The EITC and Health Across the Life Course: A Scoping Review

Pooja Madhanraj Slawa Rokicki

Working Paper September 30th, 2024 Policy Research In Social Determinants of Maternal and Child Health (PRISM)

Pooja Madhanraj Rutgers School of Public Health Department of Health Behavior, Society, & Policy

Slawa Rokicki Rutgers School of Public Health Department of Health Behavior, Society, & Policy Rutgers School of Public Health 683 Hoes Lane West, 3rd Floor Piscataway, NJ 08854 p: (732) 235-8956 slawa.rokicki@rutgers.edu

Abstract

Reduction of poverty among children may have significant long-run benefits. The Earned Income Tax Credit (EITC) is the largest federal anti-poverty program in the United States and a large body of evidence demonstrates beneficial impacts on family income, employment, and wealth. Research has also found positive effects of EITC exposure on health and social outcomes. However, there is limited understanding of the extent to which exposure to the EITC in early life affects long-run health. We conducted a scoping review to examine the current state of the evidence on the relationship between EITC exposure and health and social outcomes, and mapped that evidence to the broader literature on long-run health impacts across the life course. We searched the literature through August 2024, and focused on methodologically-strong studies (quasi-experimental or randomized trials). Results are presented across the stages of the life course, including infancy, childhood, adolescence, and adulthood. We discuss key gaps found.

1. Introduction

The Earned Income Tax Credit (EITC) is the largest federal anti-poverty program in the United States. Workers with eligible incomes receive a tax credit based on their earnings and their household size. If the tax credit earned exceeds the amount of taxes owed, they receive a lump sum payment of the difference following the filing of their tax return (Center on Budget and Policy Priorities, 2023). In 2023, the average amount for the refund was \$2,541 (Internal Revenue Service, 2024). The EITC is a work-contingent income support policy (Pilkauskas, 2023). As a result, this program has received bipartisan support over the years and has expanded several times since its establishment in 1975. Additionally, many states in the U.S. have adopted their own state EITCs.

EITC recipients are low-income working families. Those who are eligible tend to work in traditional blue-collar and service-sector jobs (Murray and Kneebone, 2017). The median income of recipients in 2018 was \$15,581, compared to a median of \$43,614 in the U.S. as a whole (Center on Budget and Policy Priorities, 2020). Participation in the EITC is high: 78% of eligible participants claimed the tax credit for the tax year of 2021 (Internal Revenue Service, 2024).

A large body of evidence shows that the EITC reduces poverty. The maximum credit can increase annual family income by as much as 45% (Bastian & Michelmore, 2018). In 2018, the EITC lifted approximately 5.6 million people above the poverty line and decreased the severity of poverty for another 16.5 million people. It plays an important role in the reduction of child poverty, where 3 million children were lifted above the poverty line and 6 million children experienced a decrease in the severity of poverty (Center on Budget and Policy Priorities, 2023).

Moreover, the EITC disproportionately serves people of color (Center on Budget and Policy Priorities, 2023). Black, Hispanic, and American Indian populations have the highest poverty rates compared to other race and ethnic populations within the United States (Shrider, 2024). Based on survey data from 2018, approximately 21% of Black and non-Hispanic women received the EITC compared to just 9% of White women (Marr & Huang, 2019).

There is a known link between poverty and health. The ability of the EITC to reduce poverty has led a growing research to explore if and how the EITC can affect health and healthrelated outcomes. However, there is limited understanding of the extent to which exposure to the EITC in early life affects long-run health. We conducted a scoping review to examine the current state of the evidence on the relationship between EITC exposure and health and social outcomes, and mapped that evidence to the broader literature on long-run health impacts across the life course. Results are presented across the stages of the life course, including infancy, childhood, adolescence, and adulthood.

1.1 Conceptual Framework

Several theoretical models of the life course have been proposed to explain how socioeconomic disadvantage in early life affects adult health. We considered three prominent models to inform our study aims and the design of the empirical analysis. In the accumulation model, the accumulation of chronic stress over the life course causes "wear and tear" on the body, which increases a person's allostatic load and leads to dysregulation of important body systems (Jones et al., 2019; Hailu et al., 2022). This concept is reflected in the weathering hypothesis that has been used to understand racial disparities and is the idea that repeated and chronic exposure to negative social and economic conditions accelerates the aging of biological systems and leads to increased risk of disease at earlier ages (Geronimus, 2001). The early programming/critical periods model posits that adverse experiences during particular critical periods in early life (such as in utero, early childhood, or adolescence) may encode the functions of organs or systems that have lifelong consequences for health (Barker, 1995; Ben-Shlomo & Kuh, 2002). The relationship between early life disadvantage and adult health remains even after controlling for adult SES. Health effects of adverse early life experiences may remain latent for many years before revealing in adulthood. In the pathways model, early life conditions indirectly affect adult health by influencing social, economic, and health outcomes and behaviors in adulthood (Ben-Shlomo & Kuh, 2002). Individuals are placed on a certain path trajectory based on their early life experiences. For example, individuals who experience early life disadvantage may have lower educational attainment, which may put them on a path to lower employment, increased financial stress and barriers to health care, and result in higher smoking rates (Doom et al., 2017). Over time this pathway leads to worse adult health. Finally, the social mobility model states that individuals transition in and out of various social classes based on social exposures, and this upward or downward social mobility determines health risk.

These life course models are likely to operate simultaneously (Halfon et al., 2002; Kilpi et al., 2017). We can use an integrated framework to consider how a policy intervention that reduces childhood and adolescent poverty – the EITC – may improve health in adulthood. First, it may be that consistent EITC payments over the full early life period reduce the cumulative exposure to poverty, serving as a protective factor. Second, there may be critical periods where the EITC is more impactful than others, for example, in utero or early childhood. Third, EITC throughout early life may alter the intermediate pathways, for example, through increasing education, reducing economic precarity and risky health behaviors, and increasing access and use

of health care in adulthood. Finally, EITC may result in upward social mobility, positively influencing health.

2. Methods

We searched the scientific literature to identify studies on the impact of the EITC on health and social outcomes across the life course. We searched the literature through August 2024, and focused on methodologically strong studies (quasi-experimental or randomized trials). Studies were summarized with regards to their population of interest, time frame, data sources, outcomes of interest, and results. Finally, findings were synthesized and organized to examine impacts across key stages of the life course, including infant, child, adolescent, and adulthood outcomes, and mapped to the broader literature on the effects of early life conditions on later-life health.

