

## Chapter 37

# Health Disparities in Adolescence

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### 1 Introduction

It is well established that there exists a gradient relationship between socioeconomic status (SES) and physical health (Adler and Newman, 2002; Adler et al, 1994, see Chapter 22). For example, individuals from lower SES environments are at an increased risk for morbidity and mortality due to a variety of causes (Mustard et al, 1997). While the majority of research has investigated SES–health relationships among adults and young children, until recently less research has focused on understanding these relationships during adolescence (although see Starfield et al (2002) and Chen et al (2002) for two reviews that highlight the impact that low SES may have on health outcomes in children and adolescents). However, as the adolescent years provide the basis for adult health, investigating health disparities among this age group is especially important.

The focus of this chapter is to review the nature of SES-based health disparities among adolescents. Adolescence is an important period in development that is marked by numerous transitions, both socially and biologically, and is generally viewed as the period between the beginning of puberty and adulthood. For the purpose of this chapter, studies are reviewed

that focus on youth in the 11- to 18-year-old age range, similar to approaches of other researchers studying adolescence (Leventhal and Brooks-Gunn, 2000; Starfield et al, 2002). In this chapter, we will also review several potential pathways through which SES may come to impact adolescent health. Understanding SES-based health disparities during this developmental period is important as adolescent health is likely to impact adult health, and because the beginnings of certain disease processes, such as atherosclerosis, emerge among adolescents (Strong et al, 1999).

### 2 Socioeconomic Disparities in Health Outcomes in Adolescence

A growing literature suggests that SES has a profound influence on a variety of health outcomes in adolescence, ranging from adolescents' perceptions of their own health to objective outcomes such as mortality.

Several large, cross-sectional studies have concluded that adolescents growing up in low SES environments generally experience greater mortality risks than their peers from higher SES families. For example, low SES youth are more likely to die from a number of causes, including pneumonia and influenza, fire, poisoning, and homicide (Nelson, 1992; Nersesian et al, 1985). In one of very few longitudinal studies, mothers were interviewed about SES at the time of their child's birth and families subsequently followed

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until the children had reached age 20 (Oliveira et al, 2007). Low parental occupation at birth was predictive of greater adolescent mortality due to external causes, particularly among boys. Hence the existing data suggest that low SES environments increase adolescents' risk for premature mortality due to a wide range of causes across the adolescent years.

Most studies investigating health disparities in adolescence have focused on overall health status. Many of these studies draw from large, nationally representative samples. For example, two studies using large samples of US adolescents found that after accounting for other sociodemographic factors, low familial SES, measured through the family's income and parental education, was associated with below average self-rated physical health status and a greater likelihood of reporting fair to poor health (Caputo, 2003; Goodman, 1999). Similarly, in a British study (Emerson et al, 2005) lower household income was associated with lower health status as measured by a wide range of indicators, including overall health status, current physical illness, and disabilities, reported by parents and teachers. More recent research is beginning to indicate that adolescents' subjective perceptions of familial SES may be just as good, if not better, predictors of their health. Several studies have reported that adolescents' subjective perceptions and reports of family SES predicted self-reported health status and quality of life and did so even after objective and parent-reported indicators of family SES had been taken into account (Goodman et al, 2007; von Rueden et al, 2005; Piko and Keresztes, 2007). von Rueden and colleagues (2005) also demonstrated that the relationship between youth's perceptions of family wealth and health status as well as quality of life was much stronger among adolescents than children, suggesting that as youth become older their subjective perceptions of familial wealth may become increasingly important.

Symptom reports among adolescents also reveal SES disparities. Starfield et al (2002) found that lower SES, as measured by parents' income, was associated with a greater likelihood of adolescents reporting fair to poor

health, physical activity limitations, bed-days, and restricted activity days. Huurre et al (2005) found that manual class origin was associated with higher rates of psychosomatic symptoms among adolescent females, but not males. Finally, one study found that low and high parental income is linked to different types of physical health symptoms (Rhee, 2005). Low SES youth's primary complaints included feeling hot, chest pain, urinary problems, and cold sweat, whereas high SES youth were more likely to complain about musculoskeletal pains.

