



The **ASTHMA** EPIDEMIOLOGY *Update*

Summer 2011

Asthma in North Carolina: Adult Prevalence, Emergency Department Visits, and Hospitalizations

Introduction

This issue of ***The Asthma Epidemiology Update*** presents adult prevalence, age-adjusted emergency department (ED) visit, and age-adjusted and age-specific hospitalization data for asthma in North Carolina. Lifetime and current prevalence rates are presented for the 23 largest counties, three geographic regions, and nine Area Health Education Centers (AHECs).

Asthma Prevalence

In 2009, about 12.9% (924,461) of adults in North Carolina had been diagnosed with asthma at some point in their lives (lifetime asthma prevalence) and about 7.8% (558,976) still had this chronic condition (current asthma prevalence). These prevalence estimates are lower than those for the United States (13.4% and 8.4%, respectively) in 2009.¹ While the increase in the lifetime prevalence for North Carolina (27.7%) was similar to that for the U.S. (27.6%) over the 10-year period (2000-

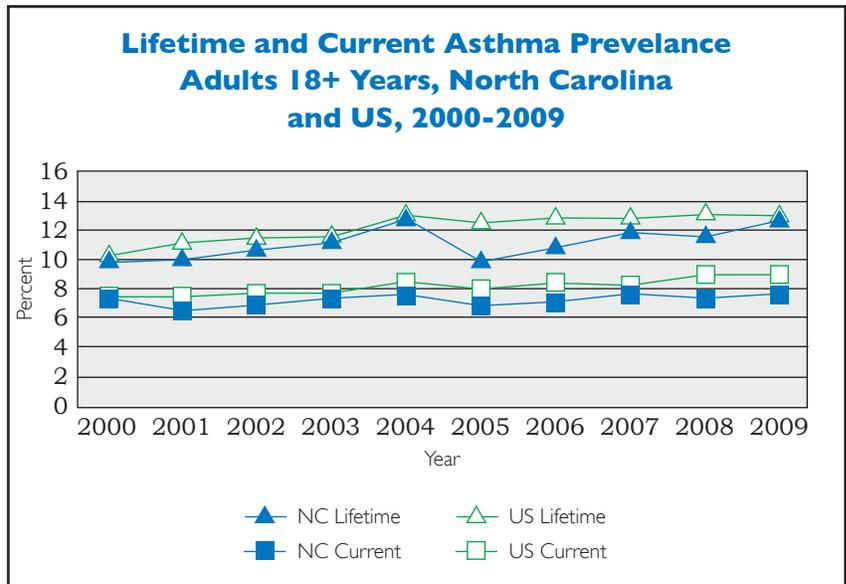
2009), the increase in current prevalence was lower (9.9% vs. 20.5%, respectively) for this same period.

Prevalence estimates for 23 counties are shown below, along with results for three geographic regions, and nine Area Health Education Centers (AHECs). The three counties with the highest lifetime asthma prevalence estimates were Wayne (18.0%), New Hanover (17.8%), and Cabarrus (17.4%), while the top three counties with the highest current asthma prevalence estimates were Johnston (12.2%), New Hanover (11.0%), and Wayne (10.9%). The Western geographic region had the highest prevalence estimates, at least one percentage point higher than those for the Eastern and Piedmont regions, which were similar in prevalence. Among the AHECs, the Southern AHEC had the highest lifetime prevalence estimate (15.0%), and the Mountain AHEC had the highest current prevalence (9.4%).

