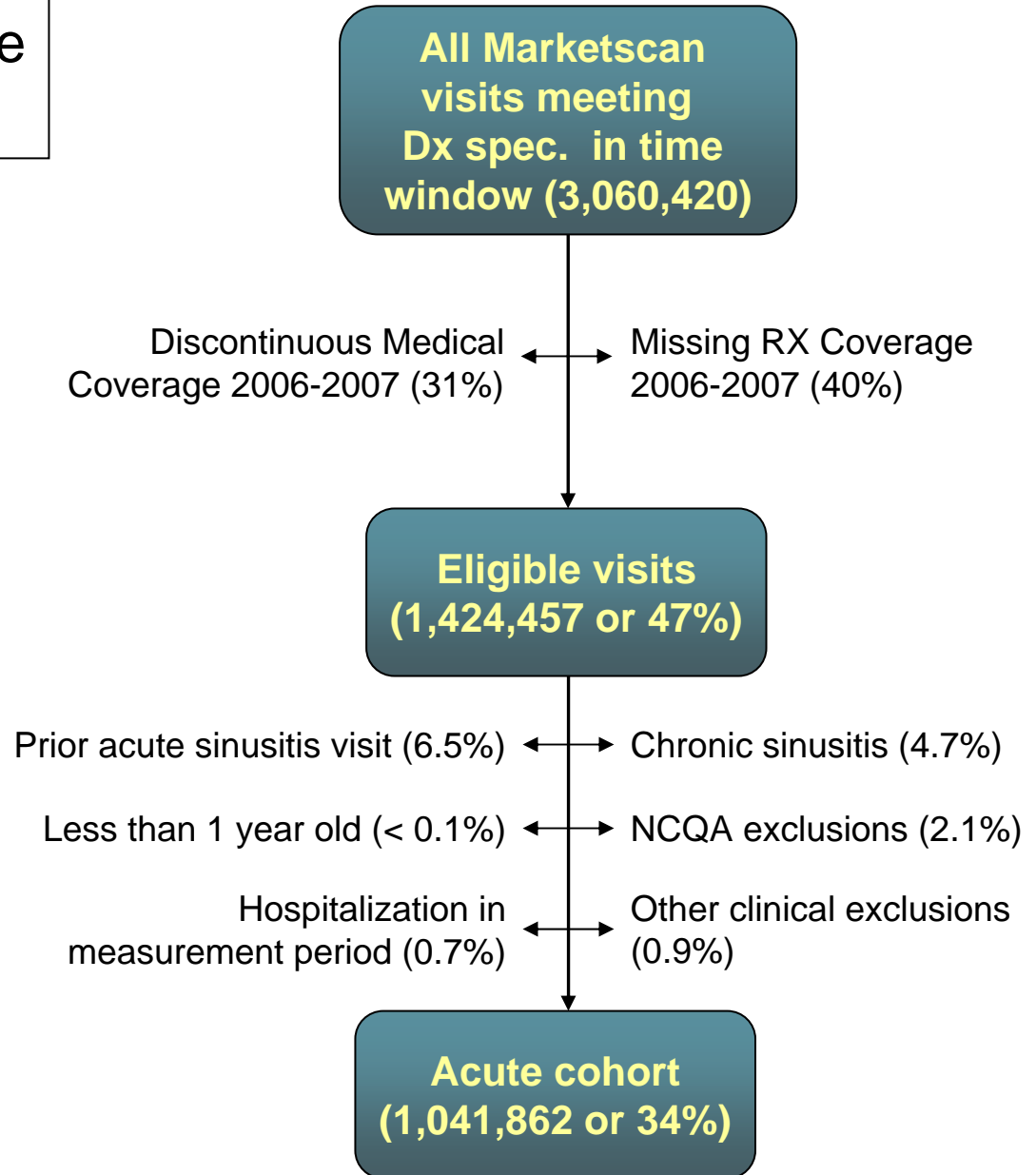
Chronic Sinusitis Measure Denominator – 3 Month Clean Period

- Any visit for chronic sinusitis in 2006
- No visit for chronic sinusitis Nov. to Dec.
- Continuous medical and pharmacy coverage in 2006 & 2007
- Standard “NCQA” exclusions
- Other exclusions:
 - Cystic fibrosis
 - Ciliary dysfunction
 - Facial dysmorphisms
- Note: multiple episodes per patient not possible; exclusion criteria are not additive (double-counting occurs often)



