

# Myeloma in Ohio, 2005-2009



Myeloma is a cancer that starts in the plasma cells in bone marrow. These abnormal plasma cells are called myeloma cells. In time, myeloma cells collect in the bone marrow and may damage the solid part of the bone. When myeloma cells collect in several bones, the disease is called "multiple myeloma." This disease may also harm other tissues and organs, such as the kidneys.

## Myeloma Incidence and Mortality

Myeloma made up 1.1 percent of the incident (newly diagnosed) cancers reported to the Ohio Cancer Incidence Surveillance System (OCISS) from 2005 through 2009. The average annual number (N) of cases of myeloma in Ohio during this time period was 672 and the average annual age-adjusted incidence rate was 5.2 cases per 100,000 persons, which is lower than the U.S. (SEER: Surveillance, Epidemiology and End Results) rate of 5.8 per 100,000 persons (Table 1). Estimated completeness of reporting for myeloma in Ohio was 82 percent in 2005-2009, which is lower than the national standard of 95 percent for complete case ascertainment. Therefore, the myeloma incidence rates presented in this report may underestimate the true myeloma burden in Ohio. The Ohio myeloma mortality rate of 3.7 deaths per 100,000 persons in 2005-2009 is slightly higher than the U.S. (NCHS: National Center for Health Statistics) mortality rate (3.4 per 100,000 persons). As shown in Table 1, in both Ohio and the United States, myeloma incidence and mortality rates were greater for males, blacks and those 65 years and older.

## Key Findings

- Myeloma incidence rates are higher in the U.S. compared to Ohio, likely due to low completeness of reporting.
- Black males had the highest myeloma incidence and mortality rates in Ohio and the U.S.; white females had the lowest rates.
- Myeloma incidence rates, in general, increased with advancing age.
- There were no strong geographic patterns of myeloma incidence or mortality rates in Ohio.
- Myeloma incidence rates were relatively stable from 1996 to 2009. Mortality rates were sporadic for blacks and relatively stable for whites.
- The vast majority of myelomas were multiple myelomas and were diagnosed at the distant stage with 39.8% probability of surviving five years.
- Risk factors/populations at high risk for myeloma are older age, black race, male sex, family history of myeloma, and personal history of monoclonal gammopathy of undetermined significance.

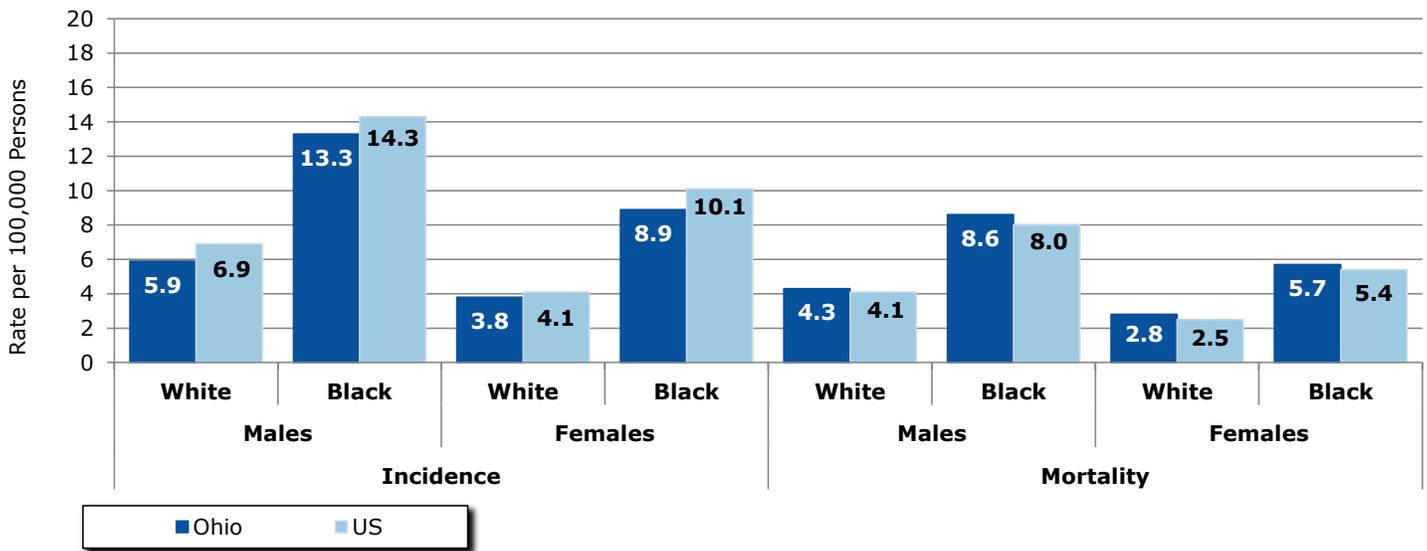
**Table 1: Myeloma: Average Annual Number (N) and Age-adjusted Rates of Invasive Cancer Cases and Cancer Deaths by Gender, Race and Age Group in Ohio and the U.S., 2005-2009**

	Incidence			Mortality		
	N	Ohio Rate	US Rate	N	Ohio Rate	US Rate
<b>Total</b>	672	5.2	5.8	472	3.7	3.4
<b>Gender</b>						
Males	361	6.5	7.4	242	4.6	4.4
Females	310	4.3	4.7	230	3.1	2.7
<b>Race</b>						
White	537	4.7	5.3	394	3.4	3.2
Black	125	10.6	11.7	76	6.8	6.4
Asian/Pacific Islander	4	4.6	3.5	2	1.3	1.7
<b>Age</b>						
<64	248	2.1	2.2	112	0.9	0.8
65+	424	27.1	30.7	360	22.8	21.3

Source: Ohio Cancer Incidence Surveillance System and the Vital Statistics Program, Ohio Department of Health, 2012; Surveillance, Epidemiology and End Results Program, National Cancer Institute, 2012; National Center for Health Statistics, 2012.

