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Introduction:

Indicators of asthma burden and management can be measured with Medicaid claims data and compared to the goals of therapy, as outlined by the national guidelines. This capability is unparalleled by other common data sources for asthma surveillance. The Michigan asthma surveillance system has harnessed the potential of this dataset to better understand the asthma burden and management for this special population. The following chapter highlights trends in a variety of indicators, pointing to the ongoing disparities in severe asthma outcomes and disease management.

Key Findings:

- The prevalence of persistent asthma among children in Medicaid is increasing over time.
- Rates of asthma emergency department visits are increasing over time among children in Medicaid.
- Black children in Medicaid experience the greatest burden in asthma prevalence and rates of asthma emergency department visits compared to other children in Medicaid.
- Recent data suggests that only 30% of children with persistent asthma are filling prescriptions for inhaled corticosteroids - the preferred, first-line medication to manage asthma. This measure has been dramatically decreasing from 2001-2005.
- The goals of asthma therapy are not being met for the pediatric Medicaid population in Michigan, especially for black children and those living in urban areas.

Key Recommendations:

- Continue to evaluate trends in these indicators over time for this population.
- In light of these data, Michigan should strengthen current efforts to reduce asthma burden and improve asthma management by targeting interventions to the pediatric Medicaid population.

The Asthma Initiative of Michigan (AIM)

AIM is a collaborative effort involving multiple partners from public and private sectors across the state and is committed to reducing the burden of asthma documented in this report. For information about AIM's priorities and interventions, please review the strategic plan for the initiative: *Asthma in Michigan 2010: A Blueprint for Action*. (<http://www.getastmahelp.org/reports.asp>)

Data Source:

Michigan Data Warehouse, Michigan Department of Community Health

Methods:

From the Michigan Medicaid beneficiary and administrative claims data (2001-2005), the study population is identified by the following parameters within each year: children 18 years and younger, continuous Medicaid enrollment (11+ months), full Medicaid coverage and no other insurance. Within this population, the following indicators of total asthma burden were measured:

- **Persistent asthma prevalence:** Persistent asthma is defined according to HEDIS® specifications: in the year of the prevalence measurement year having (1) ≥ 4 asthma medication dispensing events OR (2) ≥ 1 emergency department visits for asthma OR (3) ≥ 1 hospitalization for asthma OR (4) ≥ 4 outpatient visits for asthma and ≥ 2 asthma medication dispensing events. (National Committee for Quality Assurance. Use of Appropriate Medications for People with Asthma. *HEDIS® 2003, Volume 2: Technical Specifications*. Washington, DC; 2003) Prevalence of persistent asthma is the proportion of beneficiaries in the study population who meet the definition of persistent asthma above.
- **Rate of asthma emergency department visits:** An asthma emergency department visit is defined as a visit occurring in a hospital emergency department with a primary diagnosis of asthma (ICD-9-CM=493.XX). These data represent the number of emergency department visits for asthma, not the number of persons visiting the emergency department for asthma. The number of asthma emergency department visits divided by the number of beneficiaries generates this measure.

Children with utilization consistent with persistent asthma, as defined above, form annual study populations upon which indicators of asthma management are measured within that year, including:

- **Proportion with an outpatient visit:** The proportion of children with persistent asthma in Medicaid with one or more annual asthma outpatient visits. (ICD-9-CM=493.XX)
- **Proportion with an emergency department visit:** The proportion of children in Medicaid with persistent asthma who have had one or more annual asthma emergency department visits. (ICD-9-CM=493.XX)

Methods Continued:

- Emergency department reliance: The proportion of all ambulatory asthma visits (ICD-9-CM=493.XX, outpatient and emergency department) among children in Medicaid with persistent asthma that occur in the emergency department. It estimates the reliance on the emergency department for primary care.
- Short-acting β -agonist overuse: The proportion of children with persistent asthma in Medicaid who have filled thirteen or more prescriptions for short-acting β -agonists in a year - an indicator of overuse of this medication.
- Proportion using a long term control medication*: The proportion of children with persistent asthma in Medicaid who have filled one or more prescriptions for a long-term controller medication in a year.
- Proportion using an inhaled corticosteroid medication*: The proportion of children with persistent asthma in Medicaid who have filled one or more prescriptions for a inhaled corticosteroid medication in a year - inhaled corticosteroids are the preferred, first-line medication recommended for persons with persistent asthma.

Both geographic (urban/rural, county) and demographic (age, race, sex) subpopulation analysis are conducted to identify disparities. Maps generated using geographic information system (GIS) tools are used for visual display of the data and to identify areas of high burden. (ArcGIS™, Environmental Systems Research Institute)

Suggested Citation:

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For more information about the Asthma Initiative of Michigan, visit: www.getasthmahelp.org or call 1.866.EZLUNGS (1.866.395.8647).

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*This measure is computed differently than the NCQA HEDIS® measure "Use of Appropriate Medications for People with Asthma." Therefore, results in this report should not be compared to data strictly applying the specifications of the NCQA HEDIS® measure.

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Rate of Asthma Emergency Department Visits, 2001-2005

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8. By Race
9. By Urban/Rural Residence
10. By County of Residence (2005)

Among children (≤ 18 yrs) in Medicaid with claims evidence consistent with persistent asthma:

Proportion with an outpatient visit, 2001-2005

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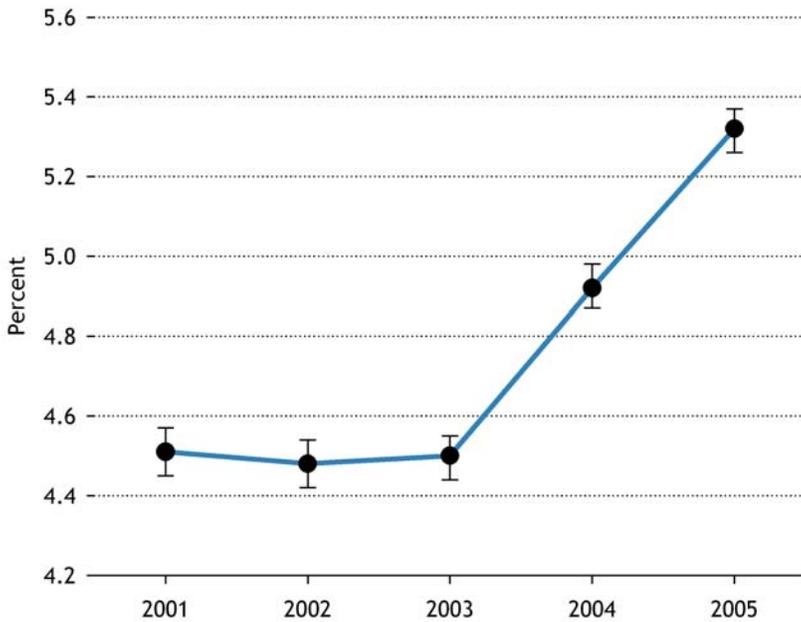
Proportion using a long term control and an inhaled corticosteroid medication, 2001-2005

31. Total

Proportion using an inhaled corticosteroid medication, 2001-2005

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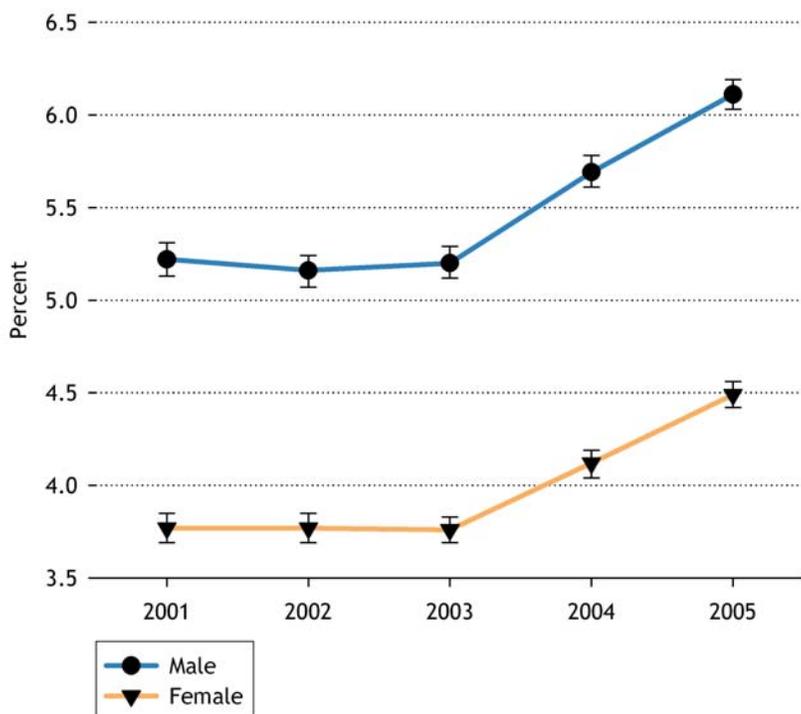
1. Prevalence¹ of Persistent Asthma², Children (≤18 years), Medicaid³, Michigan, 2001-2005



For all analyses presented in this chapter, the Medicaid population of children ≤18 years is restricted to those who are continuously enrolled in Medicaid with full coverage and no other insurance.

- About 34,600 children in Medicaid have health care utilization consistent with persistent asthma.
- The prevalence of persistent asthma was higher in 2004 and 2005 than preceding years among children enrolled in Medicaid.

2. Prevalence¹ of Persistent Asthma² by Sex, Children (≤18 years), Medicaid³, Michigan, 2001-2005



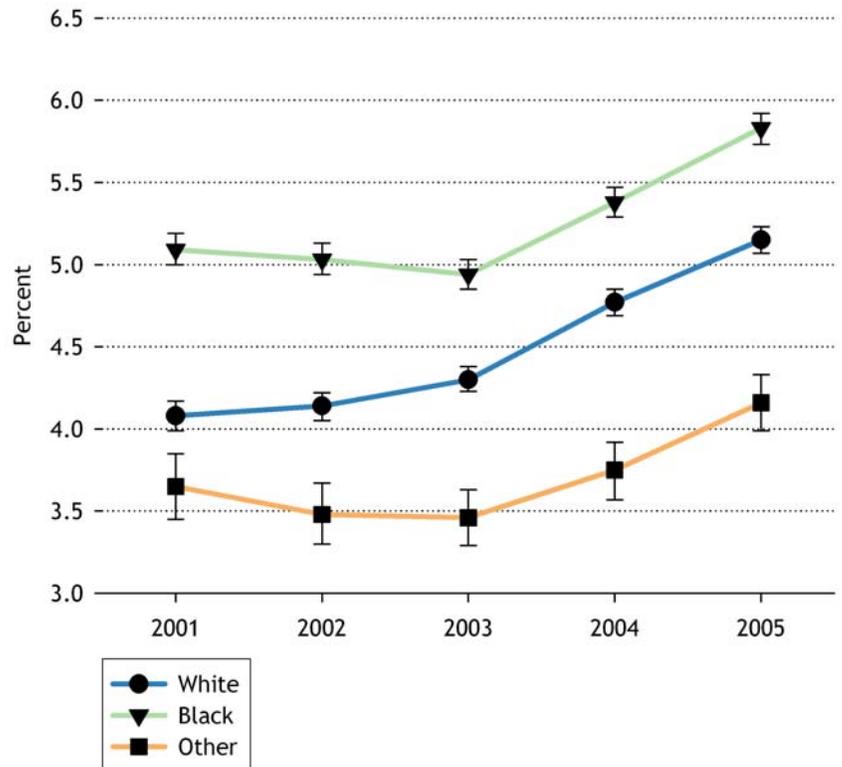
- About 20,400 of male children and 14,200 female children in Medicaid have health care utilization consistent with persistent asthma.
- The prevalence of persistent asthma for male children in Medicaid is consistently about 40% higher compared to female children in Medicaid.
- The prevalence of persistent asthma for both male and female children enrolled in Medicaid was higher in 2004 and 2005 than preceding years.

Data Notes:

- Source: Data Warehouse, MDCH
1. Age-Adjusted to the 2000 US Standard Population
 2. Based on annual NCQA HEDIS definition
 3. Medicaid population of children ≤18 years is restricted to those who are continuously enrolled in Medicaid with full coverage and no other insurance.

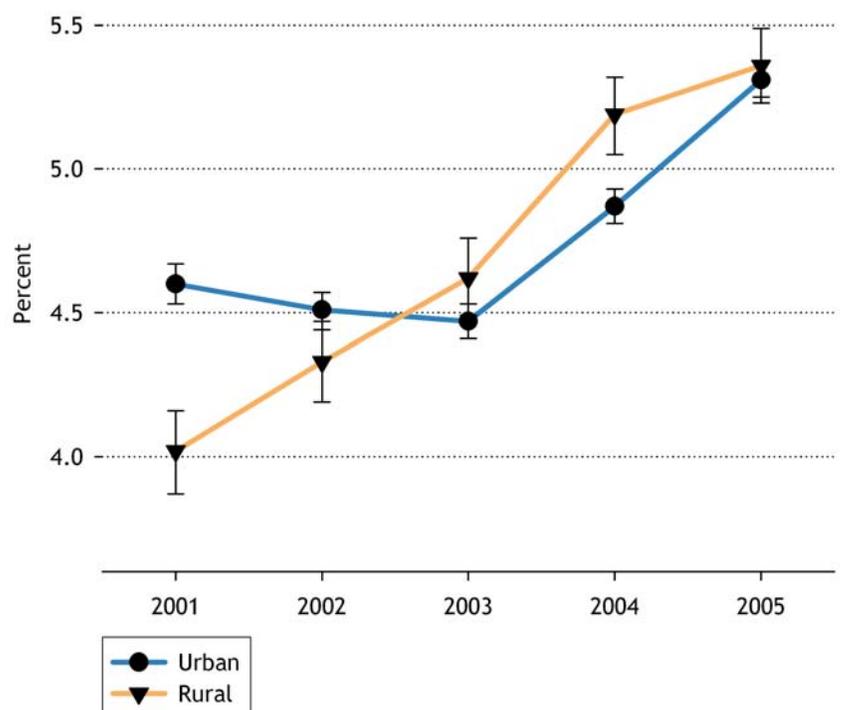
3. Prevalence¹ of Persistent Asthma² by Race, Children (≤18 years), Medicaid⁴, Michigan, 2001-2005

- About 17,200 white children, 15,000 black children in Medicaid have health care utilization consistent with persistent asthma.
- The highest prevalence of persistent asthma is observed for black children in Medicaid - it is 10% to 25% higher compared to whites.
- The prevalence of persistent asthma was higher in 2004 and 2005 than preceding years among children enrolled in Medicaid, regardless of race. For whites, there is a significant overall increase from 2001 to 2005. ($p < 0.05$)⁵



- About 28,600 of children with urban residence and 6,000 children with rural in Medicaid have health care utilization consistent with persistent asthma.
- The prevalence of persistent asthma is significantly increasing among children enrolled in Medicaid with rural residence. (For rural, $p < 0.05$)⁵
- In 2005, the prevalence of persistent asthma for children of both urban and rural residence is about the same. Across 2001-2005, the prevalence in rural areas has caught up with urban areas.

