Summary of Selected Cancer Rates for Bladen, Brunswick, New Hanover and Pender Counties, 1996–2015, and Comparison to Statewide Rates

Background and Summary

This summary was prepared to answer questions about cancer rates in four counties that have arisen during the ongoing investigation of GenX in the Cape Fear River. Central Cancer Registry data do not include information about causes of cancer or associations with specific exposures; therefore, no conclusions can be drawn about the association between GenX or other exposures and the cancer rates described here.

The North Carolina Department of Health and Human Services (NC DHHS) examined data from the North Carolina Central Cancer Registry to determine how rates of certain cancers in four counties compared with state-wide cancer rates during 1996–2015. The incidence of pancreatic, liver, uterine, testicular and kidney cancers were examined in Bladen, Brunswick, New Hanover, and Pender Counties. The incidence rates were compiled for the entire 20-year period and separately for each 5-year interval therein (1996–2000, 2001–2005, 2006–2010 and 2011–2015). A similar assessment was performed for Cumberland County after publication of this initial summary and is attached as an addendum at the end of this report.

Overall, cancer rates in the four counties were similar to state rates. There were two exceptions where the county incidence rates were higher than the state and four where the incidence rates were lower:

Higher

- New Hanover County had a higher 20-year rate of testicular cancer during 1996–2015 and a higher 5-year rate of liver cancers during 2006–2010 compared with the state. Rates of both cancers were similar to the state rates during the most recent period (2011-2015).

Lower

- Brunswick County had a lower 20-year rate of pancreatic cancer during 1996–2015; a lower 5-year rate of uterine cancer during 2006–2010; and a lower 5-year rate of pancreatic cancer during 2011–2015 compared with the state.
- Bladen County had a lower 20-year rate of kidney cancer during 1996–2015 compared with the state.

During the most recent five-year interval (2011–2015), no county-specific cancer rates examined were significantly higher than state rates.

Although the information in this summary describes cancer rates in these counties over time, only a comprehensive research study can provide information about whether a specific exposure might be associated with increased rates of cancer.

It should be noted that liver cancer incidence rates have increased in North Carolina and in the United States during the period of 1996–2015. State and national increases in liver cancer are due in part to the aging of the baby boomer population (persons born between 1945 and 1965). This population is at least five times more likely to have hepatitis C (a leading cause of liver cancer) as compared to other adults.[1] The overall increasing liver cancer rate in New Hanover County during the period examined might also be related to the increasing proportion of the population >65 years of age in that county- from 12.8% in 2000 to 16.2% in 2015.[2]

Methods

Epidemiologists at NC DHHS examined age-adjusted cancer incidence rates (reported cases per 100,000 population) during 1996–2015 for the state of North Carolina and specifically for Bladen, Brunswick, New Hanover, and Pender counties. Rates were age-adjusted to the US Census 2000 population. Data were provided by the North Carolina Central Cancer Registry. We focused on cancers of the liver, pancreas, testes, and uterus due to findings reported in laboratory animals during GenX exposure studies. Kidney cancer was examined because epidemiologic studies of exposure to perfluorooctanoic acid (PFOA) have found associations with increased occurrence of kidney cancers.[3]

For each cancer type, we examined the overall 20-year rate (1996–2015). To describe trends over time, we also looked at rates in 5-year intervals during the same period. We compared county-specific rates to the state rate by determining if the 95% confidence intervals (CIs) around the county-specific rate overlapped with the 95% CIs around the state rate for the same period. If no overlap occurred, the rates were considered significantly different.

Findings

20-year rates

All 20-year (1996–2015) county-specific incidence rates were similar to state rates except as noted below:

- The 20-year rate of testicular cancer in New Hanover County was greater than the state rate. Rates were not significantly different from the state rate when examined for any of the individual 5-year periods.
- The 20-year rate of pancreatic cancer in Brunswick County and the 20-year rate of kidney cancer in Bladen County were lower than the state rates.

