

Asthma Emergency Department Cost Report



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Asthma-related Costs

Understanding the economic burden of asthma is an important part of determining the effect of asthma on society (i.e., families, the health care system, and the community). Asthma is associated with large health care expenditures that include direct and indirect costs both to society and the individual with asthma. Direct costs may include trips to the emergency department (ED) or hospital, while indirect costs include lost work or school days. Asthma is also associated with the loss of future potential earnings related to both morbidity and mortality¹.

In the United States, one study estimated that the total cost of asthma to society was \$56 billion, with about \$3.8 billion in productivity losses due to morbidity². It also found that about 12.5% of the total costs came from direct costs². In 2011, the total charge for treat-and-release asthma-related ED visits in Utah (does not include those who were treated and admitted) was about \$7.1 million; the total charge for hospitalizations that year was \$17.6 million. This means that an estimated \$24.7 million was charged for asthma-related ED visits and hospitalizations. Furthermore, if \$24.7 million is 12.5% of total charges², then total charges (including direct and indirect costs) incurred in Utah for asthma-related episodes in 2011 was estimated at \$192 million. Total costs consist of direct costs (e.g., ED visits and hospitalizations) and indirect costs (e.g., lost work and school days).

To reduce costs, especially those related to ED visits and hospitalizations, individuals with asthma need access to quality asthma care. The goal of quality care is to reduce the effects of asthma symptoms through guidelines-based asthma care, appropriate self-management, and community support. When an individual lacks quality asthma care and/or has poor asthma management he/she may utilize the emergency department as a way to treat his or her asthma symptoms on an ongoing basis. If symptoms are severe enough and result in hospitalization, even more invasive and costly treatments to regulate breathing, like respiratory intubation, may be required.

Addressing asthma care in order to reduce ED visit and hospitalization rates and their associated costs is not only physically,



Introduction

monetarily, and emotionally beneficial for those with asthma, but also has positive implications for society at large through reducing costs to Medicare and Medicaid. In Utah, during 2011, Medicaid and Medicare made up almost half (\$3 million) of the total charges related to asthma treat-and-release ED visits.

Purpose of this Report

This report details charges incurred by Utah's health care system for asthma-related emergency department visits. The presentation of charges in this report seeks to provide the Utah Asthma Program and community health partners data that will illuminate the scope of the financial impact of asthma on insurance payers and targeted populations, thus helping to target interventions, such as asthma education reimbursement for health care providers.

This report will highlight changes in asthma-related ED charges over time and differences among local health departments (LHDs). Specifically, it will present how charges within LHDs have changed over time and the similarities and differences in median and total charges. In addition, it will also identify the factors that impact median and total charges within each LHD. Finally, it will provide detailed descriptions of the prices charged to payers like commercial health insurance, Medicaid, and Medicare.

Data Considerations

Data for ED charges come from the Emergency Department Encounter Database, managed by the Bureau of Emergency Medical Services and the Office of Health Care Statistics. The database contains information on complete billing, which includes medical codes, personal characteristics describing a patient, services received, and charges billed for each patient ED encounter. The data are comprehensive, as they come from billing forms that include a diagnosis code for all visits. However, using billing forms makes accessing quality data related to other factors that contribute to asthma severity like race, income, and education difficult. Access can be found on the Utah Department of Health IBIS website at <http://ibis.health.utah.gov>.

Extraneous data were dealt with by using medians instead of means. For most analyses, due to outliers in the charge data for some LHDs, median values were used to represent the average charge per visit rather than the mean value. Also, data are charge data and do not indicate cost. This means that the payment or the cost may be different from what was charged by the emergency department.

In reading this report, a few things must be noted to ensure accurate data interpretation. When examining total charges, certain factors which influence differences in total charges among LHDs are considered. These include the number of visits, patient demographics, and additional diagnoses. To ignore these factors would result in a misunderstanding of the financial burden of asthma across LHDs. Total charges can be useful for identifying populations that have a large financial burden regardless of population characteristics.

Other factors to consider when analyzing the data are the population characteristics for each payer type and LHD. For example, Medicare typically serves those 65+, while CHIP serves those 18 and younger. Also, because commercial insurance can be expensive, those with commercial insurance will likely have a higher income when compared to those on Medicaid. These differences in payer population will likely affect the types of services rendered, thus affecting charges. In terms of population characteristics for LHDs, Southwest has a large population of 65+, while those living in Summit have the highest median income in the state. Again, these population characteristics will likely affect the services rendered and charges incurred.

Finally, one term must be defined in order to understand the data patterns. In the section highlighting prices charged for a specific procedure, the billing code “No procedure” generally refers to anything that does not involve an incision. “No procedure” or typical care for asthma may include administration of medications to stabilize breathing and treat respiratory symptoms, oxygen administration, and observation.



Asthma-related Emergency Department Visit Charges

In Utah during 2011, there were a total of 6,149 asthma-related emergency department (ED) visits (treat-and-release and treat-and-admit) with asthma as the primary diagnosis (determined by ICD-9 code 493). This is about 22 asthma-related ED visits per 10,000 population. Charges totaled around \$21.3 million. Not only is this number higher than in 2010 (\$20.2 million), total charges for treat-and-release ED visits have also been increasing while the total number (count) of ED visits (treat-and-release) has been decreasing. From 2002 to 2011, total charges for asthma-related ED visits (treat and release) nearly tripled, from about \$2.5 million to \$7.2 million, a 183% increase, while the total number of asthma-related ED visits (treat-and-release) decreased by about 15%, from 5,649 in 2002 to 4,919 in 2011.

