



Assessing the utility of electronic health records and health care claims data to determine potential health impacts associated with opportunities for exposure to environmental contaminants

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Disclaimer

- **The findings and conclusions in this presentation are those of the author(s) and do not necessarily represent the official view of the Centers for Disease Control and Prevention.**

Outline

- **Introduction**
- **Background**
- **Methods**
- **Preliminary results**
- **Lessons learned**
- **Next steps**

Introduction

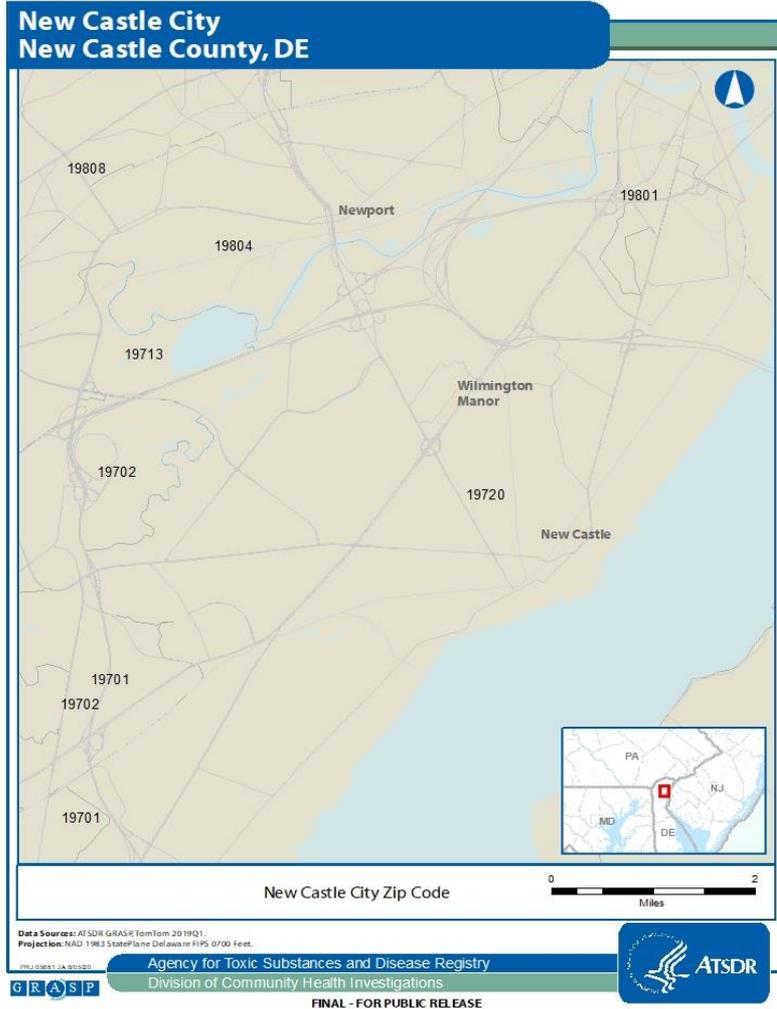
- **Health care claims (HCC) and electronic health records (EHRs) might enhance early warning surveillance**
 - Timely
 - Geographically refined
 - More information, e.g., risk factors, co-diagnosis, pharmacy and laboratory test results

Background

- **The city of New Castle, DE selected for a pilot study**
 - A variety of industrial sources are present
 - In 2015, levels of contaminants in drinking water were found to be above federal health advisory levels
 - Universal claims and access to EHR data available through the Delaware Health Information Network (DHIN)

Methods

- **Population: health care plan members who resided in New Castle County during the period 2013 – 2018**
- **Area/zip codes of interest: 19720, 19702 and 19713**



Methods cont.