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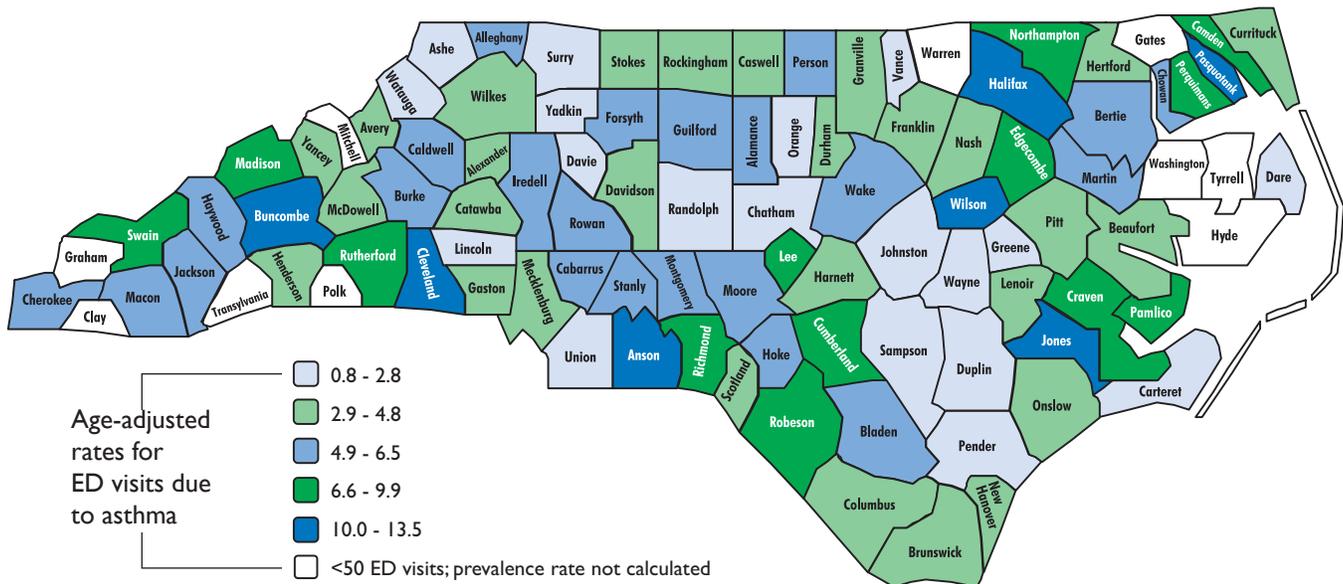
Emergency Department Visits Due to Asthma

The map below shows that four clusters of counties had the highest ED visit rates (over 6.6 per 100,000): western (Swain, Madison, Buncombe, Cumberland, Cleveland), southern (Anson, Richmond, Lee, Cumberland, Robeson), northeastern N.C. (Camden, Pasquotank, Perquimans, Northampton, Halifax, Edgecombe, Wilson), and central coast (Craven, Pamlico, Jones).



Sources: Centers for Disease Control and Prevention (www.cdc.gov/asthma/brfss/09/brfssdata.htm) Accessed April 19, 2011.

Emergency Department Visits with a Primary Diagnosis of Asthma, North Carolina, 2009¹



Data Source: NC Disease Event Tracking and Epidemiologic Collection Tool (NC DETECT), 2009

¹ Data for ED visits with a primary diagnosis of asthma are presented for all 100 N.C. Counties. Only counties where there are 50 or more cases are included.

Lifetime and Current Asthma Prevalence among Adults (Ages 18+ Years), by County, Region, and Area Health Education Center (AHEC), North Carolina, 2009¹