Acute Sinusitis Measure Denominator

- Any visit for acute sinusitis 7/1/06 – 10/8/07
- Continuous medical and pharmacy coverage in 2006 & 2007
- Other clinical exclusions:
 - Cystic fibrosis
 - Primary immunodeficiency
 - Ciliary dysfunction/immotile cilia
 - Facial dysmorphisms
- Note: multiple episodes per patient possible (see slide 7); exclusions are not additive (double-counting occurs often)



Acute/Acute-Recurrent Sinusitis Episodes per Enrollee

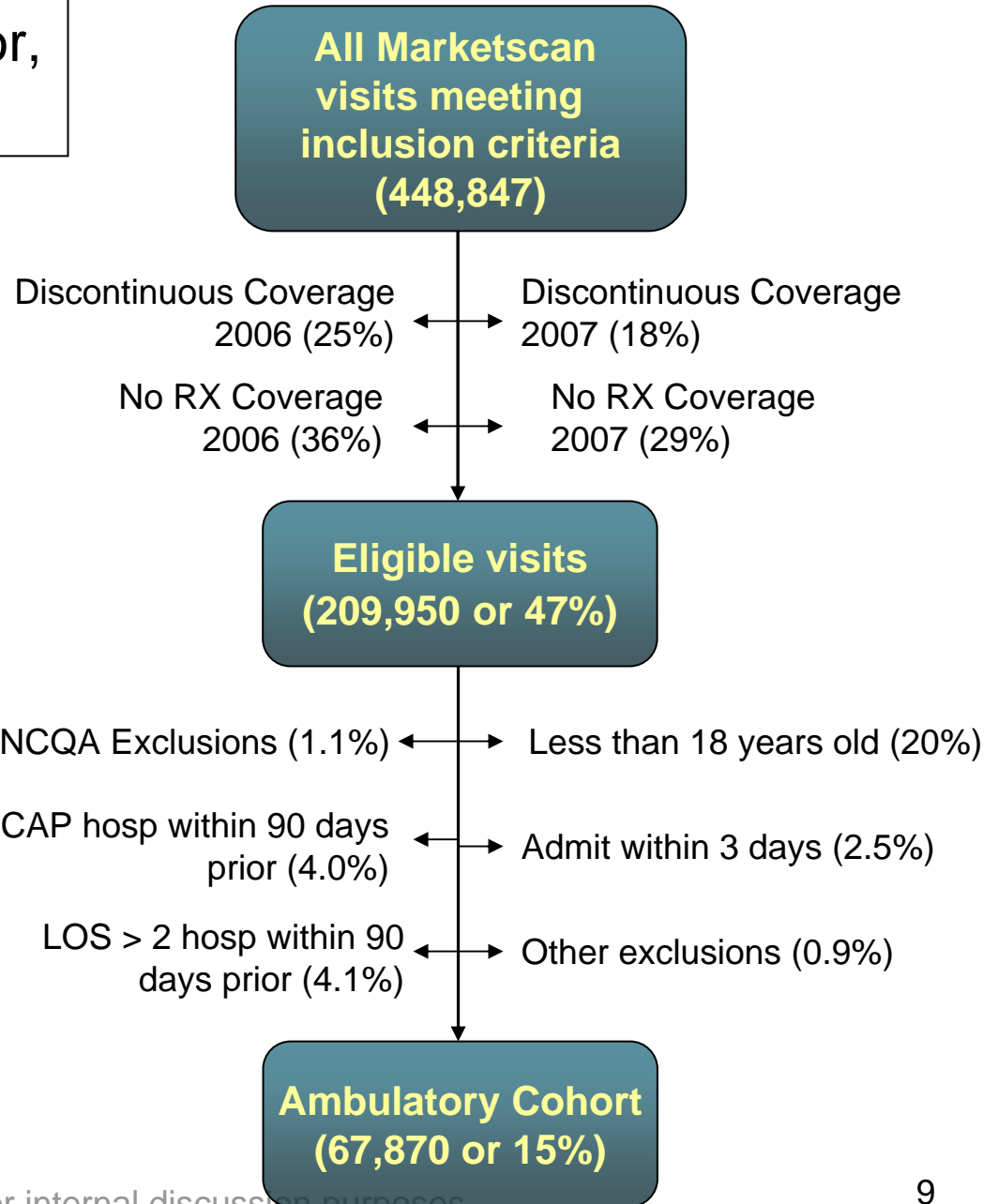
Count	Frequency	Percent
1	784,040	86.58
2	107,431	11.86
3	13,329	1.47
4	732	0.08
5	13	0.00
Total patients	905,526	100.00

Pneumonia

- Ambulatory Pneumonia: 14 days following office visit with a primary diagnosis of pneumonia; excluded if hospitalized within 3 days of diagnosis
 - Revised denominator analyses
 - Preliminary analyses of related/non-related resource use during episode
- Community-acquired Pneumonia Hospitalization: 3 days prior to and 30 days following an admission for community-acquired pneumonia (i.e., no prior hospitalizations within 90 days)
 - Revised denominator analyses

