

Progress on Population Projections

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Work Focus – July thru September

Work continued on developing framework to create projections. Yearly population projections by county, race, and age can be generated to 2055 and update is focused selection of rates driving the projection. This involves research and visualization of rates thru time, and understanding major features and considerations, screening data and checking for errors, and decisions on selecting values that can be used from the data. These rates include:

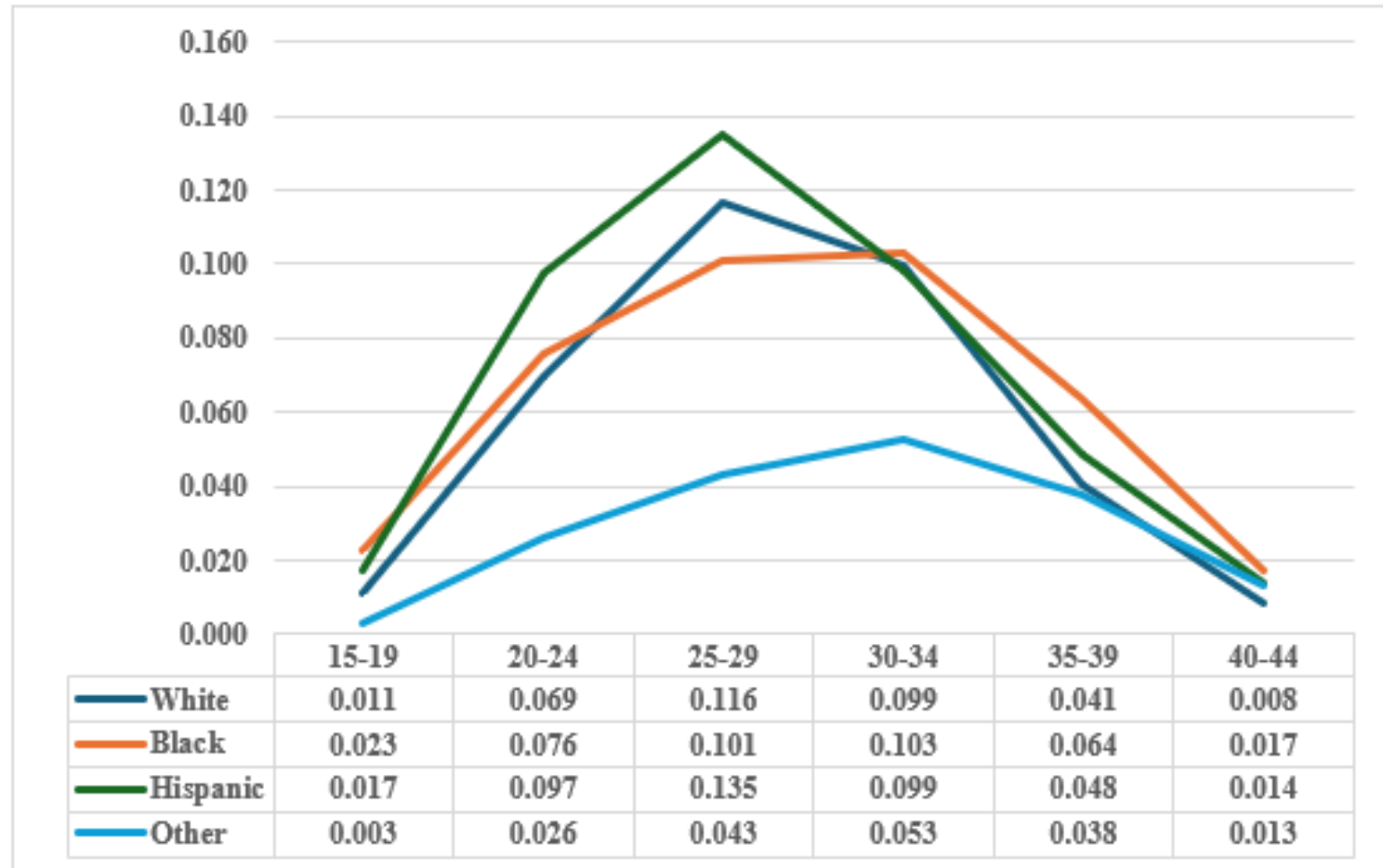
- Fertility Rates
- Death Rates
- Migration Rates
- Labor Force Rates
- Employment Rates

Fertility Rates

	kchisp	kcwh	kcbl	kcoth	nchisp	ncbl	ncoth	ncwh	scwh	schsp	scoth	scbl
F15-19	0.017	0.011	0.023	0.003	0.021	0.021	0.002	0.004	0.011	0.051	0.003	0.039
F20-24	0.097	0.069	0.076	0.026	0.083	0.068	0.016	0.022	0.061	0.148	0.015	0.130
F25-29	0.135	0.116	0.101	0.043	0.118	0.101	0.067	0.066	0.108	0.171	0.036	0.138
F30-34	0.099	0.099	0.103	0.053	0.100	0.091	0.097	0.105	0.097	0.134	0.053	0.091
F35-39	0.048	0.041	0.064	0.038	0.058	0.056	0.053	0.055	0.045	0.073	0.043	0.061
F40-44	0.014	0.008	0.017	0.013	0.016	0.015	0.012	0.011	0.009	0.022	0.006	0.015