## Myeloma Incidence and Mortality Rates by Race and Gender in Ohio Compared to the United States

**Figure 1: Myeloma: Average Annual Age-adjusted Rates of Invasive Cancer Cases and Cancer Deaths by Race and Gender in Ohio and the U.S., 2005-2009**



Source: Ohio Cancer Incidence Surveillance System and the Vital Statistics Program, Ohio Department of Health, 2012; Surveillance, Epidemiology and End Results Program, National Cancer Institute, 2012; National Center for Health Statistics, 2012.

As shown in Figure 1, black males had the highest average annual age-adjusted myeloma incidence and mortality rates in Ohio and the United States in 2005-2009, whereas white females had the lowest rates. For each gender-race-specific group, incidence rates were greater in the United States, compared to those in Ohio. This is likely the result of low (82%) estimated completeness of reporting for myeloma in Ohio. In contrast, for each gender-race-specific group, mortality rates were greater in Ohio, compared to those in the United States.

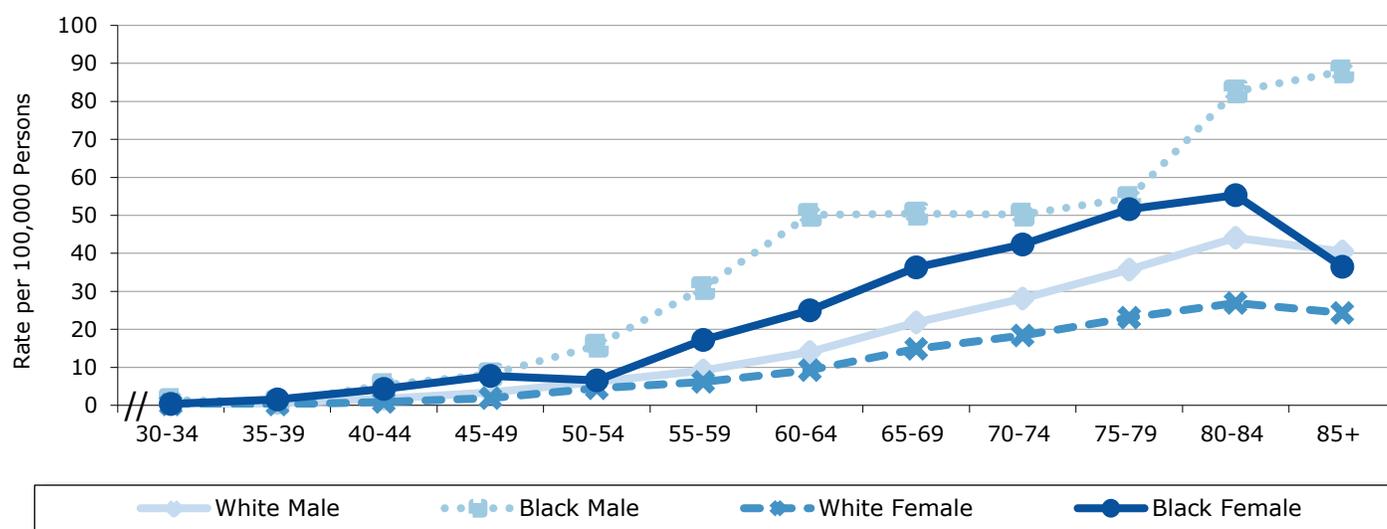
### Did You Know?

Dr. Craig Hofmeister, a physician and researcher at The Ohio State University, is partnering with the Ohio Department of Health, Case Western Reserve University and the Cleveland Clinic to develop a myeloid and amyloidosis registry for the State of Ohio. This registry will incorporate important clinical information about myeloma patients and enable patients to become informed partners in research. The registry is a two-way street, enabling contact between patients and researchers for both clinical questions and epidemiologic research. The goals of the registry are to better understand myeloma and to provide information to patients about clinical trials.

## Myeloma by Age

As shown in Figure 2, for all gender/race groups, myeloma incidence rates increased with advancing age up to ages 80-84 years and then decreased for all groups except black males. There were very few myelomas diagnosed among those younger than 30 years. Myeloma incidence rates were similar for all gender/race groups up to ages 45 to 49 years; whereas, black males had the highest rates among those 50-54 and older. With the exception of the 85+ age group, black males and black females had higher rates of myeloma for every age group, compared to white males or white females.

