

Supplementary Table 1. Age-adjusted rates of gastroesophageal reflux, Barrett’s esophagus and esophageal cancer per 100,000 endoscopies, restricted to diagnosis with concurrent endoscopy, Cerner Health Facts® Database, 2001–2010.

	Endoscopies N	Endoscopies/ 100,000 encounters		GERD diagnosis*/ 100,000 endoscopies		BE diagnosis*/ 100,000 endoscopies		EC diagnosis*/ 100,000 endoscopies	
		Encounter		GERD N	Rate (95% CI)	BE N	Rate (95% CI)	EC N	Rate (95% CI)
		N	Rate (95% CI)						
Overall	167,185	81,392,956	121.0 (120.3, 121.7)	18,508	10212.0 (9,823.5, 10600.6)	2,489	725.5 (670.3, 780.8)	555	118.6 (105.3, 131.9)
Years									
2001-2002	22,143	8,892,780	137.7 (135.4, 140.0)	2,379	11940.2 (10537.9, 13342.5)	673	1531.6 (1305.9, 1757.2)	60	90.3 (61.2, 119.5)
2003-2004	24,727	7,923,607	163.0 (160.3, 165.7)	2,699	13320.8 (10801.9, 15839.7)	572	1766.7 (964.2, 2569.1)	88	103.9 (74.9, 132.9)
2005-2006	28,956	10,090,055	153.9 (151.6, 156.3)	4,317	14829.3 (13305.2, 16353.4)	375	618.2 (524.7, 711.6)	69	73.9 (48.6, 99.1)
2007-2008	41,641	16,535,982	153.3 (151.5, 155.2)	4,664	10654.5 (9849.3, 11459.6)	481	549.2 (472.5, 626.0)	184	169.7 (135.7, 203.7)
2009-2010	49,718	37,950,532	84.5 (83.6, 85.4)	4,449	7307.3 (6829.6, 7785.0)	388	317.0 (275.8, 358.2)	154	117.9 (95.2, 140.5)
Sex									
Male	74,152	31,423,289	140.8 (139.5, 142.2)	7,154	9884.4 (9310.2, 10458.6)	1,569	1063.9 (961.1, 1166.6)	437	215.9 (185.9, 245.8)
Female	93,033	49,969,667	109.5 (108.6, 110.4)	11,354	10553.3 (9999.2, 11107.4)	920	470.2 (413.0, 527.4)	118	37.7 (28.1, 47.2)
Age									
0-9	1,755	7,651,027	22.9 (21.9, 24.0)	140	7977.2 (6655.8, 9298.6)	1	57.0 (-54.7, 168.7)	0	-
10-19	2,549	6,103,494	41.8 (40.1, 43.4)	219	8591.6 (7453.7, 9729.5)	4	156.9 (3.1, 310.7)	0	-
20-29	6,802	8,150,478	83.5 (81.5, 85.4)	611	8982.7 (8270.4, 9694.9)	29	426.3 (271.2, 581.5)	1	14.7 (-14.1, 43.5)
30-39	11,681	8,576,937	136.2 (133.7, 138.7)	1,434	12276.3 (11640.9, 12911.8)	93	796.2 (634.4, 958.0)	10	85.6 (32.5, 138.7)
40-49	21,404	11,292,051	189.5 (187.0, 192.1)	2,887	13488.1 (12996.1, 13980.2)	318	1485.7 (1322.4, 1649.0)	30	140.2 (90.0, 190.3)
50-59	30,389	12,748,553	238.4 (235.7, 241.1)	3,982	13103.4 (12696.4, 13510.4)	502	1651.9 (1507.4, 1796.4)	121	398.2 (327.2, 469.1)
60-69	30,520	10,949,149	278.7 (275.6, 281.9)	3,582	11736.6 (11352.2, 12120.9)	547	1792.3 (1642.1, 1942.5)	164	537.4 (455.1, 619.6)
70-79	32,755	9,211,490	355.6 (351.7, 359.4)	3,270	9983.2 (9641.0, 10325.4)	603	1840.9 (1694.0, 1987.9)	137	418.3 (348.2, 488.3)
80+	29,330	6,709,777	437.1 (432.1, 442.1)	2,383	8124.8 (7798.6, 8451.0)	392	1336.5 (1204.2, 1468.8)	92	313.7 (249.6, 377.8)
Race									
Caucasian	139,755	63,582,557	124.9 (124.0, 125.8)	15,741	10887.0 (10380.7, 11393.4)	2,340	821.3 (751.8, 890.9)	463	116.5 (101.4, 131.6)
African-American	18,472	11,554,043	113.3 (111.6, 115.1)	1,940	9094.4 (8264.5, 9924.3)	77	210.6 (156.1, 265.1)	76	150.7 (111.8, 189.6)
Other	8,958	6,256,356	114.6 (112.2, 117.1)	827	7601.1 (6690.0, 8512.1)	72	509.1 (298.4, 719.7)	16	80.0 (37.2, 122.9)

