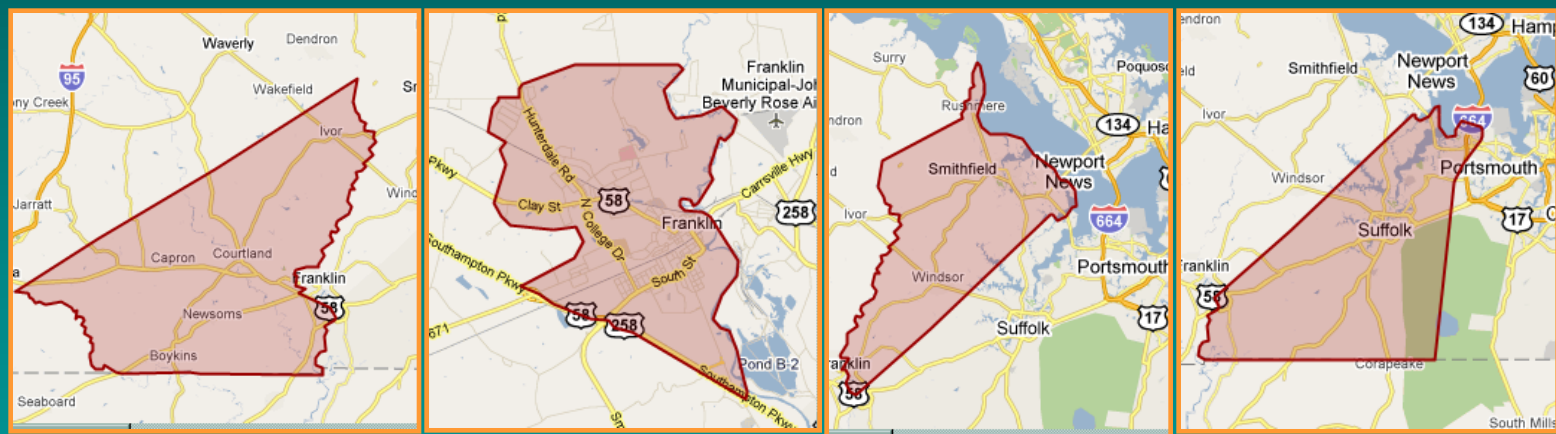# Targeted Interventions, Mapping & Health Analyses

for Western Tidewater Health District

Nancy M. Welch, MD, MHA, MBA, Acting Director
Western Tidewater Health District
October 21, 2010

Why Evaluate?

- Responsible Program Management
  - Program Planning
  - Program Implementation
  - Program Effectiveness
  - Program Efficiency
  - Cost Effectiveness

- Program Accountability
  - Required by funding agencies
  - Justify use of dollars

Research vs. Evaluation

"Research seeks to _**prove**_;

evaluation seeks to _**improve**_…"

--_M. Q. Patton_

Gather Credible Evidence

How to Start --

- Start with evaluation purpose and over-arching questions

- Develop indicators--specific, measurable

- From whom do you want to collect information?

- Determine the best way to measure the indicators
 - **Data that already exists**
  - **New data**

Trends…

Rates = Mathematical Conversion of Absolute Numbers
(as if all represent same population size)

- Use rates--not absolute numbers

  – <u>Benefits:</u>

    - Honest trend no matter change in population

    - Enables comparisons

Rates -- Examples:

