Milliman Research Report

Prepared by:

Kathryn Fitch, RN, MEd
Principal, Healthcare Management Consultant

Kosuke Iwasaki, FIAJ, MAAA
Consulting Actuary

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Ambulatory-care-sensitive admission rates: A key metric in evaluating health plan medical-management effectiveness

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INTRODUCTION

Ambulatory-care-sensitive admissions (ACSAs) are those "for which good outpatient care can potentially prevent the need for hospitalization, or for which early intervention can prevent complications or more severe disease."[1] Although the definition of ACSAs seems to describe the ideal of a health maintenance organization, few health plans measure or monitor ACSA rates, which are closely tied to medical-management effectiveness. In this paper, we provide benchmarks and approaches to fill that gap.

At the same time that policymakers and the public are demanding better outcomes from the healthcare system, the value of health plan medical-management services has come under more scrutiny. Is the expense of providing administrative services to support medical-management operations (including utilization management, case management, and disease management) bringing expected value? Monitoring medical utilization, in particular inpatient admissions per 1,000 members and bed days per 1,000 members, is well established as an outcome metric for measuring the effectiveness of medical-management operations. Inpatient utilization metrics can be adapted to measure how well a healthcare system is preventing ACSAs.

ACSAs, an important subset of inpatient admissions, can further highlight the effectiveness of utilization management as well as case and disease management. We developed Medicare benchmarks for ACSAs and rates under well-managed (WM) and loosely managed (LM) healthcare delivery systems. The data suggests that many Medicare Advantage plans have significant quality and financial opportunities if they can target populations at risk for ACSAs and reduce ACSA rates.

Primer on ambulatory-care-sensitive admissions (ACSAs)

ACSAs are considered a measure of the quality of ambulatory-care delivery in preventing medical complications. High rates of ACSAs might indicate inadequate access to high-quality ambulatory care, including preventive and disease-management services. Although the majority of ACSAs are thought to be the result of factors under the control of the healthcare system, some outside factors may affect the rate of ACSAs, such as poor environmental conditions or lack of patient adherence to evidence-based treatment recommendations.

The Agency for Healthcare Quality and Research (AHRQ) provides definitions and hospital claims data coding logic for 14 ACSAs noted in the table in Figure 1.[2] For our Medicare analysis, we did not include perforated appendix and low birth weight.

FIGURE 1: AHRQ PREVENTION QUALITY INDICATORS

ADULT ASTHMA
ANGINA
BACTERIAL PNEUMONIA
CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD)
CONGESTIVE HEART FAILURE (CHF)
DEHYDRATION
DIABETES LONG-TERM COMPLICATION
DIABETES SHORT-TERM COMPLICATION
DIABETES UNCONTROLLED
HYPERTENSION
LOW BIRTH WEIGHT
LOWER EXTREMITY AMPUTATION
PERFORATED APPENDIX
URINARY INFECTION

ACSAs should figure prominently in chronic-condition and disease-management (DM) efforts. The majority of ACSAs involves an exacerbation of chronic disease and, as such, ACSAs are an important

outcome metric for analyzing the effectiveness of DM programs. DM programs focus primarily on individuals with chronic conditions to aggressively monitor and educate patients in self-management of these chronic conditions. Admissions involving complications of diabetes, chronic obstructive pulmonary disease (COPD), congestive heart failure (CHF), coronary artery disease (CAD), asthma, and hypertension are often targeted by DM programs, and fall into nine of the 12 ACSAs that we analyzed. One of the ACSAs, bacterial pneumonia, could be an indication of the effectiveness of pneumococcal and influenza vaccination programs, another target of DM programs. Only the remaining two diagnoses, dehydration and urinary tract infection, fall outside the DM paradigm because they typically relate to a delay in seeking care or to provider-practice-pattern deficiencies (lack of adherence to practice guidelines or to prescribing appropriate treatment).

ACSA rates will also be an important metric to monitor with the advent of the medical home model programs. Chronic-care management and avoidance of ACSAs is a cornerstone of the medical home model.