- **Health outcomes of interest: cardiovascular disease; hypertension; diabetes, high cholesterol, thyroid disease; kidney cancer; and testicular cancer**
- **Calculated percent of:**
 - Health care plan members with health outcomes of interest by year

Preliminary results

Table 1. Number and percent of all health care plan members with health outcome of interest

Year	2013		2014		2015		2016		2017		2018	
	Area of Interest: Number (Percent)	New Castle County: Number (Percent)	Area of Interest: Number (Percent)	New Castle County: Number (Percent)	Area of Interest: Number (Percent)	New Castle County: Number (Percent)	Area of Interest: Number (Percent)	New Castle County: Number (Percent)	Area of Interest: Number (Percent)	New Castle County: Number (Percent)	Area of Interest: Number (Percent)	New Castle County: Number (Percent)
Total number of members	N= 40,778 (100)	N=136,867 (100)	N= 53,052 (100)	N=186,205 (100)	N= 65,140 (100)	N= 234,240 (100)	N=66,009 (100)	N= 237,449 (100)	N=65,187 (100)	N=234,354 (100)	N= 63,466 (100)	N= 229,118 (100)
Health Outcomes												
Type II diabetes	1664 (4.1)	5894 (4.3)	1376 (2.6)	4602 (2.5)	1024 (1.6)	3504 (1.5)	714 (1.1)	2425 (1.0)	576 (0.9)	1874 (0.8)	643 (1.0)	1926 (0.8)
Hypertension	2574 (6.3)	9725 (7.1)	2692 (5.1)	9689 (5.2)	2440 (3.7)	9226 (4.0)	1863 (2.8)	6828 (2.9)	1330 (2.0)	4893 (2.1)	1319 (2.1)	4805 (2.1)
Hypertensive diseases	158 (0.4)	522 (0.4)	120 (0.2)	351 (0.2)	96 (0.1)	247 (0.1)	39 (0.1)	120 (0.1)	51 (0.1)	155 (0.1)	48 (0.1)	152 (0.1)
Pregnancy-related hypertension and eclampsia	47 (0.1)	169 (0.1)	55 (0.1)	158 (0.1)	50 (0.1)	181 (0.1)	80 (0.1)	211 (0.1)	59 (0.1)	199 (0.1)	46 (0.1)	172 (0.1)
Coronary artery disease	457 (1.1)	1649 (1.2)	395 (0.7)	1431 (0.8)	279 (0.4)	1183 (0.5)	181 (0.3)	645 (0.3)	150 (0.2)	536 (0.2)	162 (0.3)	550 (0.2)
Stroke	153 (0.4)	672 (0.5)	121 (0.2)	510 (0.3)	111 (0.2)	486 (0.2)	101 (0.2)	505 (0.2)	118 (0.2)	417 (0.2)	115 (0.2)	425 (0.2)
Hypercholesterolemia	353 (0.9)	1191 (0.9)	357 (0.7)	1651 (0.9)	285 (0.4)	1497 (0.7)	139 (0.2)	830 (0.3)	*	14 (0.0)	*	15 (0.0)
High triglycerides	40 (0.1)	125 (0.1)	31 (0.1)	146 (0.1)	45 (0.1)	173 (0.1)	57 (0.1)	193 (0.1)	46 (0.1)	166 (0.1)	49 (0.1)	173 (0.1)
Mixed and other hyperlipidemia	1051 (2.6)	3589 (2.6)	1231 (2.3)	4841 (2.6)	1199 (1.8)	4811 (2.1)	1028 (1.6)	4049 (1.7)	889 (1.4)	3498 (1.5)	751 (1.2)	2856 (1.2)
Any thyroid disease	765 (1.9)	2555 (1.9)	1352 (2.5)	4775 (2.6)	914 (1.4)	3570 (1.6)	858 (1.3)	3374 (1.4)	593 (0.9)	2350 (1.0)	524 (0.8)	2091 (0.9)

*Censored because of small numbers (<10)

Preliminary results cont.

Table 2. Number and percent of health care plan members with health outcome of interest stratified by age and gender