Amb. Measure Denominator, 2-week follow up

- Primary dx of pneumonia at admission, or
- Primary dx of bacteremia, empyema, unspecified pleural effusion, septicemia, respiratory failure.
- Admission between 6/1/2006 and 12/18/2007
- Other Exclusions:
 - Cystic Fibrosis
 - Lung Cancer
 - Nursing Home or Hospice
 - Prior CAP dx on E&M claim 4 days to 6 weeks
- Note: exclusions and inclusions are not additive (double-counting occurs often)



Ambulatory Pneumonia, 2-week Follow-up Episodes per Patient

Count	Frequency	Percent
1	62,482	96.10
2	2,281	3.51
3	213	0.33
4	34	0.05
5	9	0.01
6	1	0.00
Total patients	65,020	100.00

Resource Use by Type of Service: Ambulatory Pneumonia, 2 wk

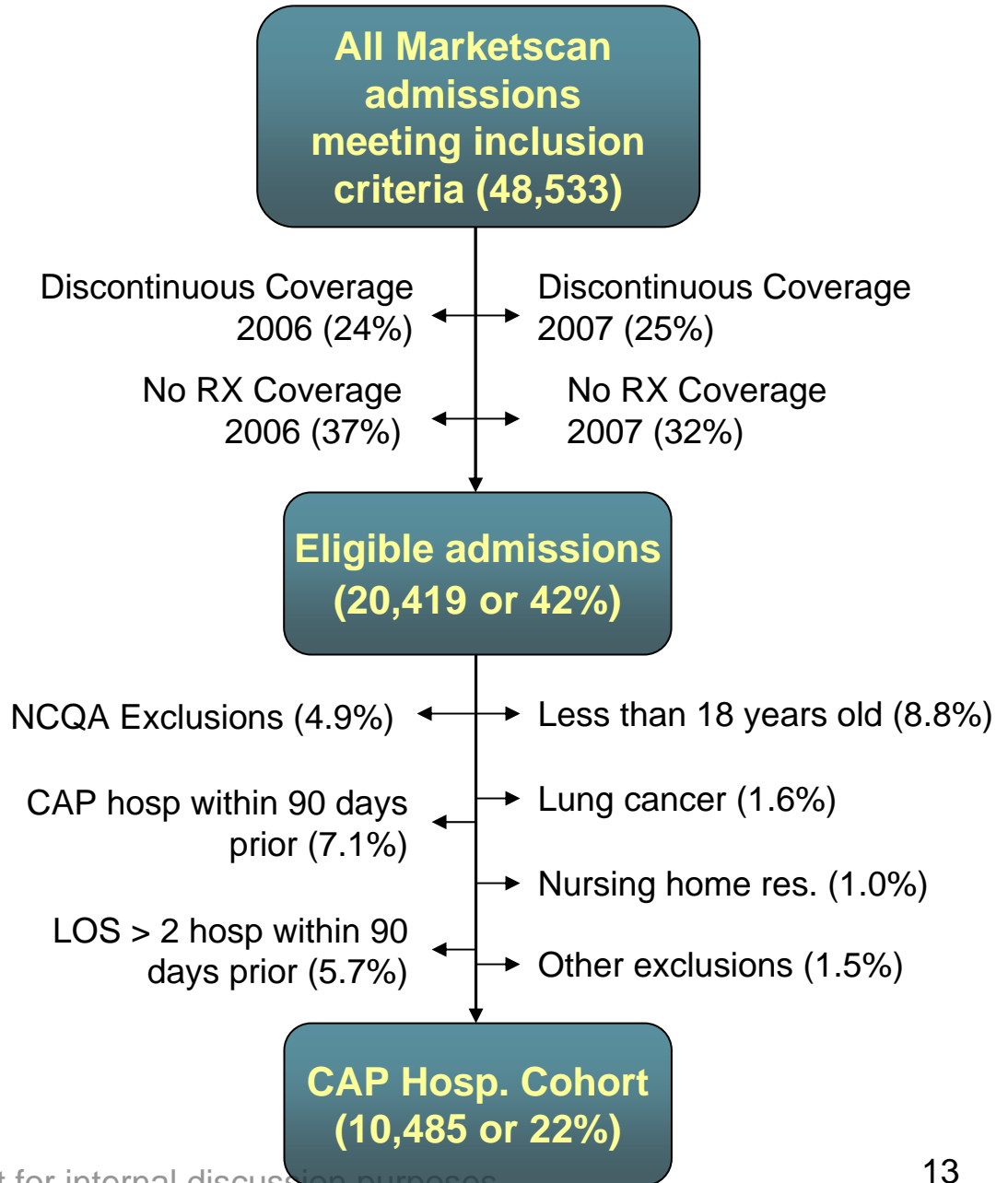
Description	Mean	% of Total	5th %	25th %	50th %	75th %	95th %
Inpatient Facility	\$41	10%	\$0	\$0	\$0	\$0	\$0
Durable Medical Equipment	\$2	1%	\$0	\$0	\$0	\$0	\$0
OP Facility	\$71	17%	\$0	\$0	\$0	\$0	\$365
Imaging	\$44	10%	\$0	\$0	\$36	\$44	\$132
Evaluation and Management	\$135	32%	\$63	\$65	\$96	\$161	\$311
Other Services	\$12	3%	\$0	\$0	\$0	\$0	\$47
Procedures	\$11	3%	\$0	\$0	\$0	\$0	\$42
Tests	\$13	3%	\$0	\$0	\$0	\$12	\$68
Unclassified	\$1	0%	\$0	\$0	\$0	\$0	\$0
Drug Costs	\$94	22%	\$0	\$12	\$74	\$127	\$285
Total Costs	\$425	100%	\$65	\$155	\$254	\$413	\$1,084