3. Results

3.1. Infancy

Infants exposed to the EITC in-utero tend to have better health outcomes. Multiple studies have found that birth weight tends to increase and the incidence of low birth weight tends to decrease with exposure to EITC (Averett and Wang, 2018; Baker, 2008; Batra et al., 2022; Hoynes et al., 2015; Komro et al., 2019; Markowitz et al., 2017; Strully et al., 2010; Wicks-Lim and Arno, 2017). There is less agreement on whether the amount of EITC exposure received determines the magnitude of the effect. Markowitz et al. (2017) find that birth weight increases in states with any level of their own EITC, with the largest effects happening in states with higher rates. However, Batra et al. (2022) finds no association between the amount of EITC

exposure and birth weight. The magnitude of the EITC's effect on birth weight also varies across populations. Across race and ethnicity, results are inconsistent. Some studies find a larger increase in birth weight in babies born to White mothers (Averett and Wang, 2018), while others find a larger increase in birth weight in babies born to Black mothers (Batra et al., 2022; Hoynes et al., 2015; Komro et al., 2019). One study found that babies born to non-Hispanic mothers had higher birth weight than babies born to Hispanic mothers (Hoynes et al., 2015). Other studies find no statistically significant differences of the effects of EITC on birth weight across race and ethnicity (Komro et al., 2019; Dench & Joyce, 2020). Maternal marital status and age may also influence the strength of the impact of EITC on birth weight. Baker (2008) finds stronger effects on birth weight in children born to single women compared to children born to married women. Strully et al. (2010) found that mothers who are between 19 to 34 years old experience the largest increase in birth weight when exposed to a state EITC.

Studies have also found that EITC exposure increases gestational age, and therefore, lowers the probability of being born premature (Hamad & Rehkopf, 2015; Hoynes et al., 2015; Komro et al., 2019; Markowitz et al., 2017). There are racial differences with this health outcome. Although this improvement is seen across racial and ethnic groups, both Komro et al. (2019) and Hoynes et al. (2015) find a stronger impact in babies born to Black mothers. However, other studies find no statistically significant differences between effects on gestational age across race and ethnicity (Komro et al., 2019; Dench & Joyce, 2020).

This improvement in infant health outcomes may influence later health outcomes of these individuals across the life course. Birth weight and gestational age are shown to be strong predictors of many different measures of health later in life (Barker 1995; Belbasis et al., 2016; Boyle et al., 2012; Coathup et al., 2020). However, more research is needed to understand how the relationship between EITC and birth outcomes is moderated by race and ethnicity. Black, Hispanic/Latino, and Indigenous populations in the United States tend to have worse baseline infant health outcomes (Hill et al., 2022). These populations are more likely to be EITC-eligible due to effects of structural racism (Chinn et al., 2021). As a result, it is imperative to understand how and why the EITC may improve infant health outcomes in these populations. Moreover, Indigenous populations are largely missing from existing EITC research altogether.

3.2. Childhood and Adolescence

3.2.1. Material Conditions and Home Environment

A large literature links EITC exposure to improved material conditions for its recipients, particularly for children. Studies have found improvements in food consumption due to the EITC (Lenhart et al., 2019; McGranahan & Schanzenbach, 2013; Rehkopf et al., 2014). Both Lenhart et al. (2019) and McGranahan & Schanzenbach (2013) find an increase in food expenditures following receipt of the EITC refund. Lenhart et al. (2019) finds that this increase is driven by changes in expenditures on food eaten at home. McGranahan & Schanzenbach (2013) find higher spending on healthy foods, such as meat, poultry, fish and eggs, dairy, fresh fruit and vegetables, across all EITC-eligible populations analyzed in their study. In a study focusing on a variety of short-term health outcomes following refund receipt, Rehkopf et al. (2014) found that women who received a minimum of \$1,000 were less likely to report not having enough food or not having enough money for food. However, they were more likely to have higher levels of sodium, LDL cholesterol, and triglycerides, which can adversely influence health. Women also reported higher levels of meat consumption in this timeframe. Food and nutrition insecurity are

associated with many adverse health outcomes, including long-run cardiovascular and metabolic outcomes (Cook et al., 2004; Gundersen & Ziliak, 2015; Olson, 1999).

A 2019 study found that the EITC reduces housing instability (Pilkauskas & Michelmore). The study found that EITC expansions decreased less severe forms of housing instability, such as the likelihood of doubling up, defined as living with family members that are not a part of the nuclear family, and the number of moves per year. However, the study did not find evidence of a program effect on the likelihood of more severe forms of housing instability, such as missing rent or mortgage payments, eviction, or homelessness. The authors found that this reduction in housing instability is driven by the EITC's increase on pre-tax income. Housing insecurity and instability influence health and health-related outcomes, particularly stress, an important pathway to life course health (Burgard et al., 2012; Cutts et al., 2011; Reid et al., 2018).

The EITC may also influence home environment quality. Averett & Wang defined home environment quality in their 2018 study through the following variables: cleanliness of the home, presence of a safe play environment, regular meals, regulated television time, type of discipline, and parental involvement in the child's life. They found that higher EITC payments significantly improved home environment quality for children of single mothers. These effects were found across race and ethnicity, however, stronger effects were seen for children of White mothers than children of Black and Hispanic mothers.

Studies have examined how the increase in employment induced by the EITC affects parental time with children, an important determinant of health and developmental outcomes (Gennetian et al., 2010; Morrill, 2011; Page et al., 2019). Studies have found that maternal time with children decreases with EITC exposure, though the effects are not statistically significant (Bastian & Michelmore, 2018; Braga et al., 2020). However, the change in parental time with children of different age ranges may be an avenue to continue research in this area. Song (2019) anticipates a decrease in maternal time as children grow older, whereas Bastian & Michelmore (2018) finds the greatest decline in maternal time when their children are under 6 years old, although it is not found to be significantly different from the decline occurring in other age ranges.