**Figure 2: Myeloma: Age-specific Incidence Rates per 100,000 Persons, by Gender and Race in Ohio, 2005-2009**



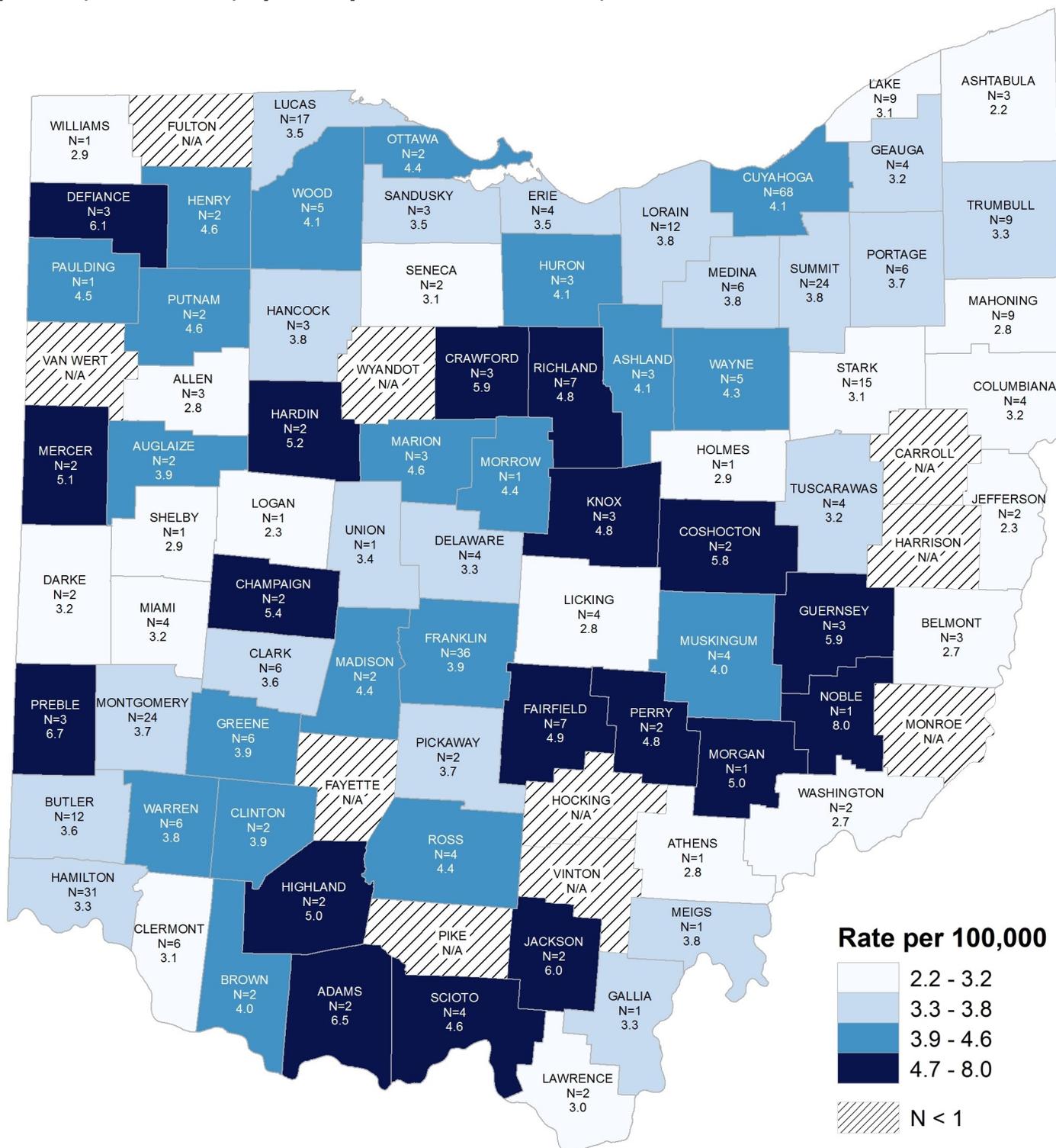
Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2012.

## Myeloma Incidence and Mortality by County of Residence

Figures 3 (page 4) and 4 (page 5) present 2005-2009 average annual numbers (N) and age-adjusted myeloma incidence and mortality rates, respectively, by county of residence. County incidence rates in Ohio ranged from 2.2 to 10.7 per 100,000 persons (Figure 3) and mortality rates ranged from 2.2 to 8.0 per 100,000 persons (Figure 4). County incidence and mortality rates were geographically dispersed. However, there was a small group of counties in the western area of the state with higher incidence rates, and groups of counties in the eastern and southern areas of the state with higher mortality rates. It should be noted that geographic differences in incidence rates may represent differences in completeness of reporting of myeloma in Ohio. Counties in northeastern Ohio and along the eastern border appear to exhibit lower mortality rates. Data used to generate these maps can be found in Tables 5 and 6 on pages 10 and 11 of this document.



**Figure 4: Myeloma: Average Annual Number of Deaths (N) and Age-adjusted Mortality Rates per 100,000 Persons, by County of Residence in Ohio, 2005-2009**



Source: Ohio Cancer Incidence Surveillance System and the Vital Statistics Program, Ohio Department of Health, 2012.

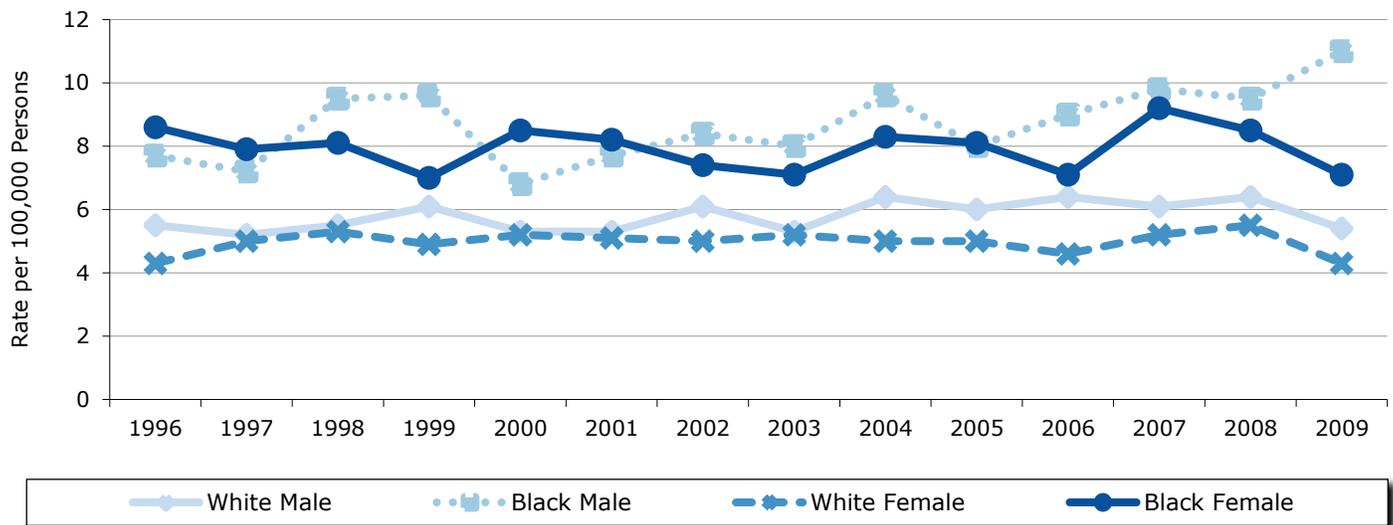
- N = Average number of deaths *per year* (= Total deaths in 2005-2009 ÷ 5 years).
- Each category represents approximately 25% of the 88 Ohio counties.
- N/A: Rates may be unstable and are not presented when the case count for 2005-2009 is less than five (i.e., N<1).