*only for individuals with endoscopy during admit and discharge dates

Supplementary Table 2. Age-adjusted rates of esophagitis, Cerner Health Facts® Database, 2001–2010.

	Esophagitis diagnosis/ 100,000 encounters			Esophagitis diagnosis*/ 100,000 endoscopies		
	Esophagitis N	Encounter N	Rate (95% CI)	Esophagitis N	Endoscopies N	Rate (95% CI)
Overall	100,522	81,392,956	95.2 (94.5, 96.0)	9,987	167,185	5959.6 (5671.9, 6247.3)
Years						
2001-2002	13,005	8,892,780	100.6 (98.5, 102.7)	2,032	22,143	9283.3 (8173.3, 10393.3)
2003-2004	14,945	7,923,607	134.0 (131.2, 136.8)	2,089	24,727	11010.8 (8835.2, 13186.5)
2005-2006	17,987	10,090,055	131.4 (128.9, 133.8)	2,126	28,956	8989.7 (8023.6, 9955.9)
2007-2008	22,151	16,535,982	111.0 (109.2, 112.9)	1,969	41,641	5094.3 (4510.8, 5677.7)
2009-2010	32,434	37,950,532	69.1 (68.2, 70.1)	1,771	49,718	3048.5 (2743.1, 3353.8)
Sex						
Male	42,924	31,423,289	115.8 (114.4, 117.1)	4,795	74,152	7322.8 (6828.4, 7817.1)
Female	49,580	49,969,667	71.5 (70.7, 72.3)	5,192	93,033	5097.0 (4737.4, 5456.6)
Age						
0-9	2,961	7,651,027	38.7 (37.3, 40.1)	45	1,755	2564.1 (1814.9, 3313.3)
10-19	4,519	6,103,494	74.0 (71.9, 76.2)	211	2,549	8277.8 (7160.8, 9394.7)
20-29	5,201	8,150,478	63.8 (62.1, 65.5)	415	6,802	6101.1 (5514.1, 6688.2)
30-39	9,775	8,576,937	114.0 (111.7, 116.2)	848	11,681	7259.7 (6771.0, 7748.3)
40-49	16,814	11,292,051	148.9 (146.7, 151.2)	1,529	21,404	7143.5 (6785.5, 7501.6)
50-59	20,702	12,748,553	162.4 (160.2, 164.6)	1,971	30,389	6485.9 (6199.6, 6772.2)
60-69	17,417	10,949,149	159.1 (156.7, 161.4)	1,791	30,520	5868.3 (5596.5, 6140.1)
70-79	13,794	9,211,490	149.7 (147.2, 152.2)	1,706	32,755	5208.4 (4961.2, 5455.5)
80+	9,339	6,709,777	139.2 (136.4, 142.0)	1,471	29,330	5015.3 (4759.0, 5271.6)
Race						
Caucasian	78,656	63,582,557	96.6 (95.6, 97.5)	8,591	139,755	6430.4 (6075.9, 6784.9)
African-American	8,424	11,554,043	58.3 (56.9, 59.6)	1,005	18,472	4563.7 (3964.6, 5162.8)
Other	5,424	6,256,356	75.0 (73.0, 77.1)	391	8,958	3757.4 (3084.2, 4430.5)

*only for individuals with endoscopy during admit and discharge dates

Supplementary Table 3. Age-adjusted rates of reflux esophagitis, Cerner Health Facts® Database, 2001–2010.