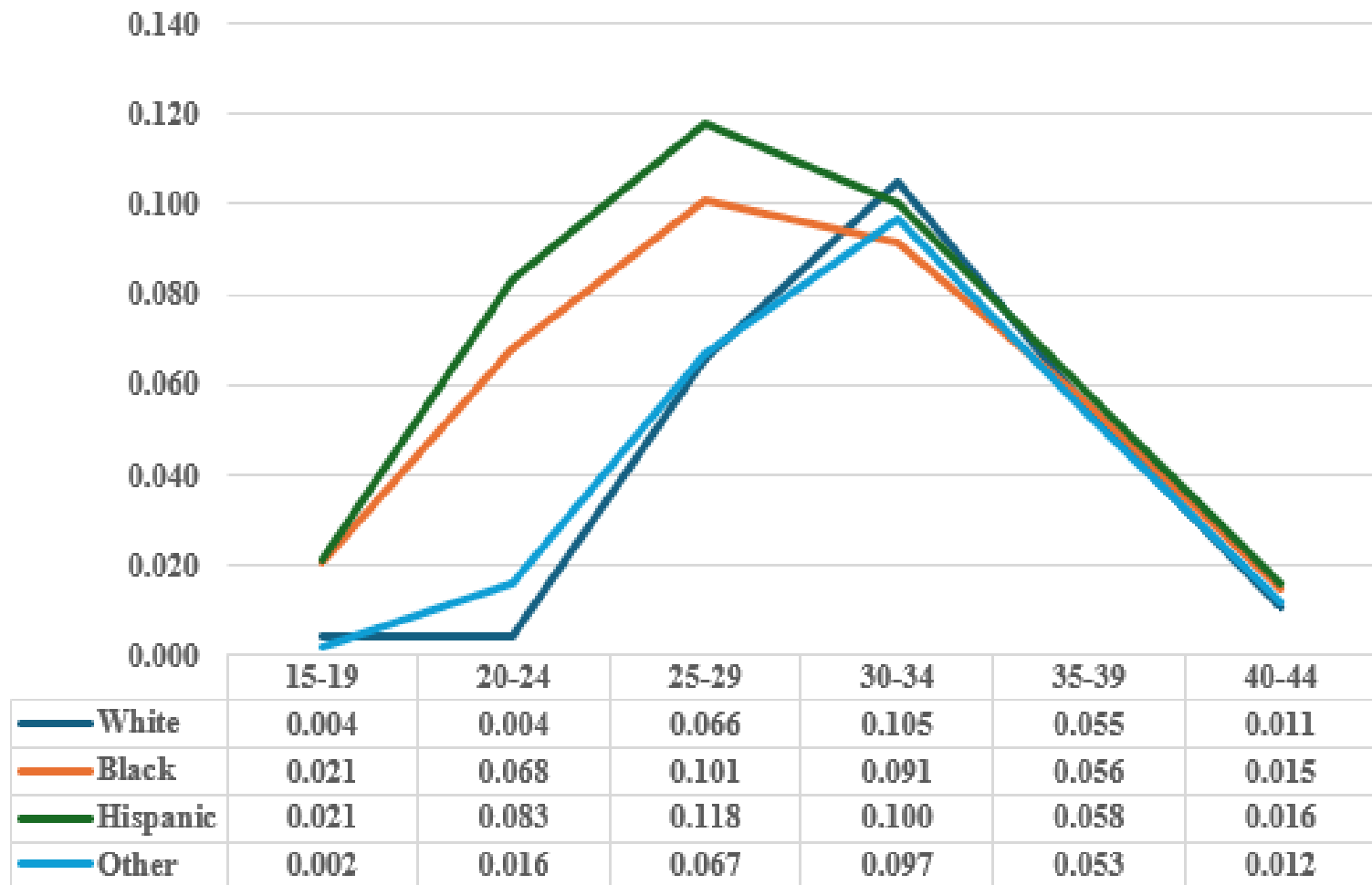
Fertility Rates

Chart 1: Fertility Rates, Kent County (by age, by race/ethnic groups)



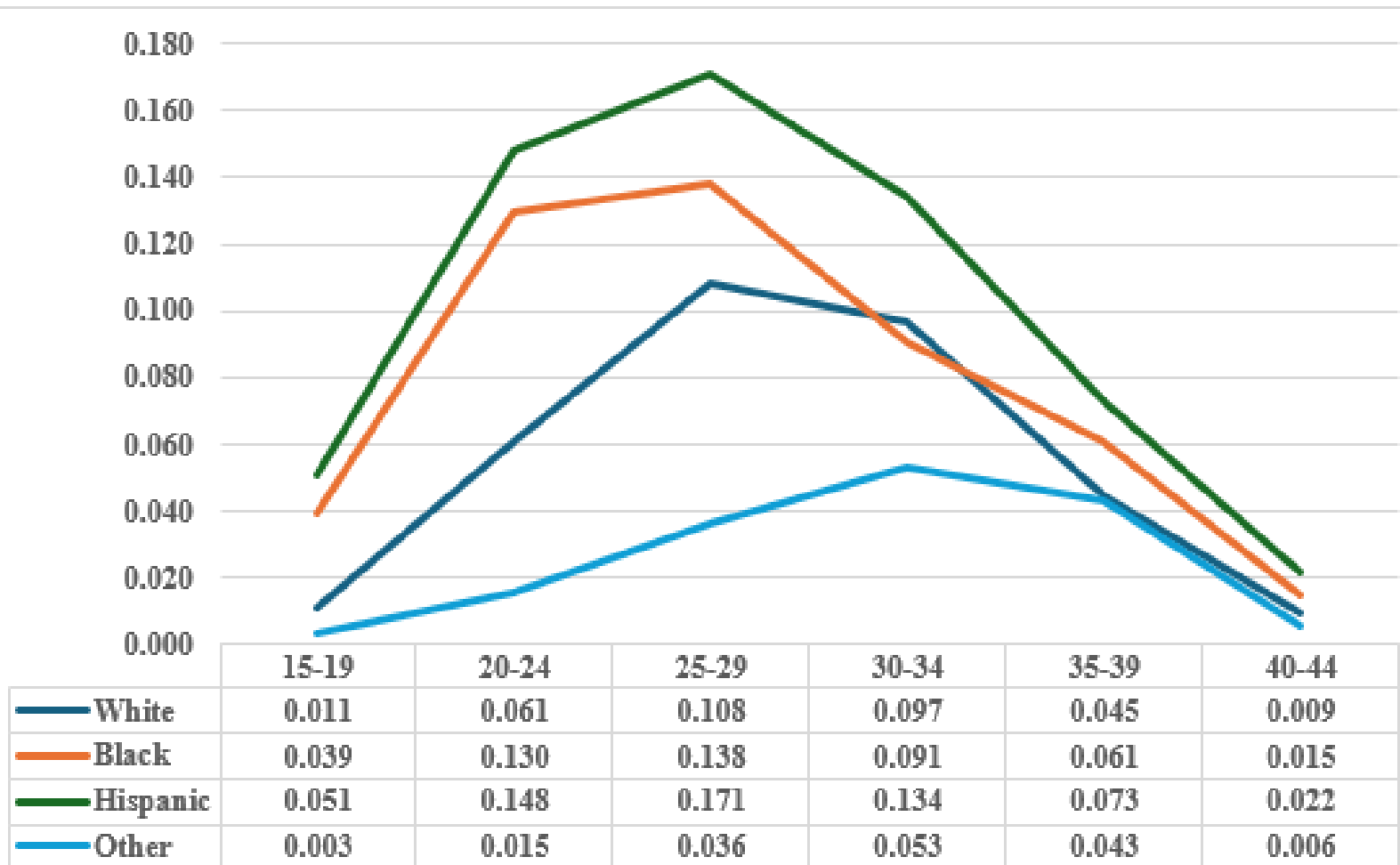
Fertility Rates (New Castle)