Several nationally recognized organizations highlight the need to monitor ACSAs. AHRQ encourages public health groups, policymakers, and healthcare providers to analyze ACSAs in order to measure the outcomes of preventive and outpatient care. AHRQ more recently refined the original Health Cost and Utilization Project (HCUP) quality indicators and developed four separate quality indicators, one of which consists of ACSAs, which it labels prevention quality indicators (PQIs). Other industry experts have reported on rates of ACSAs as a healthcare quality indicator. The Dartmouth Atlas reports a two- to threefold variation in ACSA rates across the United States for Medicare beneficiaries.[3] The Commonwealth Fund also reports on this variation in ACSA rates by state for Medicare beneficiaries and reports on the correlation between interruptions in Medicaid coverage and an increase in ACSAs.[4] The Care Continuum Alliance, formerly the Disease Management Association of America (DMAA), recommends reporting on chronic-disease-related ACSAs as a quality outcome measure.[5]

Why health plans should target ACSAs

What rate of ACSAs should be considered best performance? Although regional variation in ACSAs is well established, this is the first report that provides benchmarks useful for distinguishing between best and poor performance. Our analysis provides benchmarks for rates of ACSAs for a Medicare population under WM versus LM care delivery systems and ties these to particular conditions.

ACSAs should become a dashboard metric for health plans as well as DM vendors, both as a quality indicator and as a focus for cost control. Hospital inpatient is the single largest component of healthcare spending and, for Medicare, inpatient amounted to 47% of the total Medicare-paid claims in 2006.* A key focus of medical-management efforts is to reduce inappropriate underutilization and overutilization of inpatient services. Reducing ACSAs is a tangible and cost-effective strategy and can be an outcome that actually demonstrates the value (or lack thereof) of medical-management operations.

The first step for a health plan or vendor is to evaluate opportunity for reducing ACSA rates by benchmarking performance against well-managed performance. If improvement opportunity is identified, the second step is to predict and target individuals at risk for ACSAs and intervene accordingly.

Although we focus on ACSAs as a significant component of potentially avoidable admissions, we acknowledge two additional types of potentially avoidable inpatient admissions that can be reduced through other medical-management efforts, such as utilization management and provider-profiling initiatives: preference-sensitive conditions[6] (such as spinal fusions, joint replacements, and coronary stents) and supply-sensitive conditions[7] (admissions for conditions that do not meet medical necessity for inpatient care, such as end-of-life care or low-severity exacerbations of chronic conditions). A portion of ACSA diagnoses might actually be categorized as supply-sensitive admissions, medically unnecessary admissions related to admission practice patterns. The ACSAs that we focus on in this analysis are medically necessary admissions but could have been avoided if an individual's clinical status had not deteriorated to such a severe level. These are admissions that could be avoided if better outpatient care was accessed and complied with.

* Based on Milliman's work on Medicare 5% sample data, 2006. The hospital inpatient costs include inpatient physician claims.