3.2.2. Health Insurance

The majority of studies find a decrease in those insured by public health insurance and an increase in those insured by private or employer sponsored insurance in EITC eligible households, which is driven by its employment effects (Arno et al., 2009; Baughman, 2005; Baughman, 2012; Baughman & Duchovny, 2016; Braga et al., 2020; Cebi & Woodbury, 2014; Hoynes et al., 2015; Jones et al., 2022; Lenhart 2019). However, the literature disagrees on whether the EITC increases the total amount of people insured (Arno et al., 2009; Braga et al., 2020; Cebi & Woodbury, 2014; Jones et al., 2022; Lenhart 2019) or if the increases in private or employer sponsored insurance are negated by the decrease in public insurance (Baughman, 2012; Baughman & Duchovny, 2016; Gangopadhyaya et al., 2020; Hoynes et al., 2015; Yoder 2022). Jones et al. (2022) goes on to identify racial and ethnic differences in this effect. They find that while White, Black, and Hispanic women have an increased likelihood of being insured due to the EITC, only White women have a stronger likelihood of having private or employer sponsored insurance. They speculate that this is because labor supply responses to the EITC are stronger in White women compared to Black and Hispanic women in their findings. Greater

access to insurance may increase likelihood of preventative care and reduce delays in care across the life course.

3.2.3. Education

Many studies have examined the impacts of EITC exposure on educational outcomes. Both Bastian & Michelmore (2018) and Dahl & Lochner (2012) found increases in children's test scores. In addition, they both found differences in the magnitude of the increase based on the age range of the child, which was consistent with a 2021 study on the timing of parental income and its impact on educational outcomes (Carneiro et al., 2021). Increases to income have the biggest effect on test gains approximately between the ages of 0-5 and 13-18. The pattern is seen with other educational outcomes that the EITC influences. There is an increase in the number of years of schooling (Bastian & Michelmore, 2018) and the likelihood in the enrollment and completion of a Bachelor's degree (Manoli & Turner, 2018; Michelmore, 2013). Michelmore & Lopoo (2021) finds racial differences in the increase in the years of schooling, where they only find this effect in White women. Understanding the EITC's effects on educational outcomes is important because an individual's education level influences their health and health-related outcomes. It can make them a more efficient producer of their health (Grossman, 2000). It also affects earning and employment outcomes, which in turn, affects health and health-related outcomes (Van Der Noordt et al., 2014). Furthermore, education can allow for upwards social mobility, which alters the intergenerational transmission of poverty (Haveman & Smeeding, 2006). From the research conducted so far, EITC exposure has strong positive impacts on educational outcomes, particularly when the individual is exposed to it at critical periods.

3.2.4. Physical Health

There are a few studies focused on self-rated health in children exposed to the EITC. In general, health outcomes among EITC-eligible children tend to be worse compared to non-EITC-eligible children (Hamad et al., 2018). Hamad et al. (2018) finds no significant short-term effect on self-rated health in children immediately following the refund. Baughman (2012) finds improvement in children's health status following the implementation of a state EITC. Averett & Wang (2018) found improved mother-rated health for children of married White mothers and unmarried Black and Hispanic mothers. Hamad et al. (2018) found no short-term effects of EITC on any metabolic markers in EITC-eligible children following receipt of refund.

The effect of the EITC on the BMI of children is inconsistent across studies. Baughman & Duchovny (2016) finds no significant changes in BMI as a result of EITC exposure. Jo (2018) finds an increase in obesity that is driven by a reduction in maternal time. Baughman (2012) finds a decrease in obesity that is stronger for children living in metropolitan areas.

3.3. Adulthood

3.3.1. Marital status and Maternal Age

A 2021 study found that childhood exposure to the EITC increases marital age and maternal age of women (Michelmore & Loopoo). This effect was only seen in adults raised in disadvantaged households categorized by having single and non-college educated parents. There are racial differences in this effect between White and Black women. The increase in marital age is only seen in White women while the increase in maternal age is seen in both races. The increase in maternal age is greater in White women, as their likelihood of having a child remains negative for longer than Black women. Marital status and maternal age are linked to several health and health-related outcomes (Deal & Holt, 1998; Jia & Lubetkin, 2020; Ketterlinus et al., 1990; Sauer, 2015; Verbrugge 1979). The Michelmore and Loopoo study postulated that the mechanism behind the increases in marital and maternal age, as well as the racial differences, is the increase in educational attainment (2021). This increase in educational attainment may also increase the likelihood of having a spouse who is also college educated, which can further facilitate mobility as a result of exposure from the EITC (Gilligan et al., 2018; Schwartz & Mare, 2005).

3.3.2. Employment

The EITC has been shown to increase employment and number of working hours (Gangopadhyaya et al., 2020; Jones et al 2022). However, studies differ on population most affected. Gangopadhyaya et al. (2022) find that increases in working hours only among single mothers. Jones et al. (2022) find a stronger increase in White women compared to Black and Hispanic women. Long-run effects on employment have also been studied. Bastian & Michelmore (2018) find that the EITC affects employment in adulthood for those exposed in childhood. Overall, childhood EITC exposure was found to increase likelihood of employment and increase annual earnings in adulthood. They report that increases in family income between the ages of 0 to 5 significantly increases annual earnings between ages 22 and 27.

3.3.3. Health Behaviors

Research on the impact of the EITC on adult health behaviors lacks consensus. The majority of studies document a decrease in the likelihood of smoking following exposure to the

EITC (Averett & Wang, 2013; Collin et al., 2020; Hamad & Rekopf, 2015; Hoynes et al. 2015; Rehkopf et al., 2014; Song, 2019; Strully et al., 2010). Rehkopf et al. (2014) finds a short-term decrease following receipt of refund. Song (2019) finds a decrease in the likelihood of smoking in adulthood following long-term exposure to the EITC in childhood. Racial differences in this effect are highlighted in Averett & Wang (2013). They find that this reduction is only significant for White mothers. However, multiple studies have documented increases in smoking due to the EITC (Collin et al., 2021; Jones et al., 2022; Kenkel et al., 2014; Shields-Zeeman et al., 2021). Racial differences in this effect are observed in Collin et al. (2021) and Jones et al. (2022), where the latter found an increase in Black women and both found increases in Hispanic individuals.

Two studies found that EITC exposure increases alcohol consumption (Collin et al., 2021; Shields-Zeeman et al., 2021). Collin et al. (2021) goes on to report differences by race/ethnicity and gender, finding larger impacts among women and Hispanic individuals.

