

By Stephanie Ettinger de Cuba, Mariana Chilton, Allison Bovell-Ammon, Molly Knowles, Sharon M. Coleman, Maureen M. Black, John T. Cook, Diana Becker Cutts, Patrick H. Casey, Timothy C. Heeren, and Deborah A. Frank

DOI: 10.1377/hlthaff.2018.05265
HEALTH AFFAIRS 38,
NO. 5 (2019): 765–773
This open access article is
distributed in accordance with the
terms of the Creative Commons
Attribution (CC BY 4.0) license.

Loss Of SNAP Is Associated With Food Insecurity And Poor Health In Working Families With Young Children

ABSTRACT The Supplemental Nutrition Assistance Program (SNAP) helps working families meet their nutritional needs. Families whose earned income increases in a given month may have their SNAP benefits abruptly reduced or cut off in the following month. Using sentinel sample data from 2007–15 for families with children younger than age four, we investigated how SNAP benefit reductions or cutoffs resulting from increased income were related to economic hardships (food and energy insecurity, unstable housing, forgone health and/or dental care, and health cost sacrifices) and to caregiver and child health. After we controlled for covariates, we found that the groups whose SNAP benefits were reduced or cut off had significantly increased odds of household and child food insecurity, compared to a group with consistent participation in SNAP. Reduced benefits were associated with 1.43 and 1.22 times greater odds of fair or poor caregiver and child health, respectively. Policy modifications to smooth changes in benefit levels as work incomes improve may protect working families with young children from increased food insecurity, poor health, and forgone care.

The Supplemental Nutrition Assistance Program (SNAP) is the primary public assistance program that helps low-income working families with children, seniors, and people with disabilities purchase food. SNAP can buffer participants against food insecurity (inadequate access to enough nutritious food for an active and healthy life)¹ and poor health.² Food insecurity is associated with multiple negative health, developmental, behavioral, and educational outcomes among children and adolescents and with physical and mental health problems among adults.^{3–9}

SNAP benefits are frequently insufficient for the consistent purchase of a healthful diet. Nevertheless, among SNAP-eligible households, SNAP participation is associated with greater

food security and improved health, educational, and economic outcomes, compared to not participating.^{3,4,10–12} Additionally, SNAP makes a positive difference over the life course: SNAP participation in early childhood is associated with decreased risk of later metabolic syndrome and, among women, increased economic self-sufficiency.¹³ Other studies have examined SNAP and children's health and food security in the context of the relative generosity of state policies that determine benefit levels^{14,15} and whether food price variations across states change SNAP purchasing power and thus child outcomes.⁴

In addition to promoting family health and well-being, SNAP functions as a work support. In fiscal year 2016, 55 percent of participating SNAP households with children had earned income, including 67 percent of multiple-adult

Stephanie Ettinger de Cuba (sedc@bu.edu) is executive director of Children's HealthWatch in the Department of Pediatrics, Boston University School of Medicine, in Massachusetts.

Mariana Chilton is a professor of health management and policy at the Dornsife School of Public Health, Drexel University, in Philadelphia, Pennsylvania.

Allison Bovell-Ammon is deputy director of policy strategy at Children's HealthWatch in the Department of Pediatrics, Boston Medical Center, in Massachusetts.

Molly Knowles is a clinical research coordinator in the Division of General Internal Medicine, Penn Center for Community Health Workers, Perelman School of Medicine, University of Pennsylvania, in Philadelphia.

Sharon M. Coleman is a statistical analyst at the Biostatistics and Epidemiology Data Analytics Center, Boston University School of Public Health.

Maureen M. Black is a professor of pediatrics at the University of Maryland School of Medicine, in Baltimore, and distinguished fellow with RTI International in Research Triangle Park, North Carolina.

John T. Cook is an associate professor of pediatrics at the Boston University School of Medicine.

Diana Becker Cutts is an associate professor of pediatrics at the Hennepin County Medical Center, in Minneapolis, Minnesota.

Patrick H. Casey is a professor of pediatrics at the University of Arkansas School of Medicine, in Little Rock.

Timothy C. Heeren is a professor of biostatistics at the Boston University School of Public Health.

Deborah A. Frank is a professor of child health and well-being at the Boston University School of Medicine.

households and 46 percent of households headed by one adult.¹⁶

SNAP eligibility is based on a complex, multi-step calculation of income and basic needs expense deductions and, in some states, the value of household assets.¹⁷ Many low-wage workers have unpredictable working hours, seasonal work, or sporadic overtime hours that result in unstable or unpredictable income and greater risk of food insecurity.¹⁸ Upward income fluctuations can trigger rapid reductions in or termination of SNAP benefits (which federal regulations base on the previous month's income), exacerbating overall income volatility. Since most SNAP households have limited assets to buffer them from economic shocks,^{14,18} benefit reductions may put them at risk of multiple economic hardships in spite of increased earned income, which potentially increases health risks.

The current study builds on published findings that demonstrate SNAP's positive relationship with family health. We focus on SNAP as a work support by examining how SNAP benefit reduction or cutoff resulting from increased earned income relates to health and other aspects of working households' budgets—that is, for food, medical and dental care, utilities, and housing.