Health Outcome	2013		2014		2015		2016		2017		2018	
	Area of Interest Number (Percent)	The rest of New Castle County Number (Percent)	Area of Interest Number (Percent)	The rest of New Castle County Number (Percent)	Area of Interest Number (Percent)	The rest of New Castle County Number (Percent)	Area of Interest Number (Percent)	The rest of New Castle County Number (Percent)	Area of Interest Number (Percent)	The rest of New Castle County Number (Percent)	Area of Interest Number (Percent)	The rest of New Castle County Number (Percent)
Type II Diabetes	1664	4230	1376	3226	1024	2480	714	1711	576	1298	643	1283
<i>Gender</i>												
Female	974 (58.5)	2467 (58.3)	750 (54.5)	1691 (52.4)	533 (52.1)	1251 (50.4)	376 (52.7)	864 (50.5)	317 (55.0)	656 (50.5)	319 (49.6)	629 (49.0)
Male	690 (41.5)	1763 (41.7)	626 (45.5)	1535 (47.6)	491 (47.9)	1229 (49.6)	338 (47.3)	847 (49.5)	259 (44.9)	642 (49.5)	324 (50.4)	654 (50.9)
<i>Age group</i>												
≤18	26 (1.6)	46 (1.1)	21 (1.5)	49 (1.5)	19 (1.9)	29 (1.2)	13 (1.8)	26 (1.5)	*	25 (1.9)	*	26 (2.0)
>18 - 35	153 (9.2)	345 (8.2)	111 (8.1)	233 (7.2)	102 (9.9)	196 (7.9)	103 (14.4)	185 (10.8)	73 (12.7)	129 (9.9)	67 (10.4)	122 (9.5)
>35 - 45	229 (13.8)	490 (11.6)	146 (10.6)	282 (8.7)	149 (14.6)	283 (11.4)	98 (13.7)	241 (14.1)	80 (13.9)	149 (11.5)	66 (10.3)	126 (9.8)
>45 - 65	787 (47.3)	1989 (47.0)	748 (54.4)	1656 (51.3)	559 (54.6)	1384 (55.8)	365 (51.1)	834 (48.7)	269 (46.7)	623 (48.0)	261 (40.6)	533 (41.5)
>65	469 (28.2)	1360 (32.2)	350 (25.4)	1006 (31.2)	195 (19.0)	588 (23.7)	135 (18.9)	425 (24.8)	144 (25.0)	372 (28.7)	240 (37.3)	476 (37.1)
Hypertension	2574	7151	2692	6997	2440	6786	1863	4965	1330	3563	1319	3465
<i>Gender</i>												
Female	1599 (62.1)	4333 (60.6)	1622 (60.3)	4062 (58.1)	1379 (56.5)	3597 (53.0)	1044 (56.0)	2657 (53.5)	764 (57.4)	1936 (54.3)	742 (56.3)	1887 (54.5)
Male	975 (37.9)	2818 (39.4)	1070 (39.8)	2935 (41.9)	1061 (43.5)	3189 (46.9)	819 (43.9)	2308 (46.5)	566 (42.6)	1627 (45.7)	577 (43.8)	1578 (45.5)
<i>Age group</i>												
≤18	47 (1.8)	82 (1.2)	46 (1.7)	85 (1.2)	33 (1.4)	68 (1.0)	56 (3.0)	128 (2.6)	25 (1.9)	48 (1.4)	32 (2.4)	47 (1.4)
>18 - 35	308 (12.0)	667 (9.3)	221 (8.2)	507 (7.3)	233 (9.6)	504 (7.4)	256 (13.7)	537 (10.8)	159 (11.9)	382 (10.7)	137 (10.4)	324 (9.4)
>35 - 45	394 (15.3)	949 (13.3)	366 (13.6)	802 (11.5)	337 (13.8)	770 (11.4)	282 (15.1)	625 (12.6)	193 (14.5)	458 (12.9)	178 (13.5)	473 (13.7)
>45 - 65	1123 (43.6)	3026 (42.3)	1342 (49.9)	3306 (47.3)	1388 (56.9)	3719 (54.8)	935 (50.2)	2539 (51.1)	622 (46.8)	1652 (46.4)	584 (44.3)	1492 (43.1)
>65	702 (27.3)	2427 (33.9)	717 (26.6)	2297 (32.8)	449 (18.4)	1725 (25.4)	334 (17.9)	1136 (22.9)	331 (24.9)	1023 (28.7)	388 (29.4)	1129 (32.6)

*Censored because of small numbers (<10)

Next steps

- **Evaluate comparability of DHIN data in relation to population-based surveillance data for DE**
- **Examine differences in rates of health outcomes before and after remediation**
- **Obtain clinical data of the same health outcomes in the area of interest**

Lessons learned

- **Data request, approval, and acquisition process should be factored into project timelines**
- **Need for collaboration between HIEs and Public Health**
 - Data quality questions
 - Detect and understand patterns in data

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Thank You!

For more information, contact NCEH
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