Snap Generosity and Infant Mortality Rates in U.S. States

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Abstract:
America's infant mortality rate (IMR) is among the worst in the developed world. Health scholars have begun to document the contribution of social policies to the U.S.'s lagging IMRs and to population health more generally. Supplemental Nutrition Assistance Program (SNAP) spending may be particularly beneficial for reducing IMRs given its role in both providing nourishment to pregnant mothers and reducing stress associated with food insecurity and financial hardship. Yet, despite the growing cross-national literature on how social policies effects health and the myriad mechanisms through which SNAP is expected to affect wellbeing, research on SNAP and infant mortality in the U.S. remains extremely limited. We use fixed-effects regression models and novel data on state-level SNAP generosity derived from administrative sources to examine the impact of this type of social spending on IMRs in U.S. states. Results show a negative association between state SNAP spending and infant mortality.

Extended Abstract:

BACKGROUND

The mortality rate in the first year of life is up to 15 times higher than during the next year of life. While the infant mortality rate (IMR) in the U.S. has been declining over time, its decline has been much more gradual than other nations in recent decades. As a result, the U.S. has fallen further and further behind in global rankings, leaving it at a position of 55th internationally in 2017. Findings from a 2013 National Research Council and Institute of Medicine report "Shorter Lives, Poorer Health" demonstrate that even among better-off Americans with healthier lifestyles, health is on average worse than among their counterparts in other wealthy nations, *nations with notably more generous social welfare systems* (Medicine NRCIo, 2013). Thus, health scholars have begun to document the contribution of social policies to the U.S.'s lagging infant mortality rates and to population health more generally (Avendano, Berkman, Brugiavini & Pasini, 2015; Bambra & Eikemo, 2009; Beckfield, 2009; Beckfield et al., 2015; Beckfield, Olafsdottir & Bakhtiari, 2013; Cylus, Glymour & Avendano, 2014; Ferrarini, Nelson & Sjoberg, 2014; Lundberg, Yngwe, Bergqvist & SjÖberg, 2001; Navarro & Shi, 2001; Nordenmark, Strandh & Layte, 2006; O'Campo et al., 2015; Raphael, 2015; Brennenstuhl, 2012).

Of particular relevance to the outcome of infant mortality are social policies concerned with nutrition supplementation, such as the Supplemental Nutrition Assistance Program. The effects of SNAP on infant mortality rates may be explained via two primary mechanisms. First, as a near-cash fungible resource SNAP increases the socioeconomic resources with which to support healthy diets and physical activity as well as healthcare utilization, all of which are vital to a health pregnancy (Brady, 2009; Hasman & Novotny, 2015; Moller, Bradley, Huber, Nielsen & Stephens, 2003; Western & Healy, 1999). Without SNAP, low SES mothers may have difficulty accessing or affording healthy foods or recreational facilities, both of which have strong associations with birth outcomes (Lee & Cubbin, 2002; Morland, Wing, Diez-Roux & Poole, 2001; Morland, Wing & Roux, 2002; Ross, 2000; Yen & Kaplan, 1998). Additionally, given the high and rising costs of healthcare, individuals may face a trade-off between proper nutrition and proper healthcare, which can translate into missed opportunities for risk-assessment, treatment and management of pregnancy complications.

Second, SNAP may promote health through reducing stress and reactivity to stress. Allostatic responses to stress protect individuals by activating neural, neuroendocrine and neuroendocrine-immune systems. However, chronic activation of allostatic responses, "allostatic load", can lead to malfunction and physiological damage (McEwen, 1998). In addition to physiologically damaging stress responses, stress also contributes to unhealthy behaviors such as poor eating habits, which can act as coping mechanisms (Morland, Wing, Diez-Roux & Poole, 2001; Morland, Wing & Roux, 2002). SNAP may play an important role in reducing stress among pregnant women by mitigating financial hardship and ensuring that families' most basic needs are met.

Yet, despite the growing cross-national literature on social policy effects on health and the myriad plausible mechanisms through which SNAP is expected to

affect wellbeing, research on SNAP and population and infant mortality within the United States remains extremely limited. What research does exist is chiefly concerned with how social policies functions to enhance financial well-being, rather than health. The analysis of SNAP effects on health in the U.S. context, thus, represents a new and promising research endeavor. We pursue this research effort with the use of novel data on state-level SNAP generosity derived from administrative sources.

METHODS

Sample

Each variable is measured for each of the 50 U.S. States in 1998, 2000, 2002, 2004, and 2006. This yields a sample of 250 state-years.