	Lifetime Asthma			Current Asthma Prevalence		
	Number	Percent	95% CI**	Number	Percent	95% CI**
North Carolina	924,461	12.9	11.9-14.0	558,976	7.8	7.0-8.6
COUNTY/REGIONS						
Alamance	15,090	13.3*	8.6-19.9	10,438	9.2*	5.1-16.0
Buncombe	20,667	11.3	8.5-14.9	10,438	7.5*	5.3-10.6
Cabarrus	22,418	17.4	11.6-25.1	8,632	6.7*	4.3-10.3
Catawba	12,372	10.3*	6.9-15.1	8,288	6.9*	4.1-11.4
Cumberland	34,802	14.8	10.8-20.1	15,755	6.7*	4.5- 9.8
Davidson	12,196	9.9	7.2-13.4	8,130	6.6*	4.5- 9.4
Durham	32,413	16.1*	10.0-24.9	15,300	7.6*	4.5-12.7
Forsyth	31,159	11.5*	8.2-16.0	26,553	9.8*	6.7-14.1
Gaston	18,179	11.5*	7.4-17.4	8,536	5.4*	3.5- 8.1
Guilford	49,643	13.6	9.8-18.6	26,282	7.2*	4.6-11.0
Iredell	11,984	10.1*	7.3-13.9	6,882	5.8*	3.8- 8.7
Johnston	19,616	15.7*	10.1-23.6	15,243	12.2*	7.0-20.5
Mecklenburg	82,011	12.3	9.2-16.3	45,340	6.8*	4.7- 9.8
New Hanover	27,634	17.8	11.8-26.1	17,078	11.0*	5.8-20.0
Onslow	20,776	16.0*	11.3-22.2	10,648	8.2*	5.2-12.7
Orange	12,521	11.6*	8.3-16.1	8,635	8.0*	5.2-12.0
Pitt	10,869	8.9*	6.0-13.0	5,740	4.7*	2.9- 7.6
Randolph	11,525	10.6*	7.0-15.7	6,523	6.0*	3.9- 9.2
Robeson	12,376	13.1	9.3-18.1	8,881	9.4*	6.2-14.1
Rowan	14,592	13.5	9.5-18.7	9,512	8.8*	5.5-13.7
Union	19,481	13.6*	8.6-20.9	15,041	10.5*	5.9-18.1
Wake	79,464	11.8	8.6-16.1	44,446	6.6*	4.0-10.5
Wayne	15,616	18.0	12.5-25.3	9,456	10.9*	6.9-16.7
NC REGIONS***						
Eastern NC	342,693	12.8	11.1-14.8	211,506	7.9	6.5- 9.5
Piedmont	703,678	12.7	11.3-14.3	415,558	7.5	6.5- 8.7
Western NC	162,518	14.1	12.2-16.2	103,735	9.0	7.6-10.6
AREA HEALTH EDUCATION CENTER						
Mountain	99,155	13.4	11.5-15.5	69,557	9.4	7.9-11.2
Northwest	185,608	12.0	10.3-13.9	122,192	7.9	6.6- 9.4
Charlotte	242,481	14.0	11.1-17.5	131,633	7.6	5.9- 9.7
Greensboro	139,232	12.6	9.9-15.8	88,401	8.0	5.8-10.8
Southern Regional	143,180	15.0	11.8-19.1	72,545	7.6	5.6-10.3
South East	49,424	13.1	8.9-19.0	27,919	7.4	4.5-12.0
Wake	210,136	13.1	10.4-16.4	118,703	7.4	5.4-10.2
Area L	19,718	6.5	3.5-12.0	15,168	5.0	2.4-10.1
Eastern	125,960	12.5	9.7-16.0	85,653	8.5	6.1-11.8

Data Source: North Carolina State Center for Health Statistics, North Carolina Behavioral Risk Factor Surveillance System, 2009. Percentages are weighted.

¹ The sampling scheme for the 2009 North Carolina Behavioral Risk Factor Surveillance System (BRFSS) Survey allows for county-level prevalence estimates for only 23 of the state's largest counties.

* Percentage based on cell size less than 50; use caution in interpreting

** 95% CI – 95% Confidence Interval (a range of values within which there is a 95% chance that the true prevalence estimate lies)

*** **Eastern North Carolina:** Beaufort, Bertie, Bladen, Brunswick, Camden, Carteret, Chowan, Columbus, Craven, Cumberland, Currituck, Dare, Duplin, Edgecombe, Gates, Greene, Halifax, Harnett, Hertford, Hoke, Hyde, Johnston, Jones, Lenoir, Martin, Nash, New Hanover, Northampton, Onslow, Pamlico, Pasquotank, Pender, Perquimans, Pitt, Robeson, Sampson, Scotland, Tyrrell, Washington, Wayne, and Wilson counties.

Piedmont North Carolina: Alamance, Alexander, Anson, Cabarrus, Caswell, Catawba, Chatham, Cleveland, Davidson, Davie, Durham, Forsyth, Franklin, Gaston, Granville, Guilford, Iredell, Lee, Lincoln, Mecklenburg, Montgomery, Moore, Orange, Person, Randolph, Richmond, Rockingham, Rowan, Stanly, Stokes, Union, Vance, Wake, Warren, and Yadkin counties.

Western North Carolina: Alleghany, Ashe, Avery, Buncombe, Burke, Caldwell, Cherokee, Clay, Graham, Haywood, Henderson, Jackson, McDowell, Macon, Madison, Mitchell, Polk, Rutherford, Surry, Swain, Transylvania, Watauga, Wilkes, and Yancey counties.