Common non-Pneumonia-related Imaging, Ambulatory Episode, 2 wk

CPT	Label	Related	Not Related	Related Costs	Non-Related Costs
93307	Echocardiography, transthoracic, real-time with image docu	165	492	\$25,266	\$86,297
78465	Myocardial perfusion imaging; tomographic (SPECT), multip	103	111	\$41,704	\$57,041
71275	Computed tomographic angiography, chest (noncoronary), v	509	216	\$108,380	\$53,083
74160	Computed tomography, abdomen; with contrast material(s)	53	248	\$8,816	\$51,236
70553	Magnetic resonance (eg, proton) imaging, brain (including b		75		\$47,617
72193	Computed tomography, pelvis; with contrast material(s)	60	243	\$8,533	\$41,214
93325	Doppler echocardiography color flow velocity mapping (List	161	469	\$10,635	\$40,363
93320	Doppler echocardiography, pulsed wave and/or continuous	162	488	\$11,429	\$39,185
70486	Computed tomography, maxillofacial area; without contrast r	32	180	\$5,053	\$36,455
70450	Computed tomography, head or brain; without contrast mate	39	291	\$4,475	\$36,261
72148	Magnetic resonance (eg, proton) imaging, spinal canal and	2	77	\$320	\$35,778
72192	Computed tomography, pelvis; without contrast material	24	230	\$3,015	\$35,443
74150	Computed tomography, abdomen; without contrast material	26	232	\$3,288	\$35,239
74170	Computed tomography, abdomen; without contrast material,	17	116	\$3,649	\$27,824
72141	Magnetic resonance (eg, proton) imaging, spinal canal and		62		\$23,809

CAP Hospitalization Measure Denominator

- Primary dx of pneumonia on hospital admission, or
- Primary dx of bacteremia, empyema, unspecified pleural effusion, septicemia, or respiratory failure on IP admission with pneumonia secondary
- Admission between 6/1/2006 and 10/2/2007
- Other Exclusions:
 - Cystic Fibrosis
 - Palliative care, hospice
 - Prior CAP dx on E&M claim 4 days to 6 weeks
- Note: exclusions are not additive (double-counting occurs often)