	Reflux esophagitis diagnosis/ 100,000 encounters			Reflux esophagitis diagnosis*/ 100,000 endoscopies		
	Reflux Esophagitis N	Encounter N	Rate	Reflux Esophagitis N	Endoscopies N	Rate
Overall	38,623	81,392,956	35.6 (35.2, 36.0)	2,659	167,185	1601.8 (1457.9, 1745.7)
Years						
2001-2002	5,099	8,892,780	41.4 (40.0, 42.8)	528	22,143	2289.8 (1726.0, 2853.7)
2003-2004	5,408	7,923,607	50.5 (48.8, 52.2)	496	24,727	3002.8 (1845.4, 4160.2)
2005-2006	6,438	10,090,055	48.7 (47.2, 50.2)	459	28,956	2230.3 (1715.4, 2745.2)
2007-2008	8,507	16,535,982	40.9 (39.8, 42.0)	545	41,641	1187.4 (942.0, 1432.7)
2009-2010	13,171	37,950,532	25.5 (25.0, 26.1)	631	49,718	1120.4 (952.6, 1288.2)
Sex						
Male	15,103	31,423,289	40.1 (39.3, 40.9)	1,221	74,152	1888.3 (1641.2, 2135.3)
Female	19,350	49,969,667	27.4 (26.9, 27.8)	1,438	93,033	1412.1 (1238.1, 1586.0)
Age						
0-9	1,033	7,651,027	13.5 (12.7, 14.3)	11	1,755	626.8 (256.4, 997.2)
10-19	1,198	6,103,494	19.6 (18.5, 20.7)	52	2,549	2040.0 (1485.5, 2594.5)
20-29	2,027	8,150,478	24.9 (23.8, 26.0)	104	6,802	1529.0 (1235.1, 1822.8)
30-39	3,943	8,576,937	46.0 (44.5, 47.4)	254	11,681	2174.5 (1907.1, 2441.9)
40-49	6,778	11,292,051	60.0 (58.6, 61.5)	461	21,404	2153.8 (1957.2, 2350.4)
50-59	8,185	12,748,553	64.2 (62.8, 65.6)	569	30,389	1872.4 (1718.5, 2026.2)
60-69	6,921	10,949,149	63.2 (61.7, 64.7)	514	30,520	1684.1 (1538.5, 1829.7)
70-79	5,222	9,211,490	56.7 (55.2, 58.2)	393	32,755	1199.8 (1081.2, 1318.4)
80+	3,316	6,709,777	49.4 (47.7, 51.1)	301	29,330	1026.3 (910.3, 1142.2)
Race						
Caucasian	29,155	63,582,557	34.1 (33.6, 34.7)	2,295	139,755	1698.7 (1526.1, 1871.3)
African-American	3,046	11,554,043	20.9 (20.1, 21.7)	277	18,472	1319.1 (990.7, 1647.5)
Other	2,252	6,256,356	31.0 (29.6, 32.3)	87	8,958	1032.8 (640.9, 1424.7)

*only for individuals with endoscopy during admit and discharge dates

Supplementary Figure 1. Temporal trends of esophagitis (A) and reflux esophagitis (B) by age, Cerner Health Facts® Database, 2001–2010.

Supplementary Figure 2. Age-adjusted male-to-female incidence rate ratios by year for gastroesophageal reflux, Barrett's esophagus and esophageal cancer, Cerner Health Facts® Database, 2001–2010.

Supplementary Table 4. Age-adjusted rates of Barrett's esophagus per 100,000 encounters, restricted to those with concurrent endoscopy, Cerner Health Facts® Database, 2001–2010.

	Barrett's esophagus*/ 100,000 encounters		
	BE N	Encounters N	Rate (95% CI)
Overall	2,489	81,392,956	1.5 (1.4, 1.6)
Years			
2001-2002	673	8,892,780	3.6 (3.3, 3.9)
2003-2004	572	7,923,607	3.6 (3.2, 3.9)
2005-2006	375	10,090,055	1.8 (1.6, 2.0)
2007-2008	481	16,535,982	1.4 (1.3, 1.6)
2009-2010	388	37,950,532	0.5 (0.4, 0.6)
Sex			
Male	1,569	31,423,289	2.6 (2.4, 2.7)
Female	920	49,969,667	0.9 (0.8, 0.9)
Age			
0-9	1	7,651,027	0.01 (-0.01, 0.04)
10-19	4	6,103,494	0.1 (0.0, 0.1)
20-29	29	8,150,478	0.4 (0.2, 0.5)
30-39	93	8,576,937	1.1 (0.9, 1.3)
40-49	318	11,292,051	2.8 (2.5, 3.1)
50-59	502	12,748,553	3.9 (3.6, 4.3)
60-69	547	10,949,149	5.0 (4.6, 5.4)
70-79	603	9,211,490	6.5 (6.0, 7.1)
80+	392	6,709,777	5.8 (5.3, 6.4)
Race			
Caucasian	2,340	63,582,557	1.7 (1.6, 1.8)
African-American	77	11,554,043	0.4 (0.3, 0.6)
Other	72	6,256,356	0.9 (0.7, 1.1)