4. Prevalence¹ of Persistent Asthma² by Urban/Rural Residence³, Children (≤18 years), Medicaid⁴, Michigan, 2001-2005

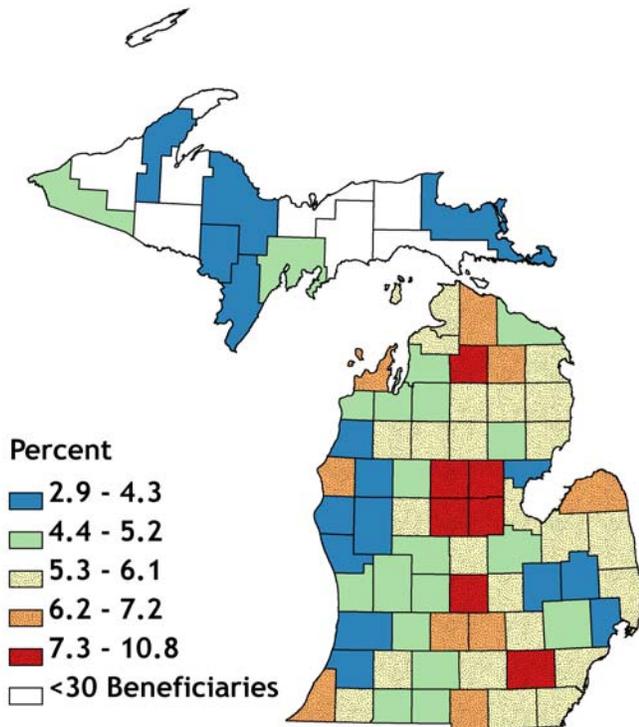


Data Notes:

Source: Data Warehouse, MDCH

1. Age-Adjusted to the 2000 US Standard Population
2. Based on annual NCQA HEDIS definition
3. Urban/Rural status determined by the intersection of county of residence and Michigan's Metropolitan Statistical Areas.
4. Medicaid population of children ≤18 years is restricted to those who are continuously enrolled in Medicaid with full coverage and no other insurance.
5. Spearman's rank correlation test

5. Prevalence¹ of Persistent Asthma² by County of Residence, Children (≤18 years), Medicaid³, Michigan, 2005



- The distribution of persistent asthma prevalence for children in Medicaid varies across Michigan.
- Counties with the highest prevalence of persistent asthma for children in Medicaid are:
 - Clare
 - Clinton
 - Gladwin
 - Isabella
 - Midland
 - Otsego
 - Washtenaw

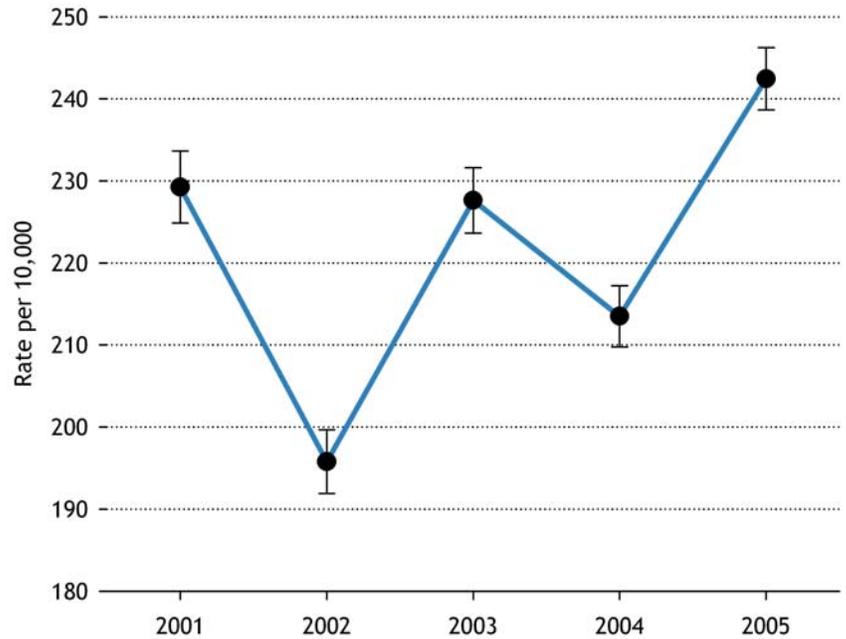
Data Notes:

Source: Data Warehouse, MDCH

1. Age-Adjusted to the 2000 US Standard Population
2. Based on annual NCQA HEDIS definition
3. Medicaid population of children ≤18 years is restricted to those who are continuously enrolled in Medicaid with full coverage and no other insurance.

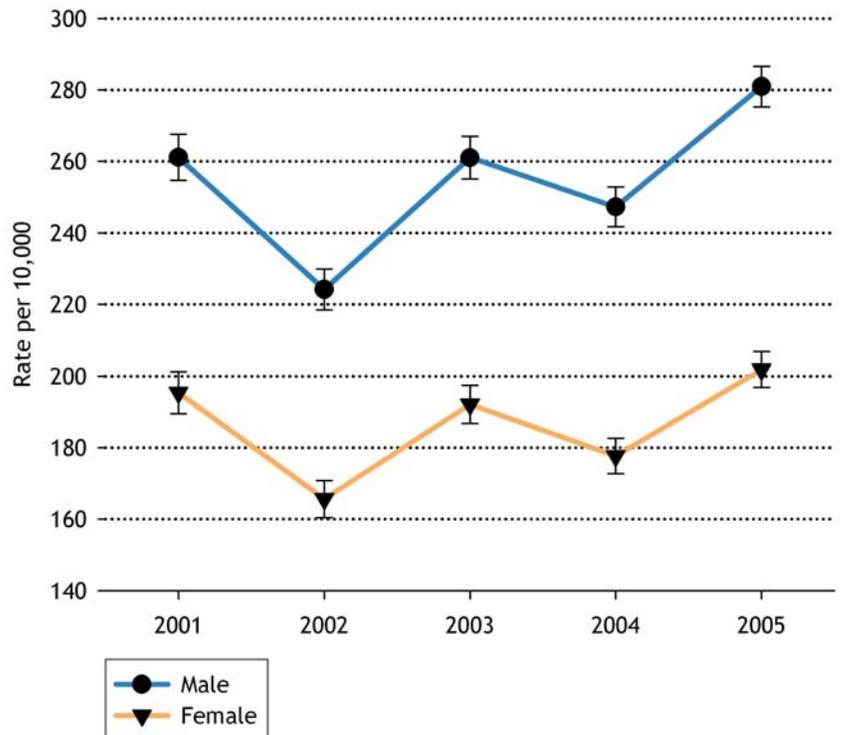
6. Rate¹ of Asthma Emergency Department Visits², Children (≤18 years), Medicaid³, Michigan, 2001-2005

- In 2005, the total number of asthma emergency department visits for children in Medicaid was about 16,100. The rate was 242.5 per 10,000.
- Despite fluctuations over time, there is an overall increasing trend in asthma emergency department visits for children in Medicaid.



7. Rate¹ of Asthma Emergency Department Visits² by Sex, Children (≤18 years), Medicaid³, Michigan, 2001-2005

- The rate of asthma emergency department visits is about 35% higher for male children compared to female children in Medicaid. This difference is consistent over time.
- The overall increasing trend in asthma emergency department visits is observed for both male and female children in Medicaid.

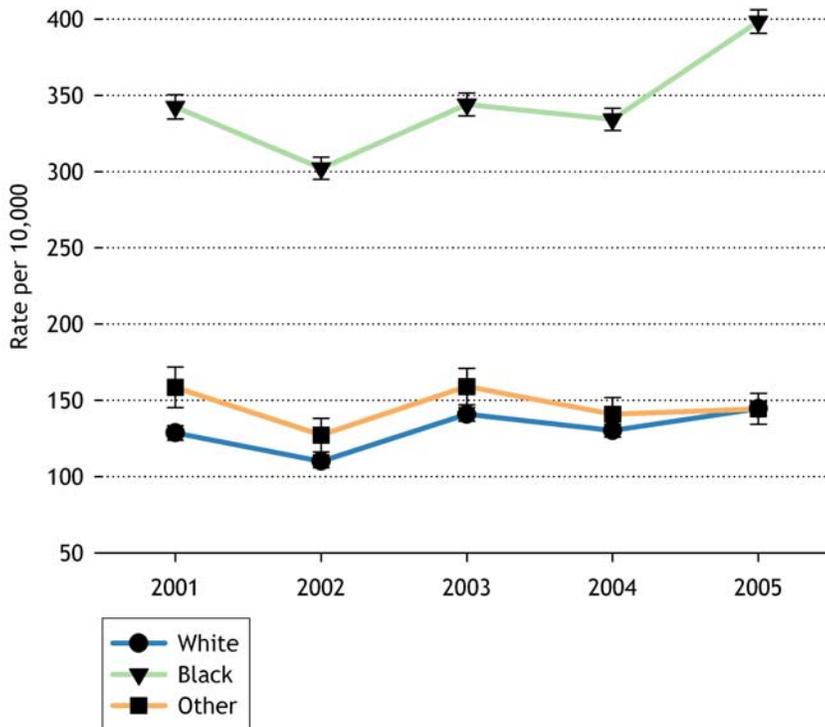


Data Notes:

Source: Data Warehouse, MDCH

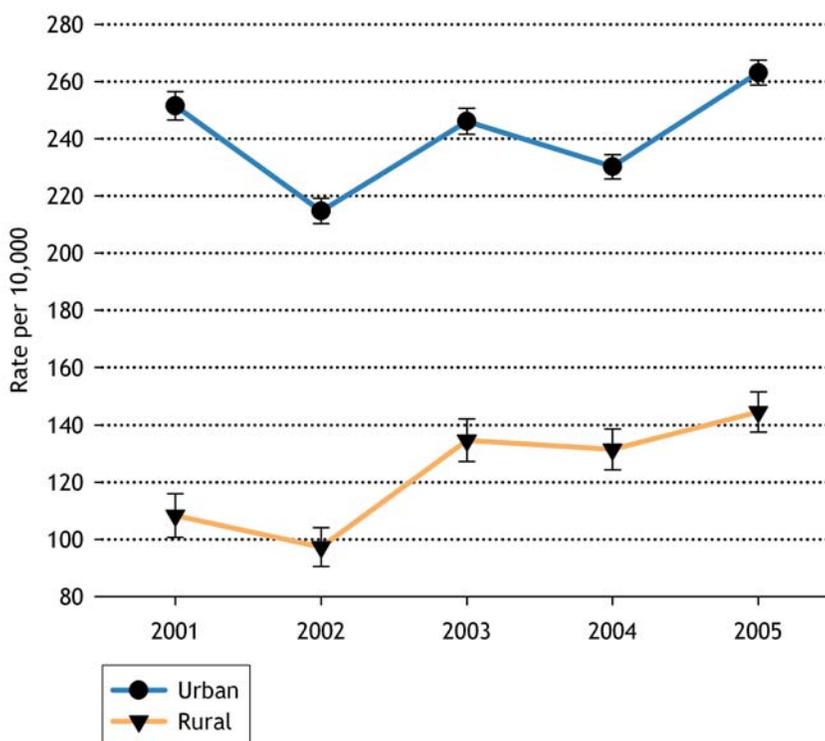
1. Age-Adjusted to the 2000 US Standard Population
2. Asthma as primary diagnosis, ICD-9-CM: 493.xx
3. Medicaid population of children ≤18 years is restricted to those who are continuously enrolled in Medicaid with full coverage and no other insurance.

8. Rate¹ of Asthma Emergency Department Visits² by Race, Children (≤18 years), Medicaid⁴, Michigan, 2001-2005



- The rate of asthma emergency department visits is highest for black children in Medicaid - over two times higher than the rate for white children in Medicaid.
- Rates among white children and those of other races are not significantly different from each other, but significantly less than the rate for black children.
- An overall increasing trend in asthma emergency department visits is observed for black children in Medicaid. Rates among white children and those of other races are generally consistent over time.

9. Rate¹ of Asthma Emergency Department Visits² by Urban/Rural Residence³, Children (≤18 years), Medicaid⁴, Michigan, 2001-2005

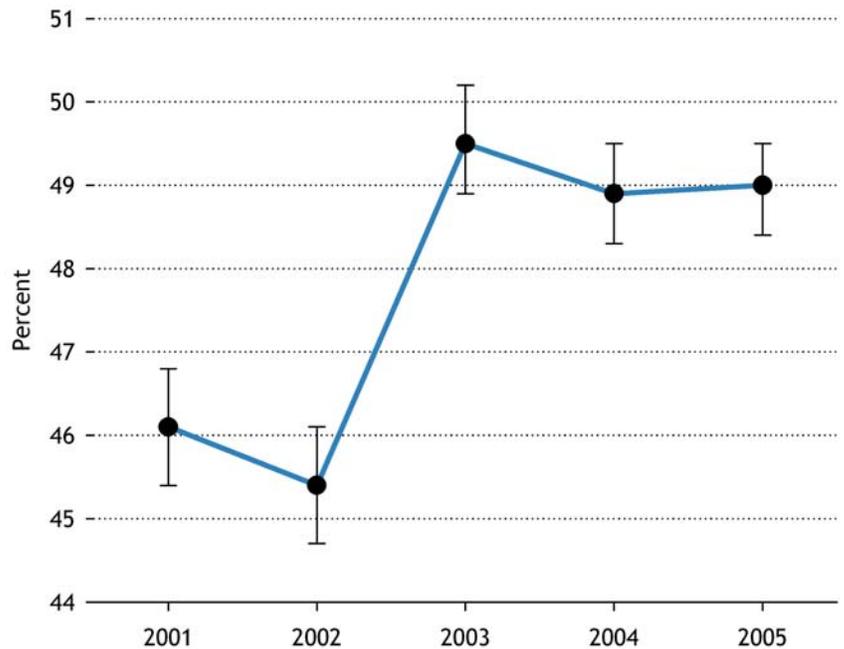


- The rate of asthma emergency department visits is about 80% higher for children with urban residence compared to children with rural residence in Medicaid. This difference is consistent over time.
- In general, an increasing trend in asthma emergency department visits is observed for children in Medicaid with both urban and rural residence.

Data Notes:
Source: Data Warehouse, MDCH
1. Age-Adjusted to the 2000 US Standard Population
2. Asthma as primary diagnosis, ICD-9-CM: 493.xx
3. Urban/Rural status determined by the intersection of county of residence and Michigan's Metropolitan Statistical Areas.
4. Medicaid population of children ≤18 years is restricted to those who are continuously enrolled in Medicaid with full coverage and no other insurance.

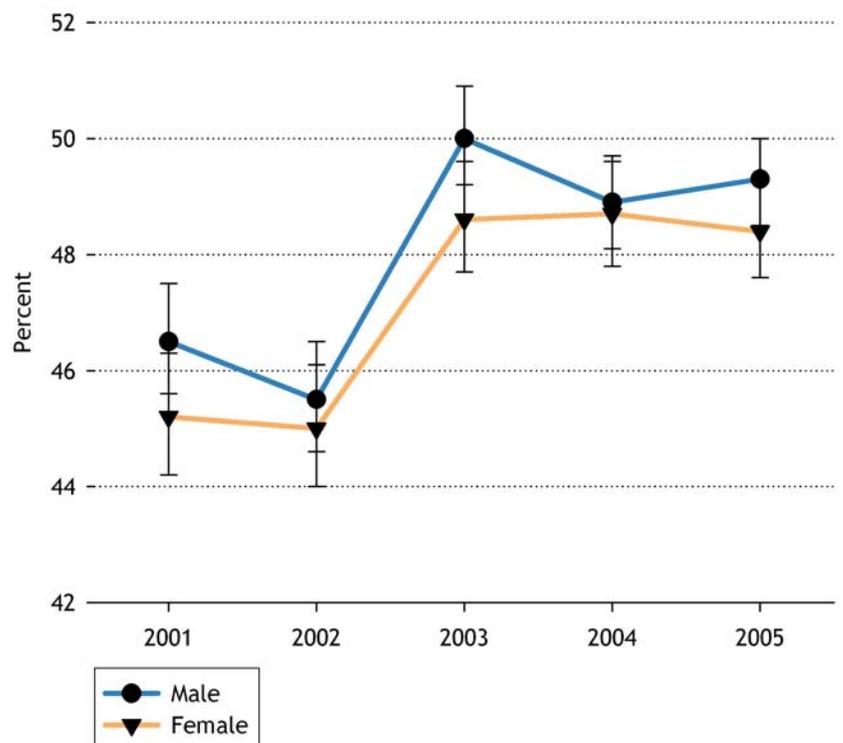
11. Percent¹ of Children (≤18 years) with Persistent Asthma² with ≥1 Outpatient Visits for Asthma³, Medicaid⁴, Michigan, 2001-2005

- Only 50% of children in Medicaid with persistent asthma have had at least one outpatient visit for asthma during a given year.
- According to national guidelines, persons with asthma should visit their primary care provider for routine asthma care at least twice a year.
- The proportion of children with persistent asthma in Medicaid with one or more outpatient visits for asthma remained constant from 2003 to 2005, but was higher than that from 2001 to 2002.