ED Charges Over Time

Figure 1 highlights how the median charge for asthma-related ED visits in Utah (gray line) has been steadily increasing over the last 10 years throughout the state (all colors). However, several LHDs, including Tooele, Davis, Salt Lake County, and Weber-Morgan, have been consistently higher than all other LHDs, while TriCounty, Central, and Wasatch have been consistently lower. There were also several LHDs that showed a sharp increase at one point in time. For example, Summit (lavender line) shows the sharpest increase in median asthma-related ED charges, from about \$500 in 2008 to about \$1,100 in 2011.

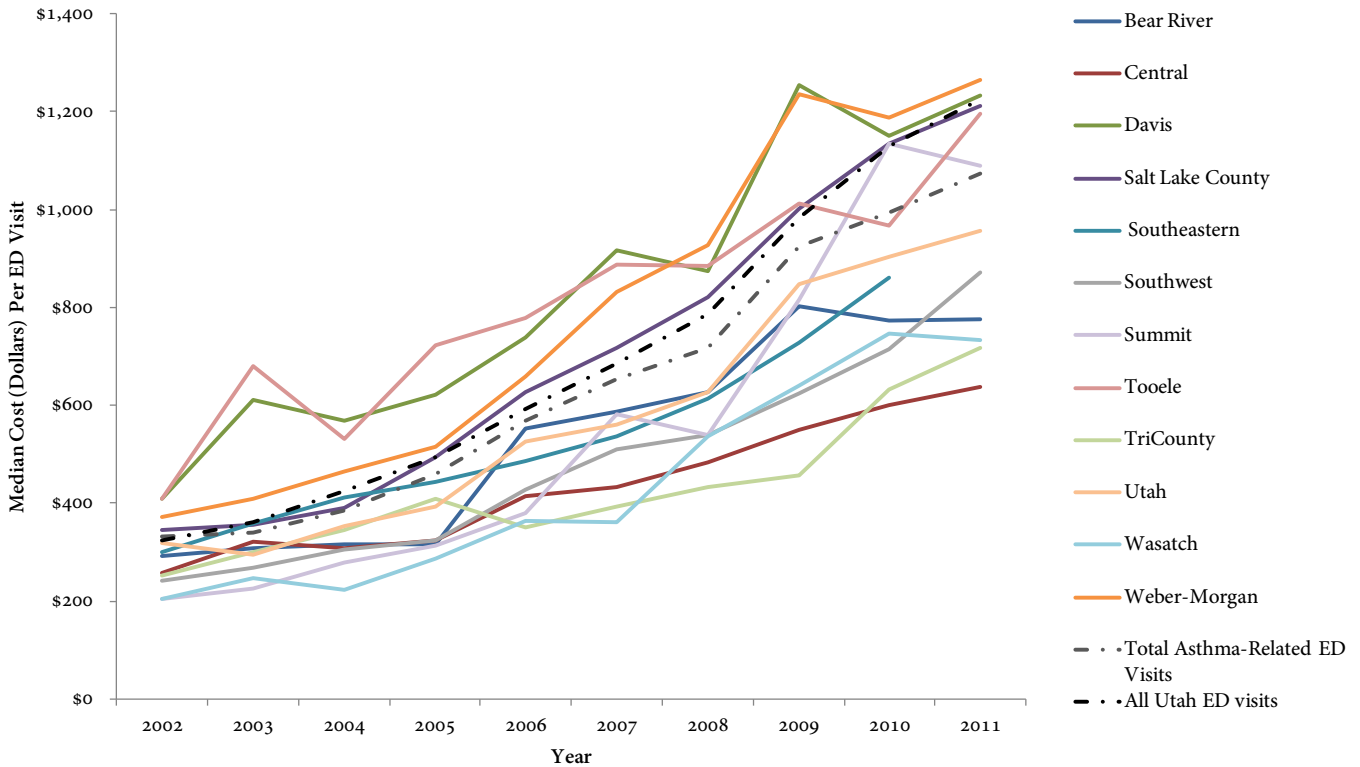
To lend perspective to the rate of increase for asthma-related ED median charges, median charges for all Utah ED visits (black dotted line) were included in Figure 1. From 2002 to 2011, median charges for all Utah ED visits showed an increase similar to the asthma-related total (gray dotted line) and LHDs (all other colors).

Although the average charge for all LHDs was higher in 2011 than in 2002, the rate at which this difference occurred varied according to LHD. Using linear regressions with year as the independent variable and asthma-related ED median charges as the dependent variable (shown in Table 1), results showed that Weber-Morgan had the largest increase from year to year ($x=113.5$). For every one-year increase there was a \$113.50 increase in the the asthma-related ED visit median charge. Central had the smallest increase at \$42.90, meaning that for every one year increase, there was a \$42.90 increase in asthma-related median charges.

Notably, Central, TriCounty, and Wasatch are all rural LHDs with some of the lowest median charges initially and over time (Figure 1). They also had some of the smallest coefficients (Table 1), indicating that rural areas with low median charges stayed low because of their slower rate of increase. On the other hand, Davis, Salt Lake County, and Weber-Morgan are urban LHDs with some of the highest median charges initially and over time. They also had some of the largest coefficients, indicating that urban areas with higher median charges remained high because of their faster rate of increase.

Asthma-related Emergency Department Visit Charges

Figure 1. Asthma-related ED Median Charges (Dollars) by Utah LHD, 2002-2011



Source: Utah Emergency Department Encounter Database, 2002-2011. Note the primary diagnosis code ICD 493 was used to identify emergency department visits due to asthma. Data include patients who were treated and released.