Together, these studies suggest that SES influences not only symptom prevalence but also the types of symptoms that are reported. Overall, however, low SES adolescents tend to report greater symptoms, mirroring the findings for the relationship between SES and self-reported overall health.

We next provide examples using several specific types of health outcomes. For example, with respect to obesity, studies are fairly consistent in suggesting that low SES is associated with a greater likelihood of being obese among adolescents (e.g., Ahn et al, 2008; Goodman, 1999; Vieweg et al, 2007). For example, a longitudinal study (De Spiegelaere et al, 1998) followed adolescents from age 12 to 15 and tracked their obesity status. Consistent with other studies they found a relationship between low SES and increased risk of obesity. In addition, the gap between low and high SES youth also widened over time, indicating that existing SES differences may be further accentuated during adolescence. For a review on the negative impact of low SES on adolescent obesity, see Shrewsbury and Wardle (2008).

SES-based differences in adolescent sexual health have also been reported. For example, black adolescent females from low SES neighborhoods were more than twice as likely to report gonorrhea if their parents were unemployed, possibly indicating that youth from low SES neighborhoods are more likely to be part of high-risk sexual networks (Sioneau et al, 2000). Similarly, Newbern et al (2004) reported data from a national sample in which lower and nonprofessional maternal education

were related to higher rates of sexually transmitted infections (STIs) in adolescents, except for white females. Overall, higher rates of STIs were found among adolescents from one-parent homes. Note, however, that not all studies find relationships between SES and STIs (e.g., see Goodman, 1999; Santelli et al, 2000). Together these studies suggest some, although not definitive, evidence for a relationship between SES and adolescent sexual health.

Previous research furthermore points to SES differences in teenage pregnancy rates. US teenage women who become pregnant are more likely to come from low SES families (Boardman et al, 2006) and a British study examining teenage pregnancies in England across a 10-year period similarly reported higher mean conception rates in more deprived areas (Wilkinson et al, 2006). A study investigating teenage pregnancies among a sample of Scottish teenage women compared teenagers who gave birth with teenagers who also reported sexual intercourse but did not get pregnant and found that those who got pregnant were more likely to come from lower SES families (Buston et al, 2006). This suggests that the difference in teenage pregnancy rates between low and high SES teens may at least in part be explained by differences in contraceptive use and not simply differences in sexual activity. Finally, teenage women from low SES backgrounds also experience greater intended as well as unintended rapid repeat pregnancies, meaning they were more likely to become pregnant again within the 24 months following their first pregnancy (Boardman et al, 2006; Raneri and Wiemann, 2007).

SES has also been linked to chronic illness outcomes in adolescents. For example, adolescents from lower income families have overall poorer asthma control, even after taking into account controller medication use and primary care service utilization (Cope et al, 2008). Adolescents from low SES families are also more likely to live with undiagnosed frequent wheezing (Yeatts et al, 2003), experience less preventive care (fewer general

check-ups and prescription fills; Kim et al, 2009), and are more likely to have been previously hospitalized because of their asthma (Dales et al, 2002). Hence, low SES affects not only the prevalence of health problems but also how illnesses are experienced and managed.