12. Percent¹ of Children (≤18 years) with Persistent Asthma² with ≥1 Outpatient Visits for Asthma³ by Sex, Medicaid⁴, Michigan, 2001-2005

- The proportion of children in Medicaid with persistent asthma with at least one outpatient visit for asthma does not differ significantly by sex.
- The proportion of children with persistent asthma in Medicaid with one or more outpatient visits for asthma remained constant from 2003 to 2005, but was higher than that from 2001 to 2002, regardless of sex.

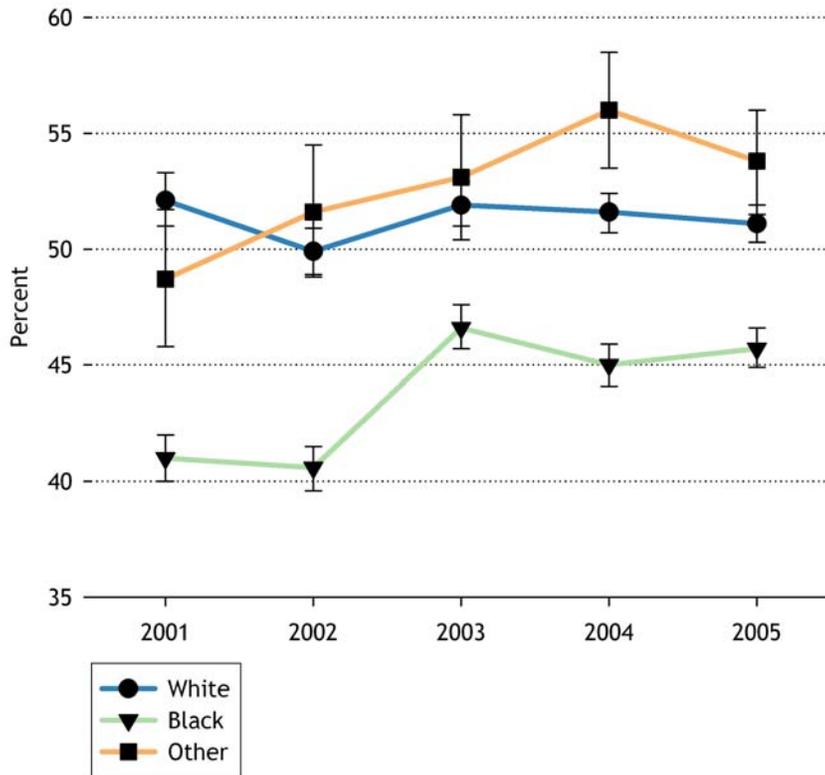


Data Notes:

Source: Data Warehouse, MDCH

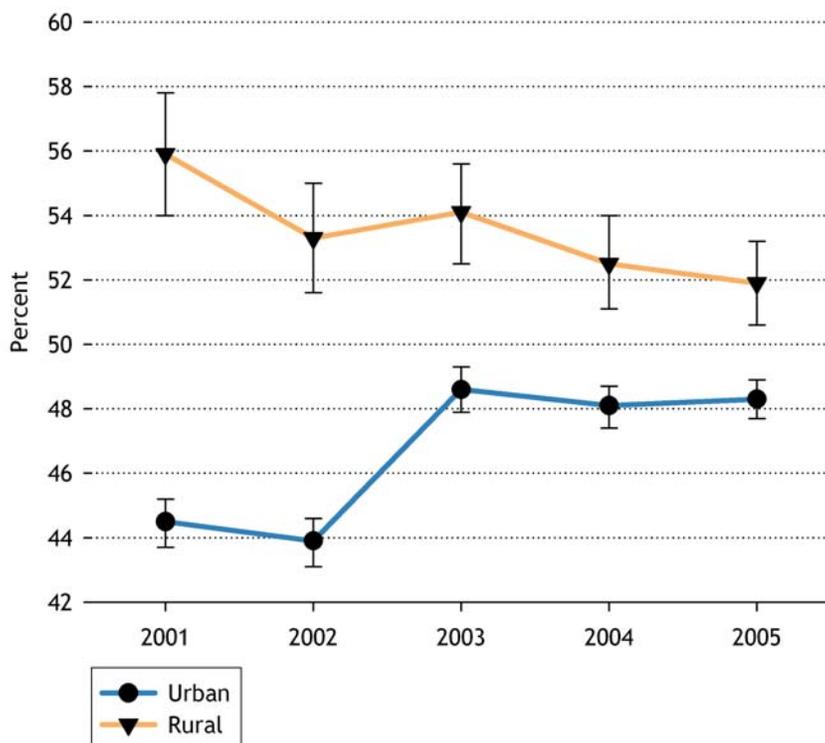
1. Age-Adjusted to the 2000 US Standard Population
2. Based on annual NCQA HEDIS definition
3. Asthma as primary diagnosis, ICD-9-CM: 493.xx
4. Medicaid population of children ≤18 years is restricted to those who are continuously enrolled in Medicaid with full coverage and no other insurance.

13. Percent¹ of Children (≤18 years) with Persistent Asthma² with ≥1 Outpatient Visits for Asthma³ by Race, Medicaid⁵, Michigan, 2001-2005



- The proportion with at least one outpatient visit for asthma for white children and those of other races are not significantly different from each other, but significantly higher than the rate for black children.
- Only 45% of black children in Medicaid with persistent asthma have had at least one outpatient visit for asthma during a given year.
- The proportion of black children with persistent asthma in Medicaid with one or more outpatient visits for asthma remained constant from 2003 to 2005, but was higher than that from 2001 to 2002.

14. Percent¹ of Children (≤18 years) with Persistent Asthma² with ≥1 Outpatient Visits for Asthma³ by Urban/Rural Residence⁴, Medicaid⁵, Michigan, 2001-2005



- The proportion of children with an urban residence in Medicaid with persistent asthma with at least one outpatient visit for asthma is significantly lower than that for those with a rural residence.
- Children in Medicaid with persistent asthma and a rural residence have experienced a steady decrease between 2001 and 2005 in the proportion with one or more outpatient visits for asthma. ($p < 0.05$)⁶

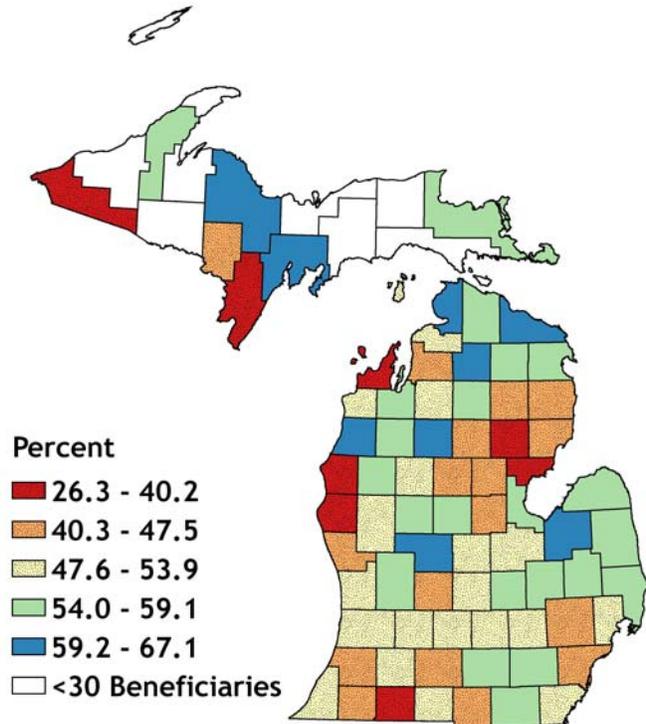
Data Notes:
Source: Data Warehouse, MDCH

1. Age-Adjusted to the 2000 US Standard Population
2. Based on annual NCQA HEDIS definition
3. Asthma as primary diagnosis, ICD-9-CM: 493.xx
4. Urban/Rural status determined by the intersection of county of residence and Michigan's Metropolitan Statistical Areas.
5. Medicaid population of children ≤18 years is restricted to those who are continuously enrolled in Medicaid with full coverage and no other insurance.
6. Spearman's rank correlation test.

15. Percent¹ of Children (≤18 years) with Persistent Asthma² with ≥1 Outpatient Visits for Asthma³ by County of Residence, Medicaid⁴, Michigan, 2005

- Counties with the lowest proportion of children with persistent asthma having one or more outpatient visits for asthma in Medicaid are:

Arenac
Gogebic
Leelanau
Mason
Menominee
Oceana
Ogemaw
St. Joseph

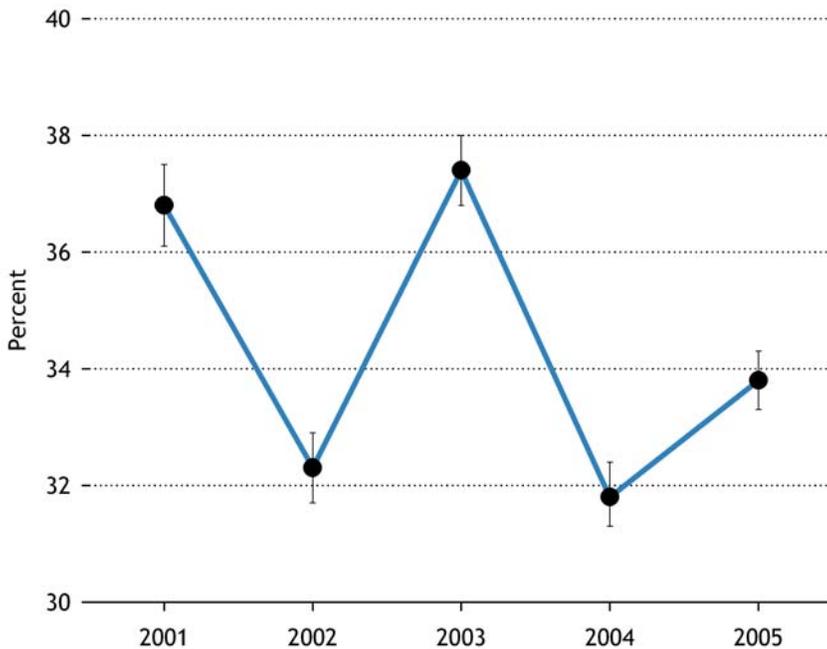


Data Notes:

Source: Data Warehouse, MDCH

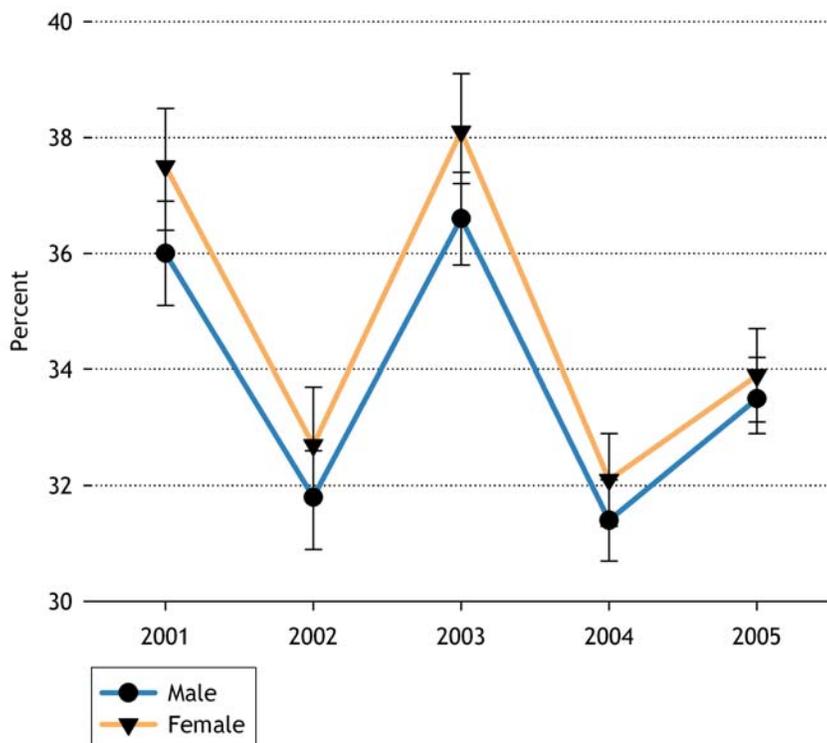
- Age-Adjusted to the 2000 US Standard Population
- Based on annual NCQA HEDIS definition
- Asthma as primary diagnosis, ICD-9-CM: 493.xx
- Medicaid population of children ≤18 years is restricted to those who are continuously enrolled in Medicaid with full coverage and no other insurance.

16. Percent¹ of Children (≤18 years) with Persistent Asthma² with ≥1 Emergency Department Visits for Asthma³, Medicaid⁴, Michigan, 2001-2005



- Over 30% of children in Medicaid with persistent asthma have had at least one emergency department visit for asthma during a given year.
- It is a goal of asthma therapy that persons with asthma experience minimal or no emergency department visits.
- Between 2001 and 2005, the proportion of children with persistent asthma in Medicaid with one or more asthma emergency department visits varied between 32% and 38%, with no apparent trend.

17. Percent¹ of Children (≤18 years) with Persistent Asthma² with ≥1 Emergency Department Visits for Asthma³ by Sex, Medicaid⁴, Michigan, 2001-2005

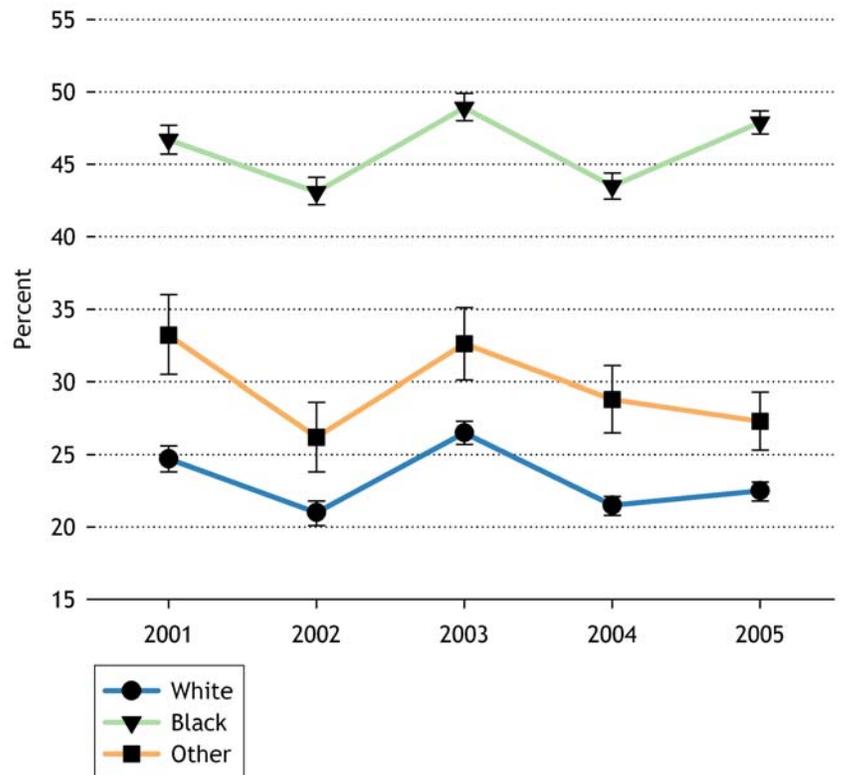


- The proportion of children in Medicaid with persistent asthma with at least one emergency department visit for asthma does not differ significantly by sex.
- Between 2001 and 2005, there is no apparent trend in the proportion of children with persistent asthma with one or more asthma emergency department visits by sex.