CAP Hospitalization Episodes per Patient

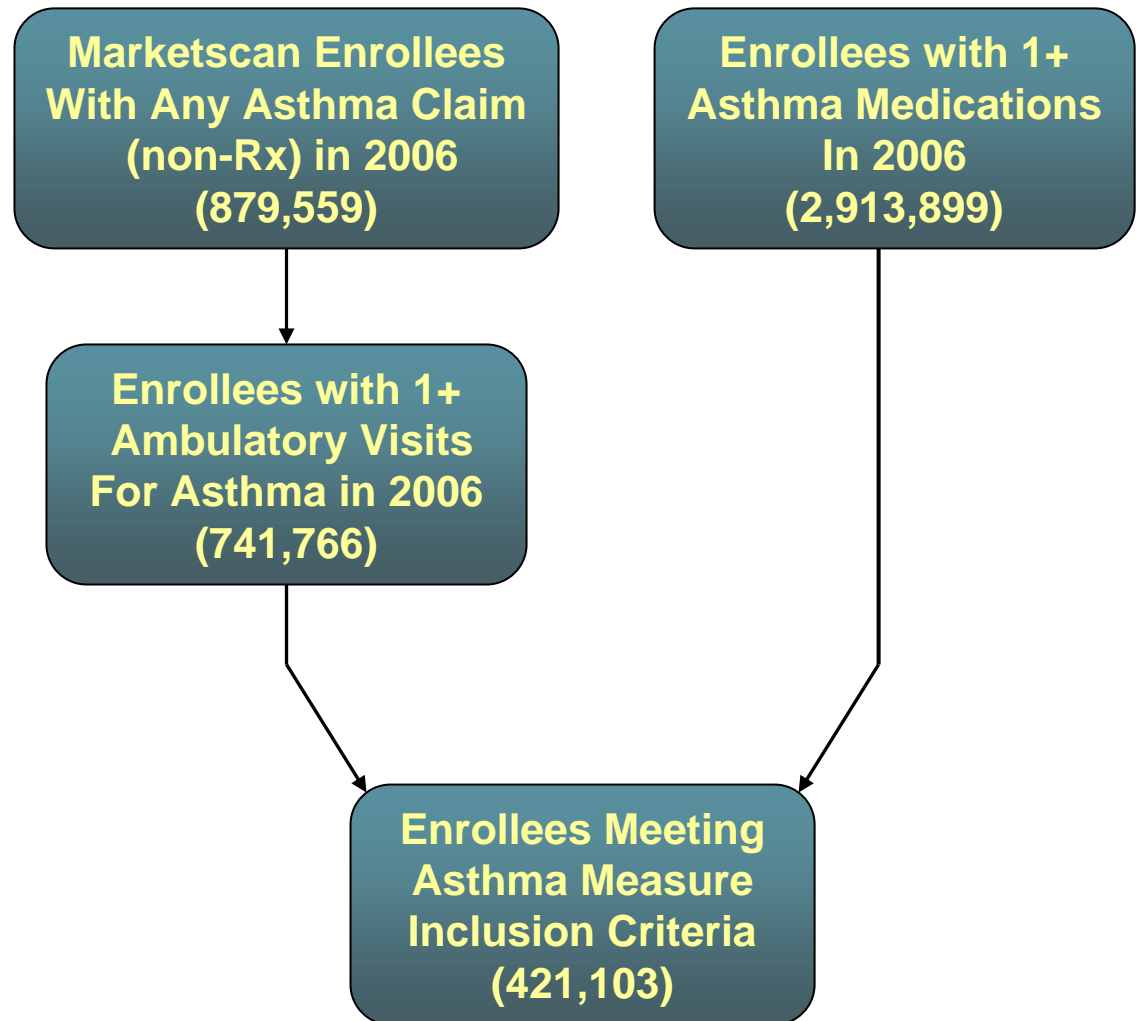
Count	Frequency	Percent
1	10,113	98.23
2	175	1.70
3	6	0.06
4	1	0.01
Total patients	10,295	100.00

Asthma

- Asthma Management Over One Year: Drugs, E&M care, testing, procedures, and other services provided in the treatment or management among patients with prevalent asthma over a 12-month period
 - Preliminary efforts to assess observed variability across asthma episodes and identify cost-driving services