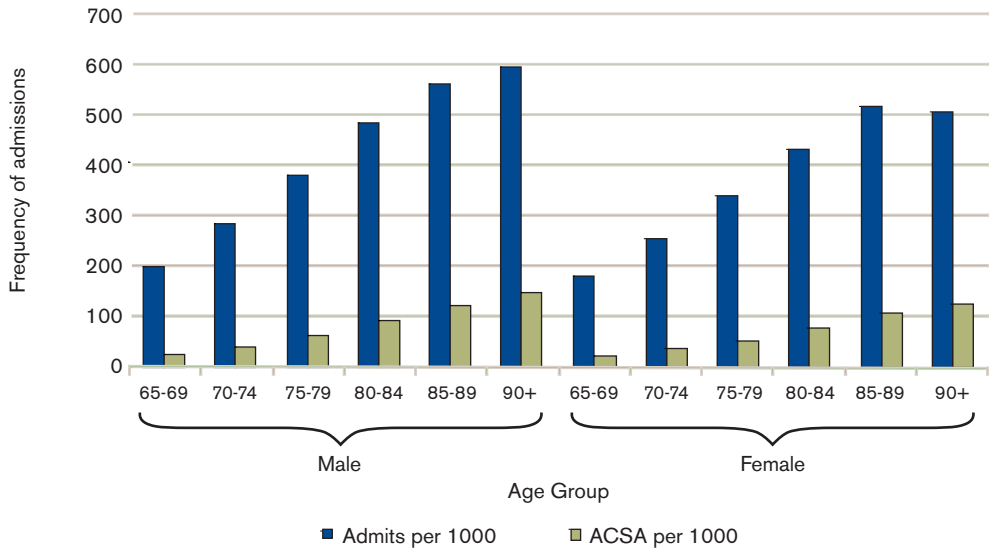
FINDINGS

As described in our methodology section, we used the Medicare 5% sample hospital-inpatient claim data to analyze rates of ACSAs. We used coding logic provided by AHRQ to identify ACSAs. We provide national average rates of ACSAs by diagnosis. Just as the Milliman Health Cost Guidelines™ utilization models need demographic and regional adjustments to make apples-to-apples comparisons, the ACSA rates we present here follow suit.

Incidence of hospital admissions and ACSAs by demographics

ACSAs make up 14% of total inpatient admissions for Medicare beneficiaries 65 years of age and over. The portion of ACSAs for beneficiaries with particular chronic diseases will be higher than the total population rate. The chart in Figure 2 shows that the ACSA rate for males is higher than that for females, although the ACSA portion of total admits is similar between sexes.

FIGURE 2: INCIDENCE OF HOSPITAL ADMISSIONS AND ACSA BY DEMOGRAPHIC GROUP



Data sources: Milliman analysis of Medicare 5% sample data. 2006; AHRQ Prevention Quality Indicators, version 3.2.

Incidence of ACSAs by condition

The table in Figure 3 shows the portion of total ACSAs that each condition contributes using the AHRQ condition categorization. Congestive heart failure (CHF) is the largest contributor with 32%, followed by bacterial pneumonia with 26%. Effective DM programs that target CHF would be expected to produce a reduction in CHF admissions.

FIGURE 3: INCIDENCE OF ACSAS BY CONDITION

	ACSA PER 1,000	% OF CLASS
DIABETES SHORT-TERM COMPLICATION	0.3	0.5%
DIABETES UNCONTROLLED	0.3	0.5%
LOWER EXTREMITY AMPUTATION	0.7	1.3%
ANGINA	0.7	1.3%
HYPERTENSION	1.1	2.0%
ADULT ASTHMA	1.8	3.3%
DIABETES LONG-TERM COMPLICATION	2.4	4.3%
DEHYDRATION	4.0	7.1%
URINARY INFECTION	6.2	11.2%
COPD	6.6	11.9%
BACTERIAL PNEUMONIA	14.1	25.5%
CHF	17.6	31.8%
TOTAL ACSA	55.4	100.0%

Data sources: Milliman analysis of Medicare 5% sample data, 2006; AHRQ Prevention Quality Indicators, version 3.2.

Because many health plans analyze their inpatient stays by diagnosis-related group (DRG), the table in Figure 4 points to how routine retrospective DRG analysis can be combined with ACSA reporting to identify potential opportunities for better patient management and reduction in ACSAs. We applied the AHRQ coding logic to the Medicare 5% inpatient claims data and identified Medicare-severity DRGs (MS-DRGs) for which all or a portion of each MS-DRG meet ACSA coding criteria. The majority of ACSAs (82%) fall into the first 11 MS-DRGs in Figure 4. The overwhelming majority of admissions within each of the higher-frequency MS-DRGs were identified as ACSAs. For less frequently noted MS-DRGs in Figure 4, the portion of those identified as an ACSA was much lower. MS-DRGs are coded at hospital discharge and reflect treatments rendered and severity of conditions throughout the course of the hospital stay; therefore, ACSAs could appear across a wide range of DRGs. However, most MS-DRGs associated with ACSAs fall into a narrow range that corresponds to the underlying condition.