Chart 2: Fertility Rates, New Castle County (by age, by race/ethnic groups)



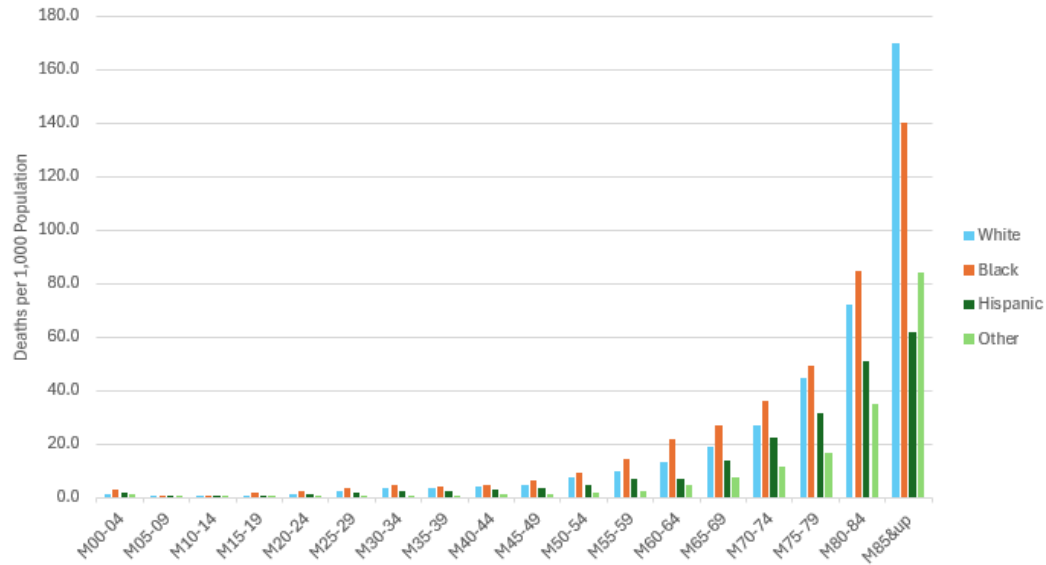
Fertility Rates (Sussex)

Chart 3: Fertility Rates, Sussex County (by age, by race/ethnic groups)

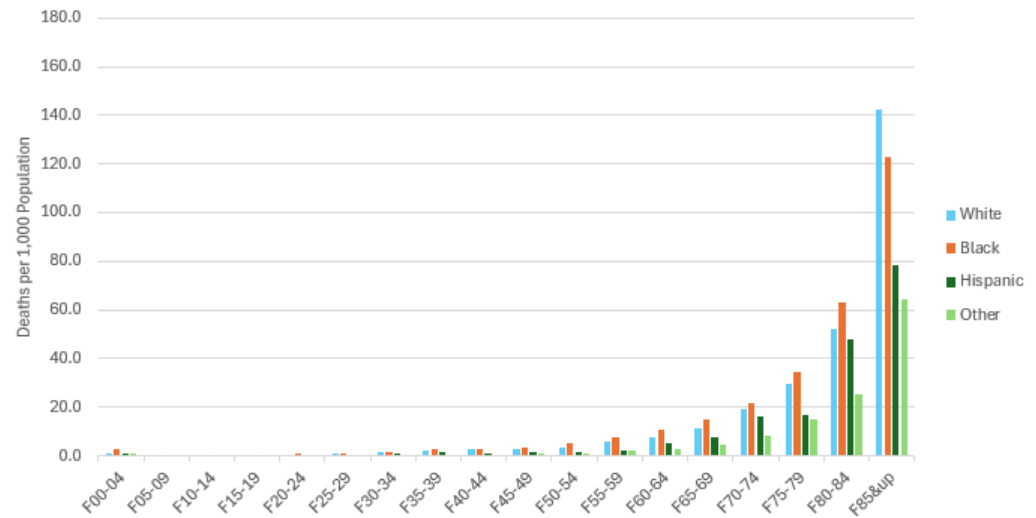


Death Rates

New Castle County 5 year Average Male Death Rates by Age, Race, and Hispanic 2019-2023