Asthma One-Year Measure Denominator

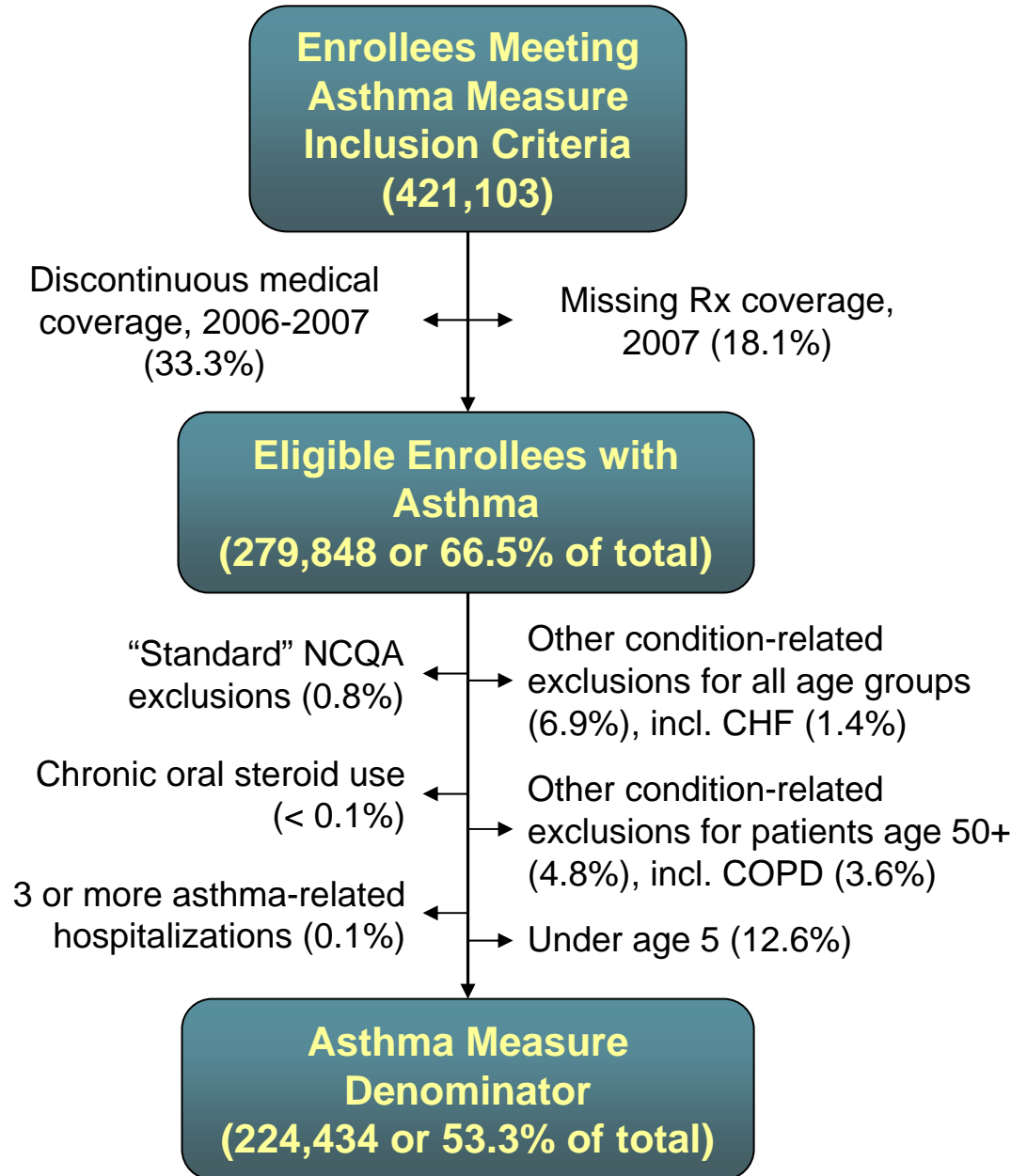
- **At least one** ambulatory visit with Dx of 493.x in 2006
- At least one asthma medication (see p.4, Table ASTHMA-B) in 2006
- Identification period: Jan. 1, 2006 – Dec. 31, 2006
- Measurement window: Jan. 1, 2007 – Dec. 31, 2007



* If requirement were reduced to 30+ days' separation, an additional ~15,000-25,000 episodes would meet measure inclusion criteria.

Asthma One-Year Measure Denominator

- **At least one** ambulatory visit with Dx of 493.x in 2006
- At least one asthma medication (see p.4, Table ASTHMA-B) in 2006
- Identification period: Jan. 1, 2006 – Dec. 31, 2006
- Measurement window: Jan. 1, 2007 – Dec. 31, 2007
- Note: exclusions are not additive (double-counting occurs often)



Identifying Variability in Asthma-specific Resource Use

- Analyses intended to identify trends in the observed variability in resource use for episodes of asthma management
- Variability measured at the following levels:
 - Region
 - State
 - Specialty
 - Individual Provider

Asthma: Resource Use by Type of Service vs. Overall Mean, by State

Description	Overall	TX	GA	CA	TN	SC	IL	OH	AL	FL	MI
N	45,864	8,654	4,834	4,553	2,354	2,057	1,330	1,252	1,235	1,189	1,157
Inpatient Facility Charge	\$185	1.01	1.04	0.75	1.05	1.13	0.88	1.36	1.36	0.93	0.60
Durable Medical Equipment	\$9	1.06	0.79	1.21	1.01	1.27	0.91	1.07	1.33	0.96	0.99
OP Facility Charges	\$337	1.08	0.97	0.76	0.81	0.94	0.94	1.43	1.28	0.81	1.03
Imaging	\$48	0.86	1.04	0.83	1.79	0.93	1.06	0.69	1.65	1.16	0.59
Evaluation and Management	\$350	0.83	1.06	1.03	1.20	1.49	1.07	0.93	1.10	1.11	0.99
Other Services	\$51	0.71	2.74	1.48	0.44	1.00	0.21	1.18	0.87	0.32	0.48
Procedures	\$43	1.11	1.34	0.63	1.14	1.20	0.74	0.47	1.36	1.26	0.66
Tests	\$91	0.99	1.01	0.94	1.15	1.25	0.87	0.75	1.06	1.30	0.79
Unclassified	\$7	3.98	0.14	0.40	0.11	0.56	0.22	1.31	0.28	0.41	0.27
Drug Charges	\$1,099	0.94	0.94	0.89	1.37	0.97	1.00	0.96	1.05	1.05	0.69
Sum of charges	\$2,221	0.96	1.02	0.89	1.20	1.08	0.96	1.04	1.13	1.01	0.78