Table 1. Linear Regression of Year (2002-2011) on Asthma-related ED Median Charge, Utah, Coefficients

| LHD | Coefficient of average increase per ED visit (dollars) |
|------------------|--|
| Utah Total | 89.7 |
| Bear River | 66.8 |
| Central | 42.9 |
| Davis | 94.2 |
| Salt Lake County | 105.2 |
| Southeastern | 59.7 |
| Southwest | 67.3 |

| LHD | Coefficient of average increase per ED visit (dollars) |
|--------------|--|
| Summit | 108.4 |
| Tooele | 73.1 |
| TriCounty | 43.6 |
| Utah County | 79.9 |
| Wasatch | 67.1 |
| Weber-Morgan | 113.5 |

Source: Utah Emergency Department Encounter Database, 2002-2011. Note the primary diagnosis code ICD 493 was used to identify emergency department visits due to asthma. Data include patients who were treated and released.

Asthma-related Emergency Department Visit Charges

ED Charges by LHD

To compare the social and economic burden of asthma among LHDs, the following table presents asthma-related ED visits, rates, and charges for all LHDs in 2011. Because several LHDs have a similar number of asthma-related ED visits but differently sized populations, rates are provided to offer comparable numbers for understanding the asthma burden within each LHD.

Regardless of population size, LHDs with a similar number of asthma-related ED visits should have a similar total charge; however, this is not always the case. For example, while Bear River and Central have a similar number of ED visits for 2011, Bear River has a nearly 40% higher total charge than Central (see Table 2). The difference in total charges between Bear River and Central is likely due to a higher median charge per visit and a few charges for expensive procedures in Bear River (see Table 3). This pattern is also evident in Wasatch and Summit LHDs where they have about the same number of ED visits but Summit had more than twice the total charges of Wasatch. Unlike Bear River and Central, the difference in total charges between Summit and Wasatch is likely due to a higher median charge in Summit (Table 3).

Table 2. Summary of Utah Asthma-related ED visits, Rates, and Charges, 2011

| LHD | Number of ED Visits | Percent of Total Visits | Age-adjusted ED Visits (per 10,000) and Confidence Intervals | Median Charge per Visit | Highest Charge | Total Charges |
|------------------|---------------------|-------------------------|--|-------------------------|----------------|---------------|
| Bear River | 262 | 5% | 15.0 (13.1-16.9) | \$776 | \$8,113 | \$269,578 |
| Central | 231 | 5% | 30.6 (26.7-35.0) | \$637 | \$12,509 | \$192,727 |
| Davis County | 415 | 8% | 12.9 (11.6-14.3) | \$1,233 | \$12,177 | \$671,910 |
| Salt Lake County | 2,041 | 41% | 19.1 (18.2-19.9) | \$1,210 | \$17,446 | \$3,340,712 |
| Southeastern | 116 | 2% | 20.2 (16.7-24.3) | \$860 | \$5,716 | \$130,874 |
| Southwest | 322 | 7% | 15.9 (14.2-17.8) | \$870 | \$7,704 | \$386,602 |
| Summit County | 49 | 1% | 13.3 (9.7-17.7) | \$1,090 | \$15,386 | \$83,277 |
| Tooele County | 188 | 4% | 30.6(26.2-35.4) | \$1,195 | \$13,302 | \$318,708 |
| TriCounty | 208 | 4% | 37.6 (32.5-43.3) | \$717 | \$6,919 | \$196,420 |
| Utah County | 535 | 11% | 9.5 (8.7-10.4) | \$955 | \$16,244 | \$660,030 |
| Wasatch County | 38 | 1% | 15.5 (10.8-21.6) | \$732 | \$4,366 | \$39,205 |
| Weber-Morgan | 514 | 10% | 20.8 (19.0-22.7) | \$1,264 | \$10,577 | \$886,550 |
| Utah Total | 4,919 | 100% | 17.0 (16.5-17.5) | \$1,074 | \$17,446 | \$7,176,593 |

Source: Utah Emergency Department Encounter Database, 2011. Note the primary diagnosis code ICD 493 was used to identify emergency department visits due to asthma. Data include patients who were treated and released.

Asthma-related Emergency Department Visit Charges

Table 3 presents the number of procedures and corresponding median charges for which asthma was listed as the primary diagnosis for each LHD.

The majority of asthma-related ED procedures were billed as “No Procedure,” meaning that most charges were likely incurred through administration of medications used to stabilize breathing and treat respiratory symptoms, administration of oxygen, and observation. “No Procedure” also accounted for the large majority of charges within each LHD. The median charge for “No Procedure” ranged from \$637 in Central to almost double that at \$1,264 in Weber-Morgan (Table 3). Rural LHDs, including Bear River, Central, Southeastern, Southwest, TriCounty, and Wasatch, tended to have a lower median charge for “No Procedure” than the urban LHDs, which include Davis, Salt Lake County, Utah County, and Weber-Morgan.

The “No Procedure” median charge range for rural LHDs was \$637 in Central to \$870 in Southwest. The range for urban LHDs was \$955 in Utah County to \$1,264 in Weber-Morgan. “No Procedure” median charges were not the only charges that ranged in price among LHDs. Charges for other procedures like “Indwelling Catheters” ranged in median charge from \$4,768 in Bear River to \$12,275 in Tooele. The differences in “No Procedure” median charge between rural and urban LHDs is also evident in all Utah ED visits, not just those related to asthma (data can be requested from the Utah Asthma Program).