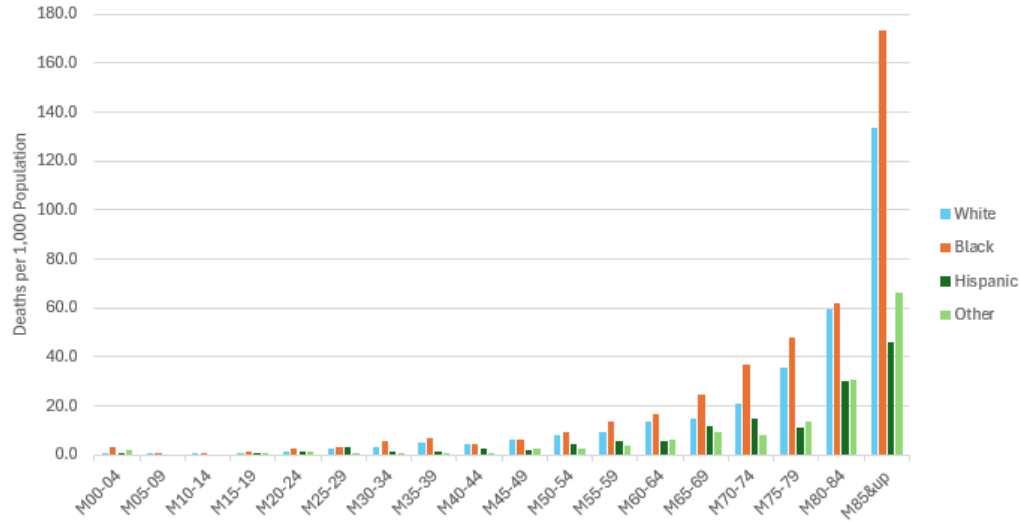


New Castle County 5 year Average Female Death Rates by Age, Race, and Hispanic 2019-2023

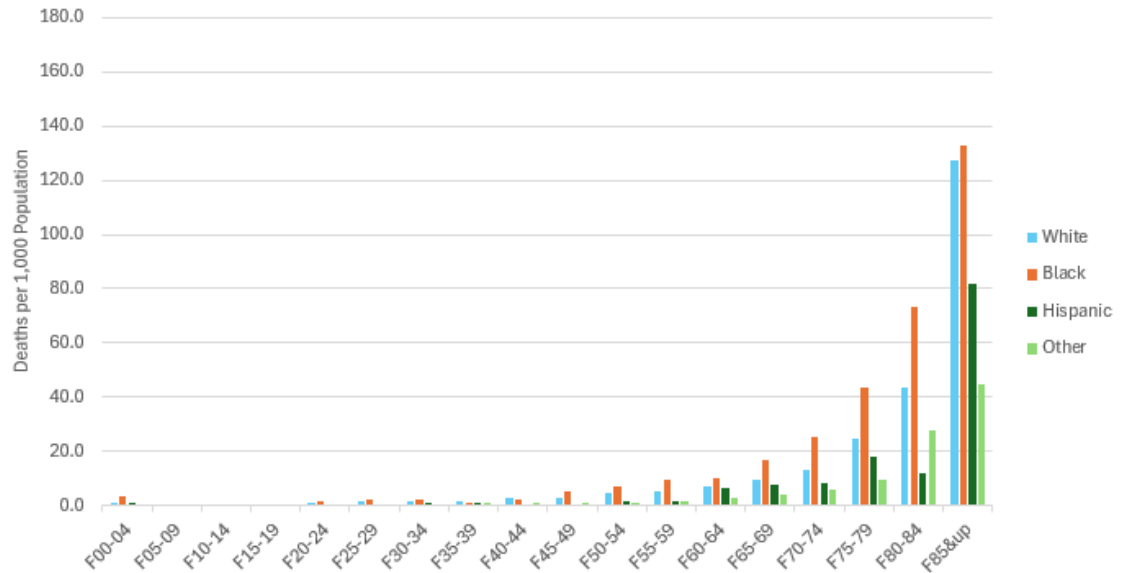


Death Rates (Sussex)

Sussex County 5 year Average Male Death Rates by Age, Race, and Hispanic
2019-2023



Sussex County 5 year Average Female Death Rates by Age, Race, and Hispanic
2019-2023



Migration

Delaware Annual change, July1 2023 to 2024

Births 10,437 1%

Deaths 10,458 1%

(Natural change -21)

Net Migration 15,438 1.5%

Net Migration Inter 7,283

Net Migration domestic 8,155

Table 2. State-to-State Migration Supplemental Estimates for Current Residence¹: 2024 American Community Survey 1-Year Estimates

Migration from Base Data and Deaths

In previous years, future migration rates were fairly constant set at 3.5% for Sussex, 0.2% for New Castle, and Kent at 0.5% with Kent Hispanic at 1%. We want to verify those figures and see if any refinements considering race and age group.

From year to year population changes by the number of deaths and the net migration. Using the population totals and deaths, the migrationrate could be computed.