3.3.4. Physical Health

Much of the existing literature on the EITC's effects on health outcomes is focused on self-rated health. From a data collection standpoint, it is an easy measure to obtain and has been shown to be an accurate predictor of mortality (DeSalvo et al., 2006; Idler & Benyamini 1997). Studies, for the most part, are in agreement that the EITC improves self-reported health status (Averett & Wang, 2018; Baughman, 2012; Braga et al., 2020; Evans and Garthwaite, 2014; Jones et al., 2022; Lenhart, 2019; Morgan et al., 2020; Shields-Zeeman et al., 2021; Song, 2019; Qian and Wehby, 2021; Yoder, 2022). However, there are some important differences across studies. While Collin et al. (2020) find no short-term effect on self-rated health, Morgan et al. (2020) finds the strongest improvements in self-rated health during periods of reimbursement. In addition, while Collin et al. (2021) finds no impact of state EITCs on self-rated health, Qian & Wehby (2021) finds that only refundable state EITCs impact self-rated health, and Morgan et al. (2020) finds that state EITCs with higher rates had lower reports of poor physical health. There are differences by race and marital status in this outcome. Jones et al. (2022) find stronger reductions in reported health limitations in White women than Black and Hispanic women. Qian & Wehby (2021) find more improvement in self-rated health in single mothers compared to married mothers.

Existing research has explored the association between the EITC and a variety of health conditions. Rehkopf et al. (2014) found a decrease in diastolic blood pressure and a decrease in the prevalence of colds in women immediately following receipt of the refund. Both Yoder (2022) and Jones et al. (2022) found that those with more cumulative adult EITC exposures have better physical health outcomes. However, the remaining results seem to conflict. Yoder (2022) could not identify what drives this effect. Jones et al. (2022) found that the decrease in the likelihood of having a mild diagnosis was due to fewer reports of arthritis, and the decrease in the likelihood of having a severe disease diagnosis was due to the decline in reported cancer and lung disease. Both studies find different racial differences. Yoder finds stronger effects for Black mothers compared to White mothers, while Jones et al. finds stronger effects for White women compared to Black and Hispanic women.

BMI can be used as a predictor for a variety of health conditions across the life course (Dixon 2010; Nuttall 2015). There is a known association between income and BMI (Ogden et al., 2017; Propper, 2005). However, research has shown that this relationship might not be a straightforward negative association (Chang & Lauderdale, 2005). Studies focused on the BMI of adult EITC recipients lack consensus. Schmeiser (2009) finds a positive association between

income of EITC recipients and BMI among women. Jones et al. (2022) find a reduction in BMI both in short-run and long-run EITC exposure as an adult, with stronger effects for White women than Black and Hispanic women. Existing research has shown that many factors, including but not limited to race, gender, area of residence, parental marital status, parental time, parental education, age of EITC exposure, and duration of EITC exposure, influence the relationship between income and BMI in EITC-eligible populations.

Metabolic markers may provide insight on the mechanisms by which the EITC impacts health. Rehkopf et al. (2014) studied short-term effects on health and health-related outcomes in EITC recipients following receipt of refund. Women who received a minimum of \$1,000 in the EITC refund had changes in HDL cholesterol and lymphocytes in a direction associated with better health while levels of sodium, LDL cholesterol, and triglycerides changed in a direction associated with worse health. Evans & Garthwaite (2014) found that EITC expansions were associated with a statistically significant decrease in risky biomarkers. This effect was driven by decreases in measures of inflammation, possibly suggesting that the EITC improves health by reducing stress.

3.3.5 Mental Health

Studies have found that the EITC largely has a positive effect on the mental health of its recipients (Braga et al., 2020; Evans & Garthwaite, 2014; Gangopadhyaya et al., 2020; Lenhart, 2019; Morgan et al., 2020; Qian & Wehby, 2021; Shields-Zeeman et al., 2021; Rambotti, 2020; Yoder, 2022). This association grows stronger with the amount of income recipients are eligible for. Both Rambotti (2020) and Lenhart (2019) found a negative association between state EITC and state suicide rate. Lenhart (2019) goes on to specify that only states with greater than or

equal to 10% of the federal rate have this association. In addition, there is a further decrease in state suicide rates if the state EITC is refundable. The relationship between state EITCs and mental health is further explored in other studies. Gangopadhyaya et al. (2020) found an improvement in mental health for both unmarried and married mothers following federal EITC expansion, but only in married mothers following state EITC expansion. Qian & Wehby (2021) found that only refundable state EITC programs improve reported mental health. In conflict with Gangopadhyaya et al., they found that single mothers experienced more improvement.

It is still not clear if long-term exposure to the EITC impacts mental health. While Yoder (2022) finds that long-term exposure during adulthood improves mental health outcomes, Jones et al. (2022) finds no significant long-term association between these two variables.

3.4 Long-run Impacts Across the Life course

3.4.1. Physical Health

Both Braga et al. (2020) and Song (2019) find an increase in self-rated health in adulthood following exposure in childhood. However, Song (2019) only finds this association when exposure to the EITC occurs in-utero or between the ages of 13-18. Braga et al. (2020) finds that adults exposed to the EITC as children have a lower likelihood of being disabled and a lower likelihood of being diagnosed with hypertension between the ages of 38-51. Multiple studies found decreases in blood pressure across the life course (Braga et al., 2020; Jones et al., 2022; Rehkopf et al., 2014).

Research also finds that exposure to the EITC in childhood leads to decreased likelihood of obesity in adulthood. Song (2019) finds this decrease is significant when exposure to the EITC happens in utero or between ages 13-18. Braga et al. (2020) finds the strongest decreases in

households that are single-parent and households in the lowest parental education group, both characteristics which comprise the target population of the EITC.

3.4.2. Mental Health

Few studies have examined exposure to the EITC in childhood on adult mental. Braga et al. (2020) found a decrease in the likelihood of reporting emotional problems as an adult when exposed to the EITC during childhood. However, this was not a significant association.

4. Discussion

This review examined the state of the literature on the impact of the EITC at key stages of the life course – infancy, childhood/adolescence, adulthood – and examined how early life exposure to EITC affects long-run health. In Figure 1 we present a map of the evidence.

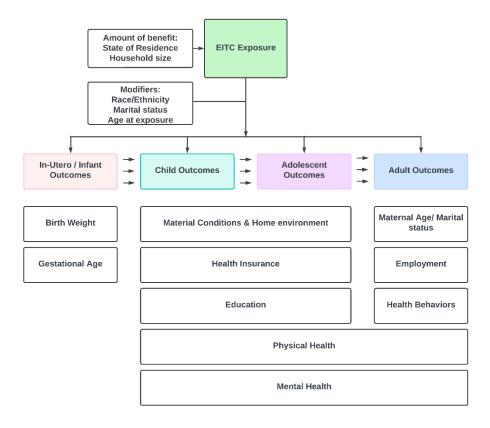


Figure 1. Map of evidence of EITC at key stages of the life course

There are several modifiers that alter the EITC's influence on health and health-related outcomes, including race and ethnicity, marital status, and age at exposure. In general, there is a current lack of consensus in the direction of these modifiers, particularly with regards to race and ethnicity. In outcomes related to education and employment, only exposures between the ages of 0-5 and 13-18 positively affected these outcomes. This suggests that there are critical or sensitive periods in a child's life when exposure to EITC is more impactful. More research is needed to understand the direction and the mechanism by which these characteristics modify impacts.

