

Public health investments and infant mortality outcomes

- High infant mortality rates
 - Florida's infant mortality rate above national average (6.1 Florida: 6.0 national).
- Disparities
 - Non-white infant mortality rates over twice as high. (5.90 white infants: 13.45 black infants)
- Evidence-based policy to optimize population health.
 - Studies identifying highest yield investment alignments.

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Data

- Florida
 - Administrative data on spending, staffing and services.
By county (all 67), by year (2001-2014), by program (50+)
- Infant mortality rates. In total and by race.

Variable	Mean	Std. Dev.
<i>Outcome measures</i> ¹		
Infant mortality count	22.43	36.76
Infant mortality rate (per 1,000 live births)	7.27	4.33
Whites	5.90	4.24
Blacks	13.45	19.01
<i>Public health expenditures per 100,000 people (in constant 2014 \$)</i> ²		
Total	7,892,127	5,227,285
Infant related	1,204,832	752,164

Birth programs

- *Programs specifically targeted to births and infants.*
- Maternal Health and Improved Pregnancy Outcomes (IPO)
 - pregnancy testing, Medicaid screening, distribution of vitamin supplements and educational material.
- Healthy Start
 - nutritional advice, psychosocial counseling, breastfeeding, interconception education, and home visits to improve the health of pregnant women, infants, and children to age 3
- Women, Infants, and Children (WIC)
 - healthy foods, nutrition education, counseling, breastfeeding support, and referrals for other services for women, infants, and children.

Determinants

- Infant mortality rate
 - ~ Birth-related program spending per capita
 - + Other determinants

Variable	Mean	Std. Dev.
<i>Control variables</i>		
Percentage of non-whites ³	18.40	9.64
Percentage of age 15-44 ³	38.48	8.29
Percentage of age 65+ ³	18.53	8.63
Unemployment rate ⁴	6.81	2.85
Personal income per capita (in constant 2014 \$) ⁵	36,269	12,019
Percentage in poverty ⁶	15.73	5.03
Median monthly Medicaid enrollment per 100 people ⁷	15.43	5.53
Physicians per 100,000 people ⁸	146.73	109.52
Hospital beds per 100,000 people ⁷	228.54	135.53
Infant population (under age one) ³	3,318	5,665
Total population ³	277,094	441,368

List of determinants informed by:

- Bekemeier. 2014a, 2012b, 2012d,
- Bradley, 2016a
- Cutler. 2000a
- Gavin, 2014a
- Grembowski, 2010a
- Herbst, 2003a
- Issel, 2010
- Mays, 2011a
- Schenck, 2015a
- WDOH, 2007

OLS Regression

Table 2. Ordinary least squares regression results

	(5)	(6)	(7)	(8)
Ln(Per capita total public health expenditures)				
Ln(Per capita public health expenditures on infants)	-0.007 (0.051)	-0.034 (0.053)	-0.170* (0.090)	-0.170 (0.132)
Percentage of non-whites		0.013** (0.005)	-0.008 (0.062)	-0.008 (0.084)
Percentage of age 15-44		-0.017*** (0.006)	-0.010 (0.024)	-0.010 (0.020)
Percentage of age 65+		0.000 (0.006)	-0.027 (0.033)	-0.027 (0.030)
Unemployment rate		0.012 (0.042)	-0.038 (0.064)	-0.038 (0.082)
Ln(Income per capita)		-0.134*** (0.049)	0.631 (0.739)	0.631 (0.573)
Percentage in poverty		-0.022 (0.015)	0.002 (0.030)	0.002 (0.036)
Medicaid enrollment per capita		0.036*** (0.013)	0.042* (0.022)	0.042 (0.036)
Physicians per capita		0.001 (0.001)	-0.000 (0.002)	-0.000 (0.002)
Hospital beds per capita		0.001 (0.001)	0.001 (0.001)	0.001 (0.001)
Lagged dependent variable	0.206*** (0.035)	0.110*** (0.036)	-0.060 (0.037)	-0.060 (0.058)
Year FE	Yes	Yes	Yes	Yes
County FE	No	No	Yes	Yes
Robust standard errors	No	No	No	Yes

Generalized Method of Moments Model

Table 3. System GMM estimation results for infant mortality

	(3)	(4)
Ln(Per capita total public health expenditures)		
Ln(Per capita public health expenditures on infants)	-0.256*** (0.080)	-0.256* (0.134)
Percentage of non-whites	0.070*** (0.022)	0.070* (0.039)
Percentage of age 15-44	-0.135*** (0.029)	-0.135*** (0.052)
Percentage of age 65+	0.010 (0.036)	0.010 (0.062)
Unemployment rate	-0.534*** (0.146)	-0.534** (0.270)
Ln(Income per capita)	-0.533** (0.221)	-0.533 (0.533)
Percentage in poverty	0.106** (0.050)	0.106 (0.097)
Medicaid enrollment per capita	0.079** (0.040)	0.079 (0.098)
Physicians per capita	0.009*** (0.003)	0.009 (0.010)
Hospital beds per capita	-0.001 (0.001)	-0.001 (0.003)
Lagged dependent variable	-0.002 (0.042)	-0.002 (0.056)
Robust standard errors	No	Yes
AR1 test: p -value	0.000	0.001
AR2 test: p -value	0.712	0.778
Hansen test: p -value		0.962

Serial Correlation

AR1. Order 1 = YES

AR2. Order 2 = no

Model tuned to accommodate AR1

System or Difference GMM

Sargen-Hansen test

System GMM used
(Trades away power for accuracy, but maintains enough power.)

GMM by Race



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Next

- Funding mix.
 - *Are programs more effective when more-funded locally?*
- Worker and service productivity.
 - *Are workers as efficient / effective in all areas?*
- Insurance status & insurer.
 - *Medicaid limits choice; often to 'off label' HMOs.*
- Education spending.
 - *Does school spending better prepare future parents?*