Yearly total migration from base data and deaths

	2011	2012	2013	2014	2015	2016	2017	2018	2020	2021	2022	2023	
Sussex White	1.1	1.4	2	2.2	2.5	2.7	2.8	2.8	3	3.9	3.1	1.1	
	1.3	1.4	2	2.1	2.2	2.5	2.6	2.5	3.1	3.9	3.1	1.2	
Sussex Black	0	-0.1	0.1	0.1	-0.1	0.1	-0.1	0.2	3.2	4.1	3.3	1.3	
	0	0.2	0	0.1	0	0	0	-0.2	3.3	4.1	3.4	1.5	
Sussex Hisp	1.3	1.6	1.3	1.4	1.4	1.2	1.3	1.3	3.5	4.3	3.6	3.5	
	1.3	1.5	1.3	1.4	1.5	1.2	1.3	1.3	3.5	4.3	3.5	3.4	
Sussex Other	5.9	5.8	5.3	5.3	4.6	4.7	4.6	4.1	3.4	4.4	3.6		
	5.1	4.5	4.6	4.1	4	4	3.5	3.7	3.5	4.2	3.5		
New Castle White	-0.8	-0.7	-0.6	-0.5	-0.2	-0.2	-0.2	-0.2	-0.4	0.1	0.4	0	
	-0.7	-0.6	-0.5	-0.5	-0.2	-0.2	-0.2	-0.3	-0.4	-0.1	0.2	0	
New Castle Black	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	-0.1	0.2	0.3	0.1	
	0.2	0.4	0.2	0.3	0.2	0.2	0.1	0.1	-0.1	0.1	0.3	0	
New Castle Hisp	3	2.7	2.4	2.3	1.2	1.1	1.1	1.2	0.1	0.2	0.3	0.2	
	3	2.7	2.4	2.3	1.1	1.2	1.1	1.1	-0.1	0.1	0.2	0.1	
New Castle Other	0.9	0.9	1	0.9	0.9	0.9	0.8	0.9	0.1	0.2	0.2	0.1	
	0.9	0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.2	0.2	0.2	0.1	
Kent White	0.8	0.9	0.9	0.9	0.5	0.4	0.4	0.4	0.7	0.7	1.1	0.8	
	1	1	0.9	0.9	0.5	0.4	0.4	0.4	0.9	0.8	1.2	0.8	
Kent Black	0.2	0.1	0.1	0.2	0	0.2	0.1	0.2	0.9	1	1	0.8	
	0.1	0.2	0.1	0.1	0.3	0.1	0.1	0.1	0.9	0.9	0.8	1	
Kent Hisp	3.4	3.1	3	1.1	0.4	0.6	0.5	0.7	1.1	1.1	1.4	1	
	3.5	3	3	1.1	0.5	0.6	0.6	0.5	0.9	0.8	1.4	1	
Kent Other	0.7	4.9	4.1	2.6	0.3	0.6	0.5	0.8	1.1	0.8	1.5	0.6	
	0.9	3.8	3.6	2.9	0.2	0.2	0	0.1	1	1	1.5	0.8	

Migration Rate by Age Sussex 2011 to 2023

	SC WM	SC WF	SC BM	SC BF	SC HM	SC HF	SC
18	2.1	2.3	1.1	1.1	2.2	2.6	
19	2.1	2.4	1.2	1.2	2.2	2.4	
20	2.2	2.4	1.1	1.4	2.4	2.5	
21	2.1	2.3	1.2	1.2	2.3	2.2	
22	2.2	2.4	1.1	1.2	2.3	2.4	
23	2.2	2.3	1.3	1	2.1	2.4	
24	2.2	2.4	1	1.2	2.1	2.3	
25	2.2	2.4	1	1.2	2.2	2.4	
26	2.3	2.3	1.1	1.3	2.3	2.3	
27	2.2	2.4	1.4	1	2.2	2.3	
28	2.2	2.4	1.1	1	2.4	2.2	
29	2.2	2.3	1.1	0.9	2.2	2.3	
30	2.1	2.4	1.2	1	2.4	2.4	
31	2.2	2.3	1.3	1	2.3	2.3	
32	2.2	2.4	0.9	1.3	2.3	2.3	
33	2.3	2.4	1.7	0.9	2.2	2.3	
34	2.4	2.5	0.9	1.1	2.1	2.3	
35	2.3	2.5	1	1.2	2.2	2.3	
36	2.4	2.6	1.4	1	2	2.3	
37	2.4	2.6	1.2	1.1	2.4	2.5	
38	2.5	2.8	1.1	0.9	2.1	2.5	
39	2.5	2.8	1.1	1	2.6	2.6	
40	2.5	2.9	1.1	1.1	2.5	2.7	
41	2.7	3	0.8	0.7	2.7	3	
42	2.8	3.2	0.9	1.3	2.8	2.8	
43	2.8	3.2	1.1	0.8	3	2.7	
44	3.1	3.3	0.7	0.9	2.9	2.8	
45	3.2	3.4	0.7	0.9	2.5	3.2	
46	3.2	3.3	0.9	0.9	2.9	3.1	
47	3.3	3.4	0.7	0.9	3.1	3	
48	3.4	3.5	0.7	0.5	2.9	3.1	
49	3.4	3.4	0.5	0.7	3.1	2.9	
50	3.5	3.5	0.9	0.6	3	2.9	
51	3.5	3.4	0.5	0.8	2.8	3	
52	3.5	3.2	0.4	0.9	3.6	3.4	
53	3.5	3.1	-0.1	1.3	2.6	2.7	
54	3.3	3	0.8	1.1	3.4	2.8	
55	3.1	2.9	-0.1	0.9	2.6	2.3	
56	2.9	2.7	-0.2	0.4	3.4	2.5	
57	2.8	2.6	0.2	0.3	2.5	2.3	
58	2.5	2.4	0.8	1.2	3	2.1	
59	2.3	2.2	-0.1	0.7	2.7	2.6	
60	1.9	1.9	-0.1	0.7	2.4	2.8	
61	1.8	1.7	0	0.3	2	2.3	

