Social and environmental exposures—the bidirectional learning between health policy and practice

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Children are vulnerable to a myriad of environmental exposures that impact health and development. With a deeper appreciation of social determinants and influencers of health, pediatricians are exploring new practices to identify exposures that could put children at risk and to better understand opportunities for intervention to alleviate detrimental outcomes. Unfortunately, identifying the risk and understanding the health impact of an environmental exposure are just the first steps alerting potential need for an intervention. Reducing or eliminating the exposure often requires behavior change to modify the environment or perhaps policy change to modify the behavior. These steps, while seemingly more distant from the child as a patient, may be most influential, even critical, to halting a decline in health or development.

In this edition of the journal, Wang, *et al*, studied the associations between paternal tobacco smoking behaviors, maternal second-hand smoke (SHS) protective behaviors, and smoke-free rules at home, assessing exposure with infant's saliva cotinine levels (1). We learn that second-hand smoke in a household with a known smoker is nearly impossible to avoid. Avoidance behaviors from the non-smoker, in this case the infant's mother, show no significant decrease in exposure as measured by nicotine metabolites in the infant. The implications here are dramatic. Clinically, our best guidance to parents is attempted avoidance, short of creating an entirely smoke-free household. This evidence validates guidelines recommending a total smoking ban at home, since there is no safe level of SHS exposure.

Additional research has shown that tobacco is not the only SHS exposure measurable in infants. Marijuana use also results in quantifiable cannabinoid metabolites measured in urine of smoke-exposed infants (2). These findings would suggest that screening for smoke exposure should be inclusive of any form of smoke and that pediatricians should be prepared to discuss health ramifications of all types of smoke exposure. The rapidly changing state laws related to marijuana access and use demonstrate a policy shift with impact to children's health on a variety of levels. To date, eight states have legalized sale and possession for both medical and recreational marijuana use (Alaska, California,

Colorado, Oregon, Massachusetts, Maine, Nevada, and Washington). The District of Columbia has legalized personal possession, but not commercial sale. Twenty-three states allow limited medicinal use, and at the federal level the FDA has approved two drugs that contain marijuana components for use in adults despite the fact that U.S. federal law defines all forms of cannabis as a Schedule I drug, illegal for use, sale, and possession. There has been no change to resolve inconsistencies with the Controlled Substances Act of 1970 and the campaign to legalize marijuana, as the Act considers marijuana to have 'no accepted medical use.'

Rapidly changing laws and regulations, in turn require clinical practice to be astute to not only evolving science, but also to culture shifts, social, and environmental policies and their impact on exposure of children and families. There is increasing movement toward screening for social and environmental exposures that could put children at risk for health impact. The interface between medical and social sciences requires bi-directional processing of information to both, use the evidence of social determinants of health to guide policy and to assess the effects of changing social and environmental policies on health.

In 2017, the American Academy of Pediatrics issued the latest revision of Bright Futures articulating best practices for preventive and primary care. For the first time, this includes recommendations for screening for social determinants of health. Bright Futures points to the evolving evidence from adverse childhood events research, as well as neurodevelopmental sciences with new understanding of the developing brain justifying necessity for early identification of social and environmental stressors to prevent downstream effects (3). But implementation of social screening has not been fully adopted largely due to the inertia of behavior change in clinical practice. Practices have begun developing validated screening items and tools, and addressing new demands on clinical workflow. The more daunting challenge is managing and treating the newly discovered social and environmental threats.