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Number and Age-adjusted Rates Per 100,000 Population for Emergency Department Visits, by County, North Carolina Disease Event Tracking and Epidemiologic Collection Tool (NC DETECT), North Carolina, 2009¹

	Number of Visits*	Rate	95%	CI**		Number of Visits*	Rate	95%	CI**
North Carolina	47,102	5.30	5.29	5.31	North Carolina	47,102	5.30	5.29	5.31
Alamance	755	5.27	5.26	5.28	Johnston	402	2.41	2.40	2.41
Alexander	148	4.14	4.13	4.14	Jones	118	13.15	13.14	13.16
Alleghany	54	5.93	5.92	5.94	Lee	421	7.27	7.26	7.28
Anson	288	11.90	11.89	11.91	Lenoir	203	3.81	3.80	3.82
Ashe	63	2.71	2.71	2.72	Lincoln	122	1.68	1.68	1.69
Avery	63	3.70	3.69	3.70	McDowell	148	5.09	5.08	5.10
Beaufort	183	4.15	4.14	4.16	Macon	164	8.68	8.67	8.69
Bertie	120	6.34	6.34	6.35	Madison	114	5.05	5.04	5.06
Bladen	180	5.65	5.64	5.66	Martin	199	4.72	4.72	4.73
Brunswick	414	4.81	4.80	4.82	Mecklenburg	4,270	4.76	4.75	4.76
Buncombe	2,207	10.38	10.37	10.39	Mitchell	42	3.04	3.04	3.05
Burke	539	6.39	6.38	6.40	Montgomery	141	5.32	5.31	5.33
Cabarrus	911	5.25	5.24	5.26	Moore	414	5.67	5.66	5.68
Caldwell	455	6.17	6.16	6.18	Nash	355	3.90	3.89	3.90
Camden	64	7.46	7.45	7.47	New Hanover	798	4.35	4.34	4.36
Cartaret	88	1.70	1.70	1.71	Northampton	183	9.69	9.68	9.71
Caswell	95	4.54	4.53	4.55	Onslow	670	3.98	3.97	3.99
Catawba	660	4.30	4.29	4.30	Orange	326	2.76	2.75	2.77
Chatham	147	2.58	2.57	2.58	Pamlico	84	7.81	7.80	7.82
Cherokee	107	5.11	5.10	5.12	Pasquotank	506	13.49	13.48	13.51
Chowan	83	6.33	6.32	6.34	Pender	135	2.83	2.83	2.84
Clay	21	2.54	2.53	2.55	Perquimans	99	9.75	9.74	9.76
Cleveland	976	10.49	10.48	10.51	Person	221	6.16	6.15	6.17
Columbus	198	3.64	3.63	3.65	Pitt	520	3.34	3.33	3.34
Craven	973	9.92	9.91	9.93	Polk	34	2.15	2.14	2.15
Cumberland	3,081	9.07	9.06	9.08	Randolph	268	1.94	1.93	1.94
Currituck	65	3.18	3.18	3.19	Richmond	328	7.20	7.19	7.21
Dare	76	2.56	2.55	2.57	Robeson	1,262	9.40	9.39	9.41
Davidson	638	4.09	4.08	4.09	Rockingham	408	4.73	4.72	4.74
Davie	81	2.06	2.05	2.06	Rowan	872	6.46	6.45	6.47
Duplin	71	1.30	1.30	1.30	Rutherford	534	8.56	8.54	8.57
Durham	1,174	4.36	4.35	4.37	Sampson	165	2.56	2.55	2.56
Edgecombe	356	7.32	7.31	7.33	Scotland	138	3.95	3.94	3.96
Forsyth	1,849	5.33	5.32	5.34	Stanly	282	4.99	4.98	4.99
Franklin	228	3.96	3.95	3.97	Stokes	153	3.55	3.54	3.56
Gaston	951	4.82	4.81	4.83	Surry	57	0.83	0.83	0.84
Gates	38	3.59	3.58	3.60	Swain	106	8.14	8.12	8.15
Graham	43	5.98	5.97	5.99	Transylvania	47	1.75	1.74	1.75
Granville	189	3.40	3.39	3.40	Tyrrell	11	2.91	2.91	2.92
Greene	53	2.56	2.55	2.57	Union	515	2.62	2.61	2.62
Guilford	2,916	6.26	6.25	6.27	Vance	77	1.78	1.77	1.78
Halifax	599	11.51	11.50	11.52	Wake	4,749	5.35	5.34	5.36
Harnett	394	3.49	3.48	3.50	Warren	23	1.25	1.25	1.26
Haywood	291	5.43	5.42	5.44	Washington	14	1.11	1.11	1.12
Henderson	395	4.41	4.41	4.42	Watauga	91	2.12	2.12	2.13
Hertford	97	4.45	4.44	4.45	Wayne	271	2.36	2.36	2.37
Hoke	304	6.05	6.04	6.05	Wilkes	220	3.36	3.36	3.37
Hyde	32	5.49	5.48	5.50	Wilson	1,009	13.00	12.99	13.02
Iredell	784	5.09	5.08	5.10	Yadkin	66	1.90	1.89	1.90
Jackson	187	5.38	5.37	5.39	Yancey	63	4.08	4.08	4.09