Measures

Outcome. Infant Mortality Rate (IMR). The infant mortality rates represent the number of deaths to infants less than one year of age per 1,000 live births in a given state-year. State IMRs we use come from the Kids Count Data Center (Annie E. Casey Foundation 2016) and are based on CDC/NCHS data.

Predictor. State-level *SNAP Generosity* was drawn from the RAND Corporation's Transfer to Persons dataset and the United States Department of Agriculture (USDA). The RAND data is publicly available upon request for a user fee. The SNAP spending variable captures direct payments to beneficiaries enrolled in SNAP, reported as monthly spending by the state. We acquired caseload data separately historical series provided by the USDA. We calculated the total number of person-weeks in a given fiscal year for each state. We divided the annual expenditures by the total number of person-weeks for each program in each year. We then expressed this as a proportion of the median state weekly income for that year. Median income data was drawn from the Census Bureau median income database.[1]

Controls. We include several control variables reflecting state economic conditions and racial composition. The percentage of the state population that is below the federal poverty line in each year is based on data from the U.S. Census Bureau (United States Census Bureau, 2016a). State racial composition is measured by the percentage of the state population that is nonwhite in each year based on census population estimates (United States Census Bureau, 2016b). State income inequality is measured in each year using the Gini coefficient provided by Frank (2013). The state unemployment rate is measured using the unemployed as a percentage of the labor force based on Local Area Unemployment Statistics, from the U.S. Bureau of Labor Statistics (BLS). Descriptive statistics are shown in Table 1.

[1] Though we initially sought to express benefits as a proportion of the cost of living in each state-year, we were unable to find such data. The majority of historical data on cost of living is provided for metropolitan statistical areas or other densely populated geographic units. The Bureau of Economic Analysis does provide information on regional price parities for each state, but this data is only available beginning 2008. Thus, we settled on median income, since it is, in principle, associated with cost of living.

Table 1. U.S. State-level Descriptive Statistics, 1998-2006 (n=250 State-Years)

	Mean	Std. Dev.	Min	Max
IMR				
overall	7.049	1.386	4.400	10.700
between		1.286	4.840	10.300
within		0.541	5.289	8.909
Snap Generosity				
overall	0.023	0.004	0.015	0.036
between		0.003	0.016	0.030
within		0.002	0.018	0.029
% Nonwhite				
overall	22.556	14.253	2.000	74.000
between		14.312	3.200	73.400
within		1.269	18.556	26.556
% Poverty				
overall	11.682	3.057	4.500	20.600
between		2.832	6.200	18.040
within		1.205	8.542	15.282
% Unemployment				
overall	4.622	1.125	2.300	7.500
between		0.827	3.060	6.820
within		0.769	2.662	6.622
Gini Coefficient				
overall	0.585	0.033	0.526	0.707
between		0.024	0.545	0.642
within		0.023	0.537	0.687

Analytic Methods

We estimate a series of panel models with state fixed-effects. U.S. states differ from one another in a variety of ways that may not be fully captured by our control variables, leading to a potential omitted variable bias. However, the use of state-level fixed-effects controls for time-constant, unobserved state characteristics that may be related to both SNAP generosity and infant mortality, and thereby helps rule out alternative explanations for our findings. We also control for time trends in IMRs over time in two ways: Model 2 uses a linear term for year, and Model 3 uses individual year fixed-effects. Models 2 and 3 also control for several other time varying state-level characteristics. All analyses were performed using Stata 15.

RESULTS

The results of the fixed-effects regression models predicting state infant mortality rates are shown in Table 2. Model 1 includes only SNAP generosity and IMR. Models 2 and 3 include all controls. The results show that increases in a state's SNAP generosity are associated with decreases in infant mortality rates. This relationship is statistically significant and negative regardless of the controls included in the model or the specification of time. The results cannot be explained by unobserved time-invariant state-level characteristics because such confounders are removed by the state fixed-effects.