- Disease or Entity Rate per 100,000 population or 1,000 persons

- Risk in different age groups

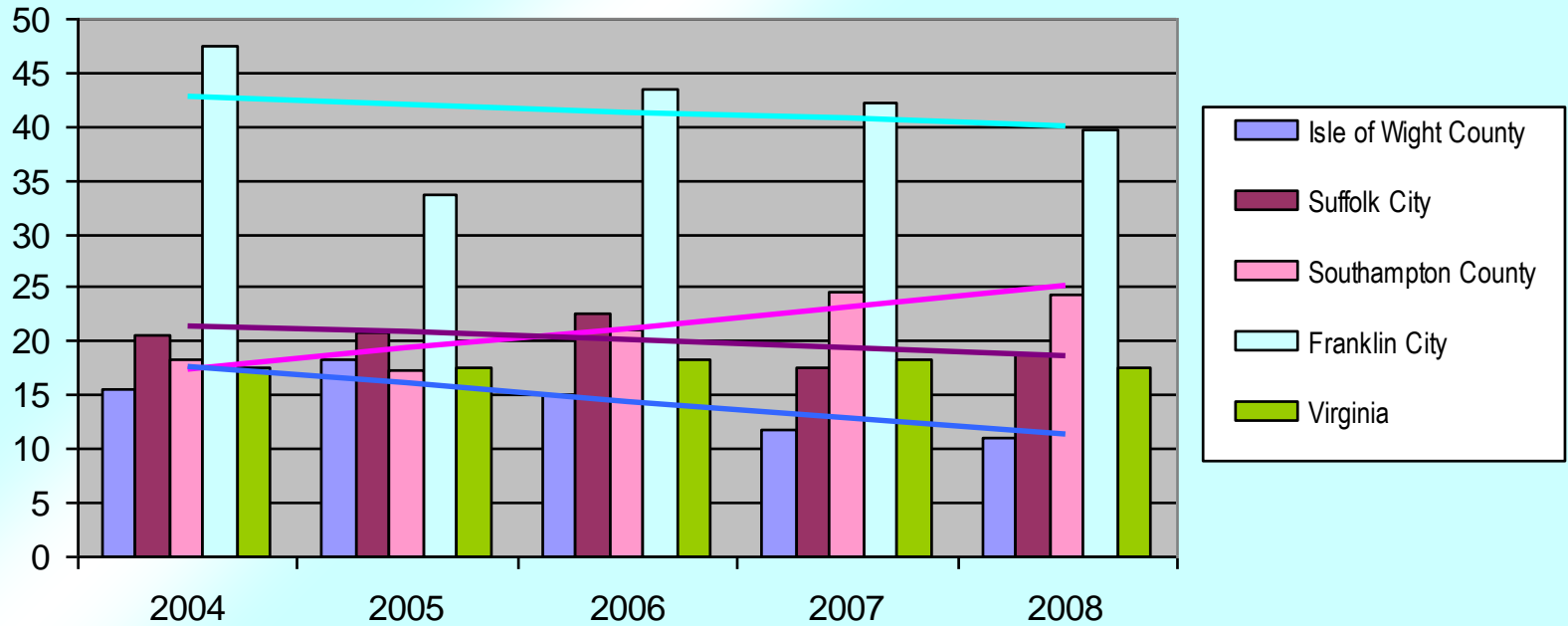- Remember "Percent" is also a rate