FIGURE 4: FREQUENCY OF ACSA BY MS-DRG (CMS VERSION 25)

RANK	MS-DRG	DESCRIPTION	ACSA PER 1000	% OF TOTAL ACSA
1	194	SIMPLE PNEUMONIA & PLEURISY W CC	7.14	12.9%
2	292	HEART FAILURE & SHOCK W CC	6.28	11.3%
3	293	HEART FAILURE & SHOCK W/O CC/MCC	5.38	9.7%
4	690	KIDNEY & URINARY TRACT INFECTIONS W/O MCC	5.03	9.1%
5	291	HEART FAILURE & SHOCK W MCC	4.52	8.2%
6	195	SIMPLE PNEUMONIA & PLEURISY W/O CC/MCC	4.24	7.6%
7	192	CHRONIC OBSTRUCTIVE PULMONARY DISEASE W/O CC/MCC	3.81	6.9%
8	641	NUTRITIONAL & MISC METABOLIC DISORDERS W/O MCC	3.15	5.7%
9	191	CHRONIC OBSTRUCTIVE PULMONARY DISEASE W CC	2.47	4.5%
10	193	SIMPLE PNEUMONIA & PLEURISY W MCC	2.08	3.8%
11	190	CHRONIC OBSTRUCTIVE PULMONARY DISEASE W MCC	1.20	2.2%
12	689	KIDNEY & URINARY TRACT INFECTIONS W MCC	1.03	1.9%
13	305	HYPERTENSION W/O MCC	0.90	1.6%
14	638	DIABETES W CC	0.76	1.4%
15	640	NUTRITIONAL & MISC METABOLIC DISORDERS W MCC	0.74	1.3%
16	639	DIABETES W/O CC/MCC	0.68	1.2%
17	311	ANGINA PECTORIS	0.64	1.2%
18	287	CIRCULATORY DISORDERS EXCEPT AMI, W CARD CATH W/O MCC	0.63	1.1%
19	203	BRONCHITIS & ASTHMA W/O CC/MCC	0.37	0.7%
20	208	RESPIRATORY SYSTEM DIAGNOSIS W VENTILAT OR SUPPORT <96 HOURS	0.25	0.5%
21	202	BRONCHITIS & ASTHMA W CC/MCC	0.24	0.4%
22	637	DIABETES W MCC	0.23	0.4%
23	074	CRANIAL & PERIPHERAL NERVE DISORDERS W/O MCC	0.23	0.4%
24	280	ACUTE MYOCARDIAL INFARCTION, DISCHARGED ALIVE W MCC	0.20	0.4%
25	286	CIRCULATORY DISORDERS EXCEPT AMI, W CARD CATH W MCC	0.16	0.3%
26	207	RESPIRATORY SYSTEM DIAGNOSIS W VENTILATOR SUPPORT 96+ HOURS	0.16	0.3%
27	981	EXTENSIVE O.R. PROCEDURE UNRELATED TO PRINCIPAL DIAGNOSIS W MCC	0.14	0.3%
28	264	OTHER CIRCULATORY SYSTEM O.R. PROCEDURES	0.13	0.2%
	OTHER DRGS		2.60	4.7%
	TOTAL		55.41	100%

Data sources: Milliman analysis of Medicare 5% sample data, 2006; AHRQ Prevention Quality Indicators, version 3.2.

We emphasize that not all ACSAs can be avoided. Our data analysis suggests that about 40% are being avoided in best-practice systems compared with the national average.