*only for individuals with endoscopy during admit and discharge dates

Supplementary Table 5. Average Age-Adjusted Rates for Individuals with Two or More Diagnoses Codes, CERNER Database, 2001-2010.

	Encounter N	BE diagnosis/ 100,000 encounters		EC diagnosis/ 100,000 encounters	
		BE N	Rate (95% CI)	EC N	Rate (95% CI)
Overall	81,392,956	3,405	2.2 (2.1, 2.2)	3,324	1.9 (1.8, 2.0)
Years					
2001-2002	8,892,780	620	3.7 (3.4, 4.0)	289	1.4 (1.3, 1.6)
2003-2004	7,923,607	485	3.0 (2.7, 3.3)	373	2.0 (1.8, 2.2)
2005-2006	10,090,055	603	3.1 (2.8, 3.4)	537	2.4 (2.1, 2.6)
2007-2008	16,535,982	1,026	3.1 (2.9, 3.3)	907	2.5 (2.3, 2.7)
2009-2010	37,950,532	671	0.9 (0.8, 1.0)	1,218	1.5 (1.4, 1.6)
Sex					
Male	31,423,289	2,169	3.6 (3.4, 3.8)	2,540	3.7 (3.5, 3.8)
Female	49,969,667	1,173	1.2 (1.1, 1.3)	592	0.5 (0.5, 0.6)
Age					
0-9	7,651,027	1	0.0 (0.0, 0.0)	0	-
10-19	6,103,494	11	0.2 (0.1, 0.3)	1	0.0 (0.0, 0.0)
20-29	8,150,478	17	0.2 (0.1, 0.3)	3	0.0 (0.0, 0.1)
30-39	8,576,937	148	1.7 (1.4, 2.0)	48	0.6 (0.4, 0.7)
40-49	11,292,051	418	3.7 (3.3, 4.1)	236	2.1 (1.8, 2.4)
50-59	12,748,553	812	6.4 (5.9, 6.8)	745	5.8 (5.4, 6.3)
60-69	10,949,149	861	7.9 (7.3, 8.4)	1,083	9.9 (9.3, 10.5)
70-79	9,211,490	791	8.6 (8.0, 9.2)	874	9.5 (8.9, 10.1)
80+	6,709,777	346	5.2 (4.6, 5.7)	334	5.0 (4.4, 5.5)
Race					
Caucasian	63,582,557	3,216	2.5 (2.4, 2.6)	2,757	1.9 (1.8, 1.9)
African-American	11,554,043	71	0.4 (0.3, 0.5)	287	1.6 (1.4, 1.7)
Other	6,256,356	55	0.7 (0.5, 0.9)	88	1.0 (0.8, 1.3)

Supplementary Table 6. Average Age-Adjusted Rates per 100,000 person-years, CERNER Database, 2001-2010.