## Myeloma Incidence and Mortality Trends

Figure 5 shows myeloma incidence rates according to year of diagnosis (1996 through 2009) by gender-race groups. For each year, black males and females had higher incidence rates than white males and females. For each gender-race group, incidence rates were sporadic but did not tend to increase or decrease over the time period, with the exception of an increase in the incidence rate for black males from 2005 to 2009.

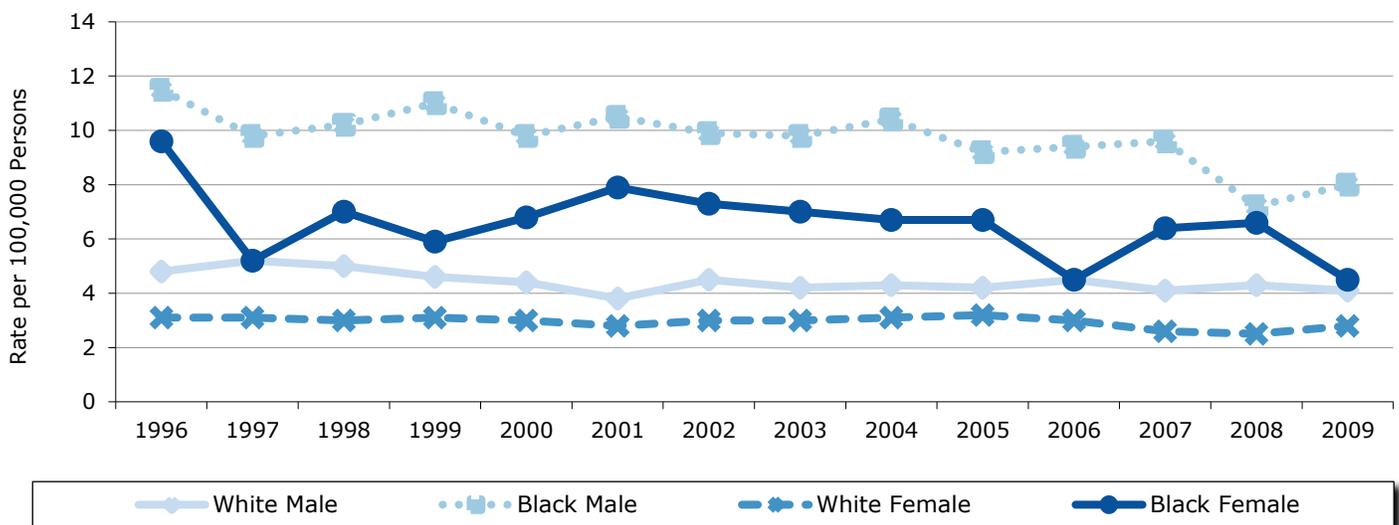
Figure 6 shows myeloma mortality rates according to year of death (1996 through 2009) by gender-race group. For each year, black males had the highest mortality rate, while white females had the lowest. Mortality rates remained relatively stable for white males and females, while mortality rates for black males and females varied over the 14-year period.

**Figure 5: Myeloma: Trends in Average Annual Age-adjusted Incidence Rates per 100,000 Persons, by Race and Gender in Ohio, 1996-2009**



Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2012.

**Figure 6: Myeloma: Trends in Average Annual Age-adjusted Mortality Rates per 100,000 Persons, by Race and Gender in Ohio, 1996-2009**



Source: Ohio Cancer Incidence Surveillance System and the Vital Statistics Program, Ohio Department of Health, 2012.

## Myeloma by Type

Doctors divide myeloma into groups that describe how rapidly or slowly the disease is progressing:

- **Asymptomatic or smoldering myeloma** progresses slowly and has no symptoms even though the patient has the disease.
- **Symptomatic myeloma** has related symptoms such as anemia, kidney damage and bone disease.

## Myeloma by Stage at Diagnosis

**Table 2: Myeloma: Proportion of Cases (%) by Stage at Diagnosis in Ohio, 2005-2009**

Stage	N	Percent
All Stages	672	
Localized	31	5.0%
Regional	--	--
Distant	640	95.0%
Unstaged/ Unknown Stage	--	--

Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2012.

Table 2 shows the proportion of myeloma cases by stage at diagnosis in Ohio in 2005-2009. Myeloma cases are diagnosed at either localized or distant stage; there is no regional stage at diagnosis of myeloma. Almost all (95.0 percent) myeloma cases in Ohio were diagnosed at distant stage. The remaining 5.0 percent were diagnosed at localized stage. The proportions diagnosed at localized and distant stages in Ohio were the same for the United States (not shown). No cases were reported as unstaged/unknown stage at diagnosis in Ohio.