For WM delivery systems, ACSAs make up a somewhat smaller portion of admissions than for LM systems. In other words, ACSAs get reduced somewhat more than other admissions. In the table in Figure 5, we show the admissions per 1,000 for two different delivery systems characterized by their total admits per 1,000–WM at 202.7 admits per 1,000 and LM at 330.6 admits per 1,000, as shown in the Total Admissions row. We note that these ACSAs are distributed across a number of MS-DRGs, shown in Figure 4. The construction of these models is described in the methodology section. These are reported on a national level for a standard Medicare elderly non-Medicaid demographic distribution. The opportunity moving from LM to WM amounts to a 41% reduction in ACSAs or about 20 admissions per 1,000 beneficiaries. The total opportunity for reducing admissions is a reduction of about 120 admits per 1,000, so ACSA reduction accounts for about 16% of the potential improvement.

FIGURE 5: WL/LM ACSA PER 1,000 BY CONDITION

CONDITION	ACSA PER 1,000 WM	ACSA PER 1,000 LM	MANAGEMENT MARGIN	COST PER ACSA
BACTERIAL PNEUMONIA	9.3	13.5	31%	$7,000
CHF	8.9	16.5	46%	$10,300
URINARY INFECTION	3.6	5.7	37%	$7,200
COPD	2.9	5.5	46%	$4,900
DEHYDRATION	1.2	2.3	48%	$7,600
DIABETES LONG-TERM COMPLICATION	0.8	1.6	47%	$5,400
ADULT ASTHMA	0.7	1.3	47%	$7,600
ANGINA	0.5	0.7	26%	$5,800
HYPERTENSION	0.4	0.9	60%	$4,200
LOWER EXTREMITY AMPUTATION	0.2	0.3	46%	$6,000
DIABETES UNCONTROLLED	0.1	0.3	49%	$6,200
DIABETES SHORT-TERM COMPLICATION	0.1	0.2	47%	$18,400
TOTAL ACSA	28.7	48.7	41%	$7,200
TOTAL ADMISSIONS (ACSA AND NON-ACSA)	202.7	330.6	39%	
% ACSA IN TOTAL ADMISSIONS	14.1%	14.7%		

- Costs are based on Medicare 5% paid claims and trended to 2009 by 3% annual trend rate.
- Management margin = (ACSA per 1,000 LM – ACSA per 1,000 WM)/ACSA per 1,000 LM, which suggests the percentage of potential savings for LM.
- Categories of diseases follow the definition by AHRQ of Prevention Quality Indicators, version 3.2.

Data sources: Milliman analysis of Medicare 5% sample data, 2006; Milliman Health Cost Guidelines and DRG models; and AHRQ Prevention Quality Indicators, version 3.2.

Although we show total admissions under a WM system at 202.7 per 1,000, reducing the ACSA admissions to WM through aggressive preventive and DM efforts, without reducing preference-sensitive or supply-sensitive admission rates, would result in significant cost savings. Of the 330.6 admissions per 1,000 in a LM system, we would consider 128 to be potentially avoidable. A portion of these are likely preference-sensitive and supply-sensitive admissions. We have identified 20 per 1,000 as ACSAs.

A Medicare Advantage prescription-drug plan with 10,000 Medicare members that is performing at an LM level would have about 500 ACSAs annually. Moving to WM performance could reduce ACSAs to about 290, or a reduction of 210 admissions. Using average paid amounts for ACSAs of $7,200 would result in savings of $1.5 million in inpatient facility costs. This does not include inpatient physician claims or medical-claim costs after discharge.

IMPLICATIONS AND RECOMMENDATIONS

ACSA rates are a credible, meaningful, and easily measured administrative-claims-data outcome metric. Traditional medical-management administrative efforts are largely focused on reducing lengths of stay or avoiding admissions by applying medical necessity criteria on a case-by-case basis—often denying payment for services that do not meet medical-necessity criteria. Avoiding ACSAs is less dependent on administrative process than traditional medical management but more dependent on clinical practice and network capabilities because it requires patient access to appropriate ambulatory care. However, the lack of a linked administrative process should not excuse the lack of standard outcome reporting of ACSAs for internal management or external customers. With so much recent focus on primary care, DM, prevention, and wellness, it is time to enhance outcomes reporting with credible metrics that demonstrate the value of these expensive efforts. We believe ACSA rates meet that challenge.