Suffolk Teen Pregnancy Rates (per 1,000 females age 10 – 19)
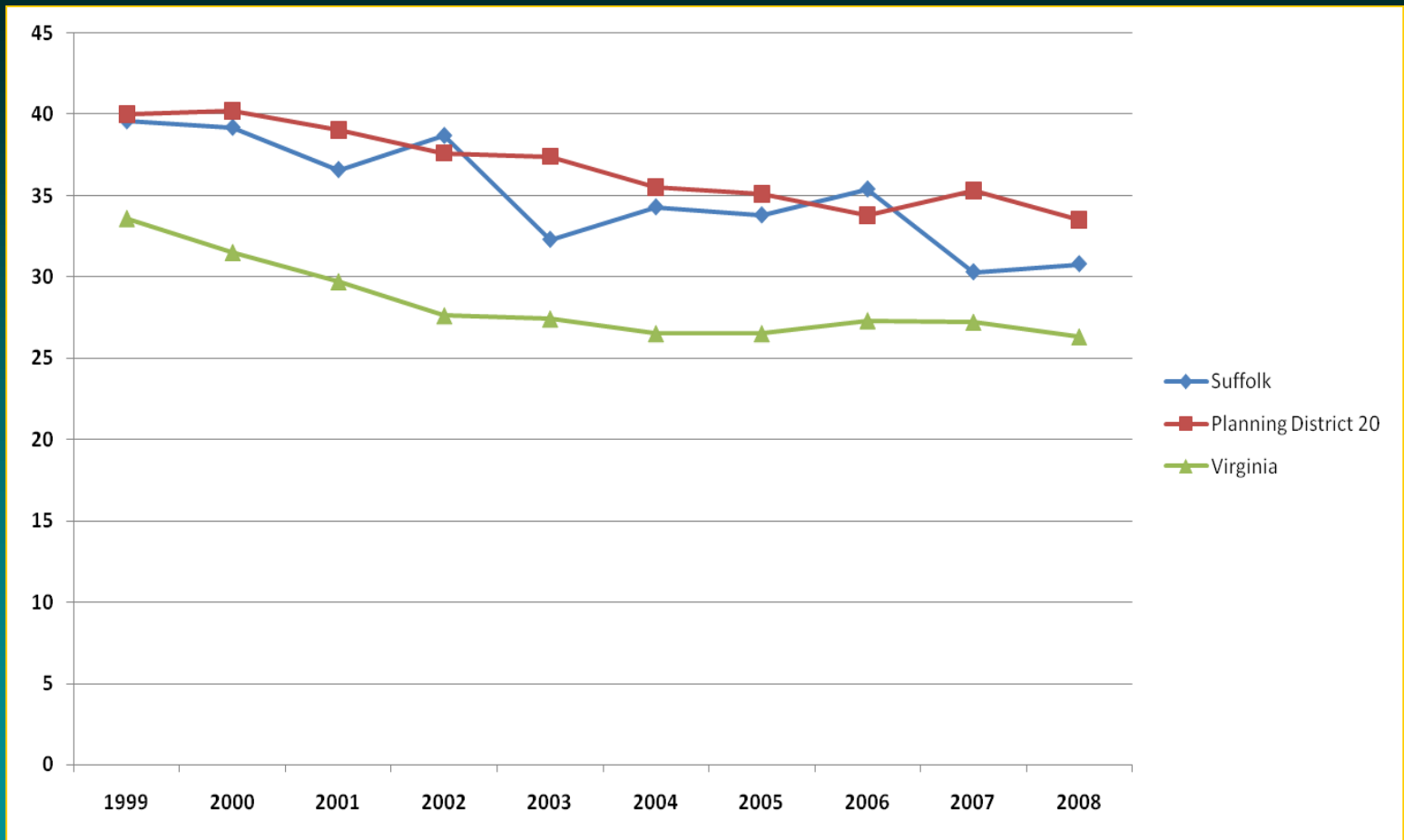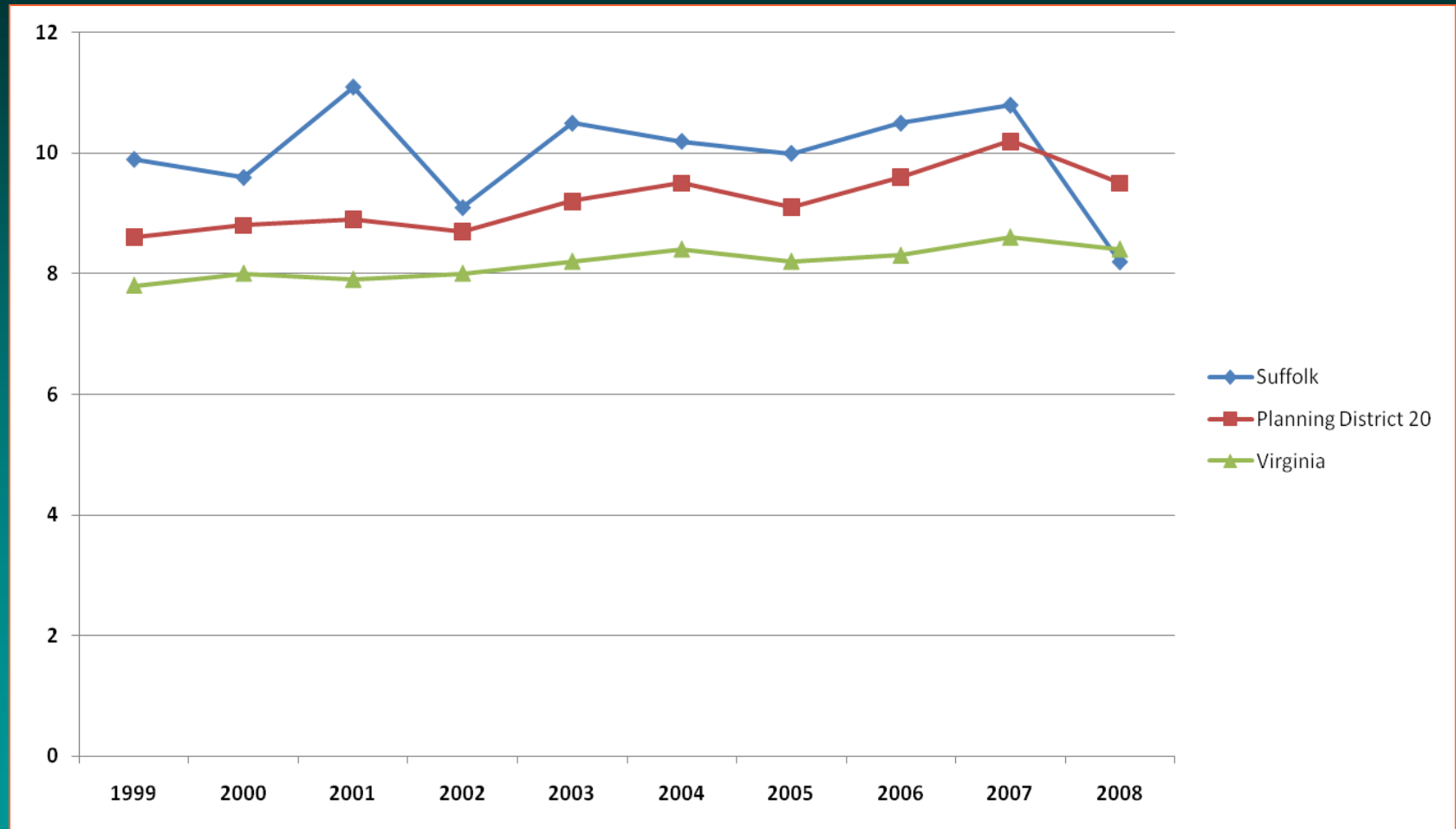