Table 3. Type of Charge for Asthma-related ED visits, Number and Median Charge, by Utah LHD, 2011

| LHD | Number of ED Encounters | Number of “No Procedure” Encounters | Indwelling Catheters | Traction, Splints, and Other Wound Care | Suture of Skin and Subcutaneous Tissue |
|------------------|-------------------------|-------------------------------------|----------------------|---|--|
| Bear River | 262 | 260 (\$775) | \$4,768 | \$894 | |
| Central | 231 | 231 (\$637) | | | |
| Davis | 415 | 413 (\$1,233) | | | \$1,542 |
| Salt Lake County | 2,041 | 2034 (\$1,209) | | \$1,453 | \$2,282 |
| Southeastern | 116 | 115 (\$854) | | | |
| Southwest | 322 | 322 (\$870) | | | |
| Summit | 49 | 49 (\$1,090) | | | |
| Tooele | 188 | 186 (\$1,194) | \$12,275 | | |
| TriCounty | 208 | 201 (\$716) | | | |
| Utah | 535 | 534 (\$955) | | | |
| Wasatch | 38 | 38 (\$732) | | | |
| Weber-Morgan | 514 | 513 (\$1,264) | | | |

Source: Utah Emergency Department Encounter Database, 2011. Note the primary diagnosis code ICD 493 was used to identify emergency department visits due to asthma. Data include patients who were treated and released.

Asthma-related Emergency Department Visit Charges

Table 3 continued. Type of Charge for Asthma-related ED visits, Number and Median Charge, by Utah LHD, 2011

| LHD | Diagnostic Spinal Tap | Nonoperative Removal of Foreign Body | Other Therapeutic Procedures | Incision and Drainage, Skin and Subcutaneous Tissue | Other Vascular Catheterization, Not Heart |
|------------------|-----------------------|--------------------------------------|------------------------------|---|---|
| Bear River | | | | | |
| Central | | | | | |
| Davis | | | | | |
| Salt Lake County | \$4,819 | \$702 | | \$4,011 | |
| Southeastern | | | | | |
| Southwest | | | | | |
| Summit | | | | | |
| Tooele | | | | | |
| TriCounty | | | \$1,369 | | |
| Utah | | | | | \$11,544 |
| Wasatch | | | | | |
| Weber-Morgan | | | | | |

| LHD | Other Respiratory Therapy | Diagnostic Procedures on Nose, Mouth and Pharynx | Other Diagnostic Radiology and Related Techniques | Respiratory Intubation and Mechanical Ventilation | Treatment, Fracture or Dislocation of Lower Extremity (Other Than Hip or Femur) |
|------------------|---------------------------|--|---|---|---|
| Bear River | | | | | |
| Central | | | | | |
| Davis | | \$3,587 | | | |
| Salt Lake County | | | | \$5,802 | |
| Southeastern | | | | \$3,865 | |
| Southwest | | | | | |
| Summit | | | | | |
| Tooele | | | | | \$4,277 |
| TriCounty | \$636 | | \$743 | | |
| Utah | | | | | |
| Wasatch | | | | | |
| Weber-Morgan | | | | \$6,294 | |

Source: Utah Emergency Department Encounter Database, 2011. Note the primary diagnosis code ICD 493 was used to identify emergency department visits due to asthma. Data include patients who were treated and released.

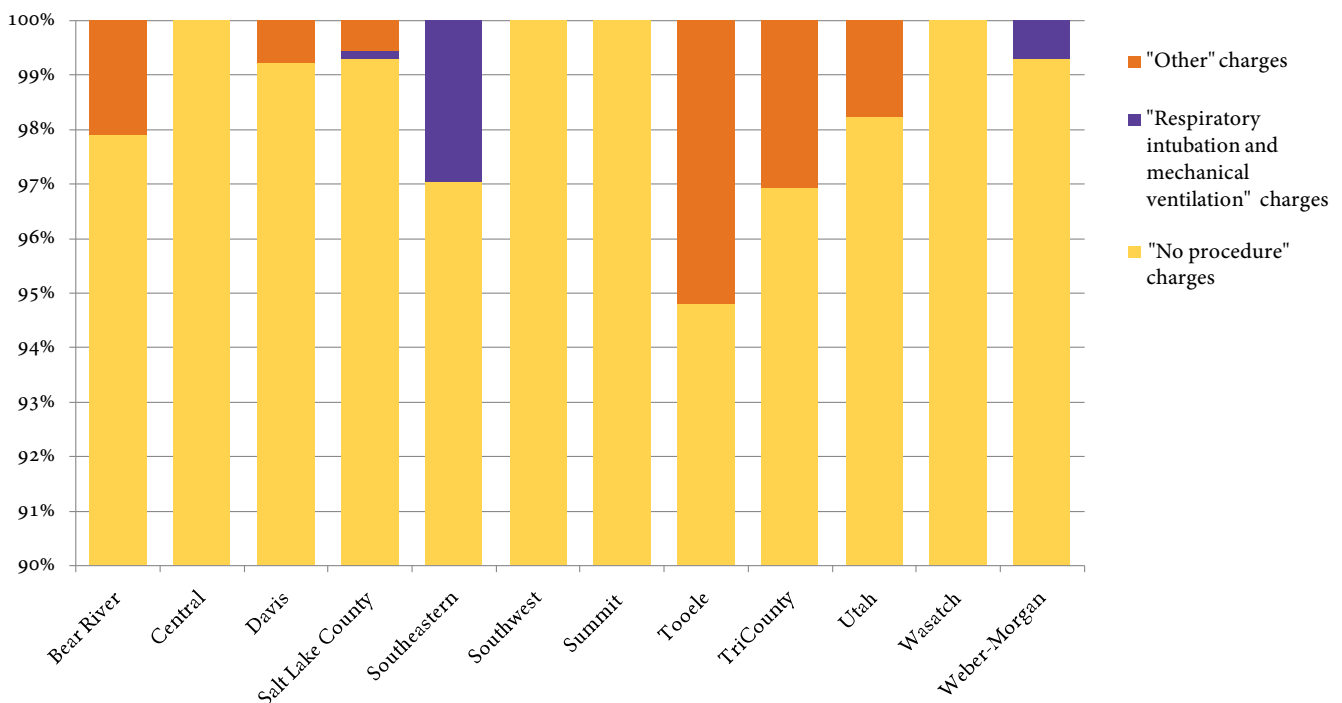
Asthma-related Emergency Department Visit Charges