Trends over time

All 5-year county-specific incidence rates were similar to state rates except as noted below:

- The liver cancer rate in New Hanover County was significantly higher than the state liver cancer rate during 2006–2010, but was similar to the state rate in 1996–2000, 2001–2005, and 2011–2015.
- The Brunswick County uterine cancer rate during 2006–2010 and the Brunswick County pancreatic cancer rate during 2011–2015 were significantly lower than the state rates during the same periods.

Conclusions

The county-specific cancer rates examined here were not significantly higher than state rates, with the exceptions of testicular and liver cancers in New Hanover County during specific periods. During the most recent five-year interval (2011–2015), no county-specific cancer rates examined were significantly higher than state rates. Although the information in this summary describes cancer rates in these counties over time, only a comprehensive research study can provide information about whether any specific exposure might be associated with increased rates of cancer.

References

1. Viral Hepatitis and Liver Cancer. CDC Fact Sheet: https://www.cdc.gov/nchhstp/newsroom/docs/factsheets/viral-hep-liver-cancer.pdf.
2. US Census Bureau. Quick Facts. New Hanover County, North Carolina: https://www.census.gov/quickfacts/geo/chart/newhanovercountynorthcarolina,NC/PST120216#viewtop

3. Environmental Protection Agency. Drinking water health advisory for perflourooctanoic acid (PFOA). May 2016: https://www.epa.gov/sites/production/files/2016-05/documents/pfoa_health_advisory_final-plain.pdf.

Table 1. Twenty-year age-adjusted incidence rates (cases per 100,000 population) for selected cancers in Bladen, Brunswick, New Hanover, and Pender Counties and North Carolina (1996–2015). Rates were age adjusted to the US 2000 Census.[*] Rates significantly different from state-wide rates are highlighted.[†]

Cancer Site	Population	Cases	Rate/100,000	95% CI
Liver	Bladen	36	4.5	3.1 , 6.2
	Brunswick	146	5.4	4.5 , 6.5
	New Hanover	258	6.3	5.6 , 7.2
	Pender	66	5.8	4.5 , 7.4
	NORTH CAROLINA	**10,779**	**5.7**	**5.6 , 5.8**
Pancreas	Bladen	77	9.9	7.8 , 12.4
	Brunswick	266	9.6	8.4 , 10.9
	New Hanover	421	10.4	9.5 , 11.5
	Pender	122	10.8	9.0 , 13.0
	NORTH CAROLINA	**20,835**	**11.3**	**11.2 , 11.5**
Testes	Bladen	12	4.2	2.2 , 7.3
	Brunswick	27	3.5	2.3 , 5.1
	New Hanover	118	6.2	5.2 , 7.5
	Pender	22	5.0	3.2 , 7.6
	NORTH CAROLINA	**4,108**	**4.7**	**4.6 , 4.9**
Kidney	Bladen	94	11.9	9.6 , 14.6
	Brunswick	420	15.4	13.8 , 17.1
	New Hanover	584	14.5	13.4 , 15.8
	Pender	180	15.7	13.4 , 18.2
	NORTH CAROLINA	**28,401**	**15.2**	**15.1 , 15.4**
Uterus	Bladen	92	20.9	16.8 , 25.8
	Brunswick	319	21.4	18.9 , 24.1
	New Hanover	499	22.2	20.3 , 24.3
	Pender	135	21.8	18.2 , 25.9
	NORTH CAROLINA	**23,090**	**22.4**	**22.1 , 22.7**

CI = confidence interval

[*]Rates were produced by the NC Central Cancer Registry (June 2017); numbers are subject to change as files are updated. A modified gamma interval was used to calculate the confidence intervals; Vintage 2015 bridged-race postcensal population estimates were obtained from the National Center for Health Statistics (www.cdc.gov/nchs/nvss/bridged_race/data_documentation.htm#vintage2015).

[†] County-specific rates were compared to the state rate using 95% confidence intervals. If 95% confidence intervals around the county-specific and state rates did not overlap, rates were considered significantly different.