Source: Virginia Department of Health
Compiled by the Suffolk Department of Budget & Strategic Planning August, 2010

8

Teenage Live Birth Rates per 1,000 Females
Western Tidewater Health District

Source: VDH Health Statistics

Low Birth Weight Trends Below 5.5 lbs.
(percent of total births)

10

STD RATES - Chesapeake
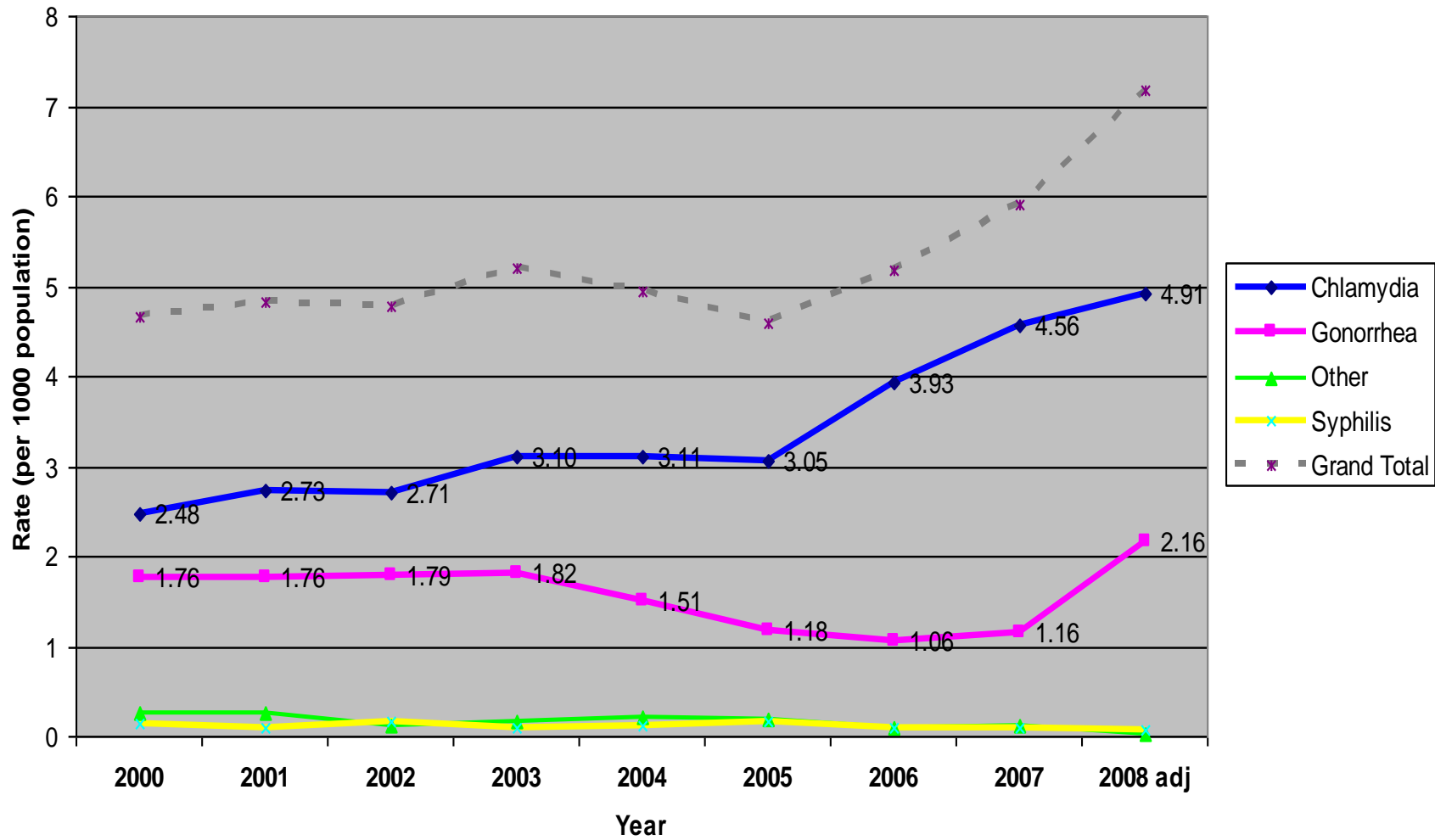
Source: VDH Health Statistics