## Myeloma by Histology

Table 3 shows the proportion of myeloma cases by histology in Ohio in 2005-2009. Nearly 93 percent of the cases were classified as myeloma, NOS, myelomatosis or plasma cell myeloma. These are synonyms for multiple myeloma. Solitary myeloma is a solitary focus of plasma cell proliferation, and plasmacytoma, extramedullary, a rare solitary plasmacytoma found outside of bone.

**Table 3: Myeloma: Proportion of Cases (%) by Histology at Diagnosis in Ohio, 2005-2009**

Histology	N	Percent
Total	672	
9731 (Solitary myeloma)	41	6.0%
9732 (Myeloma, NOS, Myelomatosis, Plasma cell myeloma)	623	92.8%
9734 (Plasmacytoma, extramedullary)	7	1.1%

Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2012.

## Myeloma Survival Probability

**Table 4: Myeloma: Five-year Survival Probability (%) by Stage at Diagnosis, Race and Gender in the U.S. (SEER), 2002-2008**

Five-year Survival Probability (%)					
Stage	Overall	White Male	White Female	Black Male	Black Female
All Stages	41.1%	42.6%	38.8%	39.5%	42.4%
Localized	67.0%	72.3%	57.8%	59.7%	55.8%
Regional	--	--	--	--	--
Distant	39.8%	40.6%	38.0%	38.6%	41.9%
Unstaged/ Unknown Stage	--	--	--	--	--

Source: SEER: Surveillance, Epidemiology and End Results Program, National Cancer Institute, 2012. Note: myeloma cases are diagnosed as either localized or distant stage.

Table 4 shows that the U.S. (SEER) five-year myeloma survival probability in 2002-2008 for all stages combined was 41.1 percent. White males had the highest survival probability for those diagnosed at localized stage (72.3 percent), although localized stage accounted for only approximately 5 percent of cases. For distant stage, black females had the highest five-year survival probability (41.9 percent) and white females had the lowest (38.0 percent). Survival probability decreased with advancing stage for all race-gender groups.

### Myeloma Treatment

People who have mild disease or where the diagnosis is not certain are often closely watched without treatment. Some people have a slow-developing form of myeloma that takes years to cause symptoms.

Medications for the treatment of myeloma include: Dexamethasone, melphalan, cyclophosphamide, doxorubicin, thalidomide, lenalidomide (Revlimid) and bortezomib (Velcade). These can be used alone or combined together. Bisphosphonates (pamidronate or zoledronic acid) may be used to reduce bone pain and prevent fractures.

Radiation therapy may also be used to relieve bone pain or treat a bone tumor.

Treatments also include two types of bone marrow transplantation:

- Autologous bone marrow or stem cell transplantation, which makes use of one's own stem cells.
- Allogeneic transplant, which makes use of someone else's stem cells. This treatment carries serious risks but offers the chance of improved survival.

Source: <http://www.ncbi.nlm.nih.gov/pubmedhealth/PMH0001609/>

## Myeloma Risk Factors and Populations at High Risk

Having one or more risk factors does not mean that a person will develop myeloma. Most people who have risk factors never develop myeloma. According to the National Cancer Institute, the following have been identified in studies as myeloma risk factors or as populations with high risk of myeloma:

- **Age over 65:** Growing older increases the chance of developing myeloma. Most people with myeloma are diagnosed after age 65. This disease is rare in people younger than 35.
- **Race:** The risk of myeloma is highest among African-Americans and lowest among Asian-Americans. The reason for the difference between racial groups is not known.
- **Being a man:** In 2011, about 11,400 men and 9,100 women were diagnosed with myeloma in the United States. It is not known why more men are diagnosed with the disease.
- **Personal history of monoclonal gammopathy of undetermined significance (MGUS):** MGUS is a benign condition in which abnormal plasma cells make monoclonal proteins, or M proteins. Usually, there are no symptoms, and the abnormal level of M protein is found with a blood test. Sometimes, people with MGUS develop certain cancers, such as myeloma. There is no treatment, but people with MGUS should get regular lab tests (every one or two years) to check for a further increase in the level of M protein. They also should get regular exams to check for the development of symptoms.
- **Family history of myeloma:** Studies have found that a person's risk of myeloma may be higher if a close relative had the disease.

Many other suspected risk factors are under study, including exposure to certain chemicals or germs (especially viruses), having alterations in certain genes, eating certain foods or being obese.

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## Myeloma Signs and Symptoms

Signs and symptoms of myeloma often do not occur until the disease is advanced—when the cancer has spread. When they do occur, signs and symptoms may include:

- Bone pain, usually in the back and ribs
- Broken bones, usually in the spine
- Feeling weak and very tired
- Feeling very thirsty
- Frequent infections and fevers
- Weight loss
- Nausea or constipation
- Frequent urination

It is possible that one or more of these signs and symptoms may be the result of other health problems. If you have any of these symptoms, you should consult with your health care provider.