Study Data And Methods

STUDY DESIGN AND PARTICIPANTS Children's HealthWatch is an ongoing five-city sentinel surveillance study in clinical settings that investigates associations among economic hardships, public assistance programs, and the health of young children and their caregivers.⁵ Study eligibility details are in the online appendix.¹⁹

Data were collected in the period October 2007–December 2015 with cross-sectional surveys of caregivers of children younger than age four who accessed health care in emergency departments or hospital primary care clinics in Baltimore, Maryland; Boston, Massachusetts; Little Rock, Arkansas; Minneapolis, Minnesota; and Philadelphia, Pennsylvania. All sites had Institutional Review Board approval for data collection and analysis, renewed annually.

Eligibility criteria included the ability to speak English, Spanish, or (Minneapolis only) Somali; state residency; knowledge of the child's household and health; and having at least one working adult in the family. Caregivers of critically ill or injured children were excluded, as were those who had previously been interviewed by the ongoing study.

Of the 41,699 caregivers approached, 4,448 (10.7 percent) were ineligible for the study; of the remaining 37,251 caregivers, 2,994 (8.0 percent) refused or were unable to complete the

interview. As a proxy for low income among households, the sample was restricted to children with public or no health insurance,²⁰ which resulted in the exclusion of another 3,356 caregivers. Additionally, we excluded 1,370 households with a child who received Supplemental Security Income (SSI) and 377 households with missing SSI information, to reduce the possibility of including families with benefit changes that reflected disability payments. As our focus was on households with at least one employed adult, we excluded 7,214 households with no employed adults and 3,184 households that reported a SNAP benefit increase within the year. We also excluded 7,635 caregivers who had never participated in SNAP or had pending applications and 2,552 caregivers whose SNAP benefits had been cut off or reduced for reasons not related to earned income. Appendix exhibit A depicts the final analysis sample of 8,569 caregiver-child pairs who met all inclusion criteria and completed the interview.¹⁹

Caregivers provided information on basic demographic characteristics; the employment status of other adults in the household; and children's age, sex, health insurance, and breastfeeding history.

PROGRAM PARTICIPATION Caregivers reported current household participation in the following programs: the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), Temporary Assistance for Needy Families (TANF), housing subsidies, and energy assistance.

MONTH AND YEAR OF SURVEY AND CONSUMER PRICE INDEX To reduce bias, we accounted for site-level economic differences that were potentially related to outcome variables by including interview site as a fixed effect. Additionally, we used the Consumer Price Index (CPI) for food by month and year for each research site to control for the local macroeconomy external to SNAP benefit level or participation.²¹

OUTCOME MEASURES

► **FOOD INSECURITY:** Household food insecurity is defined as the inability to consistently afford enough food for active, healthy lives for all household members in the past twelve months, resulting from constrained resources.²² Households were considered food insecure if three or more of ten household questions were affirmed. Households were considered child food insecure if two or more of eight child-specific questions were also affirmed.

► **ENERGY INSECURITY:** Household energy insecurity was indicated by the reporting of one or more of these circumstances in the past year: utility shutoff threatened or occurred, cooking stove used for heat, and one or more days with-

out necessary heat or cooling.²³

► **HOUSING INSTABILITY:** Housing instability was indicated by a caregiver's reporting one or more of the following: behind on rent or mortgage in the past year, two or more moves in the past year, and homelessness in the child's lifetime.²⁴

► **FORGONE CARE:** Caregivers were asked whether the reference child—the young child of interest in the caregiver-child pair—or other household members had unmet needs for health care services, prescriptions, and/or dental care because of the inability to afford care.

► **HEALTH COST SACRIFICES:** Health cost sacrifices—that is, families struggling to afford other basic needs because of out-of-pocket medical spending—were measured by asking caregivers whether the cost of medical care or prescription medications made it extremely difficult to afford basic needs such as food, housing, or utilities.²⁵

CAREGIVER AND CHILD HEALTH MEASURES

► **FAIR OR POOR HEALTH FOR CAREGIVER OR CHILD:** Health status was characterized by, respectively, self-rating or caregiver rating of health as excellent, good, fair, or poor, using a question from the National Health and Nutrition Examination Survey.²⁶

► **MATERNAL DEPRESSIVE SYMPTOMS:** Female caregivers were screened for depressive symptoms using the Kemper scale.²⁷ Since 94.3 percent of caregivers were mothers, we refer to maternal depressive symptoms.

► **DEVELOPMENTAL RISK:** Developmental risk—that is, a child at risk of developmental delays in one or more domain, such as socio-emotional, cognitive, or motor skills—was measured with the Parents' Evaluation of Developmental Status.²⁸ Two or more concerns reported for children at least four months old indicate risk.