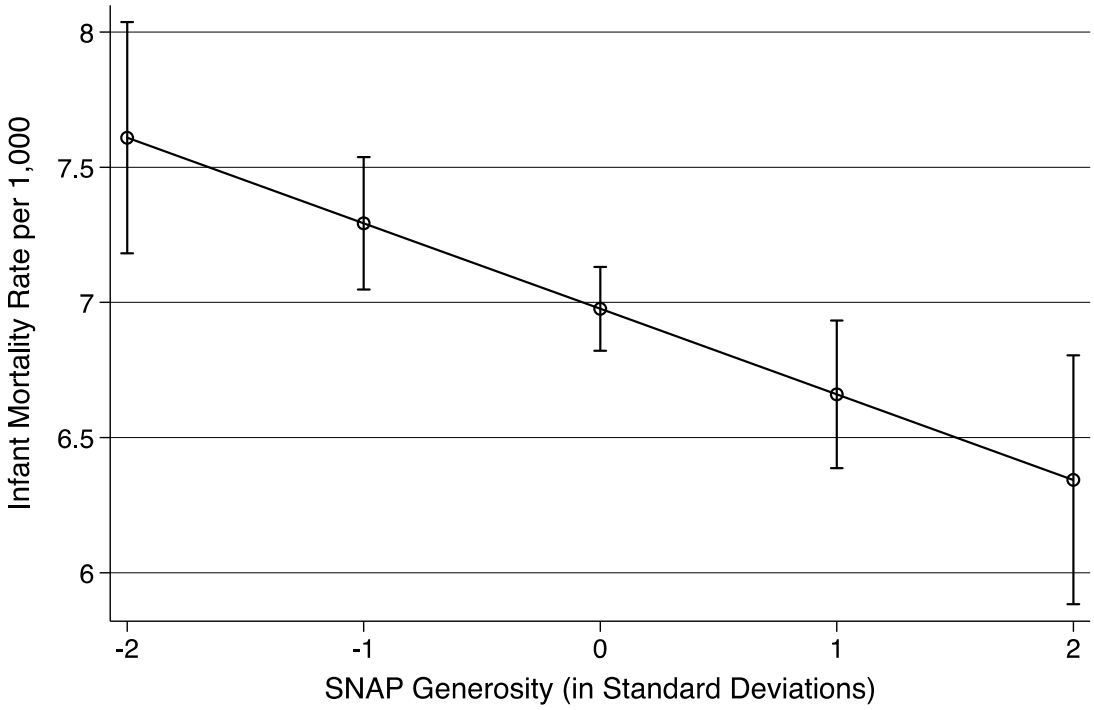
Table 2. Fixed-Effects Models Predicting State Infant Mortality Rates, 1998-2006

	Model 1	Model 2	Model 3
Snap Generosity	-69.914***	-63.582*	-75.463*
	(19.553)	(29.821)	(31.934)
% Poverty		0.047	0.032
		(0.033)	(0.035)
% Nonwhite		0.051	0.027
		(0.054)	(0.056)
Gini coefficient		2.148	0.880
		(2.066)	(2.283)
% Unemployment		0.125	0.148
		(0.066)	(0.076)
Year (linear time trend)		-0.085**	
		(0.031)	
Individual year fixed-effects			
2000			-0.333**
			(0.126)
2002			-0.440**
			(0.159)
2004			-0.528*
			(0.204)
2006			-0.583*
			(0.254)
Constant	8.631***	175.423**	6.951**
	(0.444)	(59.497)	(2.224)
N	250	250	250

Notes: Standard errors in parentheses. * p<0.05 **p<0.01 ***p<0.001

Figure 1 Illustrates the relationship between SNAP generosity and Infant mortality Rates. The y-axis show the predicted state IMR at a given level of SNAP generosity (in standard deviations) with all other variable head constant at their means. Based on model 3 estimates, state-years with Snap generosity values two standard deviations above the mean are have IMRs that are 1.3 per 1,000 lower than those with Snap generosity values two standard deviations below the mean.

Figure 1. Model Predicted Infant Mortality Rate by Level of SNAP Generosity, U.S. States, 1998-2006 (n=250 State-Years)



NEXT STEPS

This study presents clear evidence of a negative relationship between snap generosity and infant mortality in U.S. States. This suggests that SNAP spending does provide meaningful benefits for population health. To further investigate the results of our analyses, we plan to pursue the following avenues:

1. extend our state-level time series through 2017. Including data for these years will increase the size of our analytic sample, thereby enhancing statistical power. It will also permit U.S. to examine the links between safety net generosity and well-being in the context of the Great Recession.
2. explore the relationship between SNAP generosity and other population health outcomes, such as low birth weight and maternal morbidity. Maternal and child health outcomes have been strongly associated with socioeconomic conditions; this research will provide additional insight into how safety nets may affect life chances in early life.

3. further develop our generosity measure by including enrollment and eligibility criteria. This refinement provides a more thorough picture of the particular characteristics of safety nets that influence well-being among participant and at-risk populations.

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