Data Notes:
Source: Data Warehouse, MDCH
1. Age-Adjusted to the 2000 US Standard Population
2. Based on annual NCQA HEDIS definition
3. Asthma as primary diagnosis, ICD-9-CM: 493.xx
4. Medicaid population of children ≤18 years is restricted to those who are continuously enrolled in Medicaid with full coverage and no other insurance.

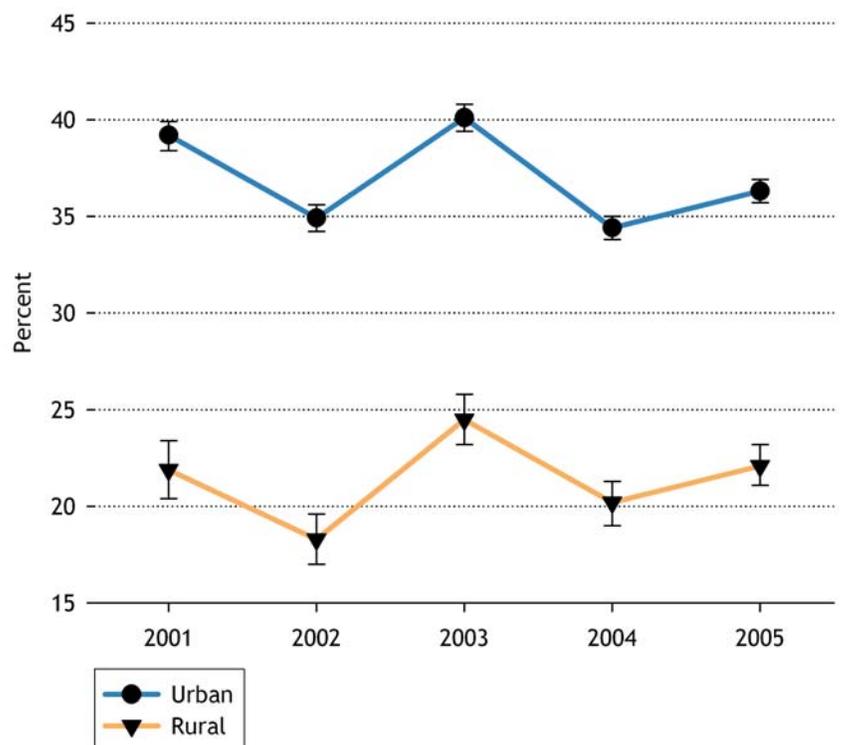
18. Percent¹ of Children (≤18 years) with Persistent Asthma² with ≥1 Emergency Department Visits for Asthma³ by Race, Medicaid⁵, Michigan, 2001-2005

- The proportion of children in Medicaid with persistent asthma with at least one emergency department visit for asthma is significantly highest for black children.
- Between 2001 and 2005, there is no apparent trend in the proportion of children with persistent asthma with one or more asthma emergency department visits by race.



19. Percent¹ of Children (≤18 years) with Persistent Asthma² with ≥1 Emergency Department Visits for Asthma³ by Urban/Rural Residence⁴, Medicaid⁵, Michigan, 2001-2005

- The proportion of children in Medicaid with persistent asthma with at least one emergency department visit for asthma is significantly higher for those with an urban residence compared to those with rural residence.
- Between 2001 and 2005, there is no apparent trend in the proportion of children with persistent asthma with one or more asthma emergency department visits by urban/rural residence.

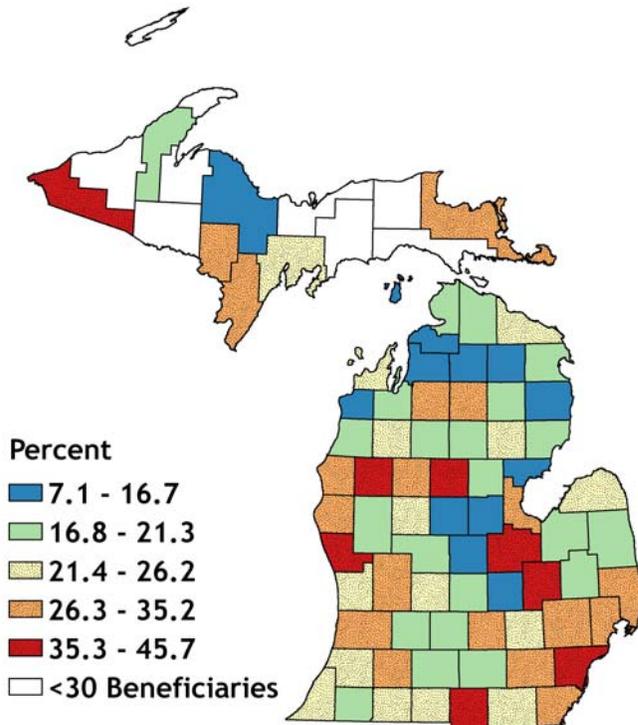


Data Notes:

Source: Data Warehouse, MDCH

1. Age-Adjusted to the 2000 US Standard Population
2. Based on annual NCQA HEDIS definition
3. Asthma as primary diagnosis, ICD-9-CM: 493.xx
4. Urban/Rural status determined by the intersection of county of residence and Michigan's Metropolitan Statistical Areas.
5. Medicaid population of children ≤18 years is restricted to those who are continuously enrolled in Medicaid with full coverage and no other insurance.

20. Percent¹ of Children (≤18 years) with Persistent Asthma² with ≥1 Emergency Department Visits for Asthma³ by County of Residence, Medicaid⁴, Michigan, 2005



- Counties with the highest proportion of children with persistent asthma having one or more emergency department visits for asthma in Medicaid are:

Clare
Genesee
Gogebic
Hillsdale
Lake
Muskegon
Saginaw
Wayne

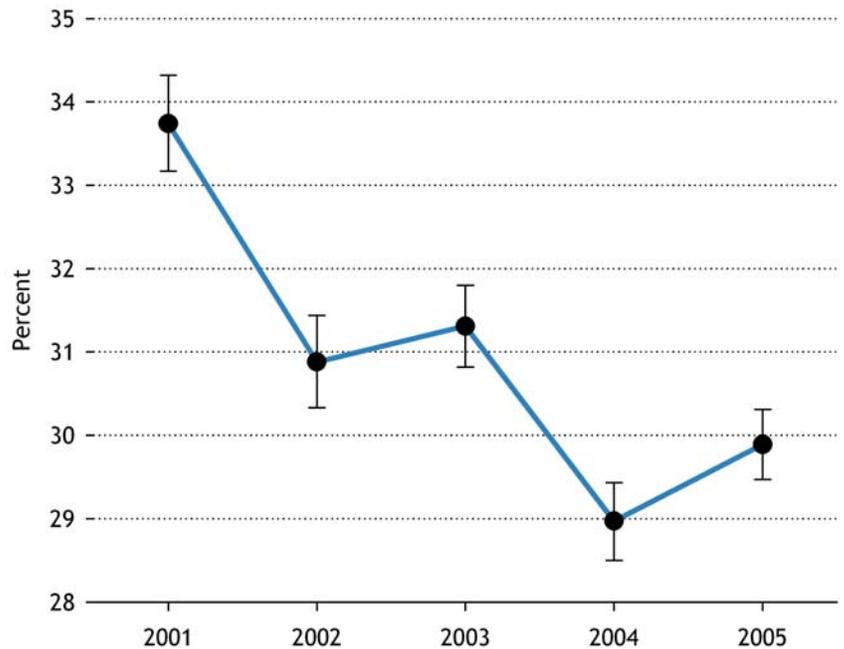
Data Notes:

Source: Data Warehouse, MDCH

- Age-Adjusted to the 2000 US Standard Population
- Based on annual NCQA HEDIS definition
- Asthma as primary diagnosis, ICD-9-CM: 493.xx
- Medicaid population of children ≤18 years is restricted to those who are continuously enrolled in Medicaid with full coverage and no other insurance.

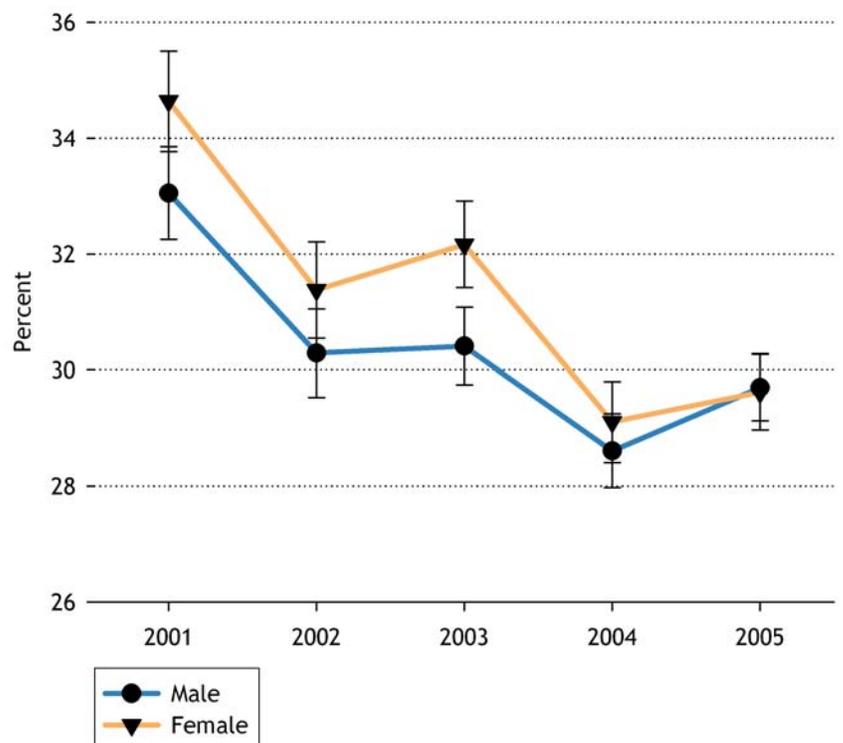
21. Percent of Reliance on Emergency Department¹ among Children (≤ 18 years) with Persistent Asthma², Medicaid³, Michigan, 2001-2005

- The proportion of outpatient visits for asthma that occur in the emergency department for children in Medicaid with persistent asthma is about 30%. (2005)
- From 2001 to 2005, there has been an overall decrease in emergency department reliance for children with persistent asthma in Medicaid.



22. Percent of Reliance on Emergency Department¹ among Children (≤ 18 years) with Persistent Asthma² by Sex, Medicaid³, Michigan, 2001-2005

- The proportion of outpatient visits for asthma that occur in the emergency department for children in Medicaid with persistent asthma is not significantly different by sex.
- The general decrease in emergency department reliance for children with persistent in Medicaid is similar by sex.

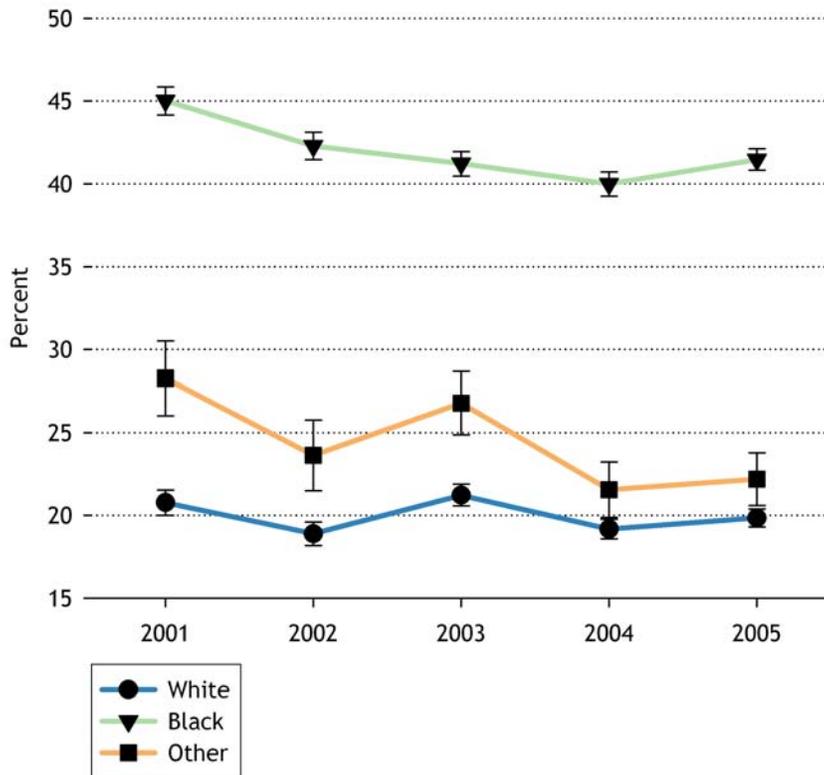


Data Notes:

Source: Data Warehouse, MDCH

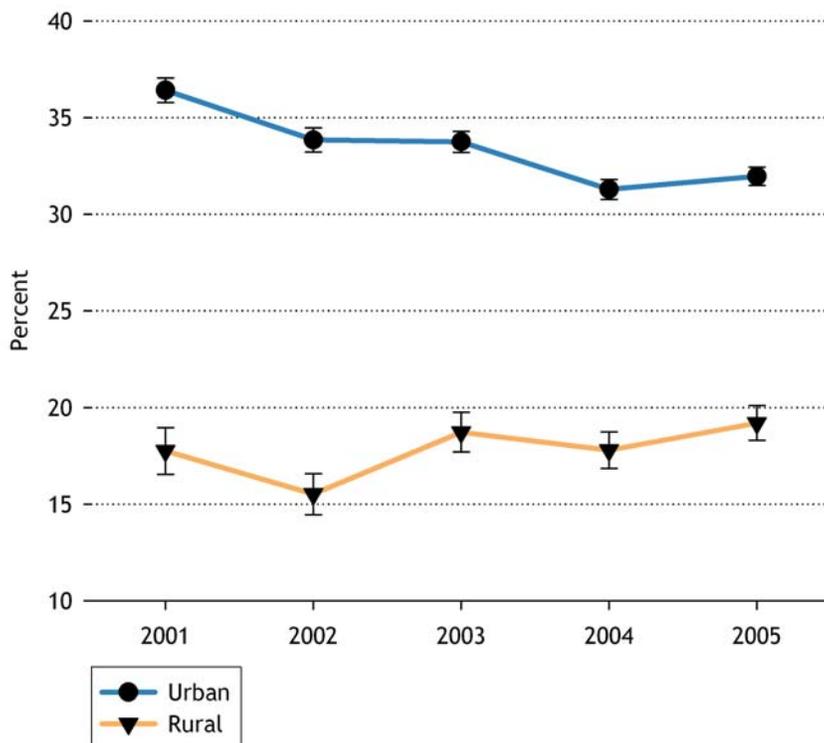
1. Proportion of all outpatient visits for asthma that are emergency department visits (Asthma as primary diagnosis, ICD-9-CM: 493.xx), age-adjusted to the 2000 US Standard Population
2. Based on annual NCQA HEDIS definition
3. Medicaid population of children ≤ 18 years is restricted to those who are continuously enrolled in Medicaid with full coverage and no other insurance.

23. Percent of Reliance on Emergency Department¹ among Children (≤18 years) with Persistent Asthma² by Race, Medicaid⁴, Michigan, 2001-2005



- The proportion of outpatient visits for asthma that occur in the emergency department for children in Medicaid with persistent asthma is significantly higher among black children compared to children of other races.
- Emergency department reliance is twice as high among black children compared to white children with persistent asthma in Medicaid.
- Emergency department reliance is not changing significantly over time, regardless of race.

24. Percent of Reliance on Emergency Department¹ among Children (≤18 years) with Persistent Asthma² by Urban/Rural Residence³, Medicaid⁴, Michigan, 2001-2005



- The proportion of outpatient visits for asthma that occur in the emergency department for children in Medicaid with persistent asthma is significantly higher among children with a urban residence compared to rural.
- Emergency department reliance is decreasing for children with an urban residence ($p < 0.05$)⁵, but remaining generally unchanged for those with a rural residence.