Finally, research has examined SES differences in adolescent rates of injuries. These studies seem inconclusive at first as they often fail to find differences by SES in the number of total injuries (e.g., Simpson et al, 2005; Williams et al, 1997) or find different directions of associations for different SES measures (Potter et al, 2005). Closer examination of the available data, however, suggests that differences in types of injuries may help explain different patterns within different SES groups. Rauscher and Myers (2008) for example found a dose-response relationship between SES and work-related injuries among adolescents. After controlling for hours worked per week, work history, and race, there was a 30% increase in injuries among adolescents whose mother had a low education as opposed to high education background. In addition, while Simpson et al (2005), using cross-sectional Canadian data, also did not find a clear direction for overall injury rates, adolescents from low SES environments were at greater risk for being hospitalized due to injury as well as for reporting fighting injuries. These patterns suggest that injuries among low SES adolescents may result in part from interpersonal conflict and unsafe physical environments, such as unsafe neighborhoods or work environments. In contrast, higher SES adolescents appear to be at greater risk for recreational and sports injuries (Simpson et al, 2005; Williams et al, 1997). This may be in part because low SES youth are less likely to be able to afford such activities. In sum, adolescents from different SES groups appear to be vulnerable to different types of injuries. In particular, youth from low SES environments are at an increased risk from work-related injuries, injuries resulting from interpersonal conflict, and road injuries, whereas youth from high SES environments are at increased risk for sports injuries.

### 3 Reasons for Why These Disparities Might Exist in Adolescence

SES is likely to impact factors at multiple levels, for example at the individual level, through health behaviors such as substance abuse, at the family level, for example through parenting behaviors, at the neighborhood level, such as through neighborhood violence, through the availability of health insurance and access to care, and finally, through physical environmental influences and a number of biological pathways. All of these, in turn, impact adolescent health. Below we describe some of the most well-studied pathways through which SES likely comes to impact child health in more detail.

#### 3.1 Individual Level: Child Health Behaviors

One of the most well-studied pathways from SES to adolescent physical health is through adolescent health behaviors. For example, low SES adolescents are less likely to engage in physical activity (Abernathy et al, 2002; Janssen et al, 2006), thereby putting themselves at risk for overweight and related health problems. A recent study furthermore showed that adolescence is a period of significant decline in activity levels (Nader et al, 2009). Using accelerometers, the authors determined the time a sample of 9- to 15-year-old youth spent engaging in moderate-to-vigorous physical activity on a daily basis. While most 9-year olds showed evidence of healthy activity levels (about 3 h per day), 15-year-old study participants had dropped below the recommended time of 60 min of moderate-to-vigorous physical activity per day. Youth from low SES backgrounds also experienced somewhat faster decreases in physical activity over time. Sallis et al (1996) showed that one of the reasons for this lack of physical activity is the lack of resources low SES families have access to. Adolescents from more affluent school

districts had more frequent and active physical education classes at school and were twice as likely to take other exercise-related classes outside of school. Low-income families, on the other hand, did not have the financial resources to provide their children with comparable opportunities.

Other studies have further clarified that there is a distinction between physical activity and sedentary behaviors and that sedentary behaviors are also important to appreciate. While a lack of physical activity indicates that people are not engaging in regular structured exercise, this does not mean they also lead a very sedentary lifestyle, which includes behaviors such as watching TV and playing computer games. Two studies have found that sedentary behaviors, but not physical activity, mediated the low SES – overweight relationship among adolescents (Hanson and Chen, 2006; Lioret et al, 2007). Targeting sedentary health behaviors may be particularly important among adolescents as research suggests that as children move into adolescence their physical activity levels decline and sedentary behaviors become more common (Brodersen et al, 2007).

Finally, other studies suggest that lack of exercise and sedentary behaviors are also related to other negative health behaviors among adolescents. Wang et al (2006) found that low SES African American youth were not only more likely to not exercise and engage in sedentary behaviors, such as watching TV and playing video games, but were also more likely to consume fried foods and soft drinks, both of which would be particularly unhealthy in the context of an already sedentary lifestyle. Delva et al (2006) reported similar results based on a nationally representative sample of adolescents and found that in addition to being less likely to engage in good dietary and exercise habits, low SES adolescents were also less likely to eat breakfast on a regular basis.