	Person-years*	GERD diagnosis [†] / 100,000 person-years*		BE diagnosis [‡] / 100,000 person-years*		EC diagnosis [‡] / 100,000 person-years*	
		GERD N	Rate (95% CI)	BE N	Rate (95% CI)	EC N	Rate (95% CI)
Overall	41,848,896	723,854	1218.4 (1215.0, 1221.9)	32,325	43.1 (42.6, 43.7)	10,934	12.6 (12.3, 12.8)
Years							
2001-2002	3,725,331	48,440	894.8 (885.6, 903.9)	4,289	67.9 (65.7, 70.2)	623	8.5 (7.8, 9.2)
2003-2004	4,062,135	63,897	1049.5 (1039.4, 1059.6)	4,604	63.6 (61.5, 65.6)	952	10.5 (9.7, 11.2)
2005-2006	4,949,302	108,855	1474.8 (1464.0, 1485.7)	5,162	59.6 (57.7, 61.4)	1,369	13.1 (12.3, 13.8)
2007-2008	7,350,348	171,140	1690.2 (1680.6, 1699.7)	7,297	57.7 (56.2, 59.1)	2,158	14.9 (14.2, 15.6)
2009-2010	21,761,780	331,522	1088.4 (1083.8, 1093.0)	10,973	26.7 (26.2, 27.3)	5,832	12.7 (12.4, 13.1)
Sex							
Male	16,552,380	258,042	1140.8 (1135.5, 1146.1)	18,611	64.7 (63.6, 65.8)	7,899	23.0 (22.5, 23.6)
Female	25,296,516	404,060	1088.6 (1084.4, 1092.8)	12,513	27.0 (26.5, 27.5)	2,054	3.7 (3.6, 3.9)
Age							
0-9	4,471,366	34,269	766.4 (758.3, 774.5)	26	0.6 (0.4, 0.8)	12	0.3 (0.1, 0.4)
10-19	3,556,220	15,229	428.2 (421.4, 435.0)	111	3.1 (2.5, 3.7)	10	0.3 (0.1, 0.5)
20-29	4,483,013	32,244	719.2 (711.4, 727.1)	471	10.5 (9.6, 11.5)	22	0.5 (0.3, 0.7)
30-39	4,614,962	58,420	1265.9 (1255.6, 1276.1)	1,577	34.2 (32.5, 35.9)	150	3.3 (2.7, 3.8)
40-49	5,962,544	106,688	1789.3 (1778.6, 1800.0)	4,571	76.7 (74.4, 78.9)	777	13.0 (12.1, 13.9)
50-59	6,391,828	142,775	2233.7 (2222.1, 2245.3)	7,986	125.0 (122.2, 127.7)	2,414	37.8 (36.3, 39.3)
60-69	5,237,113	133,908	2556.9 (2543.2, 2570.6)	7,823	149.4 (146.1, 152.7)	3,378	64.5 (62.3, 66.7)
70-79	4,118,278	112,357	2728.3 (2712.3, 2744.2)	6,345	154.1 (150.3, 157.9)	2,890	70.2 (67.6, 72.7)
80+	3,013,572	87,964	2918.9 (2899.6, 2938.2)	3,415	113.3 (109.5, 117.1)	1,281	42.5 (40.2, 44.8)
Race							
Caucasian	32,316,331	547,999	1149.6 (1145.6, 1153.5)	29,367	48.1 (47.5, 48.8)	8,624	11.8 (11.5, 12.1)
African-American	5,935,836	84,453	1175.1 (1166.8, 1183.4)	832	10.3 (9.6, 11.0)	992	11.7 (11.0, 12.4)
Other	3,596,729	29,650	716.0 (707.5, 724.4)	925	20.5 (19.1, 21.9)	337	6.9 (6.2, 7.7)

*Person-year is defined as one encounter per individual per year.

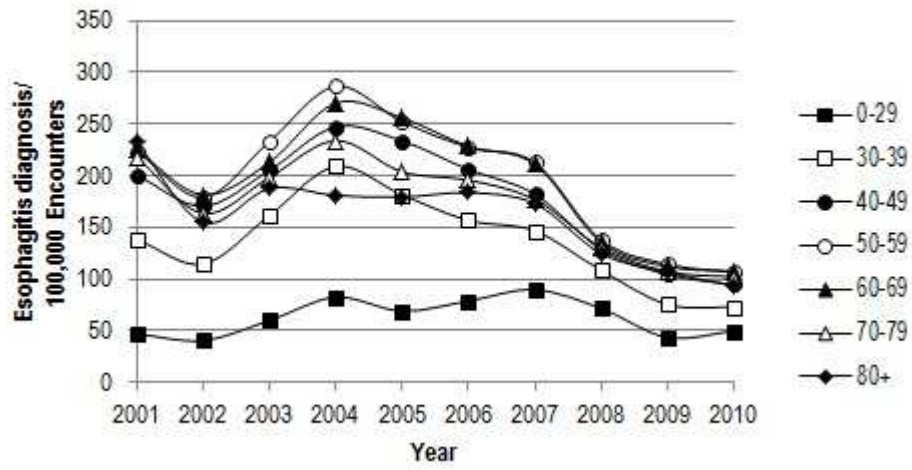
[†]Individuals remain continuously at risk for GERD, with up to one diagnosis per year.