There are several gaps in literature. Many of the outcomes discussed in this review could benefit from additional studies. In particular, the current literature on EITC and physical health heavily relies on self-rated health and self-reported health outcomes. Biological data can provide greater clarity in how the EITC affects health outcomes. In addition, more health behaviors need to be studied, especially during adolescence, which sets a path for adult behaviors. Evidence on healthcare utilization is also lacking. Furthermore, the EITC has now existed for nearly fifty years, meaning it has affected multiple generations of Americans. However, there is a lack of literature studying the intergenerational effects of this program.

5. Conclusion

Our review examined the impact of the EITC on health and social outcomes across the life course. We found positive impacts in all life course stages - infancy, childhood, adolescence, and adulthood. Few studies examined how exposure to EITC in childhood affects long-run outcomes in adulthood or intergenerational outcomes. In addition, the mechanisms by which the EITC operates across different populations remains an important area of study.

References

- Arno, P. S., Sohler, N., Viola, D., & Schechter, C. (2009). Bringing health and social policy together: the case of the earned income tax credit. Journal of public health policy, 30(2), 198–207. <u>https://doi.org/10.1057/jphp.2009.3</u>
- Averett, S., & Wang, Y. (2018). Effects of Higher EITC Payments on Children's Health, Quality of Home Environment, and Noncognitive Skills. Public Finance Review, 46(4), 519-557. <u>https://doi.org/10.1177/1091142116654965</u>
- Averett, S., & Wang, Y. (2013). The effects of Earned Income Tax Credit payment expansion on maternal smoking. Health economics, 22(11), 1344–1359. https://doi.org/10.1002/hec.2886

Baker, K. (2008). "Do Cash Transfer Programs Improve Infant Health: Evidence from the 1993
 Expansion of the Earned Income Tax Credit."
 https://economics.nd.edu/assets/24011/baker_paper.pdf.

- Barker D. J. (1995). Fetal origins of coronary heart disease. *BMJ (Clinical research ed.)*, *311*(6998), 171–174. <u>https://doi.org/10.1136/bmj.311.6998.171</u>
- Bastian, J., & Michelmore, K. (2018). The long-term impact of the earned income tax credit on children's education and employment outcomes. Journal of Labor Economics, 36(4), 1127-1163.
- Batra, A., Karasek, D., & Hamad, R. (2022). Racial Differences in the Association between theU.S. Earned Income Tax Credit and Birthweight. Women's health issues : official

publication of the Jacobs Institute of Women's Health, 32(1), 26–32.

https://doi.org/10.1016/j.whi.2021.09.003

https://doi.org/10.17310/ntj.2005.4.03

Baughman, R. A. (2012). "Effects of State EITC Expansion on Children's Health." The Carsey Institute at the Scholars' Repository Paper 168. <u>https://dx.doi.org/10.34051/p/2020.168</u>

Baughman, R. A. (2005). Evaluating the impact of the earned income tax credit on health insurance coverage. *National Tax Journal*, *58*(4), 665-684.

Baughman, R. A., & Duchovny, N. (2016). State earned income tax credits and the production of child health: Insurance coverage, utilization, and health status. *National Tax Journal*, 69(1), 103-131. https://doi.org/10.17310/ntj.2016.1.04

- Belbasis, L., Savvidou, M. D., Kanu, C., Evangelou, E., & Tzoulaki, I. (2016). Birth weight in relation to health and disease in later life: an umbrella review of systematic reviews and meta-analyses. *BMC medicine*, 14, 1-15.
- Ben-Shlomo, Y., & Kuh, D. (2002). A life course approach to chronic disease epidemiology: conceptual models, empirical challenges and interdisciplinary perspectives. *International journal of epidemiology*, 31(2), 285–293.
- Boyle, E. M., Poulsen, G., Field, D. J., Kurinczuk, J. J., Wolke, D., Alfirevic, Z., & Quigley, M.
 A. (2012). Effects of gestational age at birth on health outcomes at 3 and 5 years of age: population based cohort study. *BMJ (Clinical research ed.)*, *344*, e896.
 https://doi.org/10.1136/bmj.e896

- Braga, B., Blavin, F., & Gangopadhyaya, A. (2020). The long-term effects of childhood exposure to the earned income tax credit on health outcomes. Journal of Public Economics, 190, 104249.
- Burgard, S. A., Seefeldt, K. S., & Zelner, S. (2012). Housing instability and health: findings from the Michigan Recession and Recovery Study. *Social science & medicine (1982)*, 75(12), 2215–2224. <u>https://doi.org/10.1016/j.socscimed.2012.08.020</u>
- Carneiro, P., Garcia, I. L., Salvanes, K. G., & Tominey, E. (2021). Intergenerational mobility and the timing of parental income. *Journal of Political Economy*, 129(3), 757-788. https://doi.org/10.1086/712443
- Cebi, M., & Woodbury, S. A. (2014). Health insurance tax credits, the earned income tax credit, and health insurance coverage of single mothers. Health economics, 23(5), 501–515. <u>https://doi.org/10.1002/hec.2928</u>
- Center on Budget and Policy Priorities. (2020) "EITC Estimated Characteristics of Eligible Filers (2018)". [Internet]. Available from: https://apps.cbpp.org/program_participation/#table/126/eitc---estimated-characteristicsof-eligible-filers--2018-. Accessed 9/22/2024.