Another set of health behaviors that has been proposed to vary by SES relates to substance use. However, evidence with regard to associations between SES and substance use is somewhat mixed. Soteriades and DiFranza (2003) reported

that adolescent cigarette smoking increases as parent income and education decrease and that this relationship may be partially mediated by parental smoking habits. These results are supported by a national longitudinal study which also found inverse SES gradients for cigarette smoking and alcohol use (Goodman and Huang, 2002). However, this study also reported that the nature of the relationships was not consistent across all SES indicators. Longitudinally, Harrell et al (1998) found that low SES children and adolescents were more likely to be experimental smokers and to start smoking earlier. In contrast, some evidence suggests that substance use may be more common among adolescents from high SES families (Hanson and Chen, 2007), perhaps because it is easier for high SES youth to acquire cigarettes, alcohol, and other drugs due to greater financial resources or because youth from affluent backgrounds are not exposed to the negative consequences of drug use on a regular basis which may provide a deterrent for engaging in substance use behaviors (see also Luther and D'Avanzo, 1999). In addition, Georgiades et al (2006) found that immigrant youth were subject to greater economic hardship, but nonetheless were less likely to smoke. Overall, large-scale studies suggest that low SES youth are more likely to engage in substance use behaviors such as cigarette use, though there may be some subgroups that are less vulnerable to substance use and some circumstances under which higher SES youth have greater access to substances.

with lower education and income (Goodman, 1999; Goodman et al, 2003; Kubik et al, 2003; Mendelson et al, 2008). Depression among adolescents, in turn, is associated with a series of other outcomes. For example, Goodman and Huang (2001) report that depressed adolescents experience fewer routine physical examinations and utilize fewer medical and more mental health resources. Depression has also been linked to adolescent substance use (Kubik et al, 2003) and Goodman and Huang (2002) reported that depressive symptoms may be one mechanism through which SES affects cigarette smoking and cocaine use among adolescents.

Adolescents growing up in low SES environments also experience greater stress in their lives (Goodman et al, 2005a), which may predispose low SES youth to certain negative psychological and physical health outcomes. Chen et al (2004) and Chen and Matthews (2003) showed that youth from low SES environments more readily make interpretations of threat when presented with ambiguous, but not negative, events, perhaps as a result of having grown up in a more hostile environment where there was greater exposure to chronic as well as acute daily stressors. These psychological traits have also been linked to physiological health outcomes, such that these youth also showed evidence of greater diastolic blood pressure and heart rate reactivity (Chen et al, 2004), as well as heightened levels of inflammatory markers implicated in asthma (Chen et al, 2006).

### **3.3 Family Factors**

#### **3.2 Individual Level: Child Psychological Characteristics**

Aside from youth's health behaviors, their psychological characteristics are also likely to be impacted by their environment and, in turn, to impact their health. One of the most common and most frequently studied mental health outcomes among adolescents is depression, which is more prevalent among youth from families

At the family level, a number of factors have also been identified as potential links between youth's low SES environment and physical health outcomes. Several studies have investigated the importance of family structure. Abernathy et al (2002) found that low SES adolescents were more likely to live in a one-parent household. In turn, girls (but not boys) living with one parent were more likely to be above the 85th percentile for weight (Delva et al, 2007),

suggesting that there are health benefits to be gained from living in an intact household with both parents present. It may be easier for parents in a two-parent household to place a greater focus on active behaviors and away from sedentary behaviors, such as TV watching, and to enforce behaviors such as healthy eating.

In addition, the characteristics of low SES families have been shown to differ from those of high SES families in a number of ways. Low SES families are characterized by greater family violence (Emery and Laumann-Billings, 1998) and physical abuse within the family (Reid et al, 1999). In addition, family relationships in low SES families are less likely to be warm and supportive (Bradley et al, 2001), and parents are more likely to engage in hostile, punitive, and inconsistent behaviors (Wahler, 1990). In a recent review article, Repetti et al (2002) elaborated on this concept of 'risky families' and suggested that families marked by conflictual and cold interactions that fail to provide safe and warm environments for children and adolescents create vulnerabilities in these youth and increase their likelihood of experiencing a number of disruptions in daily life functioning and health behaviors. Repetti et al (2002) propose that risky family environments alter sympathetic-adrenomedullary (SAM) reactivity and hypothalamic-pituitary-adrenal (HPA) responses to stress, leading to negative mental and physical health outcomes among adolescents. Growing up in risky families has also been linked to disruptions in emotion processing and social competence as well as health behaviors such as substance abuse. Hence the family environment may have implications for health outcomes via a number of diverse pathways, both biological and behavioral.