Targeted Intervention…
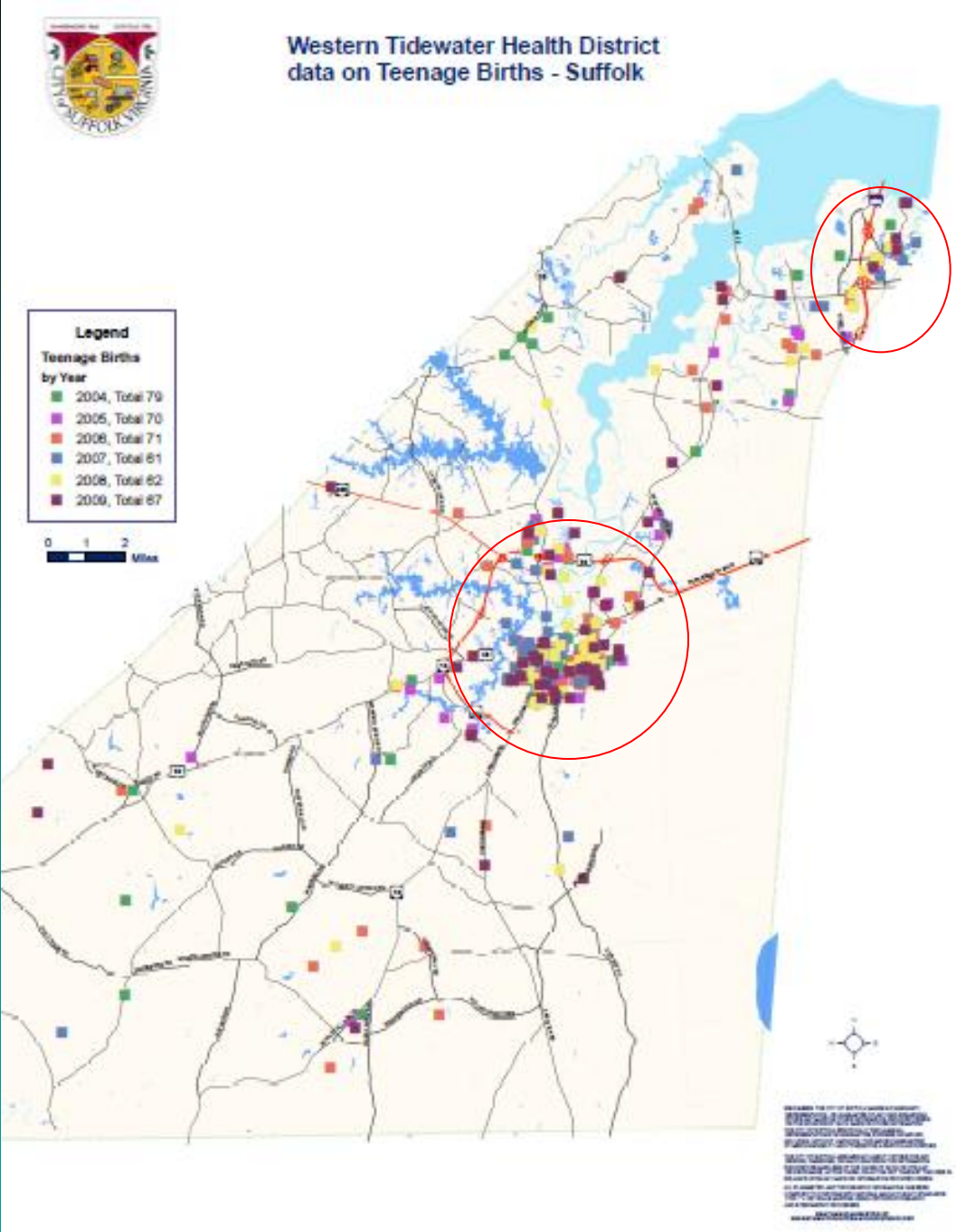
Chesapeake Live Births to Teenage Mothers, 2001-05

Targeted by Neighborhood Statistical Areas (NSAs), Middle & High Schools noted

Chesapeake Infant Death Analysis, 1999-2004

Geography - These 12 NSAs (neighborhoods) had infant death rates higher than the city average					
1999-2004 Birth Outcomes					
NSA#	**Population**	**Infant deaths per 1000 pop per year**	**Relative to the city average**	**Neighborhood (NSA) name**	**Burrough of the City**
59	916	1.2	**4.3**		So Norfolk
23	1081	0.65	**2.3**		Western Branch
54	1107	0.63	**2.3**	London/ Broadlawn	South Norfolk
51	1480	0.47	**1.7**	Poindexter	South Norfolk
28	2412	0.46	**1.6**		Deep Creek
80	2820	0.39	**1.4**		Greenbrier
48	1127	0.35	**1.3**		So Norfolk
60	1999	0.35	**1.3**	Campostella Sq	South Norfolk
50	2056	0.34	**1.2**	Cross Lakeside Park	South Norfolk
12	2135	0.33	**1.2**		Western Branch
63	649	0.31	**1.1**		So Norfolk
22	1304	0.31	**1.1**	Holly Cove	Western Branch