Center on Budget and Policy Priorities. (2023, April 28). *Policy Basics: The Earned Income Tax Credit*. Center on Budget and Policy Priorities. <u>https://www.cbpp.org/research/federal-tax/the-earned-income-tax-credit</u>

- Chang, V. W., & Lauderdale, D. S. (2005). Income disparities in body mass index and obesity in the United States, 1971-2002. Archives of internal medicine, 165(18), 2122–2128. <u>https://doi.org/10.1001/archinte.165.18.2122</u>
- Chinn, J. J., Martin, I. K., & Redmond, N. (2021). Health Equity Among Black Women in the United States. *Journal of women's health* (2002), 30(2), 212–219. https://doi.org/10.1089/jwh.2020.8868
- Coathup, V., Boyle, E., Carson, C., Johnson, S., Kurinzcuk, J. J., Macfarlane, A., Petrou, S.,
 Rivero-Arias, O., & Quigley, M. A. (2020). Gestational age and hospital admissions
 during childhood: population based, record linkage study in England (TIGAR study).
 BMJ (Clinical research ed.), 371, m4075. <u>https://doi.org/10.1136/bmj.m4075</u>
- Collin, D. F., Shields-Zeeman, L. S., Batra, A., Vable, A. M., Rehkopf, D. H., Machen, L., & Hamad, R. (2020). Short-term effects of the earned income tax credit on mental health and health behaviors. Preventive medicine, 139, 106223.

https://doi.org/10.1016/j.ypmed.2020.106223

Collin, D. F., Shields-Zeeman, L. S., Batra, A., White, J. S., Tong, M., & Hamad, R. (2021). The effects of state earned income tax credits on mental health and health behaviors: A quasiexperimental study. Social science & medicine (1982), 276, 113274. https://doi.org/10.1016/j.socscimed.2020.113274

Cook, J. T., Frank, D. A., Berkowitz, C., Black, M. M., Casey, P. H., Cutts, D. B., Meyers, A. F., Zaldivar, N., Skalicky, A., Levenson, S., Heeren, T., & Nord, M. (2004). Food insecurity is associated with adverse health outcomes among human infants and toddlers. *The Journal of nutrition*, *134*(6), 1432–1438. <u>https://doi.org/10.1093/jn/134.6.##</u>

- Curran, M. A. (2021). The efficacy of cash supports for children by race and family size:
 Understanding disparities and opportunities for equity. *Race and Social Problems*, *13*(1), 34-48.
- Cutts, D. B., Meyers, A. F., Black, M. M., Casey, P. H., Chilton, M., Cook, J. T., Geppert, J.,
 Ettinger de Cuba, S., Heeren, T., Coleman, S., Rose-Jacobs, R., & Frank, D. A. (2011).
 US Housing insecurity and the health of very young children. *American journal of public health*, *101*(8), 1508–1514. <u>https://doi.org/10.2105/AJPH.2011.300139</u>
- Dahl, G. B., & Lochner, L. (2012). The impact of family income on child achievement: Evidence from the earned income tax credit. *American Economic Review*, *102*(5), 1927-1956.
- Deal, L. W., & Holt, V. L. (1998). Young maternal age and depressive symptoms: results from the 1988 National Maternal and Infant Health Survey. *American journal of public health*, 88(2), 266–270. <u>https://doi.org/10.2105/ajph.88.2.266</u>
- Dench, D., & Joyce, T. (2020). The earned income tax credit and infant health revisited. Health economics, 29(1), 72–84. <u>https://doi.org/10.1002/hec.3972</u>
- DeSalvo, K. B., Bloser, N., Reynolds, K., He, J., & Muntner, P. (2006). Mortality prediction with a single general self-rated health question. A meta-analysis. *Journal of general internal medicine*, 21(3), 267–275. <u>https://doi.org/10.1111/j.1525-1497.2005.00291.x</u>

- Dixon J. B. (2010). The effect of obesity on health outcomes. *Molecular and cellular* endocrinology, 316(2), 104–108. <u>https://doi.org/10.1016/j.mce.2009.07.008</u>
- Doom, J. R., Mason, S. M., Suglia, S. F., & Clark, C. J. (2017). Pathways between childhood/adolescent adversity, adolescent socioeconomic status, and long-term cardiovascular disease risk in young adulthood. *Social science & medicine (1982)*, 188, 166–175. <u>https://doi.org/10.1016/j.socscimed.2017.06.044</u>
- Evans, WN., & Garthwaite, CL. (2014). Giving Mom a Break: The Impact of Higher EITC
 Payments on Maternal Health. American Economic Journal: Economic Policy, 6 (2):
 258-90. DOI: 10.1257/pol.6.2.258
- Gangopadhyaya, A., Blavin, F., Braga, B., & Gates, J. (2020). Credit where it is due:
 Investigating pathways from earned income tax credit expansion to maternal mental health. Health economics, 29(9), 975–991. <u>https://doi.org/10.1002/hec.4034</u>
- Gennetian, L. A., Hill, H. D., London, A. S., & Lopoo, L. M. (2010). Maternal employment and the health of low-income young children. *Journal of health economics*, 29(3), 353–363. <u>https://doi.org/10.1016/j.jhealeco.2010.02.007</u>
- Geronimus A. T. (2001). Understanding and eliminating racial inequalities in women's health in the United States: the role of the weathering conceptual framework. *Journal of the American Medical Women's Association (1972)*, 56(4), 133–150.

Gilligan, M., Karraker, A., & Jasper, A. (2018). Linked Lives and Cumulative Inequality:
A Multigenerational Family Life Course Framework. *Journal of Family Theory & Review*, *10*(1), 111–125. https://doi.org/10.1111/jftr.12244

- Grossman, M. (2000). The human capital model. In *Handbook of health economics* (Vol. 1, pp. 347-408). Elsevier.
- Gundersen, C., & Ziliak, J. P. (2015). Food Insecurity And Health Outcomes. *Health affairs* (*Project Hope*), 34(11), 1830–1839. <u>https://doi.org/10.1377/hlthaff.2015.0645</u>
- Hailu, E. M., Carmichael, S. L., Berkowitz, R. L., Snowden, J. M., Lyndon, A., Main, E., & Mujahid, M. S. (2022). Racial/ethnic disparities in severe maternal morbidity: An intersectional lifecourse approach. *Annals of the New York Academy of Sciences*, *1518*(1), 239–248. <u>https://doi.org/10.1111/nyas.14901</u>
- Halfon, N., & Hochstein, M. (2002). Life course health development: an integrated framework for developing health, policy, and research. *The Milbank quarterly*, 80(3), 433–iii. <u>https://doi.org/10.1111/1468-0009.00019</u>
- Halfon, N., Larson, K., Lu, M., Tullis, E., & Russ, S. (2014). Lifecourse health development: past, present and future. *Maternal and child health journal*, 18(2), 344–365. <u>https://doi.org/10.1007/s10995-013-1346-2</u>
- Hamad, R., Collin, D. F., & Rehkopf, D. H. (2018). Estimating the short-term effects of the earned income tax credit on child health. American journal of epidemiology, 187(12), 2633-2641.
- Hamad, R., & Rehkopf, D. H. (2015). Poverty, Pregnancy, and Birth Outcomes: A Study of the Earned Income Tax Credit. Paediatric and perinatal epidemiology, 29(5), 444–452. <u>https://doi.org/10.1111/ppe.12211</u>