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**Table 5: Myeloma: Average Annual Number of Invasive Cancer Cases and Age-adjusted Incidence Rates per 100,000 Persons, by County of Residence and Gender, Ohio, 2005-2009**

	Male		Female		Total			Male		Female		Total	
	Cases	Rate	Cases	Rate	Cases	Rate		Cases	Rate	Cases	Rate	Cases	Rate
Ohio	361	6.5	310	4.3	672	5.2	Lawrence	2	4.7	1	3.3	3	4.0
SEER		7.4		4.7		5.8	Licking	4	6.3	4	4.6	9	5.2
Adams	<1	*	2	9.3	2	5.9	Logan	2	8.1	2	5.3	3	6.7
Allen	4	7.6	3	4.8	7	6.1	Lorain	10	7.1	6	3.0	16	4.9
Ashland	1	4.9	1	3.9	3	4.4	Lucas	12	6.1	12	4.5	25	5.1
Ashtabula	4	8.2	2	3.4	7	5.6	Madison	<1	*	1	5.5	2	4.5
Athens	1	5.5	1	4.3	2	4.9	Mahoning	9	6.4	9	5.1	18	5.5
Auglaize	2	6.5	1	4.9	3	5.5	Marion	2	6.9	2	4.3	4	5.4
Belmont	2	4.2	3	5.4	4	4.8	Medina	6	7.5	4	3.9	10	5.6
Brown	1	5.3	1	5.8	3	5.6	Meigs	<1	*	<1	*	1	3.8
Butler	11	6.9	8	4.2	19	5.4	Mercer	2	7.6	1	4.7	3	6.0
Carroll	1	8.2	1	8.2	3	8.3	Miami	4	7.1	2	3.4	6	5.0
Champaign	<1	*	<1	*	1	2.8	Monroe	<1	*	<1	*	1	5.4
Clark	5	6.8	4	3.7	9	5.0	Montgomery	22	8.2	22	5.9	44	6.8
Clermont	5	5.2	5	5.2	10	5.4	Morgan	<1	*	<1	*	1	4.9
Clinton	1	4.6	<1	*	2	4.0	Morrow	<1	*	<1	*	1	2.9
Columbiana	3	6.0	2	2.5	5	3.8	Muskingum	3	6.1	2	3.7	5	4.6
Coshocton	1	6.2	1	4.1	2	5.3	Noble	1	18.1	<1	*	2	10.7
Crawford	2	6.5	1	2.7	3	4.6	Ottawa	1	5.6	3	8.6	4	7.0
Cuyahoga	51	7.6	47	5.0	98	6.1	Paulding	<1	*	<1	*	1	4.4
Darke	2	8.1	1	4.1	4	6.0	Perry	<1	*	1	7.0	2	5.8
Defiance	2	9.2	2	7.0	4	7.9	Pickaway	2	7.6	2	5.8	4	6.3
Delaware	4	6.5	2	3.6	6	5.0	Pike	<1	*	<1	*	2	5.1
Erie	2	3.6	1	2.3	3	3.0	Portage	5	6.6	3	3.1	8	4.8
Fairfield	4	7.2	4	4.6	8	5.6	Preble	3	10.9	1	4.3	4	7.5
Fayette	<1	*	<1	*	1	2.8	Putnam	1	5.7	<1	*	1	3.7
Franklin	26	6.3	27	4.9	53	5.4	Richland	5	7.9	3	4.2	9	5.9
Fulton	1	6.6	<1	*	2	4.7	Ross	1	3.7	2	3.9	3	3.9
Gallia	1	7.6	<1	*	2	5.4	Sandusky	<1	*	<1	*	2	2.2
Geauga	3	6.2	3	4.2	6	5.3	Scioto	2	4.9	3	6.3	5	5.7
Greene	5	7.3	4	4.6	10	5.9	Seneca	2	7.7	1	3.4	4	5.4
Guernsey	<1	*	<1	*	2	3.4	Shelby	1	5.2	1	3.3	2	4.2
Hamilton	24	5.8	21	4.0	45	4.8	Stark	13	6.4	11	4.1	25	5.1
Hancock	3	7.2	1	2.4	4	4.7	Summit	16	5.7	15	4.0	30	4.8
Hardin	<1	*	<1	*	1	3.7	Trumbull	10	8.8	6	4.1	16	5.9
Harrison	<1	*	<1	*	<1	*	Tuscarawas	2	4.8	2	3.9	5	4.2
Henry	<1	*	<1	*	1	3.0	Union	<1	*	1	4.6	2	4.4
Highland	1	5.4	1	3.5	2	4.5	Van Wert	1	6.6	<1	*	1	3.6
Hocking	1	7.8	<1	*	2	6.5	Vinton	<1	*	0	*	<1	*
Holmes	<1	*	1	5.2	2	4.4	Warren	5	6.3	5	5.1	10	5.6
Huron	1	5.0	1	4.2	3	4.4	Washington	2	6.8	1	3.1	4	4.7
Jackson	1	7.9	1	4.4	2	6.0	Wayne	4	7.2	2	3.3	6	5.0
Jefferson	3	8.1	2	2.7	5	5.1	Williams	<1	*	<1	*	1	2.5
Knox	3	11.4	2	5.6	5	7.6	Wood	2	4.8	3	4.0	5	4.2
Lake	6	5.2	4	2.3	10	3.4	Wyandot	<1	*	<1	*	<1	*

Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2012; Surveillance, Epidemiology and End Results Program, National Cancer Institute, 2012.

\*Rates may be unstable and are not presented when the case count for 2005-2009 is less than five (i.e. the average annual count is less than one).

Note: Low county numbers and rates may reflect underreporting for that county.