Migration Rate by Age New Castle 2011 to 2023

Age	NC WF	NC BM	NC BF	NC HM	NC HF
16	-0.1	0.2	0.2	1.3	1.3
17	-0.2	0.1	0.2	1.5	1.6
18	-0.2	0.2	0.2	1.5	1.6
19	-0.2	0.3	0.2	1.6	1.6
20	-0.2	0.2	0.2	1.4	1.4
21	-0.1	0.2	0.3	1.4	1.3
22	-0.1	0.2	0.2	1.4	1.3
23	-0.1	0.3	0.2	1.4	1.4
24	-0.1	0.2	0.3	1.4	1.3
25	-0.1	0.3	0.2	1.4	1.4
26	-0.1	0.3	0.2	1.4	1.3
27	-0.1	0.2	0.2	1.4	1.3
28	-0.1	0.4	0.2	1.3	1.2
29	-0.1	0.2	0.2	1.5	1.4
30	-0.1	0.3	0.2	1.4	1.2
31	-0.1	0.2	0.2	1.3	1.3
32	-0.1	0.4	0.2	1.6	1.3
33	-0.1	0.2	0.2	1.4	1.2
34	-0.1	0.3	0.2	1.5	1.4
35	-0.1	0.3	0.2	1.4	1.3
36	-0.1	0.1	0.2	1.4	1.3
37	-0.2	0.1	0.1	1.4	1.4
38	-0.2	-0.1	0.2	1.3	1.3
39	-0.1	-0.1	0.1	1.3	1.3
40	-0.2	-0.1	0.1	1.2	1.3
41	-0.2	0.1	0.1	1.3	1.3
42	-0.2	-0.1	0.1	1.4	1.2
43	-0.2	-0.2	0	1.3	1.2
44	-0.2	-0.2	0	1.2	1.3
45	-0.3	-0.1	-0.1	1.5	1.3
46	-0.3	-0.2	-0.1	1.2	1.4
47	-0.3	-0.2	0	1.5	1.1
48	-0.3	-0.2	-0.1	1.2	1.2
49	-0.3	-0.4	0	1.4	1.2
50	-0.4	-0.2	0.1	1.4	1.4
51	-0.4	-0.4	0	1.5	1.2
52	-0.4	-0.2	0	1.4	1.1
53	-0.4	-0.2	0	1.1	1.2
54	-0.3	-0.3	0	1.2	1.4
55	-0.3	-0.2	0	1.1	0.8
56	-0.4	-0.3	0.1	1	0.7
57	-0.4	0.2	-0.1	1.5	1.1
58	-0.4	0.1	-0.1	1.3	0.8
59	-0.4	-0.4	-0.2	1.3	0.7
60	-0.5	-0.2	-0.1	1.3	0.9
61	-0.7	-0.7	-0.2	0.4	0.4

Kent County Labor Force

Kent County Labor Force Participation Rates by Year and Demographic Cohort																
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Avg.
Age Cohort																
16-19	34.60	39.5	34.2	40.5	33.5	37.9	37.7	34.3	33.4	42.3	—	36	41.9	44.7	45.2	38.26
20-24	77.90	79.1	77.6	78.2	79.9	78	74.6	71.4	76.4	82.2	—	66.5	86.1	83.3	85.9	78.36
25-29	—	—	—	—	—	91.6	83.4	87.6	86.1	83.2	—	80.1	93.7	90.1	80.9	86.30
30-34	—	—	—	—	—	79.5	82.6	85.7	77.6	88.2	—	67.1	85.2	92.3	89.7	83.10
35-44	—	—	—	—	—	82.9	81.6	79.5	88.8	86.3	—	87.3	88.9	85.5	88.8	85.51
25-44	83.10	85.7	82.9	84.5	85.6	75.9	83.4	83.1	81.3	77	—	81.9	84.2	93	82.8	83.17
45-54	78.40	83.3	82.4	78.3	83.4	71.1	68.7	66.2	61.8	73.1	—	70.3	67.4	73.8	79.9	74.15
55-64	60.20	59.1	61.2	68	66.8	44.7	59.9	46.8	47.1	46.1	—	50.5	58.7	47.7	52.2	54.93
65-74	22.90	26	22	21.6	19.9	17.3	23.2	27.4	25	22	—	23.6	19.8	27.5	21.9	22.86
75+	7.40	5.7	8.6	9.7	4.2	7.6	6.7	7.9	5.8	4.8	—	3	6.6	4.9	8.1	6.50
Race & Ethnicity																
White (Only)	63.80	63.7	62.2	63.5	63.7	59.3	62.2	61	54.8	59.8	—	56.6	60.9	62.3	61.1	61.06
Black	56.80	67	66.2	66.4	60.5	60.4	61.6	63.1	54.8	63.6	—	59.4	67	64.2	64.1	62.51
Hispanic	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other	—	—	—	—	—	—	—	—	—	—	—	—	—	77	66.6	71.80
Sex																
Male	78.3	85.4	85	84.9	84.2	80.3	82.4	81	79.4	83.3	—	76.8	86.1	84.5	84.1	82.55
Female	75.1	73.3	71.1	73.2	77	72.1	73.8	71.6	73.5	72.6	—	71.4	77.8	80.2	79	74.41

Projection methodology considers projected employment as compared to labor force in a balance that indicates migration. Labor force information from the ACS was reviewed.

New Castle County Laor Force

New Castle County Labor Force Participation Rates by Year and Demographic Cohort																
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Avg.
Age Cohort																
16-19	33.1	31.9	33.6	36	35.7	39.2	29.4	29.7	46	41	—	38.7	40.9	38.9	40.3	36.74
20-24	75.1	70.1	67.1	74.9	68	71.5	65.6	61.3	70.3	77.1	—	70.6	77.2	76.5	77	71.59
25-29	—	—	—	—	—	84.3	79.1	77.8	83.3	83.5	—	85	86.5	81.8	84.3	82.84
30-34	—	—	—	—	—	80.6	86.5	77.6	83.8	84.3	—	86	88.9	90.6	87.1	85.04
35-44	—	—	—	—	—	83.2	84.5	76.3	83.6	86.2	—	82.9	86.7	86.7	87.2	84.14
25-44	84.4	83.6	85.8	85	83.8	85.1	83.5	81.4	84.6	84.3	—	83.6	88.4	85.4	86.1	84.64
45-54	83.1	82.6	84.5	84.3	81.3	77.4	73.5	70.8	74	80.7	—	77.9	81.2	74.9	81	79.09
55-64	69.6	70.1	66.5	66.9	67.8	62.2	60.4	56.1	59.7	64.4	—	63.6	60.7	63.2	63.7	63.92
65-74	28.5	28.3	28.6	26.9	27.5	26.5	28.1	25.7	29.3	25.1	—	27.3	31.1	27.4	30.6	27.92
75+	7.2	6.2	5.6	4.9	6.1	7	5.6	5.8	8.6	11.6	—	5.7	7.2	6.2	7.4	6.79
Race & Ethnicity																
White (Only)	67.4	66.2	64.2	66	64.2	64.7	63	60.9	63.4	64.4	—	65.5	64.7	61.2	62.2	64.14
Black	65.7	62.9	69.3	67	64.4	67.6	64.6	55.4	66.5	68.2	—	65.5	69.9	67.3	68.6	65.92
Hispanic	67.6	73.9	74	66	70	67	71.8	61.7	75.9	68.6	—	75.1	72.9	71.4	68.6	70.32
Other	—	67.3	—	—	64.5	73.1	—	63.7	65.4	73.9	—	71.6	69.7	72.1	72.8	69.41
Sex																
Male	82.8	82.4	82	82.5	80	81.2	80.5	76.8	82.3	83.7	—	86.1	86.1	85.2	83	82.47
Female	77.7	75.8	76.6	77.4	76.2	77.8	75.6	70.1	75.2	78.6	—	79.5	79.5	77.5	81.4	77.06