Data Source: NC Disease Event Tracking and Epidemiologic Collection Tool (NC DETECT), 2009

¹ Data for ED visits with a primary diagnosis of asthma are presented for all 100 N.C. Counties. Age-adjusted rates were calculated using the direct method with the year 2000 U.S. Standard Population.

* 1449 observations excluded due to missing age or county data

** 95% CI – 95% Confidence Interval

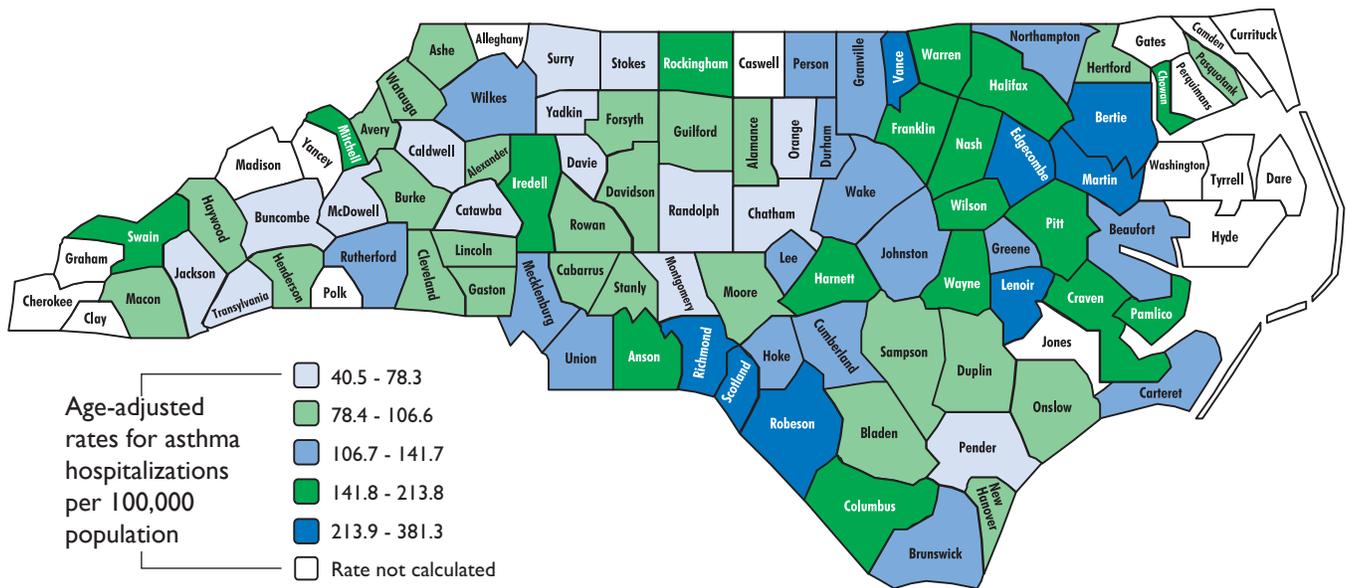
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Hospitalizations Due to Asthma