MAIN INDEPENDENT VARIABLE: SNAP PARTICIPATION Caregivers were asked whether their household had ever participated in SNAP. Families who reported SNAP participation within the previous twelve months or current participation were asked whether their benefit amount had changed in the previous year. If a reduction in their benefit was reported, the multiple-choice options for indicating the reason why included "earnings changed/welfare benefit changed." If they reported that their benefit had been cut off, the multiple-choice options for indicating the reason why included "earnings increased." Affirmative responses to these options were indicative of SNAP benefit reduction or cutoff due to increased income. For clarity, we use the terms *earned income* and *income* interchangeably throughout. SNAP participation was defined

by three mutually exclusive groups according to participants' self-reported income and benefits status within the previous twelve months. The groups were consistent SNAP participation (families with current SNAP participation, no income increase, and no increase or decrease in benefit amount in the past year), SNAP reduction (an increase in earned income and a resulting decrease in SNAP benefit), and SNAP cutoff (an increase in earned income and a cutoff of all SNAP benefits as result of increased income or assets exceeding eligibility).

COVARIATES Covariates were selected based on significant association with exposure (stability of SNAP benefits in relation to income over the previous year) and a priori knowledge of health and hardship outcome associations.

ANALYSIS Descriptive statistics for demographic characteristics and public assistance receipt were generated for the overall sample and stratified by SNAP participation. Households in each SNAP participation group were compared using chi-square and analysis-of-variance tests. Similar analyses were performed for economic hardship and health outcomes. Separate logistic regression models were fit to evaluate associations between SNAP participation and outcomes. Effect estimates using consistent SNAP receipt as the reference group were obtained using adjusted odds ratios and corresponding 95% confidence intervals. Primary models adjusted for maternal and child covariates and included site; survey year; mother's place of birth, race/ethnicity, age, marital status, and educational attainment; child's age and breast-feeding history; and WIC and TANF participation. Generalized estimating equation logistic regression models were also fit to account for site macroeconomy, as measured by city-specific CPI. Effect estimates and robust standard errors were obtained. All analyses were performed using two-sided tests and a significance level of $p < 0.05$; we used SAS software, version 9.3.

STUDY STRENGTHS AND LIMITATIONS This study's strengths include its focus on a large, sentinel, multistate, racially diverse sample of working families with a difficult-to-reach population of young children who have access to health care. The study's limitations include cross-sectional, sentinel sampling and its potential for selection and reporting bias. The sentinel sample is both a strength and a limitation as a dynamic form of data collection designed to signal early trends and identify and monitor policy effects and disease burdens before they become widely prevalent. Though limited in generalizability, it helps identify emerging health impacts promptly, so that timely interventions can be developed.^{29,30} Potential for sample selection

bias exists, as participants were caregivers of young children seeking health care in emergency departments or primary care clinics, which could have limited our findings' generalizability. Children identified in emergency departments may be more vulnerable to negative effects of SNAP reduction or cutoff, and their inclusion may bias health outcomes away from the null.

However, our sample selection diminished the problem of self-selection bias into SNAP and reverse causality by including data only from families who were currently participating in SNAP or had done so within the previous twelve months. We hypothesized that those who experienced a SNAP cutoff or reduction resulting from an income increase would be healthier and more economically secure than those with consistent SNAP participation, biasing these exposure groups' effect toward the null against finding a significant impact on health or hardship outcomes.

Trade-offs are inherent in using a sample with detailed data on family health and SNAP participation that can be employed as covariates but have less generalizability versus a wider, more representative sample that may be less detailed but has greater generalizability. The cross-sectional design limited the ability to assess causality and timing since income increases and changes to SNAP benefits and outcomes were self-reported in a single interview. Self-reported income may be limited by measurement error, although caregivers reported overall income increases or decreases in response to why their SNAP benefits changed, not specific amounts. Additionally, we did not have detailed information about the employment history of other household adults. Lastly, since caregivers were interviewed at a single point in time, we were unable to show patterns of income volatility over time that would have allowed comprehensive documentation of SNAP benefit fluctuation in relation to income, as well as timing of housing instability and energy insecurity.

Study Results

SAMPLE CHARACTERISTICS AND UNADJUSTED RESULTS Of the 8,569 families with at least one employed adult who had participated in SNAP in the past year, 1,765 (20.6 percent) reported reduced SNAP benefits, and 1,407 (16.4 percent) reported cut-off benefits (exhibit 1). There were significant differences between groups by caregiver race/ethnicity, marital status, educational attainment, interview site, public assistance participation, and child's age, with families of younger children more likely to have consistent SNAP benefits. The majority of families whose

SNAP benefits were reduced lived in Baltimore (24.5 percent) or Philadelphia (26.1 percent), and the majority of families whose benefits were cut off were in Little Rock (32.3 percent) or Boston (22.4 percent). A greater share of caregivers who reported that their benefits were cut off were married or partnered, had education beyond high school, and breast-fed their young children, compared to shares in the consistent participation and SNAP reduction groups. Caregivers with consistent participation reported an average of \$87 per person in monthly SNAP benefits, while those with SNAP reduction reported an average of \$76.

Compared to people with consistent participation, members of the other two groups were significantly more likely to report household and child economic hardships and had higher prevalences of fair or poor caregiver and child health (exhibit 2).