Sussex County Labor Force

Sussex County Labor Force Participation Rates by Year and Demographic Cohort																
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Avg.
Age Cohort																
16-19	37	40.1	44.9	37.8	54.1	39.1	31.2	34.3	46.1	51.1	—	47.3	58.4	45.4	46.1	43.78
20-24	76.1	77.8	82.4	80.8	79.7	79.1	78.2	71.4	84.7	76	—	82.6	74.4	84.4	83.1	79.34
25-29	—	—	—	—	—	83.3	83.2	87.6	85	89.8	—	83.3	89.6	93.1	79	85.99
30-34	—	—	—	—	—	81.2	84.5	85.7	88.5	87.8	—	76.4	82.3	87.2	89.2	84.76
35-44	—	—	—	—	—	77.6	79.2	79.5	80.6	82.4	—	85.3	83.1	84.6	88.5	82.31
25-44	77.4	82.8	86.2	81.8	83.3	82.2	79.7	83.1	74.7	81	—	79.1	85.4	85.1	88.1	82.14
45-54	80.4	80.5	81	79.2	80	71.7	69.7	66.2	75.7	70.2	—	63.7	77.5	69	84	74.91
55-64	58	58.4	59.7	54.6	60.7	47.8	45.7	46.8	47.6	54.3	—	48.8	49.9	59.5	57.8	53.54
65-74	20.2	24	29.1	24.8	25.3	23.2	25.3	27.4	27.1	21.7	—	22.1	21.5	24.5	23.6	24.27
75+	4.3	5.8	5.6	7.4	9.7	6.8	5.6	7.9	10.6	7.5	—	4.9	6.1	9.9	5.2	6.95
Race & Ethnicity																
White (Only)	53.8	55.5	57	52.8	55.7	53.2	52.6	52.6	53.2	51.9	—	48.5	50.3	52.8	48.7	52.76
Black	56.4	63.6	64.6	68.4	63.5	62.6	62.4	62.4	61.8	64	—	60.4	60.9	55.2	65.6	62.27
Hispanic	—	72.7	77.6	67.6	72.7	63	—	—	—	62.1	—	70.2	70.8	71.2	65.6	69.35
Other	—	—	—	—	—	—	—	—	—	—	—	—	70.2	—	—	70.20
Sex																
Male	79.2	79.2	81.3	79.9	79	80	76.5	76.5	80.5	78.9	—	76.5	80.6	82	79.5	79.26
Female	71	71	72.9	67.3	72.4	68.9	71.1	71.1	68.7	73.6	—	69.6	71.1	75.6	73.1	71.24

2010 to 2024 Labor Force Participation Rates (ACS)

		SC	NC	KC
Age Cohort				
16-19		43.8	36.7	38.3
20-24		79.3	71.6	78.4
25-29		86.0	82.8	86.3
30-34		84.8	85.0	83.1
35-44		82.3	84.1	85.5
25-44		82.1	84.6	83.2
45-54		74.9	79.1	74.2
55-64		53.5	63.9	54.9
65-74		24.3	27.9	22.9
75+		7.0	6.8	6.5
Race & Ethnicity				
White (Only)		52.8	64.1	61.1
Black		62.3	65.9	62.5
Hispanic		69.4	70.3	—
Other		70.2	69.4	71.8
Sex				
Male		79.3	82.5	82.6
Female		71.2	77.1	74.4

Steps In Current Phase

- Continued search for data
- Checking and visualizing data
- Converting to 5 year age cohorts
- Tracking down anomalies
- Choosing method of selecting the rates
- Incorporating rates into population spreadsheets