Table 2. Five-year age-adjusted incidence rates (cases per 100,000 population) for selected cancers for Bladen, Brunswick, New Hanover, and Pender Counties and North Carolina (1996–2015). Rates were age adjusted to the US 2000 Census.* Rates significantly different from state-wide rates are highlighted.†

		1996-2000			2001-2005			2006-2010			2011-2015		
Cancer Site	Population	Cases	Rate	95% CI	Cases	Rate	95% CI	Cases	Rate	95% CI	Cases	Rate	95% CI
Liver	Bladen	5	2.7	0.9 , 6.5	6	3.4	1.2 , 7.5	8	3.7	1.6 , 7.6	17	7.2	4.1 , 11.9
	Brunswick	20	4.7	2.8 , 7.6	17	3.1	1.7 , 5.1	42	5.7	4.0 , 8.0	67	6.8	5.2 , 8.9
	New Hanover	33	4.2	2.9 , 5.9	30	3.3	2.2 , 4.8	87	8.0	6.4 , 9.9	108	8.3	6.8 , 10.1
	Pender	12	5.8	3.0 , 10.2	9	3.6	1.6 , 7.0	24	7.2	4.6 , 11.0	21	6.0	3.7 , 9.4
	NORTH CAROLINA	**1,264**	**3.3**	**3.2 , 3.5**	**1,894**	**4.5**	**4.3 , 4.7**	**3,031**	**6.1**	**5.9 , 6.3**	**4,590**	**7.8**	**7.6 , 8.0**
Pancreas	Bladen	10	5.6	2.7 , 10.5	21	11.7	7.2 , 18.0	17	8.8	5.1 , 14.4	29	12.9	8.4 , 19.0
	Brunswick	35	8.6	5.8 , 12.2	52	9.3	6.8 , 12.4	82	11.1	8.7 , 14.0	97	9.2	7.3 , 11.5
	New Hanover	89	11.4	9.1 , 14.0	93	10.2	8.2 , 12.5	106	9.9	8.1 , 12.0	133	10.6	8.8 , 12.6
	Pender	18	8.6	5.1 , 13.7	19	7.2	4.3 , 11.5	39	13.2	9.3 , 18.3	46	12.5	9.1 , 16.9
	NORTH CAROLINA	**3,596**	**9.6**	**9.3 , 9.9**	**4,615**	**11.1**	**10.8 , 11.4**	**5,730**	**11.9**	**11.6 , 12.2**	**6,894**	**12.3**	**12.0 , 12.6**
Testes	Bladen	‡			‡			‡			‡		
	Brunswick	5	3.2	1.1 , 7.7				9	4.8	2.2 , 9.0	9	3.6	1.6 , 7.0
	New Hanover	27	6.7	4.4 , 9.8	27	6.0	3.9 , 8.8	32	6.6	4.5 , 9.4	32	5.8	4.0 , 8.3
	Pender	‡			‡			8	7.1	3.1 , 13.9	9	7.7	3.5 , 14.5
	NORTH CAROLINA	**835**	**4.1**	**3.8 , 4.4**	**1,022**	**4.8**	**4.5 , 5.1**	**1,131**	**5.1**	**4.8 , 5.4**	**1,120**	**4.8**	**4.5 , 5.1**
Kidney	Bladen	15	8.5	4.8 , 14.2	22	12.6	7.8 , 19.1	22	10.9	6.8 , 16.7	35	14.7	10.1 , 20.8
	Brunswick	59	13.5	10.1 , 17.7	85	15.4	12.2 , 19.3	117	15.5	12.6 , 19.0	159	16.7	13.9 , 20.0
	New Hanover	110	13.9	11.4 , 16.7	119	13.0	10.8 , 15.6	156	14.6	12.4 , 17.1	199	16.5	14.2 , 19.0
	Pender	34	15.3	10.6 , 21.6	38	15.2	10.7 , 21.0	50	16.1	11.9 , 21.4	58	15.9	12.0 , 20.9
	NORTH CAROLINA	**4,436**	**11.6**	**11.3 , 11.9**	**6,386**	**15.0**	**14.6 , 15.4**	**8,325**	**17.0**	**16.6 , 17.4**	**9,254**	**16.5**	**16.1 , 16.8**
Uterus	Bladen	14	13.8	7.5 , 23.4	22	22.2	13.8 , 33.9	27	25.3	16.5 , 37.4	29	21.5	14.2 , 31.8
	Brunswick	40	16.3	11.5 , 22.6	70	24.3	18.7 , 31.2	76	17.6	13.6 , 22.6	133	25.4	20.8 , 30.9
	New Hanover	91	20.5	16.5 , 25.2	110	21.8	17.9 , 26.4	150	25.2	21.2 , 29.7	148	20.9	17.6 , 24.7
	Pender	25	21.0	13.6 , 31.3	24	16.9	10.8 , 25.5	39	23.5	16.6 , 32.6	47	25.0	18.2 , 33.8
	NORTH CAROLINA	**4,226**	**19.9**	**19.3 , 20.5**	**4,917**	**20.9**	**20.3 , 21.5**	**6,335**	**23.4**	**22.8 , 23.9**	**7,612**	**24.3**	**23.7 , 24.9**