- Hardy, B., Hokayem, C., & Ziliak, J. P. (2022). Income inequality, race, and the EITC. *National Tax Journal*, 75(1), 149-167.
- Haveman, R., & Smeeding, T. (2006). The Role of Higher Education in Social Mobility. *The Future of Children*, 16(2), 125–150. http://www.jstor.org/stable/3844794
- Hill, L., Artiga, S., & Ranji, U. (2022, November 1). Racial disparities in maternal and infant health: Current status and efforts to address them. KFF. https://www.kff.org/racialequity-and-health-policy/issue-brief/racial-disparities-in-maternal-and-infant-healthcurrent-status-and-efforts-to-addressthem/#:~:text=Birth%20Risks%20and%20Outcomes&text=Black%2C%20AIAN%2C%

20and%20NHOPI%20women%20have%20higher%20shares%20of%20preterm,White%20women%20(Figure%203).

- Hoynes, H., Miller, D., and Simon, D. (2015). "Income, the Earned Income Tax Credit, and Infant Health." American Economic Journal: Economic Policy, 7 (1): 172-211. DOI: 10.1257/pol.20120179
- Idler, E. L., & Benyamini, Y. (1997). Self-rated health and mortality: a review of twenty-seven community studies. *Journal of health and social behavior*, *38*(1), 21–37.
- Internal Revenue Service. (2024, February 7). *EITC Fast Facts*. IRS: Earned Income Tax Credit & Other Refundable Credits. <u>https://www.eitc.irs.gov/partner-toolkit/basic-marketing-</u> <u>communication-materials/eitc-fast-facts/eitc-fast-facts</u>

- Internal Revenue Service. (2024) "EITC Participation Rate by States Tax Years 2014 through 2021". [Internet]. Available from: https://www.eitc.irs.gov/eitc-central/participation-rate-by-state/eitc-participation-rate-by-states. Accessed 9/26/2024.
- Jia, H., & Lubetkin, E. I. (2020). Life expectancy and active life expectancy by marital status among older U.S. adults: Results from the U.S. Medicare Health Outcome Survey (HOS). SSM - population health, 12, 100642. <u>https://doi.org/10.1016/j.ssmph.2020.100642</u>
- Jo, Y. (2018). Does the earned income tax credit increase children's weight? The impact of policy-driven income on childhood obesity. *Health Economics*, 27(7), 1089-1102.
- Jones, L. E., Wang, G., & Yilmazer, T. (2022). The long-term effect of the Earned Income Tax Credit on women's physical and mental health. Health Economics, 31(6), 1067-1102.
- Jones, M. R., Akee, R., & Simeonova, E. (2020). The EITC and intergenerational mobility. In Measuring and Understanding the Distribution and Intra/Inter-Generational Mobility of Income and Wealth. University of Chicago Press.
- Jones, N. L., Gilman, S. E., Cheng, T. L., Drury, S. S., Hill, C. V., & Geronimus, A. T. (2019). Life Course Approaches to the Causes of Health Disparities. *American journal of public health*, 109(S1), S48–S55. <u>https://doi.org/10.2105/AJPH.2018.304738</u>
- Ketterlinus, R. D., Henderson, S. H., & Lamb, M. E. (1990). Maternal age, sociodemographics, prenatal health and behavior: influences on neonatal risk status. *Journal of adolescent health care : official publication of the Society for Adolescent Medicine*, *11*(5), 423–431. <u>https://doi.org/10.1016/0197-0070(90)90090-0</u>

- Kenkel, D. S., Schmeiser, M. D., & Urban, C. (2014). Is smoking inferior? Evidence from variation in the earned income tax credit. Journal of Human Resources, 49(4), 1094– 1120. <u>https://doi.org/10.3386/w20097</u>
- Kilpi, F., Silventoinen, K., Konttinen, H., & Martikainen, P. (2017). Early-life and adult socioeconomic determinants of myocardial infarction incidence and fatality. *Social science & medicine (1982), 177*, 100–109.

https://doi.org/10.1016/j.socscimed.2017.01.055

- Komro, K. A., Markowitz, S., Livingston, M. D., & Wagenaar, A. C. (2019). Effects of State-Level Earned Income Tax Credit Laws on Birth Outcomes by Race and Ethnicity. Health equity, 3(1), 61–67. <u>https://doi.org/10.1089/heq.2018.0061</u>
- Lenhart, O. (2019). The effects of income on health: new evidence from the Earned Income Tax Credit. Rev Econ Household 17, 377–410. <u>https://doi.org/10.1007/s11150-018-9429-x</u>
- Lenhart O. (2019). The effects of state-level earned income tax credits on suicides. Health economics, 28(12), 1476–1482. <u>https://doi.org/10.1002/hec.3948</u>
- Maag, E., Matsui, A., & Menefee, K. (2023). How refundable tax credits can advance gender and racial equity. *National Tax Journal*, *76*(3), 743-763.
- Markowitz, S., Komro, K. A., Livingston, M. D., Lenhart, O., & Wagenaar, A. C. (2017). Effects of state-level Earned Income Tax Credit laws in the U.S. on maternal health behaviors and infant health outcomes. Social science & medicine (1982), 194, 67–75. https://doi.org/10.1016/j.socscimed.2017.10.016

Marmot, M. (2002). The influence of income on health: views of an epidemiologist. *Health affairs*, *21*(2), 31-46.

Marr, C., & Huang, Y. (2019). Women of color especially benefit from working family Tax credits. Center on Budget and Public Policy, Washington, DC, https://www.cbpp.org/research/federal-tax/women-of-color-especially-benefit-from-

working-family-tax-credits

Masarik, A. S., & Conger, R. D. (2017). Stress and child development: a review of the Family Stress Model. *Current opinion in psychology*, *13*, 85–90. https://doi.org/10.1016/j.copsyc.2016.05.008

McGranahan, L., Schanzenbach, D. W. (2013). The Earned Income Tax Credit and food consumption patterns. Federal Reserve Bank of Chicago Working Paper 2013–2014.