Data Notes:

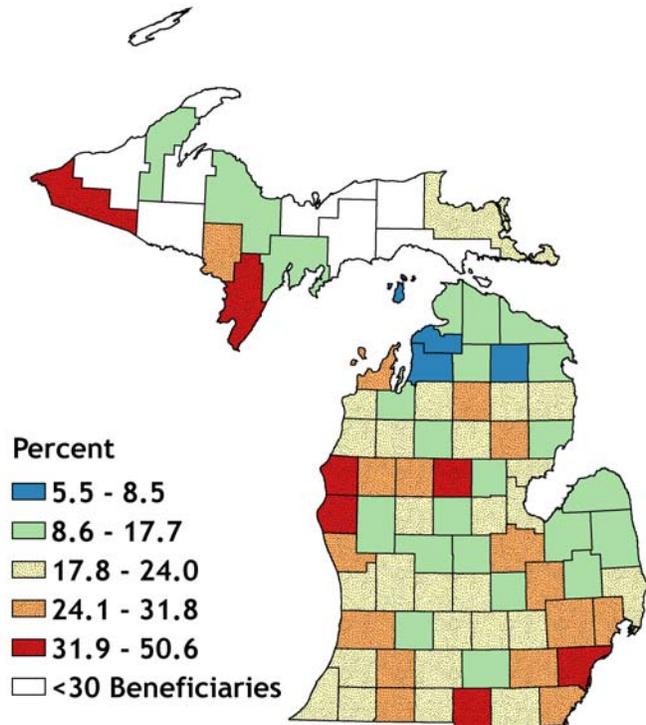
Source: Data Warehouse, MDCH

1. Proportion of all outpatient visits for asthma that are emergency department visits (Asthma as primary diagnosis, ICD-9-CM: 493.xx), age-adjusted to the 2000 US Standard Population
2. Based on annual NCQA HEDIS definition
3. Urban/Rural status determined by the intersection of county of residence and Michigan's Metropolitan Statistical Areas.
4. Medicaid population of children ≤18 years is restricted to those who are continuously enrolled in Medicaid with full coverage and no other insurance.
5. Spearman's rank correlation test

25. Percent of Reliance on Emergency Department¹ among Children (≤ 18 years) with Persistent Asthma² by County of Residence, Medicaid³, Michigan, 2005

- Counties with the highest reliance on the emergency department among children with persistent asthma in Medicaid are:

Clare
Gogebic
Hillsdale
Mason
Menominee
Oceana
Wayne

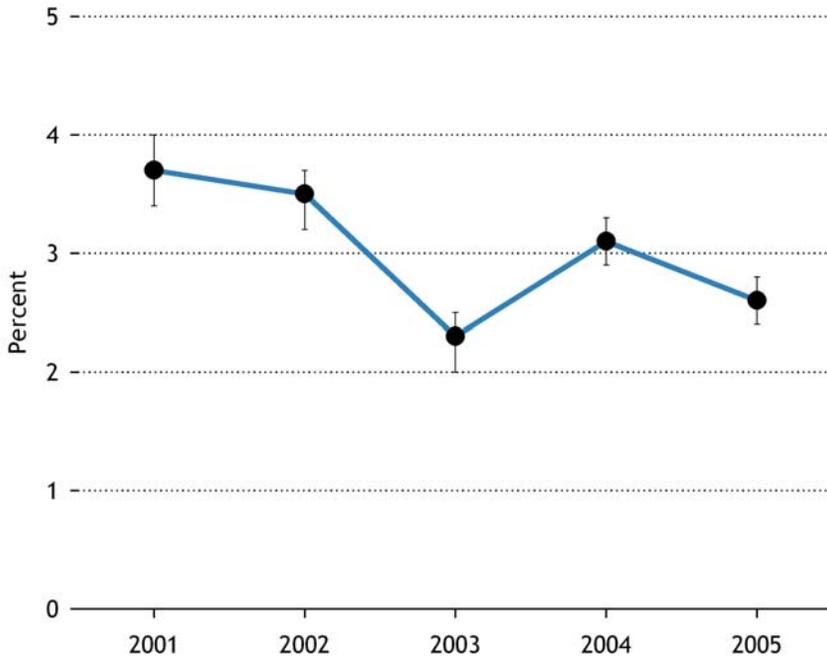


Data Notes:

Source: Data Warehouse, MDCH

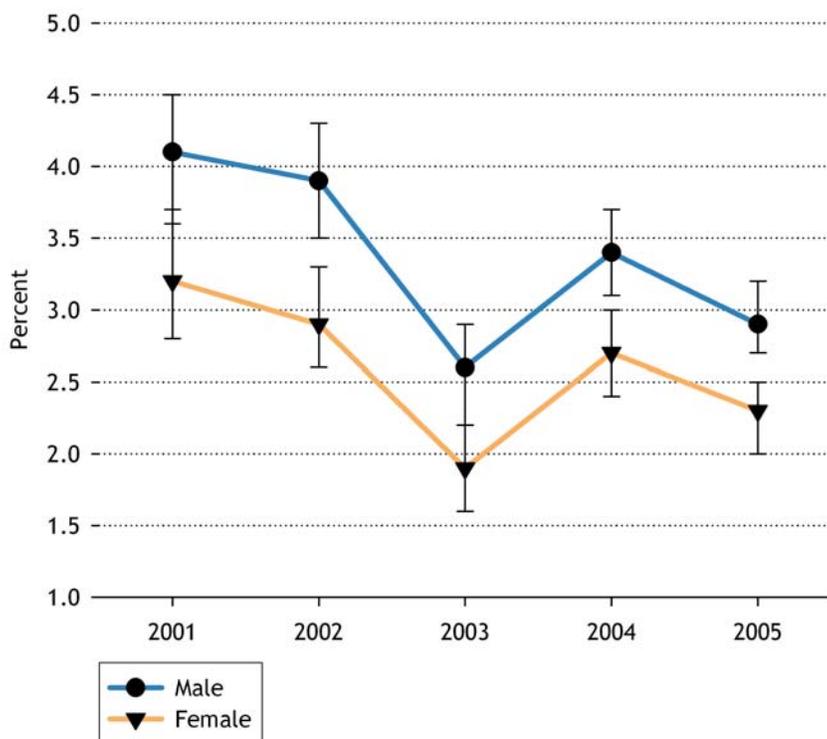
- Proportion of all outpatient visits for asthma that are emergency department visits (Asthma as primary diagnosis, ICD-9-CM: 493.xx), age-adjusted to the 2000 US Standard Population
- Based on annual NCQA HEDIS definition
- Medicaid population of children ≤ 18 years is restricted to those who are continuously enrolled in Medicaid with full coverage and no other insurance.

26. Percent of Overuse of Short-Acting β -Agonist Medication¹ among Children (≤ 18 years) with Persistent Asthma², Medicaid³, Michigan, 2001-2005



- It is a goal of asthma therapy that there be minimal use of Short Acting β -agonist medication - less than 1 canister per month.
- The prevalence of Short Acting β -agonist medication overuse among children in Medicaid with persistent asthma is 2.6%. (2005)
- From 2001 to 2005, there has been an overall decrease in Short Acting β -agonist medication overuse.

27. Percent of Overuse of Short-Acting β -Agonist Medication¹ among Children (≤ 18 years) with Persistent Asthma² by Sex, Medicaid³, Michigan, 2001-2005



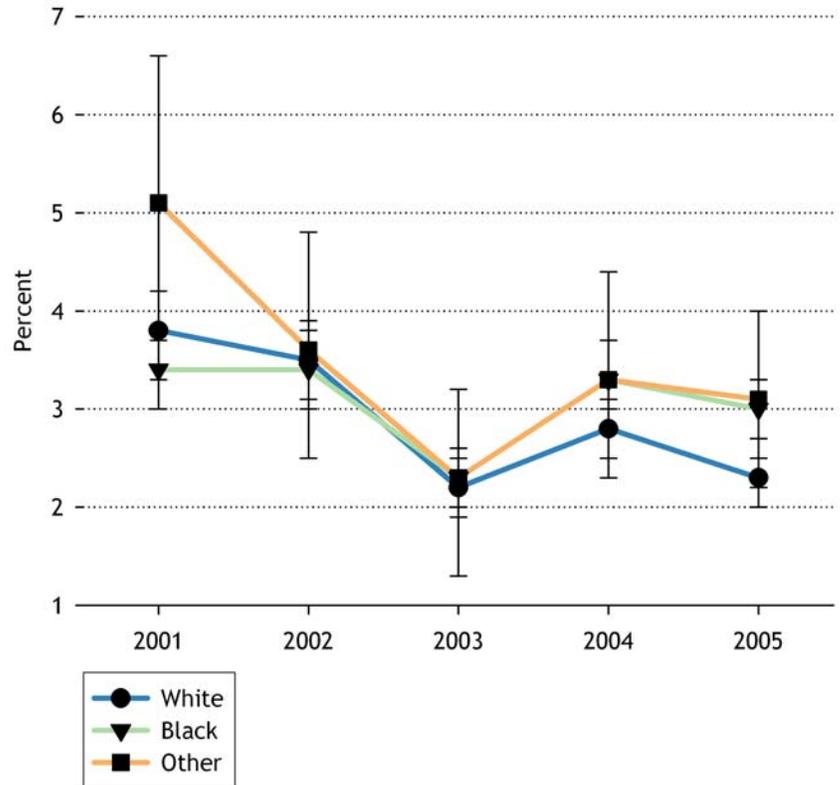
- The prevalence of Short Acting β -agonist medication overuse among children in Medicaid with persistent asthma is 30% higher for males compared to females.
- Short Acting β -agonist medication overuse is generally decreasing over time, regardless of sex.

Data Notes:
Source: Data Warehouse, MDCH

1. Proportion of children in Medicaid with persistent asthma who have claims for >12 Short-Acting β -Agonist medications during a given year; age-adjusted to the 2000 US Standard Population
2. Based on annual NCQA HEDIS definition
3. Medicaid population of children ≤ 18 years is restricted to those who are continuously enrolled in Medicaid with full coverage and no other insurance.

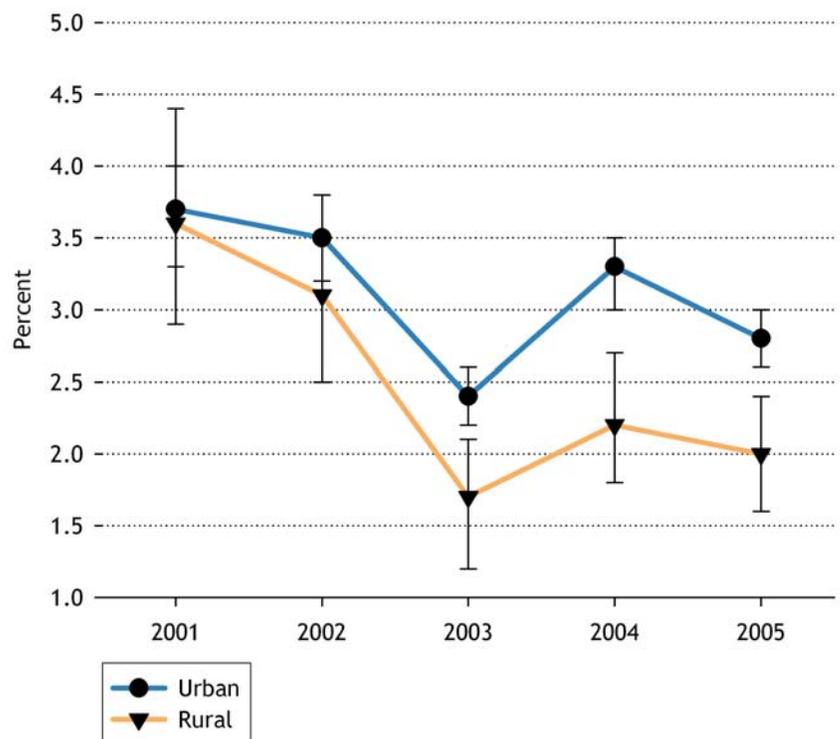
28. Percent of Overuse of Short-Acting β -Agonist Medication¹ among Children (≤ 18 years) with Persistent Asthma² by Race, Medicaid³, Michigan, 2001-2005

- The prevalence of Short Acting β -agonist medication overuse among children in Medicaid with persistent asthma is not significantly different by race.
- Short Acting β -agonist medication overuse is generally decreasing over time, regardless of race.



29. Percent of Overuse of Short-Acting β -Agonist Medication¹ among Children (≤ 18 years) with Persistent Asthma² by Urban/Rural Residence³, Medicaid⁴, Michigan, 2001-2005

- The prevalence of Short Acting β -agonist medication overuse among children in Medicaid with persistent asthma is about 40% higher for children with an urban residence compared to rural residence.
- Short Acting β -agonist medication overuse is generally decreasing over time, regardless of urban/ rural residence. However, the gap between this measure by urban/rural residence is increasing over time.

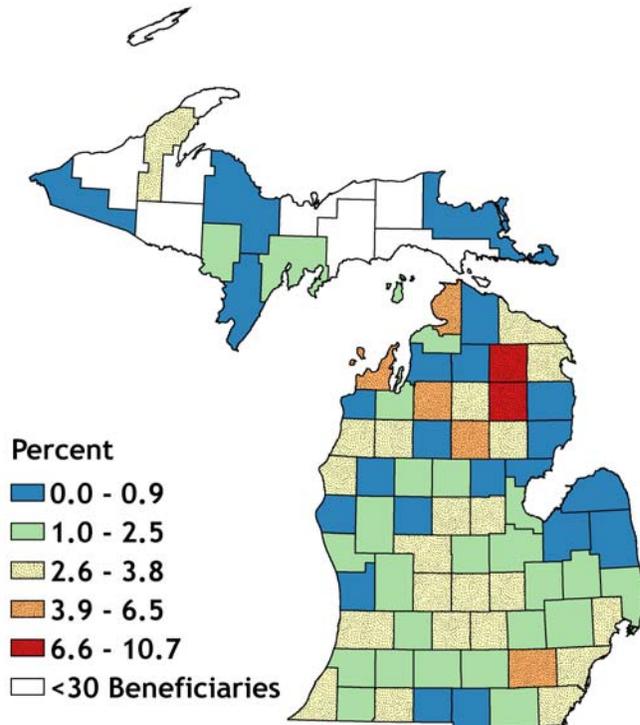


Data Notes:

Source: Data Warehouse, MDCH

1. Proportion of children in Medicaid with persistent asthma who have claims for >12 Short-Acting β -Agonist medications during a given year; age-adjusted to the 2000 US Standard Population
2. Based on annual NCQA HEDIS definition
3. Urban/Rural status determined by the intersection of county of residence and Michigan's Metropolitan Statistical Areas.
4. Medicaid population of children ≤ 18 years is restricted to those who are continuously enrolled in Medicaid with full coverage and no other insurance.