### 3.4 Neighborhood Factors

An increasing number of studies have begun to investigate effects of SES on health at the neighborhood level, including whether neighborhoods provide a safe environment for youth and the

types of resources and exposures that neighborhoods provide to youth (see Chapter 24).

In terms of social pathways, Cohen et al (2003) reported that neighborhood collective efficacy, meaning residents' willingness to help out for the common good, was lower in low SES neighborhoods in the Chicago area. This relationship mediated the association between low SES and all-cause premature mortality as well as mortality from cardiovascular disease and homicide among residents of these neighborhoods, such that lower collective efficacy was related to an increased likelihood of mortality. A recent review article (Leventhal and Brooks-Gunn, 2000) further supports this notion. Collective neighborhood efficacy is hypothesized to be one mediator through which low SES environments may come to impact adolescent health, for example, through increased supervision and monitoring by adults which could help to decrease the physical risk children and adolescents are exposed to in a neighborhood.

Neighborhoods may also be beneficial in terms of providing broader social networks allowing for greater access to informational resources. One laboratory study consistent with this explanation investigated whether being provided with informational resources from another person would affect physiological responses to stress. Chen (2007) investigated adolescents' physiological reactivity in response to a laboratory stressor over which participants received no intervention, were given control, or received social informational resources. Low SES (but not high SES) adolescents showed less reactivity when they received intervention. However, receiving social informational resources was more effective in reducing reactivity than having control over the stressor. This suggests that growing up in an environment that provides youth with increased access to informational resources may prove beneficial to their health.

Conversely, detrimental social characteristics at the neighborhood level can negatively impact health. Boynton-Jarrett et al (2008) studied a group of adolescents and found that cumulative violence exposure in their neighborhoods was associated with a graded increase in risk for

poor health, such that youth who were exposed to more than five forms of cumulative exposure were almost five times more likely to report poor health.

Furthermore, the physical characteristics of neighborhoods carries its own implications for health. In the above-mentioned study on Chicago residents (Cohen et al, 2003), low SES neighborhoods were also more likely to score higher on an index of 'broken windows,' meaning physical indicators such as boarded up homes, litter, and graffiti. This in turn mediated the effect between low SES and all-cause premature mortality, mortality from cardiovascular disease, and homicide, such that greater physical disorder in the neighborhood was related to increased risk for mortality.

Moreover, the accessibility of facilities and the physical characteristics of neighborhoods, including the existence of sidewalks, influence the amount of time youth spend engaging in extracurricular activities and physical exercise. Romero (2005) reported a lack of adults who youth felt contributed to a safe environment, as well as a lack of good quality facilities as barriers to physical activity in a sample of adolescents living in low SES neighborhoods. Gordon-Larsen et al (2006) came to a similar conclusion and reported that physical activity facilities, including parks, schools, youth organizations, and instructional facilities, such as dance schools, were not distributed equally between low and high SES areas. This lack of facilities in low SES blocks in turn led to decreased activity among the adolescents living in those areas. Moore and Diez Roux (2008) furthermore found that access to healthy foods is also a concern in low SES neighborhoods. Low SES neighborhoods were shown to overall have fewer supermarkets, fruit and vegetable markets, and natural food stores, whereas liquor stores and small grocery stores were more common in these areas. Problems relating to the availability of institutional resources have also been discussed as a potential mediating pathway between low SES and negative health outcomes among adolescents in Leventhal and Brooks-Gunn (2000).