The majority of asthma-related ED procedures were billed as “No Procedure.” However, for some LHDs, a small proportion of procedures may have been related to injuries or illnesses that occurred as a result of an asthma attack. For example, therapy with inhaled bronchodilators and corticosteroids is usually sufficient to ameliorate symptoms in patients with acute asthma; however, some patients will develop respiratory failure and require supportive care with mechanical ventilation (approximately 4 percent of all patients hospitalized for acute asthma)³.

Respiratory intubation and mechanical ventilation were other commonly reported procedures with high median charges (Table 3) and accounted for about 1% to 3% of total charges for some LHDs (Figure 2). In 2011, this procedure ranged from \$3,865 in Southeast to \$6,294 in Weber-Morgan (Figure 2). This costly procedure is unnecessary when asthma symptoms are easily treated and do not reach critical levels like respiratory failure. Also, other expensive procedures like treatment of fractures and sutures related to falls which possibly occurred as a result of an asthma attack could be prevented if asthma was properly managed.

Other evidence for severe asthma episodes resulting in expensive care and higher total charges is found in Figure 2 where “Other” includes procedures that may have been the result of a severe asthma attack. For example, in Tooele, about 5% of the total charges in the “Other” category came from two procedures that were listed under asthma as the primary diagnosis. These procedures, indwelling catheter and treatment of fracture or dislocation of a lower extremity (other than hip or femur), were likely administered as a result of a severe asthma attack that resulted in other bodily harm.

Figure 2. ED Percent of Total Charges for Asthma by LHD and Procedure Type, Utah, 2011



Source: Utah Emergency Department Encounter Database, 2011. Note the primary diagnosis code ICD 493 was used to identify emergency department visits due to asthma. Data include patients who were treated and released.

Asthma-related Emergency Department Visit Charges

Asthma-related ED Trends by Payer and LHD

For the following analysis, payer was grouped into five categories. Medicare, Medicaid, and Self-pay represented only those types of payers, while “Other” included: Charity/Unclassified, Industrial/Worker’s Compensation, CHIP, and Unknown. Finally, commercial health insurance included: Blue Cross Blue Shield, Other Commercial, and Managed Care.

Table 4 presents asthma-related ED total charges by payer and LHD. When interpreting total charges, it is important to take into consideration that population sizes are not accounted for in these numbers; thus, comparisons should be interpreted with caution. In total, commercial insurance plans had the highest total charges at almost \$2.5 million in asthma-related ED visits for the state of Utah, with Medicaid a close second at about \$2 million. Medicare had the third-highest total charges at about \$1 million (See Table 4). The economic burden of asthma on those with asthma can be seen in the “Self-Pay” category with about \$776,000 dollars being charged to those who pay for their own medical care.

Table 5 presents asthma-related ED median charges by payer for each LHD during 2011. Not all LHDs had charges for every payer type, so the following comparisons included only those payers for which all LHDs had at least one charge. These include: Medicare, Medicaid, Blue Cross Blue Shield, Managed Care, and Self-Pay. Generally, Medicare had the largest median charge for all LHDs and either Medicaid or Managed Care had the smallest median charge. Self-Pay had the largest median charge in Tooele at \$1,664 and the lowest median charge in Central at \$644.

Table 4. Asthma-related ED Total Charges by Payer and LHD, Utah, 2011

| LHD | Medicare | Medicaid | Other | Self-Pay | Commercial Health Insurance | Total |
|------------------|-------------|-------------|-----------|-----------|-----------------------------|-------------|
| Bear River | \$48,514 | \$64,400 | \$29,547 | \$21,463 | \$105,654 | \$269,578 |
| Central | \$40,737 | \$69,775 | \$18,565 | \$12,524 | \$51,126 | \$192,727 |
| Davis | \$82,760 | \$168,733 | \$123,630 | \$30,809 | \$265,978 | \$671,910 |
| Salt Lake County | \$471,204 | \$1,005,114 | \$483,160 | \$361,485 | \$1,019,749 | \$3,340,712 |
| Southeastern | \$25,045 | \$28,205 | \$8,134 | \$8,164 | \$61,326 | \$130,874 |
| Southwest | \$90,567 | \$114,247 | \$17,625 | \$59,766 | \$104,397 | \$386,602 |
| Summit | \$16,588 | \$10,264 | \$5,774 | \$5,652 | \$44,999 | \$83,277 |
| Tooele | \$24,612 | \$66,610 | \$22,345 | \$74,068 | \$131,073 | \$318,708 |
| TriCounty | \$19,968 | \$41,915 | \$23,707 | \$27,964 | \$82,866 | \$196,420 |
| Utah | \$86,059 | \$239,240 | \$36,742 | \$57,712 | \$240,277 | \$660,030 |
| Wasatch | \$7,912 | \$3,658 | \$1,151 | \$5,892 | \$20,592 | \$39,205 |
| Weber-Morgan | \$136,028 | \$280,020 | \$69,571 | \$110,387 | \$290,544 | \$886,550 |
| Total | \$1,049,994 | \$2,092,181 | \$839,951 | \$775,886 | \$2,418,581 | \$7,176,593 |

Source: Utah Emergency Department Encounter Database, 2011. Note the primary diagnosis code ICD 493 was used to identify emergency department visits due to asthma. Data include patients who were treated and released.

