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Child Poverty, Toxic Stress, and Social Determinants of Health: Screening and Care Coordination

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Abstract

Social determinants of health (SDOH) refer to the social, economic, and physical conditions in which people live that may affect their health. Poverty, which affects nearly 15 million children in the United States, has far-reaching effects on children's physical and mental health. Although it is difficult to change a family's economic circumstances, nurses can play a critical role to address SDOH through screening and effective coordination of care. As nurses, our role is to minimize the effects of SDOH, including poverty, on child health and well-being through our practice, research, and professional education. We present three exemplars of child poverty to demonstrate the impact on child health and well-being and propose a model of care for nurses to assess and address SDOH in the pediatric clinical setting.

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Social determinants of health (SDOH) refers to a broad range of social and environmental conditions that affect our health and well-being, such as access to safe housing and healthy foods; employment and educational opportunities; healthcare services; non-toxic air and water; and neighborhoods where families can live without fear of violence or discrimination (HealthyPeople.gov, n.d.). Growing up in poverty is a powerful SDOH because it can affect children's access to many of these health-promoting conditions. For example, in 2017, the federal poverty level was defined as a family of four making below $24,600; an amount estimated to be about half of what is needed to afford housing, food, child care, transportation, and health insurance (United Way, 2018). Children of color, from single-parent households, and from immigrant families are most likely to live below the poverty line (Kids Count Data Center, 2016). They also often encounter racial and economic discrimination.

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The chronic stress of living in impoverished and unhealthy conditions can overwhelm a child's stress response systems, causing what has been referred to as "toxic stress" (Garner et al., 2012). Toxic stress affects a child's brain architecture and increases the risk of developing poor physical, behavioral, socio-emotional, and cognitive health (Shonkoff et al., 2012). It can also lead to a range of chronic illnesses well into adulthood, including heart disease, substance abuse, and depression (American Academy of Pediatrics, 2018a; Braveman, 2009; Shonkoff et al., 2012). However, families can be powerful buffers of toxic stress; research has shown that access to consistent, caring adults who are positive, nurturing, and responsive can protect children from the harmful health effects toxic stress (National Academies, 2016).

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The American Academy of Nursing (AAN) and the American Academy of Pediatrics (AAP) have published several position statements on the need to address SDOH in the clinical setting (Garner et al., 2012). Indeed, nurses have been outspoken about the need to assess and address poverty-related issues in early childhood and its impact on child health (Cox et al., 2018; DeGuzman & Schminkey, 2016; Gross, Beeber, DeSocio, & Brennaman, 2016; Hallowell, Froh, & Spatz, 2017; Hornor, 2015; Mason & Cox, 2014; O'Malley, 2013). As instrumental members of collaborative teams, nurses can and should screen for SDOH and facilitate care coordination to reduce the impact of poverty on health. As the AAP has noted, our challenge is to translate effective interventions into practice settings.

The purpose of this article is to describe three exemplars that demonstrate the impact of poverty on child health and suggest a model of care for nurses to effectively assess and address SDOH in the clinical setting. The exemplars include childhood behavior problems, asthma, and food insecurity; these are childhood health problems that are more prevalent among children living in poverty and which can have long-lasting effects on child health and well-being.

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Three Exemplars of Child Poverty

Behavioral Health

Behavior problems in young children are common and, in most cases, developmentally appropriate and transient (Daniels, Mandleco, & Luthy, 2012). However, behavior problems can be a serious condition for up to 20% of children (Weitzman & Wegner, 2015) and often co-occur with emotional and developmental problems. They are now among the leading causes of chronic pediatric disability in the United States; more than 1 in 5 children diagnosed with a chronic disability has one or more social, emotional, behavioral, or developmental problems (Halfon, Houtrow et al., 2017). Among children living in poverty, these problems are more than twice as likely to occur (Halfon, Houtrow et al., 2017)

Children who live in poverty are more likely to be exposed to multiple adversities, such as parent incarceration, violence, housing instability, racial or economic discrimination, and household substance abuse (Halfon, Larson, Son, Lu, & Bethell, 2017). These sources of chronic stress and adversity affect parents' abilities to provide a safe, stable, responsive, and nurturing environment for children. Such qualities are particularly important during the first five years of life, when children's brains are first developing (National Academies, 2016). Several studies have shown that exposures to high levels of stress and poverty during infancy and early childhood are linked to observable changes in brain development, particularly those areas of the brain associated with emotion regulation and cognitive development (Shonkoff, 2012).