MULTIVARIABLE ANALYSIS Compared to households with consistent participation, those with SNAP reduction had increased adjusted odds of household food insecurity (adjusted odds ratio: 1.42; 95% CI: 1.24, 1.62), child food insecurity (AOR: 1.42; 95% CI: 1.20, 1.68), housing instability (AOR: 1.35; 95% CI: 1.18, 1.55), and energy insecurity (AOR: 1.50; 95% CI: 1.32, 1.70) (exhibit 3). They were also more likely to forgo care for family members because they could not afford it (AOR: 1.50; 95% CI: 1.31, 1.70). And compared to caregivers in the consistent participation group, those with SNAP reduction were more likely to report having fair or poor health (AOR: 1.43; 95% CI: 1.25, 1.63) and maternal depressive symptoms (AOR: 1.27; 95% CI: 1.10, 1.46) and to report the reference child's health as fair or poor (AOR: 1.22; 95% CI: 1.01, 1.47). Developmental risk was marginally associated with reduced SNAP benefits (AOR: 1.22; 95% CI: 0.99, 1.49). Health cost sacrifices and forgone care for the reference child were not significantly associated with reduced benefits.

Compared to caregivers with consistent participation in SNAP, those who reported SNAP cutoff had increased odds of household food insecurity (AOR: 1.65; 95% CI: 1.43, 1.91), child food insecurity (AOR: 1.73; 95% CI: 1.45, 2.06), energy insecurity (AOR: 1.26; 95% CI: 1.09, 1.46), and health cost sacrifices (AOR: 1.55; 95% CI: 1.27, 1.90). They were also more likely to forgo care for family members (AOR: 1.23; 95% CI: 1.06, 1.43) and for the reference child (AOR: 1.39; 95% CI: 1.05, 1.86). SNAP benefit cutoffs were also associated with caregivers' reporting developmental risk (AOR: 1.28; 95% CI: 1.01, 1.63).

Associations of benefit cutoffs with housing instability, fair or poor caregiver and child

EXHIBIT 1
Sample characteristics, by respondent's family Supplemental Nutrition Assistance Program (SNAP) status, October 2007–December 2015

Characteristic	All (N = 8,569)		Consistent participation (n = 5,397)		SNAP reduction (n = 1,765)		SNAP cutoff (n = 1,407)	
	Mean or no.	%	Mean or no.	%	Mean or no.	%	Mean or no.	%
Child's age (months) ^{****}	19.7	— ^a	18.5	— ^a	22.2	— ^a	21.2	— ^a
Caregiver's age (years) ^{****}	26.8	— ^a	26.4	— ^a	27.1	— ^a	28.0	— ^a
Per person SNAP benefit (\$) ^{b****}	84.3	— ^a	87.0	— ^a	76.4	— ^a	— ^a	— ^a
Child breast-fed ^{**}	5,263	61.6	3,312	61.5	1,053	59.8	898	64.1
Mother US born ^{c****}	6,595	77.1	3,956	73.4	1,518	86.0	1,121	80.0
Site ^{****}								
Baltimore	1,681	19.6	1,067	19.8	432	24.5	182	12.9
Boston	1,641	19.2	966	17.9	360	20.4	315	22.4
Little Rock	1,778	20.7	919	17.0	404	22.9	455	32.3
Minneapolis	1,496	17.5	1,230	22.8	108	6.1	158	11.2
Philadelphia	1,973	23.0	1,215	22.5	461	26.1	297	21.1
Race/ethnicity ^{****}								
Hispanic	2,551	30.1	1,781	33.4	448	25.6	322	23.1
Non-Hispanic black	4,545	53.6	2,766	51.9	1,037	59.3	742	53.3
Non-Hispanic white	1,104	13.0	612	11.5	208	11.9	284	20.4
Non-Hispanic other	275	3.2	175	3.3	55	3.1	45	3.2
Married or partnered ^{****}	3,224	37.7	2,012	37.3	560	31.8	652	46.5
Education ^{****}								
Some high school or less	2,038	23.8	1,561	29.0	309	17.5	168	12.0
High school graduate	3,462	40.5	2,278	42.3	680	38.5	504	35.9
Technical school or college or more	3,048	35.7	1,540	28.6	775	43.9	733	52.2
Caregiver currently employed ^{****}	5,073	59.2	2,625	48.6	1,363	77.2	1,085	77.1
Current public assistance received ^{****}								
TANF	1,839	21.5	1,526	28.4	284	16.1	29	2.1
WIC	6,441	75.3	4,270	79.3	1,279	72.5	892	63.5
Housing subsidy	1,561	21.0	928	19.7	438	27.9	195	17.1
Energy assistance	1,663	24.1	985	23.3	457	31.7	221	18.0

SOURCE Authors' analysis of data for 2007–15 from the Children's HealthWatch survey. **NOTES** SNAP status categories are explained in the text. Significance was measured by chi-square tests for categorical variables and by analysis-of-variance tests for continuous variables. TANF is Temporary Assistance for Needy Families. WIC is the Special Supplemental Nutrition Program for Women, Infants, and Children. ^aNot applicable. ^bSince SNAP benefit amount is only relevant for those participating in SNAP, the sample size is smaller than the total sample (n = 6,623). ^cIncludes Puerto Rico. ^{**}p < 0.05 ^{****}p < 0.001

health, and maternal depressive symptoms were nonsignificant.