Asthma: Resource Use by Type of Service vs. Overall Mean, by Specialty*

- Results presented for high-volume specialties: 1-5

Description	Overall	Family Practice	Allergy & Immunology	Internal Medicine	Pediatrics	Multi-Specialty Group
N	45,864	13,493	8,850	6,915	5,598	3,721
Inpatient Facility Charge	\$185	0.90	0.51	1.21	0.67	0.82
Durable Medical Equipment	\$9	1.07	0.82	1.13	1.05	1.20
OP Facility Charges	\$337	0.94	0.63	1.15	0.73	0.87
Imaging	\$48	1.02	1.02	1.35	0.49	0.83
Evaluation and Management	\$350	0.80	1.54	0.96	0.86	0.94
Other Services	\$51	0.53	1.87	0.65	0.42	1.36
Procedures	\$43	0.82	1.17	1.34	0.59	0.53
Tests	\$91	0.71	1.77	0.97	0.81	0.90
Unclassified	\$7	0.20	3.86	0.26	0.36	0.22
Drug Charges	\$1,099	0.89	1.32	1.10	0.66	0.85
Sum of charges	\$2,221	0.87	1.21	1.08	0.70	0.87

* Individual episodes may be attributed to as many as three providers, and so the resource use associated with any given episode may be reflected in the results for up to three provider specialties; family physicians will be the subject of further analysis

Asthma-Specific Services and Costs, Top 20% vs. Bottom 80% of Family Physicians

Description	Costs per Episode	% of Total	Services*		Top 20% / Bottom 80%	
			Bottom 80%	Top 20%	Services*	Costs*
Drug Costs	\$946.83	49.3%	9.85	12.26	1.24	1.45
OP Facility	\$315.44	16.4%	1.10	3.38	3.07	5.28
E&M	\$285.01	14.9%	3.42	5.09	1.49	1.99
IP Facility	\$176.11	9.2%	0.01	0.09	8.58	11.09
Tests	\$71.29	3.7%	1.64	2.32	1.41	1.42
Imaging	\$50.51	2.6%	0.61	0.99	1.62	1.56
Procedures	\$36.76	1.9%	0.41	0.66	1.60	2.52
Other	\$24.93	1.3%	0.42	0.59	1.40	5.67
DME	\$10.28	0.5%	0.23	0.26	1.16	1.93
Unclassified	\$1.86	0.1%	0.05	0.05	0.99	1.06
Total	\$1,919.01	100.0%	35.00	46.27	1.32	1.58

Asthma: Cost-Drivers, OP Facility

CPT	Description	Costs per Episode	% of Total	Services per Episode		Top 20% / Bottom 80% Ratio
				Bottom 80%	Top 20%	
.	(blank)	\$181.79	57.6%	0.39	1.82	4.62
74160	Computed tomography, abdomen; with contrast material	\$8.81	2.8%	0.01	0.02	2.82
43239	Upper gastrointestinal endoscopy including esophagoscopy	\$8.31	2.6%	0.01	0.02	1.68
71020	Radiologic examination, chest, two views, frontal and lateral	\$7.61	2.4%	0.06	0.11	1.72
99284	Emergency department visit for the evaluation and management of a patient with a chief complaint of asthma	\$7.29	2.3%	0.01	0.03	1.91
99283	Emergency department visit for the evaluation and management of a patient with a chief complaint of asthma	\$6.44	2.0%	0.02	0.06	3.54
71260	Computed tomography, thorax; with contrast material	\$5.79	1.8%	0.01	0.01	1.92
74150	Computed tomography, abdomen; without contrast material	\$5.25	1.7%	0.01	0.01	1.92
85025	Blood count; complete (CBC), automated (Hgb, Hct, platelets)	\$4.71	1.5%	0.10	0.17	1.65
70486	Computed tomography, maxillofacial area; without contrast material	\$4.16	1.3%	0.01	0.01	1.89
74170	Computed tomography, abdomen; without contrast material	\$3.59	1.1%	0.00	0.01	2.27
94640	Pressurized or nonpressurized inhalation treatment with short-acting beta2 agonist	\$3.40	1.1%	0.03	0.06	1.72
47563	Laparoscopy, surgical; cholecystectomy with cholangiogram	\$3.14	1.0%	0.00	0.00	1.43
99285	Emergency department visit for the evaluation and management of a patient with a chief complaint of asthma	\$3.13	1.0%	0.00	0.01	5.85
94060	Bronchodilation responsiveness, spirometry as in 94030	\$1.99	0.6%	0.01	0.02	2.37
43235	Upper gastrointestinal endoscopy including esophagoscopy	\$1.83	0.6%	0.00	0.00	2.15
76700	Ultrasound, abdominal, real time with image documentation	\$1.82	0.6%	0.01	0.01	1.48
71010	Radiologic examination, chest; single view, frontal	\$1.56	0.5%	0.01	0.02	1.73
94010	Spirometry, including graphic record, total and time	\$1.56	0.5%	0.01	0.02	1.58
95004	Percutaneous tests (scratch, puncture, prick) with or without skin preparation	\$1.45	0.5%	0.00	0.00	1.53