Levels of pollution are yet another neighborhood factor with relevance to adolescents' health. Lee et al (2006) reported that low SES youth growing up in a major Korean city were exposed to greater levels of small airborne particles, sulfur, and nitrogen dioxide. This greater ambient air pollution in low SES neighborhoods is particularly relevant for youth with and at risk of asthma, one of the most common chronic illnesses among children and adolescents. A recent review article suggests that the accumulation of environmental risk factors across early life such as more polluted air and water and more crowded and poorer quality housing negatively influences the health of youth (Evans, 2004).

In sum, youth's neighborhoods have a profound impact on their health, with neighborhood facilities, social cohesion, and the neighborhood physical environment affecting adolescent health by influencing the safety of their surroundings, the amount of exercise youth engage in, sexual risk behaviors, and exposure to pollutants.

### 3.5 Access to Care

Another structural factor at the societal level, access to health care and health insurance, relates to adolescents' health outcomes. Not surprisingly, in the USA low SES adolescents are less likely to have health-care coverage (Newacheck et al, 2003), which is problematic as a lack of health insurance has been linked to numerous undesirable outcomes among adolescents. The low SES adolescents in this study participated in the National Health Interview Survey and were on average disadvantaged on three of the four health status measures, six of the eight measures of access to and satisfaction with care, and six of the nine indicators of access to and use of medical care, dental care, and mental health coverage (Newacheck et al, 2003). In addition, Kim et al (2009) reported that youth without health insurance used fewer health services overall, and Haas et al (2003) reported a positive relationship between lacking

health insurance or being insured publicly and the prevalence of being overweight.

### 3.6 Biological Pathways

A number of biological pathways are thought to link SES to adolescent health. In this section we provide a brief overview of the biological risk markers that are likely to impact adolescents' health into their adult life. Research has primarily focused on risk factors for cardiovascular health, such as blood pressure, cardiac reactivity, and hormonal profiles, for example, cortisol, which can provide information about the potential dysregulation of the hypothalamic-pituitary axis (HPA).

With respect to blood pressure in adolescence, Marin et al (2008) found that low early life family SES was associated with increased current blood pressure among adolescents. Similarly, McGrath et al (2006) reported that lower neighborhood income predicted increased systolic blood pressure during daily life.

SES has also been found to impact adolescents' cardiovascular reactivity. Chen et al (2004) demonstrated a relationship between low SES and greater cardiovascular reactivity during ambiguous (but not negative) videos of social situations that participants were presented with. Likewise, Gump et al (1999) reported that children and adolescents from low SES families showed increased cardiovascular reactivity in response to a laboratory stressor. These patterns linking low SES to greater cardiovascular reactivity may be particularly strong among youth from poor neighborhoods. Wilson et al (2000) found that among African American adolescents from poor neighborhoods those with less educated parents exhibited greater diastolic blood pressure in response to a competitive video game. Lastly, these associations may only be apparent in certain subgroups. Jackson et al (1999), for example, found a race by neighborhood SES interaction for systolic blood pressure reactivity such that both low SES whites and

high SES blacks had the greatest reactivity compared to their same race cohorts. The association between low SES and greater reactivity in whites is consistent with previous research. Jackson et al (1999) speculate that the reason for the relationship between high SES and increased reactivity among African American youth may be that these youth experience greater pressure to achieve and hence experience greater emotional stress in their everyday life. However, the exact mechanism underlying this phenomenon is still unclear.

Metabolic syndrome describes a cluster of risk factors for cardiovascular disease. Recent research linking SES to metabolic syndrome suggests that lower parent education is also associated with multiple metabolic risks among adolescents, including higher insulin and glucose, higher LDL cholesterol, waist circumference, and BMI, as well as cumulative risks (Goodman et al, 2005).

SES has also been linked to inflammatory markers related to coronary heart disease risk such as fibrinogen, a coagulation protein, and C-reactive protein (CRP). Murasko (2008) reported that low SES adolescents had higher levels of CRP in a sample of US adolescents. However, there are conflicting results in this domain, as other studies have found no relationship between SES and fibrinogen among old children (Cook et al, 1999) or higher levels of fibrinogen and CRP among boys from high SES schools (Thomas et al, 2005).