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Growing up in safe, stable, and nurturing relationships can be highly protective (National Academies, 2016). Indeed, many parents raising young children in poverty have learned to create and use their social and community networks for support and to provide safe and supportive home environments for their children. Parents can be powerful buffers of adversity by providing a nurturing and responsive environment that supports secure attachment relationships and a sense of routine and predictability.

Unfortunately, there are also a number of parents raising young children in poverty who were also raised in poverty themselves and exposed to chronic adversity (Lomanowska, Boivin, Hertzman, & Fleming, 2017). As a result, they too may suffer from traumas and feel limited in their ability to provide the kind of environment they would like for their children. One in 8 children live in homes where parents have poor mental health, which can affect their abilities to focus on their children's needs and provide a consistent and nurturing environment (Lipari & Van Horn, 2017). The struggle is likely to be particularly acute for parents in poverty, who have limited resources for treatment and support. In a recent analysis of national health data of children insured by Medicaid or the State Children's Health Insurance Program (Cullen, Matejkowski, Marcus, Solomon, 2010) mental health problems were more likely to report they had no one to turn to for help with parenting and that they were not coping well with parenting.

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...parent depression

Primary care-based screening for behavioral and emotional problems in young children and mental health problems in their parents is now recommended by the American Academy of Nursing (Gross et al., 2016) and the American Academy of Pediatrics (Weitzman & Wegner, 2015). There are several child behavioral health

and developmental and behavioral problems in young children are particularly important areas for screening.

screening and prevention programs created for primary care providers to identify parenting and child behavioral health concerns during early childhood (American Academy of Pediatrics, 2018b). One example is the Bright Futures Tool and Resource Kit, which provides a range of age-specific screening tools and consumer handouts for identifying and managing common child behavior problems (American Academy of Pediatrics, 2018b). It is well established that parent depression and developmental and behavioral problems in young children are particularly important areas for screening. Both are responsive to treatment interventions when identified early but can have long-term adverse effects on a child's well-being if left untreated (Siu et al., 2016).

To date, there has been a great deal of research demonstrating the effectiveness of parent-focused interventions to strengthen parenting capacities and skills. These interventions reduce reliance on harsh discipline, and reduce child behavior problems before they become chronic and entrenched (National Academies, 2016). In fact, many of these evidence-based parenting programs have been developed and implemented by nurses, including the Chicago Parent Program (Breitenstein et al., 2012; Gross et al., 2009); ezParent Program (Breitenstein, Fogg, Ocampo, Acosta, & Gross, 2016); the Incredible Years Program (Webster-Stratton et al., 1997); and Insights (McClowry, Snow, Tamis-LeMonda, & Rodriguez, 2010). All of these programs provide parents with skills to strengthen the quality of the parent-child relationship and reduce problematic behaviors without reliance on harsh discipline.

Although more research is needed on the impact of parent-focused interventions in primary care (Peacock-Chambers, Ivy, & Bair-Merritt, 2017), there has been growing interest in promoting reimbursement streams that would support implementation of evidence-based parenting programs in primary care and educating primary care providers about parenting strategies. An important advantage of integrating behavioral health in primary care is the opportunity for more nurses to provide two-generation programs to address young children's behavioral health needs in a non-stigmatizing environment.

Environmental Exposures

Asthma, the most common chronic lung disease of childhood, affects approximately 6 million children in the United States and is thought to develop from a combination of environmental exposures and genetic factors (United States Environmental Protection Agency [U. S. EPA], 2012; Zahran, Bailey, Damon, Garbe & Breysse, 2018). Although all children are susceptible to respiratory illnesses, children in poverty are more vulnerable due to increased harmful environmental exposures. In 2016, asthma affected more children living below the Federal Poverty Line (FPL) (10.5%) than those in families with incomes of ≥250% FPL (≥250% to <450% FPL: 6.9%; ≥450% FPL: 6.7%) (Zahran et al., 2018). The burden of asthma was also worse for children in poverty with higher hospitalization rates (7.2%) compared to children living above the FPL (≥ 250% to <450% FPL: 2.1%; ≥450% FPL: 4.0%) (Zahran et al., 2018).