Secondary analyses that adjusted for the CPI for food showed similar results. All of the significant associations for SNAP reduction reported above remained significant except the association between a reduction and fair or poor child health—which was slightly attenuated (AOR: 1.22; 95% CI: 0.99, 1.51). The associations between SNAP cutoffs and developmental risk and forgone care (for both household and reference child) were also slightly attenuated and no longer significant (data available upon request).

Discussion

This study showed that, paradoxically, families with children that participated in the Supplemental Nutrition Assistance Program, increased their earned income, and therefore had their

SNAP benefits reduced or cut off in response faced economic strain that diminished their ability to pay for housing, utilities, health care, or food—compared to families with consistent SNAP benefits. In turn, this may have adversely affected overall health for caregivers and children and increased household economic hardship. These results expand upon previous research that demonstrated complex dynamics among working families earning low wages and the importance of stable SNAP benefits to the well-being of families with young children.^{2,4}

Aside from food insecurity, there was heterogeneity among families' difficulty meeting basic needs in the context of SNAP reductions and cutoffs. Most significant outcomes occurred among families that reported reduced benefits. The lack of an association between SNAP cutoffs and housing instability could be explained by the possibility that income increases large

EXHIBIT 2

Economic hardships and health outcomes, by respondent's family Supplemental Nutrition Assistance Program (SNAP) status, October 2007–December 2015

	All		Consistent participation		SNAP reduction		SNAP cutoff	
	No.	%	No.	%	No.	%	No.	%
ECONOMIC HARDSHIPS								
Household								
Food insecurity****	2,242	26.2	1,316	24.4	485	27.5	441	31.4
Housing instability****	2,177	33.2	1,295	30.9	559	39.1	323	34.9
Energy insecurity****	2,153	25.2	1,142	21.2	579	32.9	432	30.9
Forgone care****	2,119	24.9	1,119	20.8	571	32.5	429	30.8
Health cost sacrifices****	800	9.6	414	7.9	184	10.6	202	14.9
Child								
Food insecurity****	1,044	12.2	594	11.0	229	13.0	221	15.7
Forgone care***	404	4.8	219	4.1	100	5.7	85	6.1
HEALTH OUTCOMES								
Caregiver								
Fair or poor self-rated health****	1,920	23.1	1,123	21.5	475	27.3	322	23.7
Maternal depressive symptoms****	1,686	20.5	984	19.1	424	24.6	278	20.9
Child								
Fair or poor health*	838	9.8	499	9.3	195	11.0	144	10.2
Developmental risk****	646	8.7	342	7.5	178	10.7	126	10.1

SOURCE Authors' analysis of data for 2007–15 from the Children's HealthWatch survey. **NOTES** SNAP status categories are explained in the text, as are health cost sacrifices and developmental risk. Sample sizes are in exhibit 1. **p* < 0.10 ****p* < 0.01 *****p* < 0.001

EXHIBIT 3

Likelihood of experiencing economic hardships and health outcomes, by respondent's family Supplemental Nutrition Assistance Program (SNAP) status, October 2007–December 2015

	SNAP reduction	SNAP cutoff
ECONOMIC HARDSHIPS		
Household		
Food insecurity	1.42****	1.65****
Housing instability	1.35****	1.07
Energy insecurity	1.50****	1.26***
Forgone care	1.50****	1.23***
Health cost sacrifices	1.15	1.55****
Child		
Food insecurity	1.42****	1.73****
Forgone care	1.14	1.39**
HEALTH OUTCOMES		
Caregiver		
Fair or poor self-reported health	1.43****	1.11
Maternal depressive symptoms	1.27***	1.08
Child		
Fair or poor health	1.22**	1.13
Developmental risk	1.22*	1.28**

SOURCE Authors' analysis of data for 2007–15 from the Children's HealthWatch survey. **NOTES** The exhibit shows odds ratios adjusted for site; survey year; mother's place of birth, race/ethnicity, age, marital status, and educational attainment; child's age and breast-feeding history; and participation in Temporary Assistance for Needy Families and the Special Supplemental Nutrition Program for Women, Infants, and Children. The reference group is consistent SNAP participation. SNAP status categories are explained in the text, as are health cost sacrifices and developmental risk. **p* < 0.10 ***p* < 0.05 ****p* < 0.01 *****p* < 0.001

enough to result in such cutoffs may help buffer families from housing hardships. Alternatively, families may have placed a higher priority on maintaining a stable place to live and had greater willingness to tolerate other material hardships such as energy insecurity, given constrained resources.