We suggest that health plans track and follow changes in ACSA rates by population. We provide national benchmarks for standard Medicare demographics, which are linked to WM and LM aggregate utilization rates. Actuaries familiar with those models will understand the considerations (such as demographics and regional characteristics) needed to adjust those benchmarks for a particular plan's environment and strategy.

This paper has focused on measuring ACSA outcomes, but we would like to end with a comment on practical steps to avoid ACSAs. We expect that many patients with ACSAs would be identified by the typical DM program targeting the five major chronic diseases (diabetes, COPD, CHF, asthma, and CAD). However, only a small portion of the 30% of Medicare beneficiaries typically targeted by DM programs might be at high risk for ACSAs. If DM or similar efforts are to be effective at reducing ACSAs, they will need to identify individuals at the highest risk for ACSAs so that outreach efforts and resources can be used efficiently. The usual predictive models are not designed for this task. We expect our current research into this topic will develop innovative approaches to predict individuals more likely to experience ACSAs, so these individuals could be targeted for aggressive primary-care outreach.

We hope our report provides health plans with an important and practical metric for measuring the value of medical-management operations.

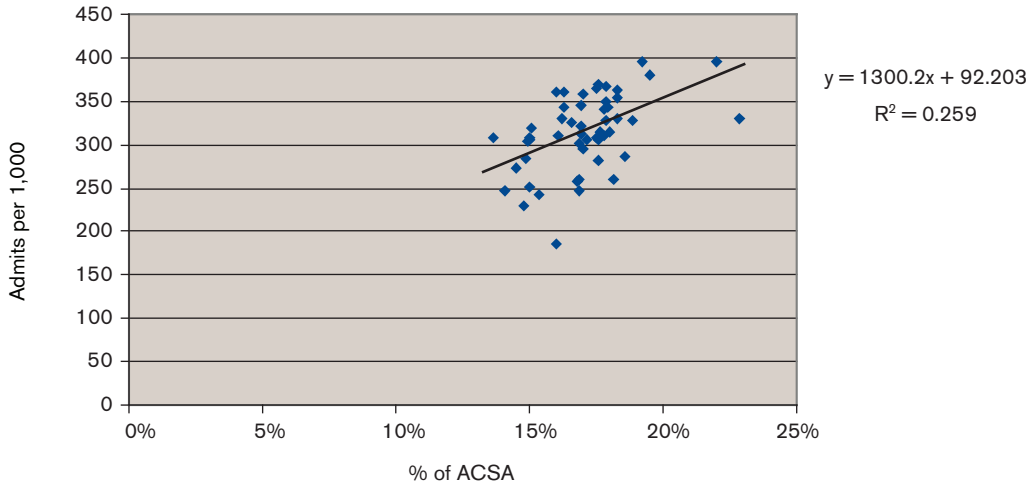
METHODOLOGY

This section describes the data analysis we performed and the data we examined.

Regression between % ACSAs and admits per 1,000

The chart in Figure 6 shows a positive relationship between percentages of ACSAs in total hospital admissions and frequency of total hospital admissions (admits per 1,000). Each point represents one state. This suggests that better management of ACSAs is often associated with better management of other kinds of admissions, such as preference-sensitive or supply-sensitive admissions.