Asthma-related Emergency Department Visit Charges

Table 5. Asthma-related ED Median Charge by LHD and Payer, Utah, 2011

| LHD | Medicare | Medicaid | Managed Care | CHIP | Self-Pay |
|------------------|----------|----------|--------------|---------|----------|
| Bear River | \$1,204 | \$712 | \$765 | \$751 | \$781 |
| Central | \$892 | \$602 | \$582 | \$645 | \$644 |
| Davis | \$2,749 | \$1,111 | \$1,323 | \$645 | \$1,134 |
| Salt Lake County | \$2,296 | \$1,069 | \$1,125 | \$815 | \$1,262 |
| Southeastern | \$1,565 | \$614 | \$850 | \$943 | \$1,038 |
| Southwest | \$1,700 | \$798 | \$863 | \$705 | \$772 |
| Summit | \$8,294 | \$888 | \$1,116 | - | \$1,518 |
| Tooele | \$2,657 | \$1,134 | \$1,169 | - | \$1,664 |
| TriCounty | \$1,236 | \$641 | \$671 | \$1,369 | \$681 |
| Utah County | \$1,197 | \$913 | \$913 | \$925 | \$885 |
| Wasatch | \$1,619 | \$545 | \$627 | - | \$555 |
| Weber-Morgan | \$2,674 | \$1,092 | \$1,567 | \$904 | \$1,325 |
| Total | \$1,836 | \$968 | \$1,065 | \$772 | \$1,088 |

| LHD | Charity/ Unclassified | Industrial and Worker's Comp. | Blue Cross Blue Shield | Other Government | Other Commercial |
|------------------|--------------------------|----------------------------------|---------------------------|---------------------|---------------------|
| Bear River | \$1,477 | \$1,439 | \$780 | \$885 | \$718 |
| Central | \$730 | - | \$608 | \$661 | \$482 |
| Davis | \$1,685 | - | \$1,313 | \$1,189 | \$1,416 |
| Salt Lake County | \$1,413 | \$1,064 | \$1,094 | \$1,116 | \$1,145 |
| Southeastern | - | - | \$1,225 | \$817 | \$1,035 |
| Southwest | \$1,254 | \$395 | \$1,292 | \$892 | \$753 |
| Summit | \$1,927 | - | \$1,018 | - | \$1,147 |
| Tooele | - | - | \$1,296 | \$1,002 | \$1,106 |
| TriCounty | - | - | \$766 | \$543 | \$781 |
| Utah County | \$1,201 | \$954 | \$1,188 | \$895 | \$1,024 |
| Wasatch | - | \$1,151 | \$1,044 | - | - |
| Weber-Morgan | \$1,083 | - | \$1,655 | \$1,228 | \$1,363 |
| Total | \$1,320 | \$1,010 | \$1,097 | \$991 | \$1,012 |

Source: Utah Emergency Department Encounter Database, 2011. Note the primary diagnosis code ICD 493 was used to identify emergency department visits due to asthma. Data include patients who were treated and released.

- Indicates that there was no data for this group.

Asthma-related Emergency Department Visit Charges

The following table (Table 6) presents the percent change in ED median charges from 2002 to 2011 by LHD and payer. CHIP had the largest increase in median charge from 2002-2011 at 277%. In 2002, the median charge for CHIP was \$205 and by 2011 it was \$772 (median charges for all payers for 2002-2011 can be requested from the Utah Asthma Program). Self-pay had the second-largest increase at 266%. In 2002, the median charge for self-pay was \$297 and by 2011 it was \$1,088. Medicare had the third-largest increase at 242%. In 2002, the median charge for Medicare was \$537 and by 2011 it was \$1,836.

For Medicare, Davis had the largest increase in median charge from 2002 to 2011 at 332%. In 2002, the median charge for Medicare in Davis was \$637 and by 2011 it was about \$2,700 (median charges for LHDs and all payers for 2002-2011 can be requested from the Utah Asthma Program). The smallest increase for Medicare charges was in Utah County at 97%. In 2002, the median charge for Medicare in Utah County was \$609 and by 2011 it was \$1,197.

For Medicaid, Southwest had the largest increase in median charge from 2002 to 2011 at 309%. In 2002, the median charge for Medicaid in Southwest was \$194 and by 2011 it was about \$798. The smallest increase for Medicaid charges was in Wasatch at 99%. In 2002, the median charge for Medicaid in Wasatch was \$273 and by 2011 it was \$545.

For Blue Cross Blue Shield, Southwest had the largest increase in median charge from 2002 to 2011 at 476%. In 2002, the median charge for Blue Cross Blue Shield in Southwest was \$224 and by 2011 it was \$1,292. The smallest increase for Blue Cross Blue Shield charges was in Central at 116%. In 2002, the median charge for Blue Cross Blue Shield in Central was \$281 and by 2011 it was \$608.