**Table 6: Myeloma: Average Annual Number of Cancer Deaths and Age-adjusted Mortality Rates per 100,000 Persons, by County of Residence and Gender, Ohio, 2005-2009**

	Male		Female		Total			Male		Female		Total	
	Deaths	Rate	Deaths	Rate	Deaths	Rate		Deaths	Rate	Deaths	Rate	Deaths	Rate
Ohio	242	4.6	230	3.1	472	3.7	Lawrence	2	4.9	<1	*	2	3.0
SEER		4.4		2.7		3.4	Licking	3	4.1	2	1.8	4	2.8
Adams	<1	*	1	8.5	2	6.5	Logan	<1	*	<1	*	1	2.3
Allen	1	2.4	2	2.9	3	2.8	Lorain	7	5.4	5	2.6	12	3.8
Ashland	1	4.5	1	3.9	3	4.1	Lucas	8	4.2	9	2.9	17	3.5
Ashtabula	2	2.9	1	1.5	3	2.2	Madison	<1	*	1	5.4	2	4.4
Athens	<1	*	<1	*	1	2.8	Mahoning	4	2.7	6	3.0	9	2.8
Auglaize	1	4.7	1	3.4	2	3.9	Marion	2	6.4	1	3.3	3	4.6
Belmont	1	2.6	2	2.6	3	2.7	Medina	3	4.1	4	3.8	6	3.8
Brown	<1	*	1	3.9	2	4.0	Meigs	<1	*	<1	*	1	3.8
Butler	6	4.3	6	3.1	12	3.6	Mercer	<1	*	2	6.3	2	5.1
Carroll	<1	*	<1	*	<1	*	Miami	2	4.2	2	2.7	4	3.2
Champaign	1	5.8	1	4.9	2	5.4	Monroe	<1	*	<1	*	<1	*
Clark	4	5.9	2	2.1	6	3.6	Montgomery	13	4.9	11	2.9	24	3.7
Clermont	3	3.4	3	2.9	6	3.1	Morgan	<1	*	<1	*	1	5.0
Clinton	1	4.8	<1	*	2	3.9	Morrow	1	6.2	<1	*	1	4.4
Columbiana	3	5.2	1	1.9	4	3.2	Muskingum	2	4.9	2	3.2	4	4.0
Coshocton	1	6.9	1	4.9	2	5.8	Noble	1	19.0	0	*	1	8.0
Crawford	2	6.9	2	5.3	3	5.9	Ottawa	1	4.0	1	4.7	2	4.4
Cuyahoga	34	5.2	34	3.5	68	4.1	Paulding	<1	*	<1	*	1	4.5
Darke	2	6.3	<1	*	2	3.2	Perry	<1	*	<1	*	2	4.8
Defiance	2	9.8	1	4.0	3	6.1	Pickaway	1	6.1	<1	*	2	3.7
Delaware	3	5.1	1	1.9	4	3.3	Pike	<1	*	<1	*	<1	*
Erie	2	3.6	2	3.2	4	3.5	Portage	3	4.8	3	2.9	6	3.7
Fairfield	3	5.7	3	4.3	7	4.9	Preble	2	10.4	1	3.8	3	6.7
Fayette	<1	*	<1	*	<1	*	Putnam	1	8.6	<1	*	2	4.6
Franklin	17	4.4	20	3.6	36	3.9	Richland	4	5.6	3	4.0	7	4.8
Fulton	<1	*	<1	*	<1	*	Ross	1	4.4	2	4.7	4	4.4
Gallia	<1	*	<1	*	1	3.3	Sandusky	<1	*	2	4.5	3	3.5
Geauga	2	3.7	2	2.7	4	3.2	Scioto	1	2.7	3	6.0	4	4.6
Greene	3	4.2	3	3.5	6	3.9	Seneca	<1	*	1	3.3	2	3.1
Guernsey	1	6.8	1	5.1	3	5.9	Shelby	<1	*	<1	*	1	2.9
Hamilton	15	3.9	17	2.9	31	3.3	Stark	8	4.2	7	2.3	15	3.1
Hancock	1	4.0	2	3.3	3	3.8	Summit	12	4.6	12	3.1	24	3.8
Hardin	<1	*	1	4.7	2	5.2	Trumbull	5	4.8	4	2.3	9	3.3
Harrison	<1	*	0	*	<1	*	Tuscarawas	2	4.5	2	2.3	4	3.2
Henry	<1	*	1	5.7	2	4.6	Union	<1	*	1	4.4	1	3.4
Highland	2	7.7	<1	*	2	5.0	Van Wert	<1	*	0	*	<1	*
Hocking	<1	*	<1	*	<1	*	Vinton	<1	*	0	*	<1	*
Holmes	<1	*	<1	*	1	2.9	Warren	3	4.6	3	3.2	6	3.8
Huron	1	4.9	1	3.5	3	4.1	Washington	1	3.7	1	1.9	2	2.7
Jackson	1	7.3	1	5.5	2	6.0	Wayne	3	5.5	2	3.3	5	4.3
Jefferson	1	3.3	1	1.5	2	2.3	Williams	1	5.3	<1	*	1	2.9
Knox	2	7.7	1	3.8	3	4.8	Wood	2	4.5	3	4.0	5	4.1
Lake	6	5.0	3	2.0	9	3.1	Wyandot	<1	*	0	*	<1	*

Source: Ohio Cancer Incidence Surveillance System and the Vital Statistics Program, Ohio Department of Health, 2012; National Center for Health Statistics, 2012.

\*Rates may be unstable and are not presented when the case count for 2005-2009 is less than five (i.e. the average annual count is less than one).

## Technical Notes

**Age-Adjusted Rate**—A summary rate that is a weighted average of age-specific rates, where the weights represent the age distribution of a standard population (direct adjustment). The incidence and mortality rates presented in this report were standardized to the age distribution of the 2000 U.S. Standard Population. Under the direct method, the population was first divided into 19 five-year age groups, i.e., <1, 1-4, 5-9, 10-14...85+, and the age-specific rate was calculated for each age group. Each age-specific rate was then multiplied by the standard population proportion for the respective age group and summed to give an overall age-adjusted rate. Rates are presented as the number of cases per 100,000 persons per year. Age-adjustment allows for the comparison of rates between populations with different age distributions.

**Average Annual Number**—The number of cases or deaths diagnosed per year, on average, for the time period of interest (e.g., 2005-2009). Average annual numbers are calculated by adding the number of cases or deaths for a given time period, dividing by the number of years that comprise the time period and rounding to the nearest whole number.