30. Percent of Overuse of Short-Acting β -Agonist Medication¹
among Children (≤ 18 years) with Persistent Asthma² by
County of Residence, Medicaid³, Michigan, 2005



- Counties with the highest percent of Short Acting β -agonist medication overuse among children with persistent asthma in Medicaid are:

Montmorency
Oscoda

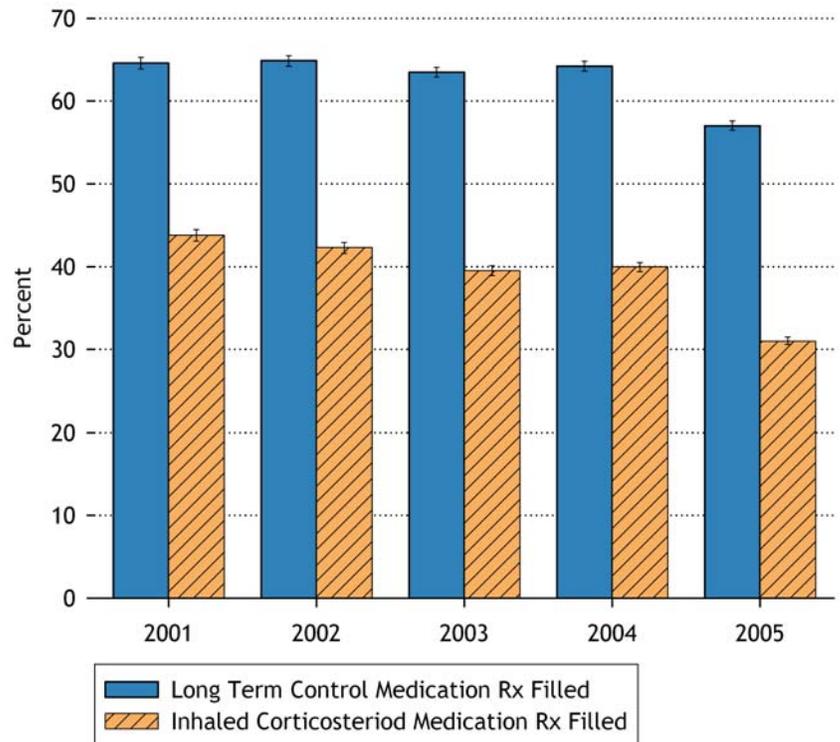
Data Notes:

Source: Data Warehouse, MDCH

- Proportion of children in Medicaid with persistent asthma who have claims for >12 Short-Acting β -Agonist medications during a given year; age-adjusted to the 2000 US Standard Population
- Based on annual NCQA HEDIS definition
- Medicaid population of children ≤ 18 years is restricted to those who are continuously enrolled in Medicaid with full coverage and no other insurance.

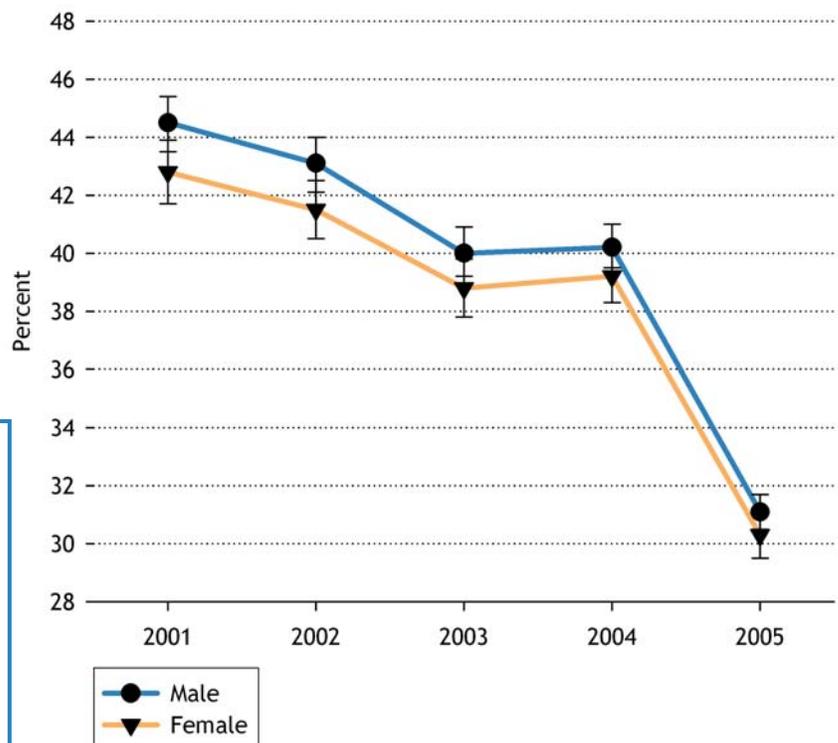
31. Percent¹ of Children (≤18 years) with Persistent Asthma² with ≥1 Long Term Control and ≥1 Inhaled Corticosteroid Medication³, Medicaid⁴, Michigan, 2001-2005

- Inhaled corticosteroid medication is the preferred, first-line medication for those with persistent asthma.
- 57% of children with persistent asthma in Medicaid have had ≥1 Long Term Control Medication prescription filled. (2005)
- 31% of children with persistent asthma in Medicaid have had ≥1 Inhaled Corticosteroid prescription filled. (2005)
- The prevalence of ≥1 Inhaled Corticosteroid prescription filled is significantly decreasing over time. ($p < 0.05$)⁵



32. Percent¹ of Children (≤18 years) with Persistent Asthma² with ≥1 Inhaled Corticosteroid Medication³ by Sex, Medicaid⁴, Michigan, 2001-2005

- The prevalence of ≥1 Inhaled Corticosteroid prescription filled for children in Medicaid with persistent asthma is not significantly different for males and females.
- The prevalence of ≥1 Inhaled Corticosteroid prescription filled is decreasing over time, regardless of sex. ($p < 0.05$)⁵

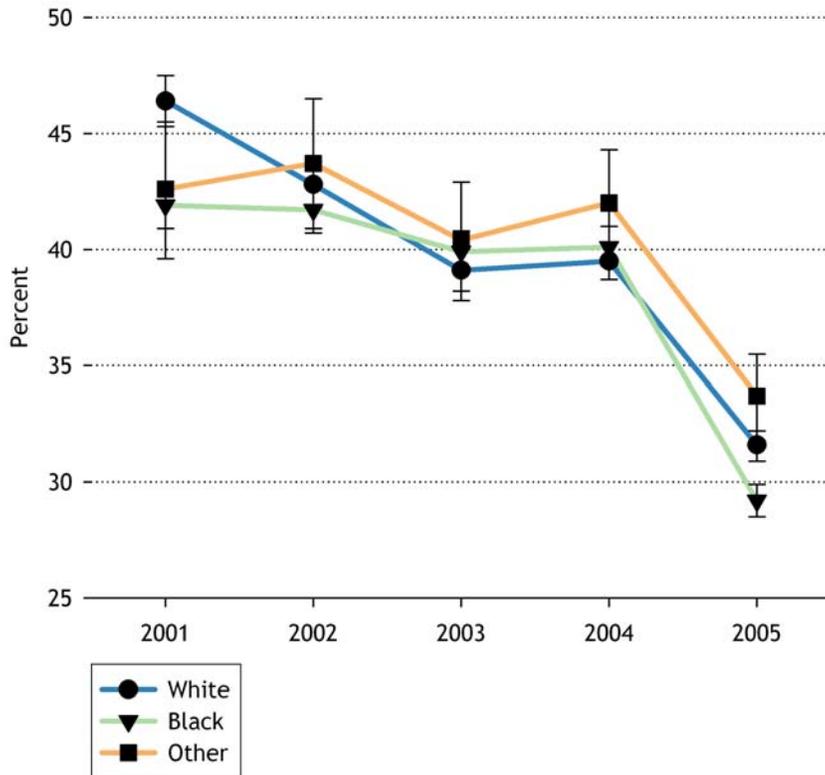


Data Notes:

Source: Data Warehouse, MDCH

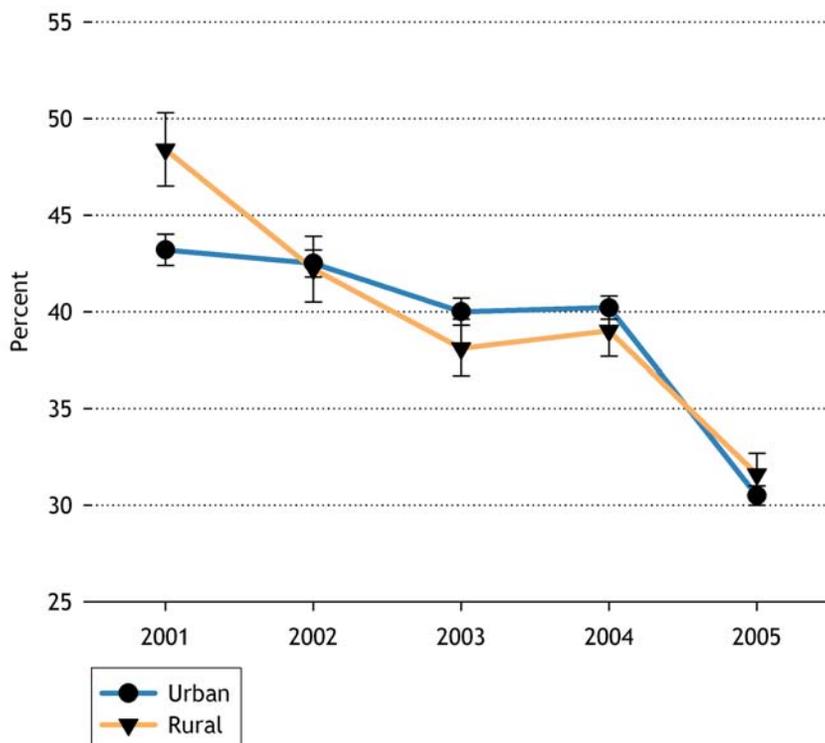
1. Age-Adjusted to the 2000 US Standard Population
2. Based on annual NCQA HEDIS definition
3. Medicaid population of children ≤18 years is restricted to those who are continuously enrolled in Medicaid with full coverage and no other insurance.
4. Measure is computed differently than the NCQA HEDIS® measure "Use of Appropriate Medications for People with Asthma." Results should not be compared to data strictly applying the specifications of the NCQA HEDIS® measure.
5. Spearman's rank correlation test

33. Percent¹ of Children (≤18 years) with Persistent Asthma² with ≥1 Inhaled Corticosteroid Medication³ by Race, Medicaid⁵, Michigan, 2001-2005



- The prevalence of ≥1 Inhaled Corticosteroid prescription filled for children in Medicaid with persistent asthma is not significantly lower for black children compared to other races.
- The prevalence of ≥1 Inhaled Corticosteroid prescription filled is decreasing over time, regardless of race. (Blacks and whites, $p < 0.05$)⁶

34. Percent¹ of Children (≤18 years) with Persistent Asthma² with ≥1 Inhaled Corticosteroid Medication³ by Urban/Rural Residence⁴, Medicaid⁵, Michigan, 2001-2005



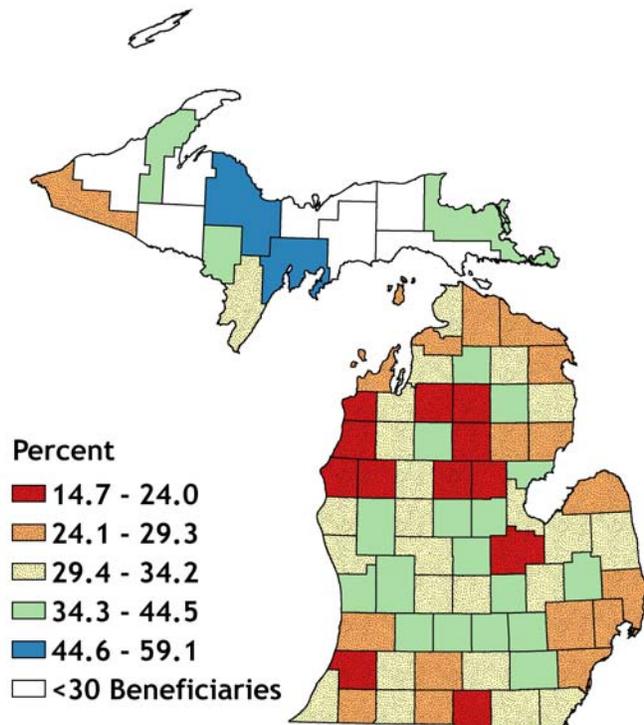
- The prevalence of ≥1 Inhaled Corticosteroid prescription filled for children in Medicaid with persistent asthma is not significantly different by urban/rural residence
- The prevalence of ≥1 Inhaled Corticosteroid prescription filled is decreasing over time, regardless of urban/rural residence. ($p < 0.05$)⁶

Data Notes:
 Source: Data Warehouse, MDCH
 1. Age-Adjusted to the 2000 US Standard Population
 2. Based on annual NCQA HEDIS definition
 3. Measure is computed differently than the NCQA HEDIS® measure "Use of Appropriate Medications for People with Asthma." Results should not be compared to data strictly applying the specifications of the NCQA HEDIS® measure.
 4. Urban/Rural status determined by the intersection of county of residence and Michigan's Metropolitan Statistical Areas.
 5. Medicaid population of children ≤18 years is restricted to those who are continuously enrolled in Medicaid with full coverage and no other insurance.
 6. Spearman's rank correlation test

35. Percent¹ of Children (≤ 18 years) with Persistent Asthma² with ≥ 1 Inhaled Corticosteroid Medication³ by County of Residence, Medicaid⁴, Michigan, 2005

- Counties with the lowest percent of ≥ 1 Inhaled Corticosteroid prescription filled for children in Medicaid with persistent asthma are:

Benzie
Clare
Crawford
Gladwin
Hillsdale
Kalkaska
Lake
Manistee
Mason
Roscommon
Saginaw
Van Buren



Data Notes:

Source: Data Warehouse, MDCH

- Age-Adjusted to the 2000 US Standard Population
- Based on annual NCQA HEDIS definition
- Measure is computed differently than the NCQA HEDIS® measure "Use of Appropriate Medications for People with Asthma." Results should not be compared to data strictly applying the specifications of the NCQA HEDIS® measure.
- Medicaid population of children ≤ 18 years is restricted to those who are continuously enrolled in Medicaid with full coverage and no other insurance.

Epidemiology of Asthma in Michigan Chapter 9: Asthma Burden for Children in Medicaid