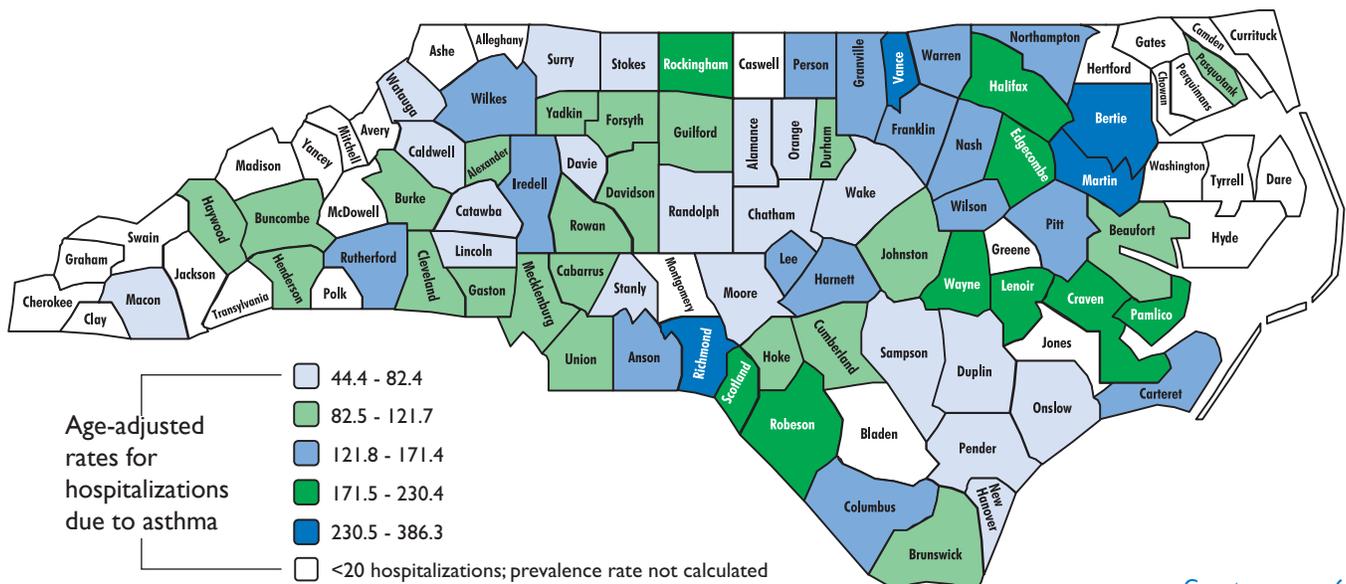
The maps below include only North Carolina counties with 20 or more hospitalizations. For the state as a whole (all ages), the highest hospitalization rates (over 213.9 per 100,000 residents) were from three southern counties along the North Carolina-South Carolina border, as well as five counties in the northeastern area to the central eastern area.

Counties with the highest rates (over 230.5 per 100,000 residents) among adults (18+ years) included Vance, Bertie, Martin, and Richmond Counties. Counties with the highest rates (over 239.5 per 100,000 residents) among children (<18 years) were Edgecombe, Lenoir, Richmond, Scotland, Robeson, and Columbus Counties.