Michelmore, K., & Lopoo, L. M. (2021). The Effect of EITC Exposure in Childhood on Marriage and Early Childbearing. Demography, 58(6), 2365–2394.

https://doi.org/10.1215/00703370-9506903

Michelmore, K. (2013). The effect of income on educational attainment: Evidence from state earned income tax credit expansions. *Available at SSRN 2356444*.

Morgan, E. R., Hill, H. D., Mooney, S. J., Rivara, F. P., & Rowhani-Rahbar, A. (2020). State earned income tax credits and general health indicators: A quasi-experimental national study 1993-2016. Health services research, 55 Suppl 2(Suppl 2), 863–872. https://doi.org/10.1111/1475-6773.13307 Morrill M. S. (2011). The effects of maternal employment on the health of school-age children. *Journal of health economics*, 30(2), 240–257. https://doi.org/10.1016/j.jhealeco.2011.01.001

- Murray, C., & Kneebone, E. (2017, April 18). *The Earned Income Tax Credit and the White Working Class*. Brookings. <u>https://www.brookings.edu/articles/the-earned-income-tax-</u> <u>credit-and-the-white-working-class/</u>
- Nuttall F. Q. (2015). Body Mass Index: Obesity, BMI, and Health: A Critical Review. *Nutrition today*, 50(3), 117–128. <u>https://doi.org/10.1097/NT.000000000000092</u>
- Ogden, C. L., Fakhouri, T. H., Carroll, M. D., Hales, C. M., Fryar, C. D., Li, X., & Freedman, D. S. (2017). Prevalence of Obesity Among Adults, by Household Income and Education United States, 2011-2014. *MMWR*. *Morbidity and mortality weekly report*, 66(50), 1369–1373. <u>https://doi.org/10.15585/mmwr.mm6650a1</u>

Olson C. M. (1999). Nutrition and health outcomes associated with food insecurity and hunger. *The Journal of nutrition*, *129*(2S Suppl), 521S–524S. https://doi.org/10.1093/jn/129.2.521S

- Page, M., Schaller, J., & Simon, D. (2019). The effects of aggregate and gender-specific labor demand shocks on child health. *Journal of Human Resources*, 54(1), 37-78. <u>https://doi.org/10.3368/jhr.54.1.0716.8045R</u>
- Pilkauskas, N. V. (2023). Child poverty and health: the role of income support policies. The Milbank Quarterly, 101(S1), 379-395. <u>https://doi.org/10.1111/1468-0009.12623</u>

- Pilkauskas, N., & Michelmore, K. (2019). Does the Earned Income Tax Credit Reduce Housing Instability?. Demography, 56(4), 1303-26.
- Propper C. (2005). Why economics is good for your health. 2004 Royal Economic Society Public Lecture. *Health economics*, *14*(10), 987–997. <u>https://doi.org/10.1002/hec.1024</u>
- Qian, H., & Wehby, G. L. (2021). The Effects of Refundable and Nonrefundable State Earned Income Tax Credit Programs on Health of Mothers of Two or More Children. Women's health issues : official publication of the Jacobs Institute of Women's Health, 31(5), 448– 454. https://doi.org/10.1016/j.whi.2021.04.004
- Rambotti S. (2020). Is there a relationship between welfare-state policies and suicide rates? Evidence from the U.S. states, 2000-2015. Social science & medicine (1982), 246, 112778. <u>https://doi.org/10.1016/j.socscimed.2019.112778</u>
- Rehkopf, D. H., Strully, K. W., & Dow, W. H. (2014). The short-term impacts of Earned Income Tax Credit disbursement on health. International journal of epidemiology, 43(6), 1884-1894.
- Reid, K. W., Vittinghoff, E., & Kushel, M. B. (2008). Association between the level of housing instability, economic standing and health care access: a meta-regression. *Journal of health care for the poor and underserved*, *19*(4), 1212–1228. https://doi.org/10.1353/hpu.0.0068
- Sauer M. V. (2015). Reproduction at an advanced maternal age and maternal health. *Fertility and sterility*, *103*(5), 1136–1143. <u>https://doi.org/10.1016/j.fertnstert.2015.03.004</u>

Schmeiser M. D. (2009). Expanding wallets and waistlines: the impact of family income on the BMI of women and men eligible for the Earned Income Tax Credit. Health economics, 18(11), 1277–1294. <u>https://doi.org/10.1002/hec.1430</u>

Schwartz, C. R., & Mare, R. D. (2005). Trends in educational assortative marriage from 1940 to 2003. *Demography*, *42*(4), 621–646. https://doi.org/10.1353/dem.2005.0036

- Shields-Zeeman, L., Collin, D. F., Batra, A., & Hamad, R. (2021). How does income affect mental health and health behaviours? A quasi-experimental study of the earned income tax credit. Journal of epidemiology and community health, 75(10), 929–935. <u>https://doi.org/10.1136/jech-2020-214841</u>
- Shrider, E. A. (2024). *Poverty in the United States: 2023*. U.S. Census Bureau https://www.census.gov/library/publications/2024/demo/p60-283.html
- Song, Z. (2019) Long-Term Health Effect of Earned Income Tax Credit. Available at SSRN: https://ssrn.com/abstract=3487069 or http://dx.doi.org/10.2139/ssrn.3487069
- Strully, K. W., Rehkopf, D. H., & Xuan, Z. (2010). Effects of Prenatal Poverty on Infant Health: State Earned Income Tax Credits and Birth Weight. American Sociological Review, 75(4), 534-562. <u>https://doi.org/10.1177/0003122410374086</u>
- Van Der Noordt, M., IJzelenberg, H., Droomers, M., & Proper, K. I. (2014). Health effects of employment: a systematic review of prospective studies. *Occupational and environmental medicine*, 71(10), 730-736.

- Verbrugge, L. M. (1979). Marital Status and Health. *Journal of Marriage and Family*, 41(2), 267–285. <u>https://doi.org/10.2307/351696</u>
- Wicks-Lim, J., & Arno, P. S. (2017). Improving population health by reducing poverty: New York's Earned Income Tax Credit. SSM - population health, 3, 373–381. <u>https://doi.org/10.1016/j.ssmph.2017.03.006</u>
- Wimer, C., Collyer, S., Harris, D., & Lee, J. (2022). The 2021 child tax credit expansion: Child poverty reduction. *Poverty and Social Policy Brief*, 6(8).
- Yoder, M. (2022). Investigating the Long-Run Impact of the Earned Income Tax Credit on Maternal Health. Available at SSRN 4147185.