CI = confidence interval

*Rates were produced by the NC Central Cancer Registry (June 2017); numbers are subject to change as files are updated. A modified gamma interval was used to calculate the confidence intervals; Vintage 2015 bridged-race postcensal population estimates were obtained from the National Center for Health Statistics (www.cdc.gov/nchs/nvss/bridged_race/data_documentation.htm#vintage2015).

† County-specific rates were compared to the state rate using 95% confidence intervals. If 95% confidence intervals around the county-specific and state rates did not overlap, rates were considered significantly different.

‡ Counts fewer than 5 are suppressed; no rate was estimated.

Addendum

Summary of Selected Cancer Rates in Cumberland County, 1996–2015

Summary of Selected Cancer Rates for Cumberland County, 1996–2015 and Comparison to Statewide Rates

North Carolina Department of Health and Human Services, January 14, 2018

This summary was prepared in response to a request for data for Cumberland County that are comparable to data for Bladen, Brunswick, New Hanover and Pender Counties included in a previous summary, released in June of 2017 (https://www.ncdhhs.gov/news/press-releases/nc-dhhs-releases-summary-selected-cancer-rates-counties-cape-fear-region).

Methods

As in the previous summary, we examined the overall 20-year rate (1996–2015) for each cancer type. To describe trends over time, we also looked at rates in 5-year intervals during the same period. We compared county-specific rates to the state rate by determining if the 95% confidence intervals (CIs) around the county-specific rate overlapped with the 95% CIs around the state rate for the same period. If no overlap occurred, the rates were considered significantly different.

Results

All 5-year county-specific incidence rates were similar to state rates.

All 20-year (1996–2015) county-specific incidence rates were similar to state rates except as noted below:

- The 20-year rate of liver cancer in Cumberland County was greater than the state rate.
- The 20-year rate of testicular cancer in Cumberland County was lower than the state rate.

Notes

Central Cancer Registry data do not include information about causes of cancer or associations with specific exposures; therefore, no conclusions can be drawn about the association between GenX or other exposures and the cancer rates described here. Only a comprehensive research study can provide information about whether any specific exposure might be associated with increased rates of cancer.

Table 1. Twenty-year age-adjusted incidence rates (cases per 100,000 population) for selected cancers in Cumberland County and North Carolina (1996–2015). Rates were age adjusted to the US 2000 Census. Rates significantly different from state-wide rates are highlighted.