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Along with socioeconomic disparities, there are racial and ethnic disparities in asthma prevalence and morbidity. In 2016, asthma affected Black children (15.7%) and children of Puerto Rican descent (12.9%) more than White children (7.1%) (Zahran et al., 2018). The burden of asthma is also disproportionately distributed. Of asthma-related emergency department visits among children, 22.5% were Black compared with 12.2% who were White (Zahran et al., 2018).

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Differential environmental exposures have been shown to contribute to disparities in respiratory outcomes, such as asthma, experienced by children living in poverty. For example, toxic exposures are more frequent for children in poverty who are more likely to live near hazardous waste sites, industrial facilities, and sewage treatment plants (Buonanno, Marks, & Morawska, 2013; Glad et al., 2012; Mohai, Lantz, Morenoff, House, & Mero, 2009; Morello-Frosch, Pastor, Porras, & Sadd, 2002). These children are also more likely to live near large roads, increasing their exposure to ozone, nitrogen dioxide, and carbon monoxide, which are associated with asthma exacerbations and upper respiratory infections (Cook, Devos, Pereira, Jardine, & Weinstein, 2011; Li et al., 2011). These areas may also lack health promoting factors, such as healthy food outlets (Morland & Filomena, 2007), green spaces (Sbihi, Tamburic, Koehoorn, & Brauer, 2015), and recreational areas (Dahmann, Wolch, Joassart-Marcelli, Reynolds & Jerrett, 2009) that improve health by decreasing obesity and improving asthma symptoms.

Indoor air pollutant exposures are also disproportionately experienced by children in poverty. Secondhand smoke exposure, which occurs at a higher rate for children in poverty, harms the respiratory tract leading to reduced lung function, impaired response to viral respiratory pathogens and increased prevalence of wheeze (Milligan, Matsui, & Sharma, 2016). Many studies have found relationships between secondhand smoke exposure and increased

prevalence of acute (Difranza et al., 2012) and chronic respiratory illness (Butz et al., 2011; Kanchongkittiphon, Mendell, Gaffin, Wang, & Phipatanakul, 2015).

There is a significant financial burden for these illnesses. The direct medical cost of bronchiolitis, an acute lower respiratory tract infection, is $500 million annually (Pelletier, Mansbach, & Camargo, 2006). It is well established that a history of bronchiolitis increases a child's odds of developing asthma. Recent research suggests that when a child with a history of bronchiolitis is exposed to air pollution, their risk of developing asthma significantly increases. (Kim et al., 2013). The cost of asthma for adults and children is $81.9 billion annually when considering healthcare-related expenditures and costs incurred due to absenteeism and mortality (Nurmagambetov, Kuwahara, & Garbe, 2018). The increased exposure to air pollution and secondhand smoke for children living in poverty lead to expensive, long-term complications.

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Through advocacy, research, and outreach nurses are working to mitigate and eliminate environmental exposures for children who live in poverty. Professional organizations, such as the Public Health Nursing section of the American Public Health Association, advocate for the Environmental Protection Agency's "Clean Power Plan," which reduces carbon emissions and other harmful air pollutants (The American Public Health Association, 2017). Nurse researchers analyze the contributions of SDOH to respiratory illness (DePriest & Butz, 2017) and also test interventions (Butz et al., 2017) to decrease asthma morbidity.

Because poverty affects children's respiratory health in several ways, addressing it requires a multi-pronged approach.

There are several home visiting programs and mobile care vans that provide outreach to families and children living in poverty. Because poverty affects children's respiratory health in several ways, addressing it requires a multi-pronged approach. While nurses and nurse researchers are addressing environmental exposures in the community setting, there is opportunity to expand the role of nurses in the clinical setting. By referring patients to community asthma organizations using the AsthmaCommunityNetwork.org site (n.d.), nurses and advanced practice nurses (APRNs) are able to link patients to educational and emotional support and resources. Nurses and APRNs should also screen for SDOH and coordinate care for any needs identified. This novel approach would help to reduce morbidity and mortality experienced by children living in poverty.