Among the SNAP cutoff group, there was a strong association with health cost sacrifices. Families whose benefits were reduced were more likely to have forgone health and/or dental care for family members because of constrained household resources, potentially affecting overall health.³¹

Caregivers and children in families whose incomes were not high enough to trigger a complete cutoff but that experienced benefit reductions resulting from increased earned income were more likely to report fair or poor health than those with consistent SNAP participation, though this finding was attenuated somewhat with consideration of the CPI. Possible pathways to poor health could include stress associated with economic hardships or inadequate nutrition and compromised immune systems resulting from increased food insecurity.³² Fair or poor health is highly predictive of increased health services use and higher health care costs.^{3,5,33} Mothers with SNAP reduction were more likely to report maternal depressive symptoms—a known child health and development risk.³⁴

Policy Implications

Some policy makers may consider a reduction in or loss of Supplemental Nutrition Assistance Program benefits resulting from increased earned income to be a potential disincentive to participants to increase their income. However, research on work disincentives in public assistance programs, including SNAP, has demonstrated that SNAP is unlikely to affect workforce participation.^{35,36} If indeed some work disincentive does exist, policies could be implemented that would make SNAP reduction less abrupt. Any policy proposals that change SNAP eligibility and benefit amounts should also take into account the timing and amount of income in relation to SNAP benefits, as well as household health and potential increases in health care costs associated with changes to SNAP.^{18,36}

Policy makers at the federal and state levels have debated SNAP eligibility restrictions and implementing work requirements for adults with children, who are currently excluded from such requirements. Proposals being debated would determine SNAP eligibility based on monthly reporting of work activities without regard to the stability of employment or the adequacy of income. People with volatile employment participating in SNAP, therefore, may be placed at even greater risk of fluctuations in their eligibility, resulting in SNAP reductions or cut-offs.³⁷ These policy proposals deviate from the program goal of reducing food insecurity and are particularly concerning because they may also result in families' losing eligibility for other critical supports that are often tied to SNAP eligibility—such as free or reduced-price school meals,³⁸ utility discounts, and potentially Medicaid.³⁹ This benefit loss cascade may leave families

worse off than they were before increasing their income.⁴⁰ Loss of SNAP and related resources may also require families to reapply for SNAP or other benefits to make ends meet. Such churning causes family strain and increases government administrative costs.^{41,42}

Policy proposals that improve families' upward economic mobility without placing them at risk of increased economic hardships or poor health are necessary.⁴² For example, instead of calculating documented income monthly, averaging income over a longer period of time, such as three to six months, could provide a more realistic picture of family employment and income stability and contribute to a smoother and more effective “off-ramp” from SNAP.^{41,43}

Conclusion

Though the Supplemental Nutrition Assistance Program theoretically provides gradually declining benefits as participants' household income increases, in practice, families that increase their earned income and whose SNAP benefits consequently are reduced or cut off may face economic strain that may in turn affect children's and caregivers' health and well-being. Implementing SNAP policies that buffer the unintended impacts of potentially short-lived income increases in a population prone to unstable employment and with limited reserves to compensate for sudden SNAP reductions or losses may promote family health and well-being. Additionally, smoothing the path for working families to transition out of receiving SNAP benefits as they increase their incomes and remain stable in their jobs may promote family economic stability. ■

The Annie E. Casey Foundation provided a grant to Children's HealthWatch, which supported a prior version of these analyses. The authors thank Richard Sheward, Ana Poblacion, Megan Sandel, and Eduardo Ochoa Jr. for their

thoughtful contributions to this article. This is an open access article distributed in accordance with the terms of the Creative Commons Attribution (CC BY 4.0) license, which permits others to distribute, remix, adapt, and

build upon this work, for commercial use, provided the original work is properly cited. See <https://creativecommons.org/licenses/by/4.0/>.