Cancer Site	Population	Cases	Rate/100,000	95% CI
Liver	Cumberland	340	6.8	6.1 - 7.6
	NORTH CAROLINA	**10,986**	**5.8**	**5.7 - 5.9**
Pancreas	Cumberland	557	11.9	10.9 - 13.0
	NORTH CAROLINA	**21,043**	**11.5**	**11.3 - 11.6**
Testes	Cumberland	118	3.6	2.9 - 4.4
	NORTH CAROLINA	**4,138**	**4.8**	**4.6 - 4.9**
Kidney	Cumberland	742	14.5	13.4 - 15.5
	NORTH CAROLINA	**28,668**	**15.4**	**15.2 - 15.5**
Uterus	Cumberland	607	21.6	19.9 - 23.4
	NORTH CAROLINA	**23,206**	**22.5**	**22.2 - 22.8**

*Rates were produced by the NC Central Cancer Registry (January 2018); numbers are subject to change as files are updated. A modified gamma interval was used to calculate the confidence intervals; Vintage 2016 bridged-race postcensal population estimates were obtained from the National Center for Health Statistics (www.cdc.gov/nchs/nvss/bridged_race/data_documentation.htm#vintage2016).

Table 2. Five-year age-adjusted incidence rates (cases per 100,000 population) for selected cancers for Cumberland County and North Carolina (1996–2015). Rates were age adjusted to the US 2000 Census. Rates significantly different from state-wide rates are highlighted.

		1996-2000			2001-2005			2006-2010			2011-2015		
Cancer Site	**Population**	**Cases**	**Rate**	**95% CI**	**Cases**	**Rate**	**95% CI**	**Cases**	**Rate**	**95% CI**	**Cases**	**Rate**	**95% CI**
Liver	**Cumberland**	41	4.3	3.0 - 5.9	67	6.1	4.7 - 7.8	86	6.5	5.2 - 8.0	146	9.3	7.8 - 10.9
	NORTH CAROLINA	1,27	3.3	3.2 - 3.5	1,90	4.5	4.3 - 4.7	3,035	6.1	5.9 - 6.3	4,789	8.1	7.9 - 8.3
Pancreas	**Cumberland**	95	10.0	8.0 - 12.2	112	10.7	8.8 - 12.9	166	13.5	11.5 - 15.7	184	12.9	11.1 - 15.0
	NORTH CAROLINA	3,596	9.6	9.3 - 9.9	4,62	11.1	10.8 - 11.4	5,733	11.9	11.6 - 12.2	7,097	12.6	12.3 - 12.9
Testes	**Cumberland**	26	3.2	2.0 - 4.9	30	3.5	2.3 - 5.1	37	4.6	3.2 - 6.5	25	3.0	1.9 - 4.6
	NORTH CAROLINA	836	4.1	3.8 - 4.4	1,02	4.8	4.5 - 5.1	1,131	5.1	4.8 - 5.4	1,148	4.9	4.6 - 5.2
Kidney	**Cumberland**	130	12.1	10.0 - 14.4	165	14.1	12.0 - 16.4	211	15.9	13.8 - 18.2	236	15.4	13.5 - 17.6
	NORTH CAROLINA	4,436	11.6	11.3 - 11.9	6,394	15.0	14.6 - 15.4	8,340	17.0	16.7 - 17.4	9,498	16.9	16.5 - 17.2
Uterus	**Cumberland**	105	18.2	14.9 - 22.1	132	20.3	17.0 - 24.1	154	21.2	18.0 - 24.9	216	25.7	22.3 - 29.4
	NORTH CAROLINA	4,226	19.9	19.3 - 20.5	4,918	20.9	20.3 - 21.5	6,338	23.4	22.8 - 24.0	7,724	24.6	24.1 - 25.2

*Rates were produced by the NC Central Cancer Registry (January 2018); numbers are subject to change as files are updated. A modified gamma interval was used to calculate the confidence intervals; Vintage 2016 bridged-race postcensal population estimates were obtained from the National Center for Health Statistics (www.cdc.gov/nchs/nvss/bridged_race/data_documentation.htm#vintage2016).

† Counts fewer than 5 are suppressed; no rate was estimated.