State Level Data, Michigan, 2001-2005

Measure	Year	Total	Male	Female	White	Black	Other	Urban	Rural
Among all children in Medicaid Prevalence (%) [Figures 1-4]	2001	4.5 (4.5-4.6)	5.2 (5.1-5.3)	3.8 (3.7-3.9)	4.1 (4.0-4.2)	5.1 (5.0-5.2)	3.7 (3.5-3.9)	4.6 (4.5-4.7)	4.0 (3.9-4.2)
	2002	4.5 (4.4-4.5)	5.2 (5.1-5.2)	3.8 (3.7-3.9)	4.1 (4.1-4.2)	5.0 (4.9-5.1)	3.5 (3.3-3.7)	4.5 (4.4-4.6)	4.3 (4.2-4.5)
	2003	4.5 (4.4-4.6)	5.2 (5.1-5.3)	3.8 (3.7-3.8)	4.3 (4.2-4.4)	4.9 (4.9-5.0)	3.5 (3.3-3.6)	4.5 (4.4-4.5)	4.6 (4.5-4.8)
	2004	4.9 (4.9-5.0)	5.7 (5.6-5.8)	4.1 (4.0-4.2)	4.8 (4.7-4.9)	5.4 (5.3-5.5)	3.8 (3.6-3.9)	4.9 (4.8-4.9)	5.2 (5.1-5.3)
	2005	5.3 (5.3-5.4)	6.1 (6.0-6.2)	4.5 (4.4-4.6)	5.2 (5.1-5.2)	5.8 (5.7-5.9)	4.2 (4.0-4.3)	5.3 (5.3-5.4)	5.4 (5.2-5.5)
Rate of Emergency Department Visits (per 10,000) [Figures 6-9]	2001	229.3 (224.9-233.7)	261.1 (254.7-267.6)	195.4 (189.5-201.3)	128.7 (123.9-133.6)	342.5 (334.6-350.3)	158.6 (145.3-171.8)	251.5 (246.5-256.5)	108.3 (100.7-116.0)
	2002	195.8 (191.9-199.7)	224.2 (218.4-229.9)	165.6 (160.5-170.8)	110.1 (105.9-114.3)	302.2 (294.9-309.5)	127.2 (116.2-138.3)	214.7 (210.2-219.1)	97.3 (90.5-104.0)
	2003	227.6 (223.6-231.6)	261.1 (255.1-267.0)	192.2 (186.8-197.5)	140.9 (136.4-145.3)	343.9 (336.4-351.5)	159.1 (147.2-171.0)	246.1 (241.5-250.6)	134.7 (127.2-142.2)
	2004	213.5 (209.8-217.3)	247.3 (241.7-252.8)	177.7 (172.7-182.6)	130.2 (126.1-134.3)	334.2 (327.0-341.5)	141.0 (130.2-151.8)	230.2 (226.0-234.5)	131.5 (124.3-138.6)
	2005	242.5 (238.7-246.3)	281.0 (275.3-286.6)	201.8 (196.9-206.8)	144.7 (140.6-148.8)	398.4 (390.6-406.1)	144.5 (134.3-154.6)	263.1 (258.7-267.4)	144.6 (137.5-151.6)
Percent (%) with 1+ Outpatient Visits [Figures 11-14]	2001	46.1 (45.4-46.8)	46.5 (45.6-47.5)	45.2 (44.2-46.3)	52.1 (50.3-53.3)	41.0 (40.0-42.0)	48.7 (45.8-51.7)	44.5 (43.7-45.2)	55.9 (54.0-57.8)
	2002	45.4 (44.7-46.1)	45.5 (44.6-46.5)	45.0 (44.0-46.1)	49.9 (50.7-50.9)	40.6 (39.6-41.5)	51.6 (48.8-54.5)	43.9 (43.1-44.6)	53.3 (51.6-55.0)
	2003	49.5 (48.9-50.2)	50.0 (49.2-50.9)	48.6 (47.7-49.6)	51.9 (51.0-52.9)	46.6 (45.7-47.6)	53.1 (50.4-55.8)	48.6 (47.9-49.3)	54.1 (52.5-55.6)
	2004	48.9 (48.3-49.5)	48.9 (48.1-49.7)	48.7 (47.8-49.6)	51.6 (48.9-52.4)	45.0 (44.1-45.9)	56.0 (53.5-58.5)	48.1 (47.4-48.7)	52.5 (51.1-54.0)
	2005	49.0 (48.4-49.5)	49.3 (48.5-50.0)	48.4 (47.6-49.3)	51.1 (51.0-51.9)	45.7 (44.9-46.6)	53.8 (51.5-56.0)	48.3 (47.7-48.9)	51.9 (50.6-53.2)
Percent (%) with 1+ ED Visits [Figures 16-19]	2001	36.8 (36.1-37.5)	36.0 (35.1-36.9)	37.5 (36.4-38.5)	24.7 (23.8-25.6)	46.7 (45.7-47.7)	33.2 (30.5-36.0)	39.2 (38.4-39.9)	21.9 (20.4-23.4)
	2002	32.3 (31.7-32.9)	31.8 (30.9-32.6)	32.7 (31.8-33.7)	21.0 (20.1-21.8)	43.1 (42.2-44.1)	26.2 (23.8-28.6)	34.9 (34.2-35.6)	18.3 (17.0-19.6)
	2003	37.4 (36.8-38.0)	36.6 (35.8-37.4)	38.1 (37.2-39.1)	26.5 (25.7-27.3)	48.9 (48.0-49.9)	32.6 (30.1-35.1)	40.1 (39.4-40.8)	24.5 (23.2-25.8)
	2004	31.8 (31.3-32.4)	31.4 (30.7-32.1)	32.1 (31.3-32.9)	21.5 (20.8-22.1)	43.5 (42.6-44.4)	28.8 (26.5-31.1)	34.4 (33.8-35.0)	20.2 (19.0-21.3)
	2005	33.8 (33.3-34.3)	33.5 (32.9-34.2)	33.9 (33.1-34.7)	22.5 (21.8-23.1)	47.9 (47.1-48.7)	27.3 (25.3-29.3)	36.3 (35.7-36.9)	22.1 (21.1-23.2)
Percent (%) ED Reliance [Figures 21-24]	2001	33.7 (33.2-34.3)	33.1 (32.3-33.9)	34.6 (33.8-35.5)	20.8 (20.0-21.5)	45.0 (44.2-45.9)	28.3 (26.0-30.5)	36.4 (35.8-37.1)	17.8 (16.6-19.0)
	2002	30.9 (30.3-31.4)	30.3 (29.5-31.1)	31.4 (30.6-32.2)	18.9 (18.2-19.6)	42.3 (41.5-43.1)	23.6 (21.5-25.8)	33.8 (33.2-34.5)	15.5 (14.5-16.6)
	2003	31.3 (30.8-31.8)	30.4 (29.8-31.1)	32.2 (31.4-32.9)	21.2 (20.6-21.9)	41.2 (40.5-42.0)	26.8 (24.9-28.7)	33.7 (33.2-34.3)	18.7 (17.7-19.8)
	2004	29.0 (28.5-29.4)	28.6 (28.0-29.3)	29.1 (28.4-29.8)	19.2 (18.6-19.8)	40.0 (39.3-40.7)	21.6 (19.9-23.2)	31.3 (30.8-31.8)	17.8 (16.9-18.8)
	2005	29.9 (29.5-30.3)	29.7 (29.1-30.3)	29.6 (29.0-30.3)	19.9 (19.3-20.4)	41.5 (40.8-42.1)	22.2 (20.6-23.8)	32.0 (31.5-32.4)	19.2 (18.3-20.1)
Percent (%) Overuse of Short-Acting β -Agonist Medication [Figures 26-29]	2001	3.7 (3.4-4.0)	4.1 (3.6-4.5)	3.2 (2.8-3.7)	3.8 (3.3-4.2)	3.4 (3.0-3.8)	5.1 (3.7-6.6)	3.7 (3.3-4.0)	3.6 (2.9-4.4)
	2002	3.5 (3.2-3.7)	3.9 (3.5-4.3)	2.9 (2.6-3.3)	3.5 (3.1-3.9)	3.4 (3.0-3.8)	3.6 (2.5-4.8)	3.5 (3.2-3.8)	3.1 (2.5-3.8)
	2003	2.3 (2.0-2.5)	2.6 (2.2-2.9)	1.9 (1.6-2.2)	2.2 (1.9-2.5)	2.3 (3.0-2.6)	2.3 (1.3-3.2)	2.4 (2.2-2.6)	1.7 (1.2-2.1)
	2004	3.1 (2.9-3.3)	3.4 (3.1-3.7)	2.7 (2.4-3.0)	2.8 (2.5-3.1)	3.3 (3.0-3.7)	3.3 (2.3-4.4)	3.3 (3.0-3.5)	2.2 (1.8-2.7)
	2005	2.6 (2.4-2.8)	2.9 (2.7-3.2)	2.3 (2.0-2.5)	2.3 (2.0-2.5)	3.0 (2.7-3.3)	3.1 (2.2-4.0)	2.8 (2.6-3.0)	2.0 (1.6-2.4)
Percent (%) with 1+ Long Term Control Medication Rx* [Figures 31]	2001	64.6 (63.9-65.3)	65.4 (64.5-66.3)	63.6 (62.6-64.7)	68.3 (67.3-69.4)	62.3 (61.3-63.3)	60.8 (57.9-63.6)	63.6 (62.9-64.3)	71.1 (69.4-72.8)
	2002	64.9 (64.2-65.5)	65.4 (64.5-66.3)	64.1 (63.1-65.1)	68.1 (67.1-69.0)	61.9 (60.9-62.8)	65.9 (63.2-68.7)	63.9 (63.1-64.6)	70.4 (68.8-71.9)
	2003	63.5 (62.9-64.1)	64.1 (63.2-64.9)	62.7 (61.7-63.6)	68.1 (67.2-68.9)	59.2 (58.3-60.1)	62.5 (59.9-65.2)	62.1 (61.4-62.8)	70.7 (69.3-72.1)
	2004	64.2 (63.6-64.8)	64.8 (64.0-65.5)	63.4 (62.5-64.3)	69.2 (68.4-70.0)	58.6 (57.8-59.5)	64.6 (62.1-67.1)	62.3 (61.7-62.9)	73.0 (71.7-74.2)
	2005	57.0 (56.5-57.6)	57.8 (57.1-58.5)	56.1 (55.2-56.9)	64.7 (63.9-65.4)	48.1 (47.3-48.9)	59.0 (56.8-61.2)	54.7 (54.1-55.3)	68.2 (67.0-69.4)
Percent (%) with 1+ Inhaled Corticosteroid Medication Rx* [Figures 32-34]	2001	43.8 (43.1-44.5)	44.5 (43.5-45.4)	42.8 (41.7-43.9)	46.4 (45.3-47.5)	41.9 (40.9-42.9)	42.6 (39.6-45.5)	43.2 (42.4-44.0)	48.4 (46.5-50.3)
	2002	42.3 (41.6-42.9)	43.1 (42.1-44.0)	41.5 (40.5-42.5)	42.8 (41.8-43.8)	41.7 (40.7-42.7)	43.7 (40.9-46.5)	42.5 (41.8-43.2)	42.2 (40.5-43.9)
	2003	39.5 (38.9-40.1)	40.0 (39.2-40.9)	38.8 (37.8-39.8)	39.1 (38.2-40.0)	39.9 (39.0-40.8)	40.4 (37.8-42.9)	40.0 (39.3-40.7)	38.1 (36.7-39.6)
	2004	40.0 (39.4-40.5)	40.2 (39.5-41.0)	39.2 (38.3-40.1)	39.5 (38.7-40.3)	40.1 (39.3-41.0)	42.0 (39.6-44.3)	40.2 (39.6-40.8)	39.0 (37.7-40.3)
	2005	31.0 (30.6-31.5)	31.1 (30.5-31.7)	30.3 (29.5-31.0)	31.6 (30.9-32.2)	29.2 (28.5-29.9)	33.7 (31.8-35.5)	30.5 (30.0-31.0)	31.6 (30.5-32.7)

Source: Data Warehouse, MDCH

*Measure is computed differently than the NCQA HEDIS® measure "Use of Appropriate Medications for People with Asthma." Results should not be compared to data strictly applying the specifications of the NCQA HEDIS® measure.

Epidemiology of Asthma in Michigan Chapter 9: Asthma Burden for Children in Medicaid

County Level Data - Among All Children in Medicaid, Michigan, 2005

County	Prevalence (%) (Figure 5)		Rate of Emergency Department Visits Rate per 10,000 (Figure 10)	
Alcona	5.7	(3.9-7.5)	152.9	(57.2-248.5)
Alger*				
Allegan	4.3	(3.8-4.9)	179.6	(144.8-214.4)
Alpena	5.3	(4.3-6.3)	107.6	(61.3-154.0)
Antrim	4.6	(3.6-5.7)	37.6	(7.5-67.8)
Arenac	4.2	(3.1-5.3)	86.0	(34.8-137.1)
Baraga*				
Barry	5.2	(4.4-6.1)	115.5	(76.0-155.0)
Bay	5.4	(4.9-6.0)	183.7	(151.1-216.4)
Benzie	5.1	(3.7-6.5)	104.4	(39.4-169.3)
Berrien	6.3	(5.9-6.8)	174.7	(151.4-197.9)
Branch	4.6	(3.9-5.4)	118.2	(78.6-157.8)
Calhoun	4.7	(4.3-5.1)	118.2	(98.2-138.2)
Cass	5.8	(5.0-6.7)	144.1	(103.3-185.0)
Charlevoix	5.4	(4.2-6.6)	48.7	(14.9-82.5)
Cheboygan	7.1	(6.0-8.2)	144.7	(93.5-195.9)
Chippewa	2.9	(2.2-3.6)	105.6	(63.5-147.6)
Clare	8.2	(7.1-9.2)	410.3	(333.1-487.5)
Clinton	7.9	(6.7-9.1)	174.3	(115.6-233.0)
Crawford	5.6	(4.2-7.0)	251.7	(154.4-349.1)
Delta	4.6	(3.8-5.5)	128.1	(83.1-173.0)
Dickinson	3.8	(2.7-4.8)	125.0	(65.2-184.8)
Eaton	6.3	(5.5-7.0)	184.5	(146.0-223.0)
Emmet	5.7	(4.6-6.7)	131.0	(79.8-182.3)
Genesee	4.3	(4.1-4.5)	251.4	(235.9-266.8)
Gladwin	8.1	(6.9-9.4)	185.2	(121.8-248.5)
Gogebic	4.6	(3.4-5.8)	217.0	(131.9-302.1)
Grand Traverse	4.8	(4.1-5.4)	89.5	(60.4-118.6)
Gratiot	6.1	(5.1-7.0)	118.2	(77.7-158.8)
Hillsdale	6.3	(5.4-7.1)	331.4	(266.8-396.0)
Houghton	3.9	(3.0-4.8)	96.9	(52.7-141.2)
Huron	7.1	(6.0-8.3)	214.6	(150.3-278.9)
Ingham	7.2	(6.8-7.6)	288.9	(264.0-313.7)
Ionia	4.9	(4.2-5.7)	123.1	(84.9-161.4)
Iosco	5.5	(4.5-6.5)	131.0	(82.3-179.7)
Iron*				
Isabella	10.8	(9.7-12.0)	196.4	(146.5-246.3)
Jackson	5.5	(5.1-5.9)	119.7	(99.8-139.6)
Kalamazoo	5.4	(5.0-5.7)	216.9	(191.8-242.1)
Kalkaska	5.0	(3.9-6.1)	150.4	(88.6-212.2)
Kent	5.0	(4.8-5.2)	186.5	(172.7-200.3)
Keweenaw*				

Source: Data Warehouse, MDCH

* Beneficiaries <30

Epidemiology of Asthma in Michigan Chapter 9: Asthma Burden for Children in Medicaid

County Level Data - Among All Children in Medicaid, Michigan, 2005

County	Prevalence (Figure 5)		Rate of Emergency Department Visits (Figure 10)	
Lake	3.9	(2.7-5.0)	221.4	(127.9-315.0)
Lapeer	4.0	(3.4-4.6)	103.2	(72.5-133.9)
Leelanau	6.5	(4.4-8.6)	219.9	(94.0-345.7)
Lenawee	5.9	(5.3-6.6)	162.8	(127.7-197.8)
Livingston	5.6	(4.9-6.4)	149.3	(109.1-189.4)
Luce*				
Mackinac*				
Macomb	4.3	(4.0-4.5)	172.3	(157.8-186.7)
Manistee	3.7	(2.7-4.7)	109.4	(55.6-163.2)
Marquette	3.7	(3.0-4.4)	65.1	(34.2-96.0)
Mason	6.8	(5.7-7.9)	279.7	(208.0-351.3)
Mecosta	5.3	(4.4-6.1)	174.0	(123.8-224.1)
Menominee	3.9	(2.8-5.0)	156.2	(86.6-225.8)
Midland	8.2	(7.4-9.1)	170.7	(131.4-210.0)
Missaukee	6.1	(4.6-7.6)	140.2	(66.4-214.0)
Monroe	6.0	(5.4-6.6)	233.9	(195.4-272.4)
Montcalm	4.7	(4.1-5.3)	114.6	(83.1-146.1)
Montmorency	6.9	(5.0-8.8)	99.7	(25.6-173.7)
Muskegon	4.3	(4.0-4.7)	218.3	(194.9-241.6)
Newaygo	4.1	(3.4-4.7)	87.0	(57.0-117.0)
Oakland	5.0	(4.8-5.3)	212.5	(197.6-227.4)
Oceana	3.6	(2.8-4.4)	138.9	(91.4-186.4)
Ogemaw	5.1	(4.1-6.1)	119.0	(67.7-170.2)
Ontonagon*				
Osceola	4.9	(3.8-5.9)	206.7	(136.7-276.7)
Oscoda	5.4	(3.7-7.2)	164.1	(67.0-261.2)
Otsego	8.5	(7.1-9.8)	165.9	(103.1-228.8)
Ottawa	4.7	(4.2-5.2)	159.6	(132.0-187.3)
Presque Isle	4.7	(3.1-6.4)	134.3	(40.3-228.3)
Roscommon	5.8	(4.7-6.8)	98.6	(55.2-142.0)
Saginaw	5.0	(4.7-5.3)	251.4	(228.5-274.4)
St. Clair	5.3	(4.9-5.8)	188.9	(160.8-216.9)
St. Joseph	4.9	(4.2-5.5)	134.8	(100.4-169.2)
Sanilac	5.5	(4.7-6.3)	145.3	(101.8-188.8)
Schoolcraft*				
Shiawassee	6.0	(5.3-6.7)	107.1	(74.8-139.3)
Tuscola	5.3	(4.5-6.0)	141.6	(102.7-180.4)
Van Buren	4.3	(3.8-4.8)	116.4	(89.3-143.4)
Washtenaw	8.8	(8.2-9.3)	387.5	(352.3-422.7)
Wayne	5.5	(5.4-5.6)	357.9	(349.8-366.1)
Wexford	6.1	(5.1-7.0)	168.4	(118.0-218.8)