Food Insecurity

Nearly than 13 million children in the United States live in food insecure homes, defined as a household with any member who has limited access to enough food due to lack of finances and resources (Coleman-Jensen, Rabbitt, Gregory, & Singha, 2018). Children who live in poverty are most vulnerable to also live in food insecure homes and experience hunger (Wight, Kaushal, Waldfogel, & Garfinkel, 2015). In fact, all households with children, especially headed by single parents, Blacks, and Hispanics, and households with incomes below the federal poverty level, disproportionately experience food insecurity at some point in time, *exceeding* the national average of food insecurity among all households (Coleman-Jensen et al., 2016).

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Children who face food insecurity are more likely to experience a host of health, developmental, and student achievement issues. Food insecurity increases a child's risk for asthma, with increased odds in Hispanic children compared to non-Hispanic Whites and Blacks, (Mangini, Hayward, Dong, & Forman, 2015); iron deficiency anemias (Eicher-Miller, Mason, Weaver, Mccabe, & Boushey, 2009); developmental issues in infants and toddlers, (Rose-Jacobs et al., 2008); growth stunting, (Bernal, Frongillo, Herrera, & Rivera, 2014); poor social, emotional, and cognitive skills needed for the Kindergarten year (Johnson & Markowitz, 2017); and absenteeism from school (Bernal et al., 2014).

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There have even been studies that have shown that children in food-insecure homes are more likely to be exposed to violence in the home compared to children in food-secure homes (Jackson, Lynch, Helton, & Vaughn, 2018). Unexpectedly, both cross-sectional and longitudinal studies have demonstrated that children in food-insecure homes were nearly twice as likely to be obese, as early as two years old, with girls at most risk (Holben & Taylor, 2015; Kaur, Lamb, & Ogden, 2015; Metallinos-Katsaras, Must, & Gorman, 2012; Metallinos-Katsaras, Sherry, & Kallio, 2009). An explanation for this could be that children in food-insecure homes are prone to eating low-cost, high caloric foods or have limited knowledge concerning healthy eating and exercise, both of which can contribute to elevating the body mass index.

The United States Department of Agriculture operates several food and nutrition assistance programs, such as the Supplemental Nutrition Assistance Program (SNAP); Women, Infants, and Children (WIC); and the Child and Adult

Care Food Program to help vulnerable families consume quality foods in appropriate amounts (United States Department of Agriculture, n.d.). The existence of these nutrition programs, however, does not guarantee the eradication of food insecurity among children. Furthermore, the survival and expansion of these programs rely on a healthy budget determined by a politically transient Congress.

The American Academy of Pediatrics (AAP) supports screening for food insecurity and providing referrals to federal assistance programs and community resources (Council on Community Pediatrics, 2015). The AAP has produced a toolkit to guide pediatricians to implement screening and referral in their workplaces (American Academy of Pediatrics, 2017; Knowles et al., 2018). However, there exist no national level models of implementation in the clinical setting. Developing a robust collaborative model that is inclusive of nurses is necessary. Nurses are capable and well within their scope of practice to assess, refer, and advocate for families who experience food insecurity. They should be an integral part of any model exploring ways to implement screening for food insecurity in the clinical setting.

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Discussion and a Proposed Model of Care

Given the number of children living in poverty, a meaningful response to the condition of poverty among our healthcare delivery systems has been elusive. Since the advent of the Affordable Care Act (ACA), healthcare delivery systems have attempted to emphasize prevention of disease and the elimination of health disparities. Concerning children specifically, the ACA has increased access to healthcare among parents of young children and children with pre-existing conditions and has expanded the Maternal, Infant, and Early Childhood Home Visiting Program, which targets at risk families and provides clinicians the opportunity to address SDOH (Keller & Chamberlain, 2014).