For self-pay, Tooele had the largest increase in median charge from 2002 to 2011 at 369%. In 2002, the median charge for self-pay in Tooele was \$355 and by 2011, it was \$1,663. The smallest increase for self-pay was in Central at 112%. In 2002, the median charge for self-pay in Central was \$303 and by 2011, it was \$643.

In total, Central had the smallest increase in median charge from 2002 to 2011 at 147%. In 2002, the median charge in Central was \$258 and in 2011 it was \$637. Summit had the largest increase in median charge from 2002 to 2011 at 472%. In 2002, the median charge in Summit was \$204 and in 2011 it was \$1,090.

Asthma-related Emergency Department Visit Charges

Table 6. Percent Increase in Asthma-related ED Median Charge by LHD and Payer from 2002 to 2011, Utah

| LHD | Medicare | Medicaid | Other Government | Blue Cross Blue Shield | Other Commercial |
|------------------|----------|----------|------------------|------------------------|------------------|
| Bear River | 131% | 152% | 287%† | 175% | 173% |
| Central | 189% | 162% | 6%† | 116% | 93% |
| Davis | 332% | 227% | 118% | 274% | 280% |
| Salt Lake County | 297% | 211% | 156% | 203% | 250% |
| Southeastern | 183% | 143% | 51%† | 261% | 167% |
| Southwest | 267% | 309% | 384% | 476% | 242% |
| Summit | 1412%† | 145% | 865%† | 414% | 537%† |
| Tooele | 181% | 121% | 393%† | 212% | 173% |
| TriCounty | 299% | 153% | 70% | 314% | 177% |
| Utah County | 97% | 179% | 165% | 292% | 220% |
| Wasatch | 703%† | 99% | 76%† | 573%† | 178%† |
| Weber-Morgan | 313% | 203% | 149% | 335% | 337% |

| LHD | Managed Care | Self Pay | Charity/ Unclassified | Industrial and Worker's Comp. | CHIP | Total |
|------------------|--------------|----------|-----------------------|-------------------------------|-------|-------|
| Bear River | 146% | 157% | 205%† | 237%† | 292% | 269% |
| Central | 163% | 112% | 37%† | - | 329% | 147% |
| Davis | 216% | 147% | 201%† | 49%† | 131%† | 201% |
| Salt Lake County | 239% | 347% | 81% | 152%† | 216% | 251% |
| Southeastern | 222% | 342% | 22%† | 134%† | 429%† | 199% |
| Southwest | 238% | 229% | 195% | -58%† | 267%† | 261% |
| Summit | 427% | 1111%† | 454%† | - | 707%† | 432% |
| Tooele | 195% | 369% | - | - | 244%† | 192% |
| TriCounty | 186% | 221% | - | 101%† | 841%† | 185% |
| Utah County | 217% | 183% | 242%† | 131%† | 172% | 200% |
| Wasatch | 292% | 18%† | 65%† | - | - | 257% |
| Weber-Morgan | 365% | 251%† | 266%† | 35%† | 169%† | 239% |

Source: Utah Emergency Department Encounter Database, 2002-2011. Note the primary diagnosis code ICD 493 was used to identify emergency department visits due to asthma. Data include patients who were treated and released.

Highlighted areas indicate that years other than 2002 and/or 2011 were used to calculate percent change because there was missing data for those years.

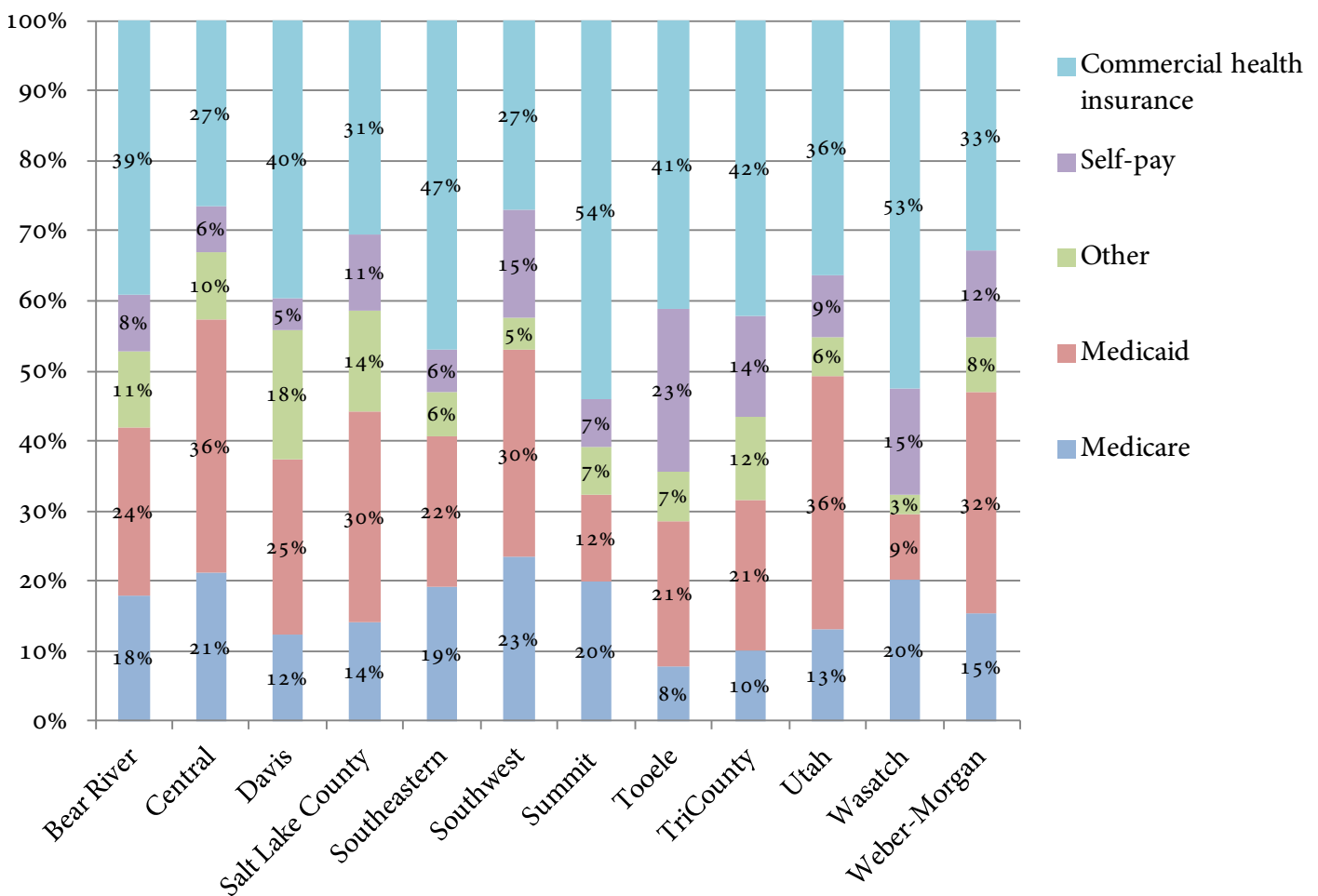
†Data had fewer than 5 observations for median charges in either 2002 or 2011 and should be interpreted with caution.