Hospitalizations Per 100,000 Residents Due to Asthma, All Ages, 2009

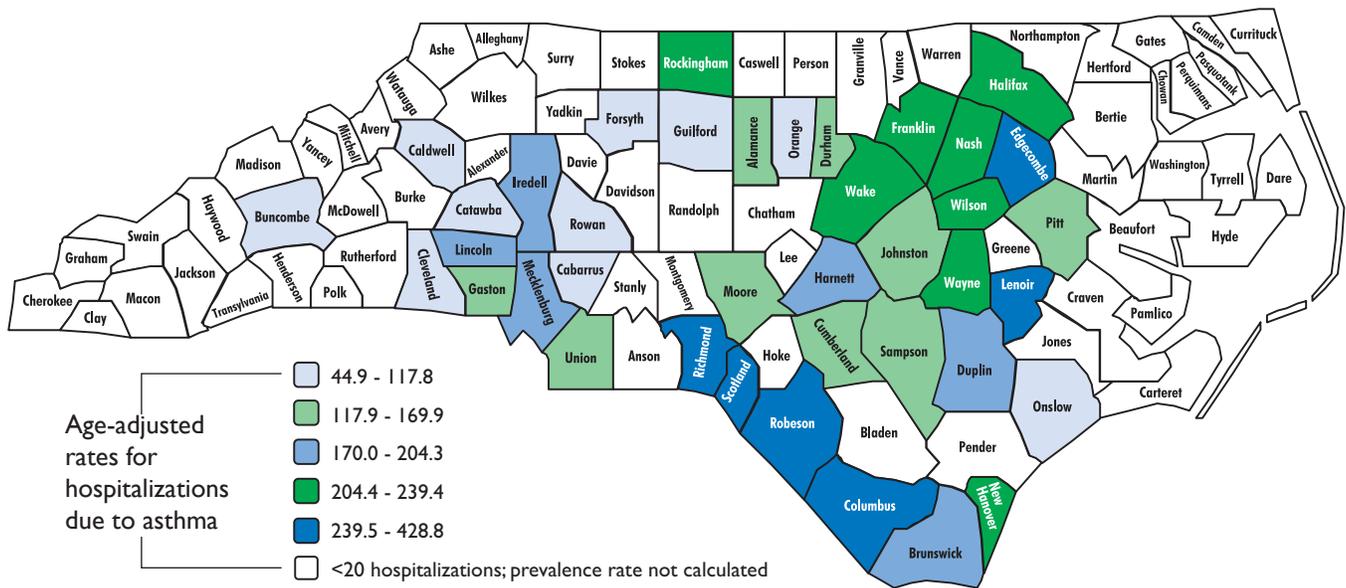


Hospitalizations Per 100,000 Residents Due to Asthma, Adults 18+ Years, 2009



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Hospitalizations Per 100,000 Residents Due to Asthma, Children <18 Years, 2009



Data Source: North Carolina State Center for Health Statistics, 2009 provisional data.

North Carolina Resident Hospital Discharges with a Primary Diagnosis of Asthma, Numbers and Rates Per 100,000*, by County of Residence and Age Group¹

	Total		Aged <18 years		Aged 18+ years	
	Number	Rate (Age-adjusted)	Number	Rate (Crude)	Number	Rate (Crude)
North Carolina	11,024	116.9	3,379	152.4	7,645	106.7
Alamance	144	97.5	54	154.8	90	79.3
Alexander	35	88.6	6	*	29	100.3
Alleghany	9	*	1	*	8	87.2
Anson	49	189.6	16	*	33	171.4
Ashe	22	84.3	8	*	14	*
Avery	20	99.4	3	*	17	*
Beaufort	58	119.6	16	*	42	114.1
Bertie	54	234.6	6	*	48	309.8
Bladen	28	85.0	12	*	16	*
Brunswick	117	117.9	39	204.3	78	88.6
Buncombe	182	72.8	27	56.8	155	84.8
Burke	79	82.3	12	*	67	95.5
Cabarrus	162	93.9	37	81.4	125	97
Caldwell	61	78.3	21	117.8	40	64.2
Camden	7	*	1	*	6	*
Carteret	85	121.0	17	*	68	127.7
Caswell	12	*	1	*	11	*
Catawba	122	76.3	38	103	84	69.9
Chatham	40	65.2	18	*	22	44.4
Cherokee	18	*	7	*	11	*
Chowan	22	152.7	4	*	18	*
Clay	5	*	1	*	4	*