NOTES

- 1 Coleman-Jensen A, Rabbitt MP, Gregory CA, Singh A. Household food security in the United States in 2016 [Internet]. Washington (DC): Department of Agriculture, Economic Research Service; 2017 Sep [cited 2019 Feb 27]. (Economic Research Report No. 237). Available from: <https://www.ers.usda.gov/webdocs/publications/84973/err-237.pdf>
- 2 Kreider B, Pepper JV, Gundersen C, Jolliffe D. Identifying the effects of SNAP (food stamps) on child health outcomes when participation is endogenous and misreported. *J Am Stat Assoc*. 2012;107(499):958–75.
- 3 Gundersen C, Ziliak JP. Food insecurity and health outcomes. *Health Aff (Millwood)*. 2015;34(11):1830–9.
- 4 Bronchetti ET, Christensen G, Hoynes HW. Local food prices, SNAP purchasing power, and child health [Internet]. Berkeley (CA): University of California Berkeley, Richard and Rhoda Goldman School of Public Policy; 2017 Sep 12 [cited 2019 Feb 27]. Available from: <https://gspp.berkeley.edu/assets/uploads/research/pdf/Bronchetti-Christensen-Hoynes-09-12-17.pdf>
- 5 Cook JT, Frank DA, Berkowitz C, Black MM, Casey PH, Cutts DB, et al. Food insecurity is associated with adverse health outcomes among human infants and toddlers. *J Nutr*. 2004;134(6):1432–8.
- 6 Shankar P, Chung R, Frank DA. Association of food insecurity with children's behavioral, emotional, and academic outcomes: a systematic review. *J Dev Behav Pediatr*. 2017;38(2):135–50.
- 7 Gundersen C, Kreider B. Bounding the effects of food insecurity on children's health outcomes. *J Health Econ*. 2009;28(5):971–83.
- 8 Heflin CM, Siefert K, Williams DR. Food insufficiency and women's mental health: findings from a 3-year panel of welfare recipients. *Soc Sci Med*. 2005;61(9):1971–82.
- 9 Seligman HK, Bindman AB, Vittinghoff E, Kanaya AM, Kushel MB. Food insecurity is associated with diabetes mellitus: results from the National Health Examination and Nutrition Examination Survey (NHANES) 1999–2002. *J Gen Intern Med*. 2007;22(7):1018–23.
- 10 Mabl J, Ohls J, Dragoset L, Castner L, Santos B. Measuring the effect of Supplemental Nutrition Assistance Program (SNAP) participation on food security [Internet]. Alexandria (VA): Department of Agriculture, Food and Nutrition Service; 2013 Aug [cited 2019 Feb 27]. (Nutrition Assistance Program Report). Available from: <https://fns-prod.azureedge.net/sites/default/files/Measuring2013.pdf>
- 11 Almond D, Hoynes HW, Schanzenbach DW. Inside the war on poverty: the impact of food stamps on birth outcomes. *Rev Econ Stat*. 2011;93(2):387–403.
- 12 Frank DA, Chilton M, Casey PH, Black MM, Cook JT, Cutts DB, et al. Nutritional-assistance programs play a critical role in reducing food insecurity. *Pediatrics*. 2010;125(5):e1267, author reply e1267–8.
- 13 Hoynes H, Schanzenbach DW, Almond D. Long-run impacts of childhood access to the safety net. *Am Econ Rev*. 2016;106(4):903–34.
- 14 Ratcliffe C, McKernan S-M, Wheaton L, Kalish E, Ruggles C, Armstrong S, et al. Asset limits, SNAP participation, and financial stability [Internet]. Washington (DC): Urban Institute; 2016 Jun [cited 2019 Feb 27]. (Research Report). Available from: <https://www.urban.org/sites/default/files/2000843-asset-limits-snap-participation-and-financial-stability.pdf>
- 15 Schmidt L, Shore-Sheppard L, Watson T. The effect of safety net programs on food insecurity [Internet]. Cambridge (MA): National Bureau of Economic Research; 2013 Oct [cited 2019 Feb 27]. (NBER Working Paper No. 19558). Available from: <https://www.nber.org/papers/w19558.pdf>
- 16 Lauffer S (Mathematica Policy Research, Washington, DC). Characteristics of Supplemental Nutrition Assistance Program households: fiscal year 2016 [Internet]. Alexandria (VA): Department of Agriculture, Food and Nutrition Service; 2017 [cited 2019 Feb 27]. (Report No. SNAP-17-CHAR). Available from: <https://fns-prod.azureedge.net/sites/default/files/ops/Characteristics2016.pdf>
- 17 Department of Agriculture, Food and Nutrition Service. State options report: Supplemental Nutrition Assistance Program [Internet]. 13th ed. Alexandria (VA): FNS; [revised 2017 Aug 15; cited 2019 Feb 27]. Available from: https://fns-prod.azureedge.net/sites/default/files/snap/13-State_Options-revised.pdf
- 18 Coleman-Jensen AJ. Working for peanuts: nonstandard work and food insecurity across household structure. *J Fam Econ Issues*. 2011;32(1):84–97.
- 19 To access the appendix, click on the Details tab of the article online.
- 20 Frank DA, Casey PH, Black MM, Rose-Jacobs R, Chilton M, Cutts D, et al. Cumulative hardship and wellness of low-income, young children: multisite surveillance study. *Pediatrics*. 2010;125(5):e1115–23.
- 21 Bureau of Labor Statistics. Consumer Price Index [Internet]. Washington (DC): BLS; [cited 2019 Feb 28]. Available from: <https://www.bls.gov/cpi/>
- 22 Bickel G, Nord M, Price C, Hamilton W, Cook J. Measuring food security in the United States: guide to measuring household food security [Internet]. Alexandria (VA): Department of Agriculture, Food and Nutrition Service; [revised 2000; cited 2019 Feb 28]. Available from: <https://fns-prod.azureedge.net/sites/default/files/FSGuide.pdf>
- 23 Cook JT, Frank DA, Casey PH, Rose-Jacobs R, Black MM, Chilton M, et al. A brief indicator of household energy security: associations with food security, child health, and child development in US infants and toddlers. *Pediatrics*. 2008;122(4):e867–75.
- 24 Sandel M, Sheward R, Ettinger de Cuba S, Coleman SM, Frank DA, Chilton M, et al. Unstable housing and caregiver and child health in renter families. *Pediatrics*. 2018; 141(2):e2017–199.
- 25 Ettinger de Cuba S, Coleman S, Jeng K, Cook J, Chilton M, Cutts DB. Health care costs, child health and development, and household expense trade-offs. Paper presented at: Pediatric Academic Societies Annual Conference; 2010 May 2; Vancouver, BC.
- 26 Centers for Disease Control and Prevention. National Health and Nutrition Examination Survey: NHANES III (1988–1994) [Internet]. Atlanta (GA): CDC; [cited 2019 Feb 28]. Available from: <https://www.cdc.gov/nchs/nhanes/nhanes3/default.aspx>
- 27 Kemper KJ, Babonis TR. Screening for maternal depression in pediatric clinics. *Am J Dis Child*. 1992;146(7):876–8.
- 28 Glascoe FP. Evidence-based approach to developmental and behavioural surveillance using parents' concerns. *Child Care Health Dev*. 2000;26(2):137–49.
- 29 Erwin PC. Tracking the impact of policy changes on public health practice. *Am J Public Health*. 2017; 107(5):653–4.
- 30 World Health Organization. Immunization, vaccines, and biologicals: sentinel surveillance [Internet]. Geneva: WHO; [cited 2019 Feb 28]. Available from: https://www.who.int/immunization/monitoring_surveillance/burden/vpd/surveillance_type/sentinel/en/
- 31 Low W, Tan S, Schwartz S. The effect of severe caries on the quality of life in young children. *Pediatr Dent*. 1999;21(6):325–6.
- 32 Berkowitz SA, Basu S, Meigs JB, Seligman HK. Food insecurity and health care expenditures in the United States, 2011–2013. *Health Serv Res*. 2018;53(3):1600–20.
- 33 O'Hara B, Caswell K. Health status, health insurance, and medical services utilization: 2010 [Internet].