**Incidence**—The number of cases diagnosed during a specified time period (e.g., 2005-2009). Myeloma cases were defined as follows: International Classification of Diseases for Oncology, Third Edition (ICD-O-3), types 9731-9732 and 9734.

**Invasive Cancer**—A malignant tumor that has infiltrated the organ in which the tumor originated. Invasive cancers consist of those diagnosed at the localized, regional, distant and unstaged/unknown stages. Only invasive cancers were included in the calculation of myeloma incidence rates.

**Mortality**—The number of deaths during a specified time period (e.g., 2005-2009). Myeloma deaths were defined as follows: International Statistical Classification of Diseases and Related Health Problems, Tenth Edition (ICD-10), codes C900 and C902.

**Rate**—The number of cases or deaths per unit of population (e.g., per 100,000 persons) over a specified time period (e.g., 2005-2009). Rates may be unstable and are not presented when the case count for 2005-2009 is less than five. The 2005-2009 rates were calculated using vintage 2009 postcensal estimates for July 1, 2005-2009 (U.S. Census Bureau, 2011).

**Stage at Diagnosis**—The degree to which a tumor has spread from its site of origin at the time of diagnosis. Cancer stage is often related to survival and is used to select appropriate treatment. Patients with early stage disease often have better long-term survival, and detecting cancers at an early stage may lead to a reduction in mortality. The stages presented in this report, in the order of increasing spread, are *in situ*, localized, regional, and distant. *In situ* and localized tumors are referred to as early stage tumors, and regional and distant tumors are termed late stage. Cancers diagnosed at the localized, regional, distant and unstaged/unknown stages are categorized as invasive.

***in situ***—Noninvasive cancer that has not penetrated surrounding tissue.

**Localized**—A malignant tumor confined entirely to the organ of origin.

**Regional**—A malignant tumor that has extended beyond the organ of origin directly into surrounding organs or tissues or into regional lymph nodes.

**Distant**—A malignant tumor that has spread to parts of the body (distant organs, tissues, and/or lymph nodes) remote from the primary tumor.

**Unstaged/Unknown**—Insufficient information is available to determine the stage or extent of the disease at diagnosis.

**Survival Probability**—The probability that an individual will survive five years after diagnosis. Five-year relative survival probabilities are from the SEER 18 areas for diagnosis, years 2002-2008. Probabilities are based on follow-up of patients into 2009.

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## Clinical Trials Information

Clinical trials test many types of treatments including new drugs, surgical procedures, radiation therapy and combinations of these. The goal of conducting clinical trials is to find better ways to treat cancer. To obtain information concerning clinical trials for myeloma, please talk with your health care provider or visit one of the following web sites:

- **National Cancer Institute:**  
<http://www.cancer.gov/clinicaltrials>
- **American Cancer Society:**  
[http://www.cancer.org/docroot/ETO/ETO\\_6.asp?sitearea=ETO](http://www.cancer.org/docroot/ETO/ETO_6.asp?sitearea=ETO)
- **The Ohio State University Comprehensive Cancer Center—Arthur G. James Cancer Hospital and Richard J. Solove Research Institute:**  
[http://cancer.osu.edu/patientsandvisitors/cancerinfo/clinical\\_trials/Pages/index.aspx](http://cancer.osu.edu/patientsandvisitors/cancerinfo/clinical_trials/Pages/index.aspx)
- **The Cleveland Clinic:**  
[http://my.clevelandclinic.org/cancer/clinical\\_trials/default.aspx](http://my.clevelandclinic.org/cancer/clinical_trials/default.aspx)
- **Case Western Reserve University Comprehensive Cancer Center:**  
<http://cancer.case.edu/sharedresources/clinicaltrials>
- **University of Cincinnati:**  
<http://uccancer.com/PatientCare/ClinicalTrials/Overview.aspx>
- **Toledo Community Hospital Oncology Program:**  
<http://tchop.com/clinical-trials>
- **Dayton Clinical Oncology Program:**  
<http://www.med.wright.edu/dcop/Clinical%20Trials.htm>
- **Columbus Community Clinical Oncology Program:**  
<http://columbusccop.org>

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## Sources of Data and Additional Information

- **Ohio Cancer Incidence Surveillance System:**  
[http://www.odh.ohio.gov/healthstats/ocisshs/ci\\_surv1.aspx](http://www.odh.ohio.gov/healthstats/ocisshs/ci_surv1.aspx)
  - **National Cancer Institute:**  
<http://www.cancer.gov/cancertopics/types/myeloma>
  - **American Cancer Society:**  
<http://www.cancer.org/cancer/multiplemyeloma/index>
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**To address comments and information requests:**

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Web site: [http://www.odh.ohio.gov/healthstats/ocisshs/ci\\_surv1.aspx](http://www.odh.ohio.gov/healthstats/ocisshs/ci_surv1.aspx)

**Acknowledgements**

The following individuals contributed to this report:

Holly L. Sobotka, M.S., Marjorie Jean-Baptiste, B.S., Robert W. Indian, M.S., Mary B. Lynn, M.S.,  
Ohio Department of Health

James L. Fisher, Ph.D., Julie A. Stephens, M.S., Jesse Plascak, M.S., Electra D. Paskett, Ph.D.,  
The Ohio State University

Sincere appreciation to all the cancer registrars, medical records staff and other health professionals reporting cancer cases in Ohio whom made this report possible.

**Suggested Citation**

*Myeloma in Ohio, 2005-2009.* Ohio Cancer Incidence Surveillance System, Ohio Department of Health and The Ohio State University, Columbus, Ohio, August 2012.

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