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	Total		Aged <18 years		Aged 18+ years	
	Number	Rate (Age-adjusted)	Number	Rate (Crude)	Number	Rate (Crude)
Cleveland	99	98.0	23	99.3	76	100.7
Columbus	105	188.7	44	310.3	61	144.8
Craven	168	165.4	19	*	149	201.3
Cumberland	349	112.0	129	150.1	220	93.6
Currituck	7	*	0	0.0	7	*
Dare	13	*	4	*	9	*
Davidson	148	85.7	17	46.2	131	106.4
Davie	27	58.5	2	*	25	78
Duplin	52	94.2	25	179.9	27	67.9
Durham	293	114.2	100	154.2	193	95.9
Edgecombe	143	280.2	55	418.8	88	230.4
Forsyth	306	84.8	38	44.9	268	98.9
Franklin	106	178.1	30	215.1	76	168
Gaston	213	101.7	69	140.3	144	91.1
Gates	6	*	1	*	5	*
Graham	10	*	2	*	8	*
Granville	77	133.8	12	*	65	144.6
Greene	25	112.7	7	*	18	*
Guilford	506	105.8	127	114.4	379	103.9
Halifax	115	207.7	31	237.8	84	199.3
Harnett	171	155.8	55	192.1	116	137.7
Haywood	67	105.8	12	*	55	117.4
Henderson	92	80.6	13	*	79	94.4
Hertford	21	82.7	6	*	15	*
Hoke	58	126.7	19	*	39	119.8
Hyde	7	*	1	*	6	*
Iredell	267	168.2	71	185	196	165.2
Jackson	27	77.0	9	*	18	*
Johnston	219	135.0	67	154.7	152	121.7
Jones	17	*	6	*	11	*
Lee	79	132.3	19	*	60	137.6
Lenoir	139	245.3	46	335.5	93	213.7
Lincoln	80	106.6	34	194.3	46	79
McDowell	24	53.2	6	*	18	*
Macon	29	79.9	9	*	20	71.7
Madison	13	*	0	0.0	13	*
Martin	79	304.2	10	*	69	380.9
Mecklenburg	1,162	134.2	449	197.2	713	107
Mitchell	28	177.6	11	*	17	*
Montgomery	21	74.4	5	*	16	*
Moore	87	97.2	30	168.6	57	82.4
Nash	162	168.3	55	239.4	107	146.9
New Hanover	173	95.8	88	226.6	85	54.8
Northampton	28	121.2	4	*	24	144.7
Onslow	144	94.8	54	108.8	90	69.3
Orange	73	59.7	20	82.1	53	49.1
Pamlico	25	175.3	5	*	20	187.7
Pasquotank	44	103.7	15	*	29	89
Pender	36	69.1	15	*	21	49.4
Perquimans	11	*	2	*	9	*
Person	58	141.7	9	*	49	164.9
Pitt	229	161.0	59	161.9	170	139.2
Polk	13	*	0	0.0	13	*
Randolph	77	52.4	19	*	58	53.4
Richmond	181	381.3	45	386.5	136	386.3

Cont. on p. 8

	Total		Aged <18 years		Aged 18+ years	
	Number	Rate (Age-adjusted)	Number	Rate (Crude)	Number	Rate (Crude)
Robeson	321	244.6	123	335.8	198	209.6
Rockingham	206	213.6	43	210.7	163	228.1
Rowan	135	93.1	32	98.7	103	95.3
Rutherford	79	112.8	8	*	71	144
Sampson	67	100.7	28	169.9	39	79.7
Scotland	103	280.2	41	428.8	62	226.6
Stanly	47	80.4	16	*	31	66.7
Stokes	22	40.5	1	*	21	57.4
Surry	51	67.8	10	*	41	71.9
Swain	25	175.5	7	*	18	*
Transylvania	24	74.8	6	*	18	*
Tyrrell	5	*	0	0.0	5	*
Union	213	112.3	86	162	127	88.7
Vance	113	248.9	19	*	94	293.5
Wake	977	117.5	462	210.8	515	76.5
Warren	34	166.1	8	*	26	162
Washington	18	*	5	*	13	*
Watauga	33	85.4	7	*	26	67.3
Wayne	248	213.8	70	234.8	178	205.2
Wilkes	92	122.0	10	*	82	155.8
Wilson	125	156.4	43	217.6	82	136.1
Yadkin	27	70.3	0	0.0	27	92.6
Yancey	19	*	6	*	13	*

Data Source: North Carolina State Center for Health Statistics, 2009 provisional data. Newborns were not included.

¹ Hospitalization data are provided for all 100 N.C. counties and include only N.C. residents served in N.C. hospitals.

* Age-adjusted and age-specific crude rates are calculated only if there are 20 or more hospitalizations for a particular county.

Future Topics

Additional data from the North Carolina BRFSS and the North Carolina Childhood Health Assessment and Monitoring Program (CHAMP) will allow us to provide further information on behavioral risk factors, and asthma management and control. We continue to explore other sources of surveillance data and will share asthma-related information of interest with you. As always, we welcome your comments and suggestions on this issue and for future topics. Please contact the North Carolina Asthma Program at 919-707-5213.



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