Steps In October Phase

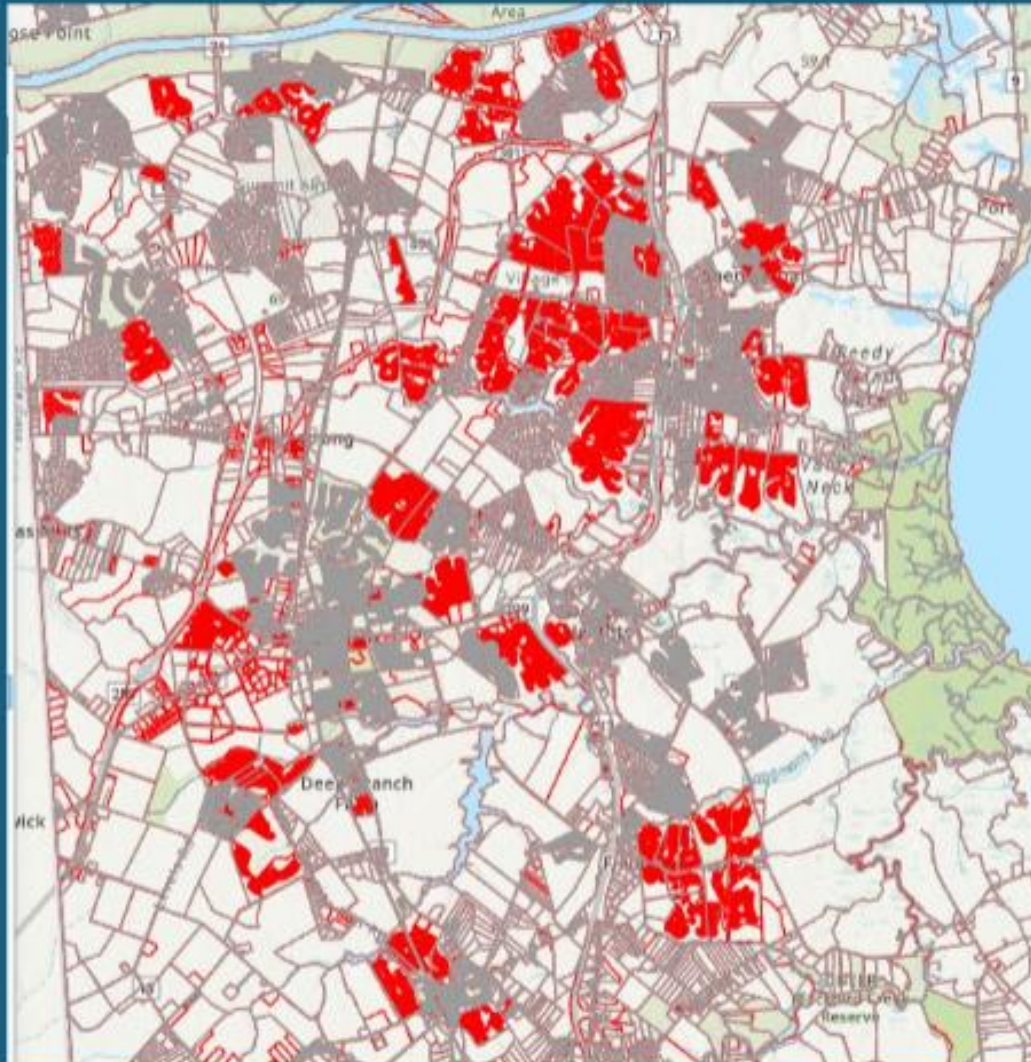
- Choose rates to use
- Establish employment projections
- Analyze household structures
- Allocate projections to Middletown, Newark, Dover, Wilmington
- Address seasonal populations
- Research and modeling to refine factors
- Reporting

Allocating projections to small areas

Options

- Build projections for municipalities as we did for counties. Use base data previously compiled and use geocoded births and deaths
- Use data that indicates probability of future development
 - Building permit time series
 - Tax parcel based development, lots and properties that can be subdivided
 - Proposed development lists
- Models for future development based on development time series
- Competing growth curves





New Castle County
South of Canal

Year 2000

over

Year 2024

	LOTS	PLOTS
New Castle	10,235	2000
Kent	10,350	3500
Sussex	23700	8300
Middletown	1934	64
Dover	1022	50
Wilmington	898	6
Newark	168	22

Estimation of the probability of construction of tax parcel lot in the next five year period. (binary logistic regression model)

Probability =

$$\frac{e^z}{(1 + e^z)}$$

$$Z = -1.24 + \text{COMLOT} * -.498 + \text{OLDLOT} * -1.71 + \text{INCOMM} * 0.87 \\ + \text{SEWER} * 0.31 + \text{NOTLOT} * -1.883 + \text{TAZBLT} * 1.61$$

Where:

COMLOT = commercial lot

OLDLOT = LOT that has been a lot for 15 or more years

INCOMM = in a named community/subdivision

SEWER = in sewer district

NOTLOT = a potential lot within a plot

TAZBLT = traffic zone based figure , ratio of lots built to lots available in previous

5 year period

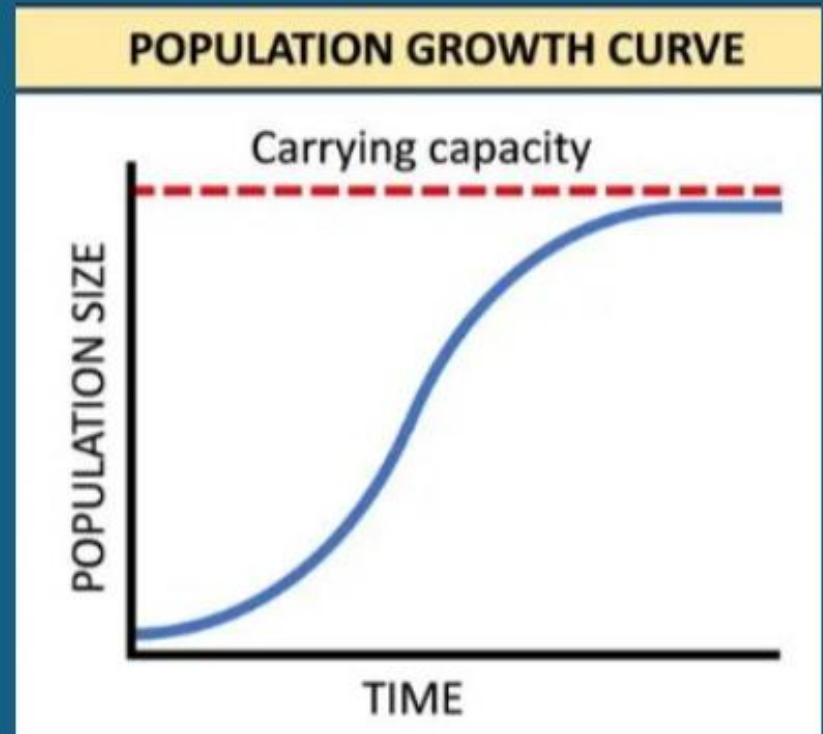
Previous Efforts

Competing Population Growth Curves

Example: Population and Housing Allocation Model, 1970s

Each census tract was placed on a growth curve using historical data and developable land

As time progresses, position on growth curves ascends for all tracts until control totals are reached



Steps in October Phase

- Choose rates to use
- Establish employment projections
- Analyze household structures
- Allocate projections to Middletown, Newark, Dover, Wilmington
- Address seasonal populations
- Reporting

Projection Effort FY 26/27

- Project Manager 6 weeks allocated, 4 remaining
- Staff 15 weeks allocated, 11 remaining