WTHD Teen Pregnancy

Western Tidewater Health District data on Teenage Births - Suffolk

Legend

Teenage Births by Year

- 2004, Total 79
- 2005, Total 70
- 2006, Total 71
- 2007, Total 61
- 2008, Total 62
- 2009, Total 67

WTHD Infant Mortality

Western Tidewater Health District data on Infant Mortality - Suffolk

Legend

Infant Mortality by Year

- 2004, Total 15
- 2005, Total 12
- 2006, Total 11
- 2007, Total 13
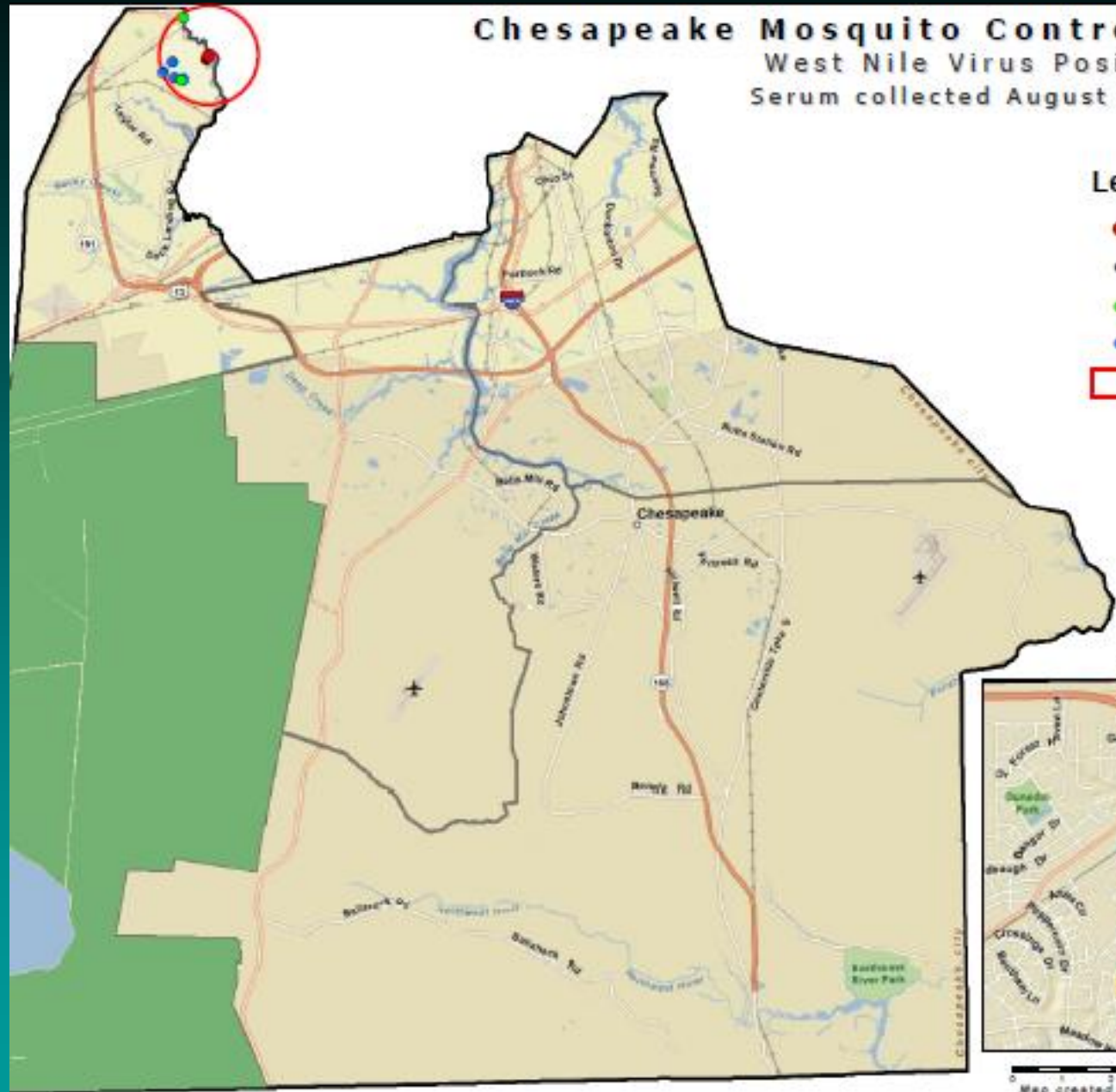- 2008, Total 6
- 2009, Total 4