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Most importantly, the ACA has made possible creative and innovative models of care in which screening for SDOH and care coordination in the primary care setting can be optimized. For example, the Center for Medicare and Medicaid Services (CMS) Innovation Center developed a model of care called the Accountable Health Communities Model which empowers clinicians to address social issues such as housing instability, food insecurity, and safety, while preserving and reducing healthcare costs (Centers for Medicare and Medicaid Services, n.d.). Additionally, CMS developed the Accountable Health Communities Health-Related Social Needs Screening Tool with the hope that all clinicians can use this to identify and coordinate care to address SDOH (Centers for Medicare and Medicaid Services, 2017). Since this initiative is ongoing, it remains unclear how the Accountable Health Communities Model is making an impact in addressing the social needs of communities, and specifically children. Nevertheless, there is a critical need to develop, compare, and contrast additional innovative and emerging models of care with the hope of addressing poor health related to unmet social needs.

Bridging the gap between healthcare and SDOH requires the development of a robust, collaborative care model designed to respond to treatable poverty-related issues caused by exposure to poor environmental conditions (Wilson, 2017). An emerging model must also define standards of care, uniform protocols, and analytics across delivery systems to support essential continuous quality improvement processes specific to the treatment of poverty.

Bridging the gap between healthcare and SDOH requires the development of a robust, collaborative care model...

A potential SDOH treatment model inclusive of nurses is Transition to Success (TTS), a Clinton Global Initiative operating in small pilots across the country. TTS is an evidence-based, sustainable, scalable, and measurable system of care that screens and responds to the SDOH (Wilson, 2017). TTS was initially developed as a direct response to poverty for 10,000 clients being served at a charity in Detroit, MI. There, integrating evidence-based, best practices of care management, clients of all ages were screened for social determinants using the nationally recognized Arizona Self Sufficiency Matrix (*Transition To Success™ Final Evaluation Report*, 2015).

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Initial outcomes at this charity led to grant funding at local, state, and federal levels that included the development and evaluation of the first standards of care to treat the condition of poverty, corresponding SDOH

screening tools, and analytics. Independent evaluations of TTS reported statistically significant results in improving the social conditions in Head Start and at an outpatient Medicaid behavioral health clinic (Wilson, 2017). Today, TTS integrates SDOH screening with Centers for Medicare and Medicaid Services approved, validated, screenings and assessments and are integrated with technology platforms that integrate Health Insurance Portability and Accountability Act (HIPAA) compliant TTS CARE Plans across multi-user/ multi-programs.

In TTS, nurses can be uniquely positioned to screen and respond to SDOH as billable services. Once SDOH issues are identified, nurses can coordinate needed resources, maximizing all of the programs and services for which patients are eligible. SDOH are then responded to and tracked at each visit, again as a billable service. These demonstrated clinical screening tools provide vital, real-time, clinical information on the availability of and impact of referred services. Utilizing ICD 10 billing codes for primary and secondary (social determinant) diagnostics, claims tracking can now include SDOH. This data, once analyzed, provides critical information on the impact of addressing SDOH on the cost and quality of care, particularly for chronic conditions. Once SDOH are identified, nurses are positioned to coordinate needed resources, maximizing all of the programs and services for which patients are eligible.

In TTS, nurses can be uniquely positioned to screen and respond to SDOH as billable services.

In conclusion, nurses can provide direct care as it relates to health conditions caused by SDOH. Nurses are also positioned to lead the necessary culture shift, or the transformational change needed in healthcare and society as it relates to understanding and responding to SDOH. In their role as respected, evidence-based practitioners, nurses can directly change the hearts and minds of healthcare providers, healthcare institutions, and our nation with an understanding that health issues related to poverty are not a choice, but rather the direct result of exposure to disparate environmental conditions.

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Nurses can bring hope to this condition affecting so many with a defined response, using new tools and technologies within the existing funded healthcare delivery system. The profession of nursing is positioned to build the bridge between healthcare and the social determinants, creating and integrating science and data, leading training, developing skills, changing attitudes and influencing policy. As direct care providers, researchers, advocates and educators, nurses can confront poverty directly, teaching in practice, across organizations and community to understand this condition with a collective response of compassion and best practice to demonstrate improved outcomes clinically and fiscally in the treatment of poverty.

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Marcella Wilson has over 30 years of extensive experience in healthcare administration, not-for-profit management, behavioral health, criminal justice, and public-sector programming. Dr. Wilson, a University of Michigan alumnus, holds a Master's degree in Social Work and a PhD in Health and Higher Education. Dr. Wilson is an Emmy Award winner and Founder of Transition to Success™. Wilson is leading a national social change

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