- Washington (DC): Census Bureau; 2013 Jul [cited 2019 Feb 28]. (Current Population Report No. P70-133RV). Available from: <https://www.census.gov/prod/2012pubs/p70-133.pdf>
- 34** Casey P, Goolsby S, Berkowitz C, Frank D, Cook J, Cutts D, et al. Maternal depression, changing public assistance, food security, and child health status. *Pediatrics*. 2004;113(2):298–304.
- 35** Moffitt RA. The US safety net and work incentives: is there a problem? What should be done? In: Strain MR, editor. *The US labor market: questions and challenges for public policy*. Washington (DC): AEI Press; 2016. p. 122–37.
- 36** Rosenbaum D. The relationship between SNAP and work among low-income households [Internet]. Washington (DC): Center on Budget and Policy Priorities; 2013 Jan 30 [cited 2019 Feb 28]. Available from: <https://www.cbpp.org/research/the-relationship-between-snap-and-work-among-low-income-households>
- 37** Butcher KF, Schanzenbach DW. Most workers in low-wage labor market work substantial hours, in volatile jobs [Internet]. Washington (DC): Center on Budget and Policy Priorities; 2018 Jul 24 [cited 2019 Feb 28]. Available from: <https://www.cbpp.org/research/poverty-and-inequality/most-workers-in-low-wage-labor-market-work-substantial-hours-in>
- 38** Department of Agriculture, Food and Nutrition Service. School meals: applying for free and reduced price meals [Internet]. Alexandria (VA): FNS; [last updated 2018 Apr 24; cited 2019 Feb 28]. Available from: <https://www.fns.usda.gov/school-meals/applying-free-and-reduced-price-school-meals>
- 39** Wagner J, Huguelet A. Opportunities for states to coordinate Medicaid and SNAP renewals [Internet]. Washington (DC): Center on Budget and Policy Priorities; 2016 Feb 5 [cited 2019 Feb 28]. Available from: <https://www.cbpp.org/research/health/opportunities-for-states-to-coordinate-medicaid-and-snap-renewals>
- 40** Bingulac M, Carey C, Crandall S. The road to the cliff edge: understanding financial gaps in public assistance programs available to Massachusetts families [Internet]. Boston (MA): UMass Boston, Center for Social Policy; 2017 [cited 2019 Mar 13]. Available from: https://www.umb.edu/editor_uploads/images/centers_institutes/center_social_policy/The_Road_to_the_Cliff_Edge_08.16.17.pdf
- 41** Mills GB, Vericker T, Lippold K, Wheaton L, ELkin S. Understanding the rates, causes, and costs of churning in the Supplemental Nutrition Assistance Program (SNAP) [Internet]. Washington (DC): Urban Institute; 2014 Oct 13 [cited 2019 Feb 28]. Available from: <https://www.urban.org/research/publication/understanding-rates-causes-and-costs-churning-supplemental-nutrition-assistance-program-snap>
- 42** Ettinger de Cuba S, Harker L, Weiss I, Scully K, Chilton M, Coleman S. Punishing hard work: the unintended consequences of cutting SNAP benefits [Internet]. Boston (MA): Children’s HealthWatch; 2013 Dec 12 [cited 2019 Feb 28]. Available from: http://childrenshealthwatch.org/wp-content/uploads/cliffeffect_report_dec2013.pdf
- 43** National Commission on Hunger. Freedom from hunger: an achievable goal for the United States of America. Washington (DC): The Commission; 2015.