0   0.9   1.8
Miles

Chesapeake Mosquito Control Commission
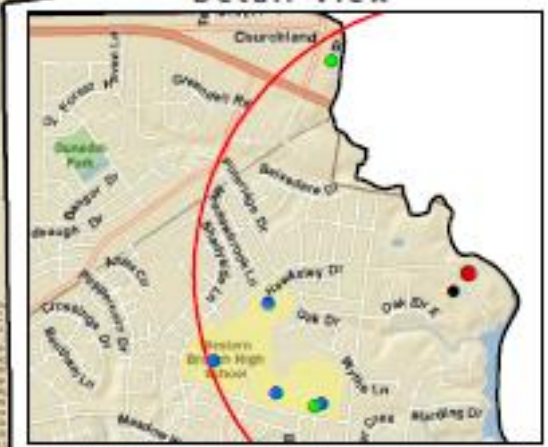West Nile Virus Positive Location Map
Serum collected August 2nd, 2010 (Week 31)

Legend
- WNV Positive Chicken
- Horse Owner
- Daycare Center
- School
- 1 Mile Buffer

Detail View

Socio-economic Breakdown by Census Tract, Chesapeake-2006

Legend

census_tracts2000_Dissolve

INCOME_GRP
- Low Income
- Medium Income
- High Income

Definitions:
Lower income census tract -- both % on Food Stamps & % Receiving TANF are >= the City-wide percentage
Medium income census tract -- either % on Food Stamps OR % Receiving TANF is >= the City-wide percentage
Highest income census tract -- both % on Food Stamps & % Receiving TANF are < the City-wide percentage

Cost Benefit Analysis…

Evaluation of CGH E.R. Visits by Adult Clinic Patients

- Group selected if admitted to adult clinic in FY'02-03, and randomly selected 100 patients

- Looked at all visits for this group (56% had been to the ER at least once)

- We calculated average # ER visits before/after starting adult clinic. Hypothesis: there would be a decrease in Average ER visits (increased access to care)

	Total ER Visits	# Patients Seen	Average Visits/pt	Society Cost of ER Visits
FY'00	18	12	1.5	$ 73,735.20
FY'01	51	39	1.31	$ 64,702.05
FY'02	45	52	0.87	$ 51,014.22
FY'03	48	56	0.86	$ 49,823.93
FY'04	35	51	0.69	$ 52,088.65
Before Adult Clinic	71	56	1.26	$ 73,440.26 (average)
After Adult Clinic	40	56	0.71	$ 41,341.45 (average)
Ave Cost Saved per yr by decreasing ER Visits				$32,098.81

** Cost of ER Visits = (total #pts) x (56%) x (Ave visits/pt) x (Ave ER Cost), Average ER Cost= $209

(http://content.nejm.org/cgi/content/short/334/10/642)

Evaluation of CGH hospitalization by Adult Clinic Patients

- Group selected if admitted to adult clinic in FY'02-03, and randomly selected 100 patients

- Looked at all visits for this group (25% had been hospitalized at least once)

- We calculated average LOS before/after starting adult clinic. Hypothesis: there would be a decrease in hospitalization (increased access to care)

	Hospital Days per year	Average Length of Stay per hospital stay	Ave Hosp Days per AC Patient	Society Cost of hospitalization
Before Adult Clinic	104.7	4.19	1.05	$ 1,294,800
After Adult Clinic	77.2	3.09	0.77	$ 949,520
Ave Cost Saved per yr by decreasing hospitalization				$345,280

- CONCLUSION: Adult Clinic Care decreases hospitalization and subsequent costs

**Society Cost calculated =
   (Ave Hosp days/Pt) x (Total # pts is 645) x (Ave Cost per Hospital Day is $1911.85 per day)

Est. Cost Savings if Baby Care were Chesapeake City-wide

	Total Births	Infant deaths	Surviving infants	Avg Perinatal Cost per infant ($)[1,2]	Baby Care % Change	# Babies Impacted	Total Cost (millions $)
Extreme Prematurity (≤28 wks)	201	91	110	$ 239,749	-39.3%	-43	- $ 10.36
Premature (29-36 weeks)	1712	25	1687	$ 16,647	-20.5%	-346	- $ 5.77
Full Term (≥37 wks)	15,133	30	15,103	$ 4,788	+2.6%	+389	+ $ 1.87
Potential Hospital Cost Saved over 2000-05							- $ 14.26
Ave Cost saved per year							- $ 2.38
Est. City-Wide Cost of Baby Care							+ $ 1.04**
Return on Investment							129%