In addition, some studies have found links between SES and hormonal profiles among adolescents. Results from a longitudinal study (Evans and Kim, 2007) showed that among 13-year olds, those who had been exposed to greater cumulative exposure to poverty over the course of their life span had higher levels of overnight urinary free cortisol at the follow-up assessment, after controlling for baseline values. Another study found evidence of increased daily salivary cortisol output among both healthy children and adolescents whose parents were less educated (Wolf et al, 2008). However, some studies have found that the association of low SES with higher salivary morning cortisol is stronger in

younger children than in adolescents (Lupien et al., 2001).

Finally, SES has also been associated with biological markers within samples of adolescents with a chronic illness. For example, Chen et al. (2003) examined immune and neuroendocrine markers of asthma in a group of adolescents with asthma. Living in a low neighborhood was associated with greater stimulated production of the asthma-relevant cytokine interleukin 5 (IL-5), and marginally lower morning cortisol (a hormone with anti-inflammatory effects) among these adolescents. Likewise, another study with children and adolescents with asthma showed that those coming from low SES environments had a heightened production of the asthma-relevant cytokines IL-5 and IL-13, as well as higher eosinophil counts, a type of white blood cell involved in the inflammatory process of asthma. Taken together, these findings suggest that SES can have biological effects that have implications for the progression of chronic diseases and that low SES among adolescents is associated with a differential profile of hormonal output that, over the long term, may have negative implications for health.

## 4 Conclusion

Health disparities among adolescents are common and have potentially far-reaching implications for adolescents' future health during adulthood. We have reviewed the recent literature and shown that SES disparities predispose adolescents to a wide range of physical health problems. Strong associations have been found in particular for the impact of SES on adolescent mortality, obesity, self-reported health, and cardiovascular reactivity. Other areas, for example, the impact of SES on sexual health, are in need of more research before conclusions about the strength and direction of these relationships can be drawn. But overall, low SES youth face a series of disadvantages. They live in neighborhoods that support unfavorable health behaviors and compromise their safety. They are less likely

to be adequately insured, receive the diagnosis, treatment, and prolonged care that they may be in need of. And they may come from families that may be unable to support them, both emotionally in times of distress and financially with respect to, for example, leisure time physical activity. Lastly, they are more likely to engage in unhealthy and unsafe behaviors, in addition to being more likely to experience psychological distress.

These patterns imply that interventions will need to address SES-related disparities on a number of levels, ranging from the individual to the societal. Consequently, no single intervention focusing only on the neighborhood, the family, or the individual will be enough. Multi-pronged interventions may be needed, with separate components targeting individual, family, and neighborhood contributors to health disparities in order to create meaningful reductions in adolescent health disparities. In addition, a number of methodological issues also require more attention in future research. For example, as adolescents typically still live at home with their parents but begin to be increasingly independent, at times already even earning their own money, it becomes more and more difficult to determine whether family, i.e., parental, SES is an acceptable indicator of adolescents' SES, and under what conditions adolescents' own SES should be accounted for. Second is the issue of age or pubertal stage. The issue of age/pubertal stage is that many studies look at combined samples of children and adolescents together, meaning that any disparity differences by age group or pubertal development will be masked. This is consistent with several studies that have found different influences of SES on health outcomes in children as opposed to adolescents (e.g., Cope et al., 2008; von Rueden et al., 2005). In addition, when biological outcomes are measured, puberty status becomes especially important given natural changes in, for example, hormones with puberty.

In sum, adolescents growing up in adverse, low SES environments, just like children and adults from low SES backgrounds, are more likely to experience a range of negative health

outcomes. By better understanding and targeting the pathways between low SES and adolescent health, future research may be able to help place low SES youth on more positive trajectories leading to better health well into their adult years.

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