- **Note: 16% of total episode costs overall**

Asthma: Cost-Drivers, E&M Costs

CPT	Description	Costs per Episode	% of Total	Services per Episode		Top 20% / Bottom 80% Ratio
				Bottom 80%	Top 20%	
99213	Office or other outpatient visit for the evaluation and management of the patient, which requires a detailed history and physical examination and medical decision making of low complexity.	\$97.26	34.1%	1.04	1.16	1.12
99214	Office or other outpatient visit for the evaluation and management of the patient, which requires a detailed history and physical examination and medical decision making of moderate complexity.	\$63.34	22.2%	0.66	0.72	1.09
95165	Professional services for the supervision of preparation of a patient for allergen immunotherapy.	\$33.47	11.7%	0.14	0.27	1.97
95117	Professional services for allergen immunotherapy, intradermal.	\$19.88	7.0%	0.75	1.27	1.68
95115	Professional services for allergen immunotherapy, subcutaneous.	\$7.26	2.5%	0.38	0.77	2.03
99215	Office or other outpatient visit for the evaluation and management of the patient, which requires a detailed history and physical examination and medical decision making of high complexity.	\$6.94	2.4%	0.04	0.05	1.24
99284	Emergency department visit for the evaluation and management of the patient, which requires a detailed history and physical examination and medical decision making of moderate complexity.	\$5.34	1.9%	0.02	0.06	2.83
99203	Office or other outpatient visit for the evaluation and management of the patient, which requires a detailed history and physical examination and medical decision making of moderate complexity.	\$5.28	1.9%	0.05	0.05	0.88
92014	Ophthalmological services: medical examination and ophthalmic history.	\$4.18	1.5%	0.05	0.03	0.69
99244	Office consultation for a new or established patient.	\$3.80	1.3%	0.02	0.02	1.29
99204	Office or other outpatient visit for the evaluation and management of the patient, which requires a detailed history and physical examination and medical decision making of moderate complexity.	\$3.69	1.3%	0.02	0.02	0.96
99212	Office or other outpatient visit for the evaluation and management of the patient, which requires a detailed history and physical examination and medical decision making of low complexity.	\$3.16	1.1%	0.06	0.10	1.56
99285	Emergency department visit for the evaluation and management of the patient, which requires a detailed history and physical examination and medical decision making of high complexity.	\$2.85	1.0%	0.01	0.03	4.44
99222	Initial hospital care, per day, for the evaluation and management of the patient, which requires a detailed history and physical examination and medical decision making of high complexity.	\$2.49	0.9%	0.00	0.03	17.16
99245	Office consultation for a new or established patient.	\$2.20	0.8%	0.01	0.02	2.47
92004	Ophthalmological services: medical examination and ophthalmic history.	\$2.18	0.8%	0.02	0.02	0.96
99283	Emergency department visit for the evaluation and management of the patient, which requires a detailed history and physical examination and medical decision making of high complexity.	\$2.06	0.7%	0.02	0.03	1.66
92012	Ophthalmological services: medical examination and ophthalmic history.	\$2.02	0.7%	0.03	0.03	1.04
99232	Subsequent hospital care, per day, for the evaluation and management of the patient, which requires a detailed history and physical examination and medical decision making of high complexity.	\$1.36	0.5%	0.01	0.07	12.57
99202	Office or other outpatient visit for the evaluation and management of the patient, which requires a detailed history and physical examination and medical decision making of moderate complexity.	\$1.34	0.5%	0.02	0.02	1.21

- **Note: 15% of total episode costs overall**