FIGURE 6: REGRESSION BETWEEN % OF ACSAS IN HOSPITAL ADMISSIONS AND ADMITS PER 1,000

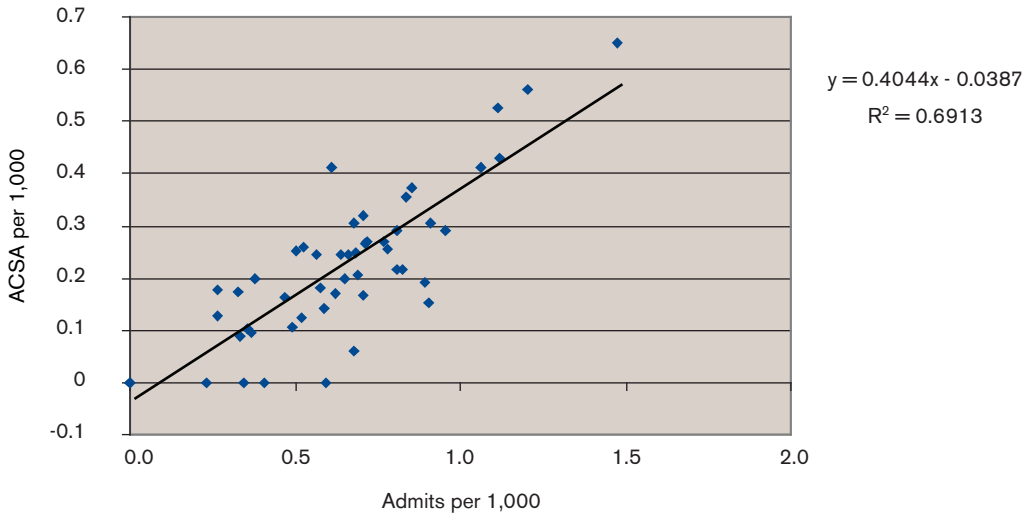


Data sources: Milliman analysis of Medicare 5% sample data, 2006; AHRQ Prevention Quality Indicators, version 3.2.

Regression between admits per 1,000 and ACSAs per 1,000 by MS-DRG

We found a positive relationship between admits per 1,000 and ACSAs per 1,000 at the MS-DRG level. We performed regression between admits per 1,000 and ACSAs per 1,000 for each MS-DRG identified as an ACSA. The chart in Figure 7 is an example of the case of *Bronchitis & Asthma w CC/MCC* (MS-DRG 202). Each point represents a state.

FIGURE 7: REGRESSION BETWEEN ADMITS PER 1,000 AND ACSA PER 1,000 OF *BRONCHITIS & ASTHMA W CC/MCC* (MS-DRG 202)



Data sources: Milliman analysis of Medicare 5% sample data, 2006; AHRQ Prevention Quality Indicators, version 3.2.

Because of the positive relationship, we were able to apply the results of the MS-DRG-level regressions to the existing WM/LM models. In this way, we created models showing the ACSAs consistent with a WM system. The table in Figure 5 summarizes the benchmarks.

Data sources

- Inpatient claim data and denominator data of Medicare 5% (2006) with MS-DRG (CMS Version 25).
- Agency for Healthcare Research and Quality (AHRQ), Prevention Quality Indicators, version 3.2 (March 10, 2008), downloaded from http://www.qualityindicators.ahrq.gov in October 2008.
- Milliman Health Cost Guidelines (July 1, 2008), Inpatient Hospital Detail By MS-DRG (CMS, version.25), Over-65 Population, Well-managed and Loosely Managed Care.

Identification of ACSA admissions

Population: Medicare beneficiaries who were not enrolled in a Medicare Advantage plan, not eligible for Medicaid, and over age 65.

Inpatient claims included in this analysis: All inpatient claims in Medicare 5% (2006) of beneficiaries meeting criteria described above.

Identification of ACSA: Prevention Quality Indicators.

All inpatient claims included in any of the categories defined by AHRQ

- We excluded two of the ACSAs identified by AHRQ: low birth weight rate and perforated appendix admission rate.
- We excluded admissions transferred from another hospital, which are identified as having "A (Transfer From Hospital)" or "A (Transfer from a Critical Access Hospital)" in "Claim Source of Inpatient Admission (SRC_ADMS)" field.

Demographic adjustment between states

We performed a demogaphic adjustement by stratifying the population and admissions for each state into demographic categories and recompositing admission rates using a standard demographic.

Groupings for demographic adjustement: Sex and five-year age bands.

Standard demographics: Non-excluded population for nation.

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1301 Fifth Avenue, Suite 3800
Seattle, WA 98101
(206) 624-7940

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