**If Baby Care were city-wide for all high-risk citizens (teens, pycho-social problems, substance abusers, etc)

Ave Cost of maternity portion of BC per year = $573,182/3 = $191,061

Ave spent per BC client = $3266 x 319 Preemies/yr =$1.04 million
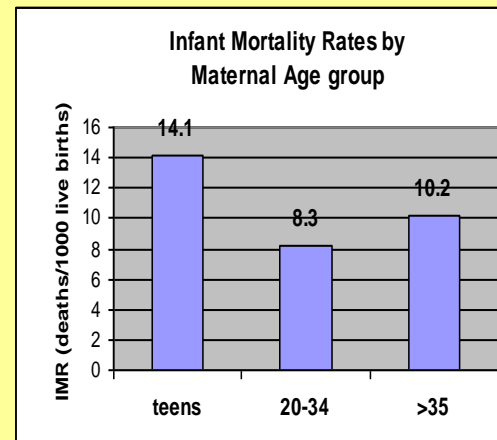
Infant Mortality Analysis for Chesapeake

DESCRIBING THE CHALLENGE

- Chesapeake's Infant Mortality Rate (IMR) is 16-62% higher than state average for the past 5 years (8.6-12.0 deaths per 1000 live births)
- In 2007 Gov. Kaine challenged us to reduce the IMR to less than 7 deaths per 1000 live births
- The primary Causes for IMR that we can impact are:
  - Low Birth Weight/Prematurity
  - Pregnancy Complications
  - SIDS (Often sleep related)
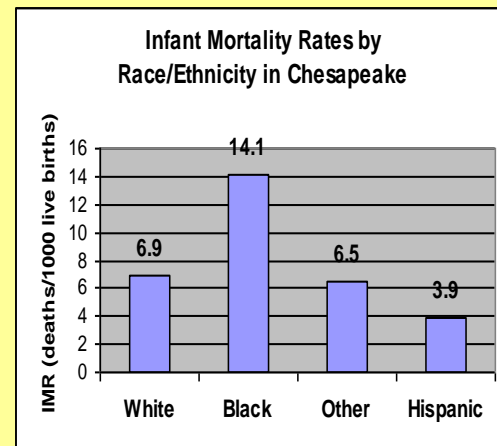
DESCRIBING OUR TARGET GROUP

- In Chesapeake the highest IMR/Poor Birth Outcomes are among:
  - African Americans (104% higher risk)
  - Teenagers (63% higher risk)
  - Residents of South Norfolk (46% higher risk)
  - Uninsured (41% higher risk)

Infant Mortality Rates by Race/Ethnicity in Chesapeake

IMR (deaths/1000 live births)

- White: 6.9
- Black: 14.1
- Other: 6.5
- Hispanic: 3.9

Infant Mortality Rates by Maternal Age group

IMR (deaths/1000 live births)

- teens: 14.1
- 20-34: 8.3
- >35: 10.2

IMPACT OF TEENAGE PREGNANCY ON SCHOOL SYSTEM

- Teenage Pregnancy increases Truancy/Drop-out, which decreases school revenue
  - 70% of teenage mothers drop-out of school (lose an average of 1.7 years)
  - School Age Teenage Pregnancies (2000-2005) = 1044 (1765.7 Lost student-years)
  - **$1,242,710 loss of state funds per year** (average) due to drop-outs from teenage pregnancy (school receives $4222.84 per student in attendance)

- Teenagers have more premature babies, which require more SPECIAL NEEDS
  - Prematurity is 13% more likely, Low Birth Weight is 33% more likely
  - **40-50%** of Premature have some Learning disability
  - **20%** of Premature babies will require Special Education

  - Chesapeake kids enrolled in Special Education programs (2007) =**7094**
  - Average Cost per Student per year (above ADM funds) (State=$3052, City=$932)
  - Lifelong Cost of Special Education per student (State=$45,786, City=$13, 982)

  - **Lifelong Special Education Cost Burden of Premature Babies born each year (Total = $3, 811, 237, State = $2, 919, 632, City = $891, 606)**

IMPACT OF PREMATURITY ON COMMUNITY HEALTHCARE COSTS

- Preventing Prematurity could save Community Health Care Dollars in Chesapeake
  - Extreme Premature ($\leq$28 weeks) perinatal health care cost = $239,749 per infant, Premature (<37 weeks) Cost = $16, 647 per infant, Full-term Cost = $4,788 per infant
  - Community Perinatal Cost of Prematurity = $12.9 million per year
  - Cost Savings produced by a **10% decrease in prematurity (33 fewer premies per year) could = $1.17 million per year in saved perinatal costs**

Conclusion

- Baby Care improves birth outcomes.
  - Infant Mortality is **65%** lower
  - Rate of Low Birth Weight is 14% lower
  - Rate of Extreme LBW is **35%** lower
  - Rate of Prematurity is 21% lower
  - Rate of Extreme Prematurity is **39%** lower
  - In Teens the post-pregnancy Rate is **89%** lower

- Baby Care if projected to all high risk maternity patients in the City of Chesapeake could produce a perinatal hospital cost savings of $1.34 million per year (ROI = 129%) by reducing premature births.

Questions?