Source: Data Warehouse, MDCH

* Beneficiaries <30

Epidemiology of Asthma in Michigan Chapter 9: Asthma Burden for Children in Medicaid

County Level Data - Among Children in Medicaid with Persistent Asthma, Michigan, 2005

County	Percent (%) with 1+ Outpatient Visits (Figure 15)		Percent (%) with 1+ Emergency Dept. Visits (Figure 20)		Percent (%) ED Reliance (Figure 25)		Percent (%) Overuse of Short-Acting β -Agonist Medication (Figure 30)		Percent (%) with 1+ Inhaled Corticosteroid Medication Rx** (Figure 35)	
Alcona	46.6	(31.9-61.4)	14.9	(2.7-27.1)	18.1	(5.2-31.1)	0.0		31.3	(16.0-46.6)
Alger*										
Allegan	51.3	(44.7-57.9)	31.5	(25.5-37.5)	26.6	(21.9-31.2)	3.7	(0.9-6.4)	26.2	(21.1-31.2)
Alpena	55.5	(45.6-65.5)	19.3	(11.1-27.4)	15.0	(8.7-21.4)	3.1	(-0.4-6.6)	29.0	(20.2-37.9)
Antrim	47.1	(36.0-58.3)	7.1	(1.4-12.8)	5.5	(0.2-10.8)	0.0		30.9	(22.0-39.9)
Arenac	35.0	(21.9-48.2)	16.4	(6.2-26.6)	18.8	(-0.8-38.4)	0.0		35.8	(24.1-47.5)
Baraga*										
Barry	53.9	(45.3-62.4)	18.9	(12.3-25.4)	17.0	(10.9-23.1)	2.2	(-0.4-4.8)	34.9	(27.6-42.1)
Bay	57.8	(52.6-63.0)	28.0	(23.4-32.7)	19.6	(16.1-23.1)	1.8	(0.2-3.4)	30.7	(26.5-34.8)
Benzie	53.0	(38.5-67.6)	16.6	(5.2-28.0)	18.5	(3.4-33.6)	0.0		22.2	(9.4-35.0)
Berrien	50.1	(46.4-53.7)	22.4	(19.3-25.4)	21.8	(19.0-24.7)	2.8	(1.4-4.1)	32.2	(29.4-35.0)
Branch	50.8	(41.9-59.6)	24.7	(17.1-32.4)	19.6	(12.7-26.6)	0.0		25.6	(19.3-32.0)
Calhoun	47.5	(43.0-52.0)	21.0	(17.4-24.6)	21.4	(17.8-25.0)	2.0	(0.6-3.5)	28.8	(25.1-32.4)
Cass	45.3	(37.9-52.8)	18.8	(13.1-24.4)	21.0	(14.9-27.1)	2.2	(0.0-4.3)	25.7	(20.1-31.2)
Charlevoix	51.2	(39.7-62.8)	9.4	(2.9-16.0)	7.1	(1.4-12.8)	1.8	(-0.7-4.3)	29.0	(19.1-39.0)
Cheboygan	57.7	(50.0-65.3)	17.2	(11.1-23.3)	17.3	(11.4-23.3)	0.6	(-0.6-1.9)	26.8	(20.7-32.9)
Chippewa	57.8	(45.2-70.4)	28.2	(17.3-39.1)	22.7	(13.6-31.9)	0.0		35.0	(22.4-47.6)
Clare	46.1	(38.9-53.2)	36.1	(29.3-42.8)	35.1	(29.1-41.1)	2.3	(-0.1-4.6)	22.2	(17.2-27.2)
Clinton	52.4	(44.6-60.3)	20.1	(14.0-26.3)	18.7	(13.3-24.1)	2.8	(0.0-5.6)	32.5	(25.9-39.1)
Crawford	56.6	(43.4-69.8)	32.8	(20.0-45.6)	26.7	(17.8-35.5)	3.1	(-1.2-7.3)	19.5	(9.1-30.0)
Delta	60.7	(51.3-70.1)	23.5	(15.7-31.3)	15.8	(10.3-21.2)	1.9	(-0.7-4.5)	59.1	(49.8-68.5)
Dickinson	43.8	(30.2-57.4)	34.3	(21.5-47.2)	28.7	(16.9-40.4)	1.9	(-1.8-5.6)	44.5	(31.5-57.5)
Eaton	50.5	(44.6-56.4)	21.2	(16.2-26.1)	19.5	(15.2-23.8)	3.0	(0.5-5.5)	37.0	(31.6-42.3)
Emmet	62.4	(52.9-72.0)	17.4	(9.9-24.8)	15.2	(9.3-21.1)	6.5	(1.2-11.7)	32.6	(26.3-38.9)
Genesee	58.2	(55.9-60.6)	41.9	(39.6-44.3)	29.1	(27.5-30.7)	1.7	(1.0-2.3)	33.8	(31.7-35.9)
Gladwin	46.3	(38.0-54.6)	21.3	(14.5-28.1)	17.2	(11.5-23.0)	0.5	(-0.5-1.6)	16.9	(10.9-22.9)
Gogebic	26.3	(15.6-36.9)	43.7	(28.1-59.2)	50.6	(31.6-69.7)	0.0		27.8	(16.5-39.1)
Grand Traverse	54.8	(47.7-61.8)	18.2	(12.7-23.7)	14.7	(9.9-19.5)	1.8	(0.1-3.6)	30.7	(24.6-36.7)
Gratiot	51.5	(42.8-60.2)	16.5	(10.4-22.6)	12.8	(6.5-19.1)	2.4	(-0.2-5.0)	37.2	(30.2-44.2)
Hillsdale	46.1	(38.2-54.0)	37.3	(29.7-44.9)	35.4	(28.6-42.1)	0.7	(-0.3-1.8)	21.6	(16.1-27.1)
Houghton	55.7	(44.0-67.4)	18.8	(9.8-27.7)	14.8	(8.5-21.1)	3.1	(-1.2-7.4)	40.4	(29.6-51.3)
Huron	56.8	(48.2-65.4)	24.2	(16.8-31.5)	17.0	(12.0-21.9)	0.7	(-0.7-2.1)	28.6	(21.8-35.4)
Ingham	53.2	(50.3-56.0)	30.4	(27.8-32.9)	24.0	(22.1-25.9)	3.8	(2.6-4.9)	37.1	(34.7-39.6)
Ionia	45.7	(38.2-53.2)	21.6	(15.3-27.9)	21.9	(15.6-28.2)	2.8	(0.1-5.5)	31.2	(24.6-37.9)
Iosco	46.2	(36.9-55.5)	17.0	(10.8-23.2)	15.7	(10.0-21.3)	0.9	(-0.9-2.6)	28.9	(21.3-36.5)
Iron*										
Isabella	56.6	(50.1-63.2)	14.8	(10.1-19.5)	13.1	(9.0-17.3)	2.8	(0.7-4.9)	39.1	(34.1-44.2)
Jackson	56.4	(52.2-60.5)	18.8	(15.6-22.0)	14.3	(11.7-16.8)	2.5	(1.1-3.9)	30.4	(26.9-33.9)
Kalamazoo	50.5	(46.8-54.3)	30.5	(27.1-33.9)	26.0	(23.3-28.7)	2.3	(1.0-3.5)	32.5	(29.5-35.5)
Kalkaska	50.5	(38.7-62.3)	29.3	(19.3-39.3)	20.3	(12.7-27.8)	4.5	(-0.6-9.6)	24.0	(15.1-32.9)
Kent	54.4	(52.1-56.8)	28.2	(26.1-30.3)	23.4	(21.7-25.1)	1.4	(0.8-2.1)	35.3	(33.2-37.4)
Keweenaw*										

Source: Data Warehouse, MDCH

* Beneficiaries <30

**Measure is computed differently than the NCQA HEDIS® measure "Use of Appropriate Medications for People with Asthma." Results should not be compared to data strictly applying the specifications of the NCQA HEDIS® measure.

Epidemiology of Asthma in Michigan Chapter 9: Asthma Burden for Children in Medicaid

County Level Data - Among Children in Medicaid with Persistent Asthma, Michigan, 2005

County	Percent (%) with 1+ Outpatient Visits (Figure 15)		Percent (%) with 1+ Emergency Dept. Visits (Figure 20)		Percent (%) ED Reliance (Figure 25)		Percent (%) Overuse of Short-Acting β -Agonist Medication (Figure 30)		Percent (%) with 1+ Inhaled Corticosteroid Medication Rx** (Figure 35)	
Lake	56.2	(40.3-72.1)	41.4	(27.1-55.7)	28.7	(18.6-38.8)	0.0		18.9	(8.8-29.1)
Lapeer	54.8	(46.4-63.1)	19.3	(13.2-25.5)	16.7	(10.0-23.3)	1.8	(-0.3-4.0)	36.7	(30.9-42.4)
Leelanau	37.9	(21.2-54.5)	24.4	(9.0-39.7)	29.1	(12.2-45.9)	4.7	(-1.4-10.8)	28.8	(14.8-42.8)
Lenawee	58.0	(51.8-64.2)	22.8	(17.7-27.9)	19.9	(15.2-24.7)	1.7	(-0.3-3.8)	33.0	(28.1-37.9)
Livingston	52.5	(45.5-59.6)	21.9	(15.9-27.8)	20.6	(15.1-26.0)	2.0	(-0.3-4.2)	37.6	(31.1-44.0)
Luce*										
Mackinac*										
Macomb	51.5	(48.8-54.3)	31.0	(28.5-33.5)	25.3	(23.3-27.2)	3.4	(2.4-4.5)	27.3	(25.1-29.6)
Manistee	63.1	(49.2-77.0)	19.2	(7.6-30.7)	21.2	(11.6-30.7)	3.6	(-1.4-8.6)	20.4	(11.1-29.7)
Marquette	67.1	(58.2-75.9)	16.5	(9.1-23.9)	12.7	(7.1-18.4)	0.0		53.5	(44.1-62.8)
Mason	37.0	(28.9-45.1)	33.6	(26.0-41.2)	39.2	(31.2-47.1)	2.9	(0.1-5.8)	14.7	(9.0-20.4)
Mecosta	57.7	(49.6-65.8)	25.9	(18.8-33.0)	21.1	(15.8-26.4)	0.9	(-0.9-2.7)	32.4	(25.7-39.1)
Menominee	38.7	(26.5-50.9)	28.6	(13.5-43.7)	42.7	(0.5-84.9)	0.0		33.4	(18.0-48.9)
Midland	42.5	(37.1-48.0)	16.7	(12.4-20.9)	21.1	(16.5-25.6)	2.9	(0.9-5.0)	34.9	(30.5-39.4)
Missaukee	62.0	(48.2-75.9)	20.3	(9.1-31.4)	16.3	(7.0-25.6)	0.0		37.1	(27.7-46.5)
Monroe	52.1	(47.1-57.2)	30.7	(26.0-35.5)	25.0	(21.3-28.6)	3.4	(1.5-5.4)	30.1	(25.8-34.3)
Montcalm	60.9	(53.7-68.1)	19.9	(14.2-25.6)	13.9	(10.1-17.8)	3.3	(0.7-5.8)	33.7	(27.7-39.6)
Montmorency	58.1	(42.8-73.4)	12.7	(3.4-22.0)	8.5	(1.7-15.3)	7.8	(-1.1-16.8)	30.3	(19.3-41.2)
Muskegon	47.4	(43.5-51.3)	38.0	(34.3-41.8)	31.8	(28.8-34.8)	1.5	(0.5-2.5)	30.2	(26.9-33.6)
Newaygo	51.1	(42.9-59.2)	18.4	(12.1-24.7)	16.2	(9.4-23.0)	1.4	(-0.5-3.2)	39.3	(31.7-47.0)
Oakland	47.5	(45.1-49.9)	32.3	(30.0-34.5)	30.4	(28.4-32.3)	2.1	(1.4-2.9)	28.3	(26.4-30.2)
Oceana	35.0	(24.5-45.6)	32.0	(22.0-42.0)	35.1	(23.9-46.4)	0.0		34.2	(24.8-43.5)
Ogemaw	40.2	(30.2-50.3)	21.5	(13.1-29.9)	27.8	(18.0-37.6)	3.5	(-0.4-7.3)	26.7	(19.1-34.3)
Ontonagon*										
Osceola	51.2	(39.8-62.7)	35.2	(24.0-46.5)	27.1	(18.3-35.9)	2.2	(-2.1-6.6)	31.2	(21.2-41.1)
Oscoda	46.3	(28.6-63.9)	20.9	(6.8-34.9)	20.6	(6.4-34.8)	10.7	(-0.4-21.7)	35.5	(18.5-52.4)
Otsego	62.8	(53.6-72.0)	16.2	(9.0-23.4)	14.0	(8.7-19.4)	0.6	(-0.5-1.7)	36.8	(28.9-44.7)
Ottawa	51.3	(46.1-56.5)	26.2	(21.6-30.8)	23.8	(19.9-27.6)	0.8	(-0.3-1.9)	39.2	(34.4-44.0)
Presque Isle	60.0	(43.1-76.9)	23.1	(7.9-38.4)	17.7	(4.9-30.6)	2.8	(-2.7-8.4)	28.8	(12.1-45.5)
Roscommon	44.1	(35.3-52.9)	18.4	(11.3-25.5)	18.6	(7.6-29.6)	4.5	(0.4-8.7)	19.1	(12.2-26.0)
Saginaw	51.4	(48.2-54.6)	37.0	(33.9-40.1)	31.4	(29.0-33.8)	2.0	(1.1-2.9)	23.7	(21.2-26.1)
St. Clair	59.1	(54.6-63.6)	29.1	(25.0-33.2)	21.5	(18.3-24.6)	1.5	(0.3-2.7)	29.3	(25.7-32.9)
St. Joseph	35.1	(28.7-41.6)	25.9	(19.8-32.0)	27.1	(20.7-33.4)	3.2	(0.6-5.7)	32.0	(26.0-38.0)
Sanilac	57.5	(49.5-65.5)	20.8	(14.3-27.3)	15.0	(10.6-19.3)	0.0		29.9	(23.2-36.7)
Schoolcraft*										
Shiawassee	57.3	(50.5-64.1)	15.6	(10.4-20.8)	13.8	(9.6-18.0)	2.9	(0.1-5.7)	35.5	(30.2-40.7)
Tuscola	60.7	(53.6-67.8)	20.1	(14.4-25.7)	14.0	(10.3-17.8)	0.6	(-0.6-1.8)	30.9	(25.3-36.4)
Van Buren	43.8	(37.8-49.7)	23.4	(18.4-28.4)	21.2	(16.8-25.5)	2.3	(0.5-4.2)	23.3	(18.5-28.1)
Washtenaw	57.8	(54.5-61.2)	32.6	(29.6-35.6)	25.1	(22.7-27.5)	4.2	(2.7-5.7)	38.0	(35.0-41.1)
Wayne	41.9	(41.0-42.9)	45.7	(44.7-46.6)	43.1	(42.3-43.9)	3.4	(3.0-3.7)	28.7	(27.9-29.5)
Wexford	54.6	(46.4-62.9)	21.6	(14.9-28.4)	20.4	(14.3-26.5)	2.8	(0.0-5.5)	32.5	(26.3-38.7)

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* Beneficiaries <30

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