[‡]BE and EC are considered incident cases at the first diagnosis, and individuals are removed from the risk set after diagnosis.

Supplementary Table 7. Average Age-Adjusted Rates for Hospitals that Contributed Data Yearly, CERNER Database, 2001-2010.

	Encounter N	GERD diagnosis/ 100,000 encounters		BE diagnosis/ 100,000 encounters		EC diagnosis/ 100,000 encounters	
		GERD N	Rate (95% CI)	BE N	Rate (95% CI)	EC N	Rate (95% CI)
Overall	38,879,405	354,730	656.5 (653.8, 659.3)	18,602	26.3 (25.9, 26.7)	6,040	7.2 (7.0, 7.4)
Years							
2001-2002	3,453,756	23,019	464.2 (456.4, 472.0)	2,176	34.9 (33.2, 36.6)	241	2.9 (2.5, 3.3)
2003-2004	3,946,166	33,637	600.8 (591.9, 609.7)	2,647	36.6 (34.9, 38.2)	394	4.1 (3.6, 4.5)
2005-2006	5,918,795	60,635	692.5 (685.3, 699.7)	3,315	31.6 (30.3, 32.8)	711	5.6 (5.1, 6.0)
2007-2008	9,712,315	96,715	760.3 (754.3, 766.4)	4,891	28.6 (27.7, 29.6)	1,500	7.2 (6.8, 7.6)
2009-2010	15,848,373	140,724	633.0 (628.9, 637.2)	5,573	18.3 (17.8, 18.9)	3,194	9.5 (9.2, 9.9)
Sex							
Male	15,087,298	140,592	709.3 (704.6, 714.1)	11,128	41.6 (40.7, 42.6)	4,809	14.4 (13.9, 14.9)
Female	23,792,107	214,138	632.8 (629.3, 636.4)	7,474	17.3 (16.8, 17.7)	1,231	2.4 (2.2, 2.5)
Age							
0-9	3,737,441	16,955	453.7 (446.8, 460.5)	9	0.2 (0.1, 0.4)	9	0.2 (0.1, 0.4)
10-19	2,897,083	8,193	282.8 (276.7, 288.9)	70	2.4 (1.9, 3.0)	5	0.2 (0.0, 0.3)
20-29	3,896,475	15,946	409.2 (402.9, 415.6)	283	7.3 (6.4, 8.1)	12	0.3 (0.1, 0.5)
30-39	3,961,043	27,880	703.9 (695.6, 712.1)	971	24.5 (23.0, 26.1)	88	2.2 (1.8, 2.7)
40-49	5,405,781	52,502	971.2 (962.9, 979.5)	2,775	51.3 (49.4, 53.3)	492	9.1 (8.3, 9.9)
50-59	6,250,231	69,785	1116.5 (1108.2, 1124.8)	4,596	73.6 (71.4, 75.7)	1,389	22.2 (21.1, 23.4)
60-69	5,318,470	66,104	1242.9 (1233.4, 1252.4)	4,431	83.4 (80.9, 85.8)	1,865	35.1 (33.5, 36.7)
70-79	4,403,012	55,842	1268.3 (1257.7, 1278.8)	3,667	83.3 (80.6, 86.0)	1,495	34.0 (32.2, 35.7)
80+	3,009,869	41,523	1379.6 (1366.3, 1392.8)	1,800	59.8 (57.1, 62.6)	685	22.8 (21.1, 24.5)
Race							
Caucasian	30,711,436	298,688	695.2 (691.8, 698.6)	17,552	30.6 (30.1, 31.2)	5,315	7.5 (7.3, 7.8)
African-American	5,727,316	41,177	566.7 (560.8, 572.7)	584	6.6 (6.1, 7.2)	513	5.4 (4.9, 5.9)
Other	2,440,653	14,865	520.4 (511.6, 529.2)	466	14.4 (13.1, 15.8)	212	5.9 (5.1, 6.7)

A) Esophagitis Rates



B) Reflux Esophagitis Rates