- Indicates that there was no data for this group.

Asthma-related Emergency Department Visit Charges

Figure 3 shows the percent of total charges for each payer by LHD in 2011. When compared to other LHDs, the largest proportion charged to Medicare was in Southwest at 23%. This makes sense due to the relatively large elderly population residing in the Southwest LHD. The proportion of total charges charged to Medicaid was largest in Central and Utah County at 36%. The largest proportion of “Other” was charged in Davis at 18%. Tooele had by far the largest proportion of self-pay charges at 23%. Finally, Summit had the largest proportion of commercial health insurance total charges at 54% when compared to other LHDs.

Figure 3. ED Percent of Total Charges for Asthma by LHD and Payer, Utah, 2011



Source: Utah Emergency Department Encounter Database, 2011. Note the primary diagnosis code ICD 493 was used to identify emergency department visits due to asthma. Data include patients who were treated and released.

Conclusion

Providing education, treatment, and support to individuals with poorly controlled asthma can improve outcomes and reduce preventable costs like emergency department visits and hospitalizations. Total charges for asthma-related ED visits have been on the rise in Utah over the last 10 years, while the total number of ED visits has fallen. The increase in total charges from 2002 to 2011 seems to be driven by an increase in median charge for the most common ED treatment for asthma, “No procedure”. Thus, the increase in ED total charges is likely due to an increase in charges related to common asthma treatments like medication, oxygen administration, and general observation. Although ED visits have been declining, they have not been declining fast enough to compensate for the increase in charges, resulting in increased total charges.

Increases in median charges show a noticeable difference between rural and urban LHDs. Rural LHDs tend to have a lower median charge and a slower rate of increase than urban LHDs. The precise reason for this finding is unclear; however, studies looking at asthma-related hospital median charges have attributed differences between urban and rural settings to government payment policies that differ according to urban or rural designation⁴. Also, cost of living and associated costs of health care are lower in rural areas and rural hospitals are generally smaller and offer fewer services than urban institutions⁴. Finally, teaching hospitals are less common in rural areas and tend to charge more per visit because their funding streams are threatened by competitive health care market forces and by potential reductions in federal funding⁵.

Not only does urban or rural status matter, but the demographics of certain areas also affect charges. The proportion of total charges from each payer (i.e., Medicaid, Commercial health insurance, Medicare, etc.) differed across LHDs that had large differences in their demographic compositions. For example, Southwest has the largest population of persons aged 65+ in Utah at 15.8%⁶ (Utah total is 9.2%) and the largest proportion of total charges for Medicare at 23%. Also, in 2011, Summit (\$86,515) had the highest median household income (2008-2012) when compared to the state (\$58,164)⁷ and the

Conclusion

largest proportion of total charges for commercial insurance at 54%. Having a high percentage of 65+ in Southwest may explain why a large proportion of charges were made to Medicaid. Also, Summit having the highest median income in the state means that more residents can afford commercial insurance, which may explain why Summit had the largest proportion of charges from commercial insurance.

One way to improve asthma outcomes and reduce costs (aside from cost containment measures) requires that partners work together to address barriers like lack of access to care, poor housing conditions, and lack of knowledge about asthma and the benefits of asthma management. For example, insurance companies can play an important role in ensuring that those with asthma receive self-management education by reimbursing health care providers for this service. They can also help by making sure that needed medications are covered. Pharmacists can educate patients when they pick up their medications about proper inhaler techniques and correct medication usage. Health care providers should provide written asthma action plans for their patients and adhere to the national guidelines for the Diagnosis and Treatment of Asthma (EPR-3 Guidelines). Schools and childcare centers can support children with asthma through education and environmental management. Different sectors partnering together can help those with asthma gain control over and manage their asthma, thereby mitigating rising costs to insurance payers and reducing the financial burden on those who do not have access to health care coverage.

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