Consider inquiry about marijuana exposure as an example. The challenge is not about asking the question of whether there is marijuana use, although the reservation to ask may lie with personal bias and cultural beliefs. Lack of knowledge about how

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to counsel an adult who responds positively, lack of resources for providing support to quit, and lack of understanding the health outcomes of marijuana exposure are the true limits on a pediatrician's actions. Much research is still needed to fully understand the health effects of marijuana and cannabinoids. What we do know is: (1) that smoke from combustion has similar effects on endothelial function whether from tobacco or marijuana, as demonstrated in rat studies (4); (2) marijuana metabolites are measurable in infants exposed to smoking adults (2); (3) measurable levels of marijuana SHS in infants are higher when co-smoking tobacco (2); and (4) during the time adolescents are beginning to use marijuana, the brain is still undergoing development with myelination and pruning lasting into the early 20s and is susceptible to injury and impairment during this time (5). In the clinical setting, marijuana exposure should be considered an environmental determinant of health. Clinical practice should include screening for all smoke exposures; counseling on parental use, risks of second hand smoke to children, and safety; and provision of community resources for counseling or treatment. The AAP policy statement on marijuana last updated in 2015 offers recommendations for limiting marijuana exposure in children (6). As we gain greater understanding of risks, even more specific guidelines are needed for practitioners.

The primary policy that promotes screening for pediatric patients is Medicaid via the Early and Periodic Screening, Diagnostic, and Treatment (EPSDT) benefit. EPSDT is designed to provide comprehensive and preventive health care services for children under age 21 years. Screening is intended to detect potential problems and may include tests for behavioral, developmental, and other issues, including social and environmental influencers of health. Thus, EPSDT facilitates improved screening practices that may include smoking and other social determinants, and also ensures that Medicaid will cover services and treatment of medically necessary care related to identified risks to correct and ameliorate health conditions. This benefit surpasses that of adult preventive care in Medicaid with the explicit intention of early detection and treatment before health problems become advanced and treatment is more difficult and costly. As evidenced in adult care, lack of policy to reimburse for screening and prevention diminishes its priority in practice. The ongoing threat of Medicaid cuts and caps puts EPSDT at risk, making Medicaid the most important policy that pediatricians must advocate to preserve if we want to optimally address social determinants of health in low-income populations.

Changing marijuana policies are also highly relevant, affecting children in multiple ways. Increased prevalence and access to the substance creates greater potential of increased exposure from adult use, and increased access to adolescents (albeit illegal). Although there is no evidence to suggest that legalization is increasing use of marijuana among teens, use is rising among 18–25 year olds, coinciding with the age of young parents (7). In Colorado, accidental ingestion of marijuana among young children has increased since

legalization (8). The next generation of policy efforts aims to target both clinical care and public health. State-level policies in states where marijuana has been legalized have the potential to complement efforts in the clinical setting. Regulations are being put into place to protect children from marijuana exposure, including, but not limited to, restriction of marketing to youth under 21 years of age; clean indoor air acts to protect against passive marijuana smoke; bans on college campuses, schools, and child care centers; tracking and monitoring of emergency visits for accidental ingestions among children; safer child-resistant packaging, warning labels, and imprinted symbols on packages to indicate products containing marijuana; and warning labels specific for pregnant women of the dangers of marijuana use. Standards must be set for safety thresholds for SHS by bystanders, especially children. Clearly, additional funding for research to strengthen the evidence of marijuana effects is needed to create and study policies and their implementation.

Marijuana policies are continuing to evolve at the state and federal level. In January 2018, U.S. Attorney General Jeff Sessions rescinded the Cole Memo, which had previously encouraged federal prosecutors to refrain from targeting state-legal marijuana operations, and issued a memo instructing U.S. Attorneys to enforce prosecution for federal charges related to marijuana. Undoubtedly, the ground will continue to shift with politics and policy, but first and foremost, our clinical and civil responsibility is to protect children and adolescents from harm and ill-effects of unintended exposure.

Screening for social and environmental determinants of health is a pediatric necessity elevating the importance of social and environmental policies to protect children. Rapidly changing policies impacting coverage, screening, and explicit exposures inclusive of SHS require physician understanding, civic engagement, and advocacy. We must continue to screen for all forms of smoke exposure, encourage a smoke-free household, guide adults about the potential impact of marijuana SHS, and be vigilant about pursuing the research required to fully understand the health impacts of marijuana. Evidence from clinical research must guide policy. We also need unifying policy to impact population level determinants of health. Perhaps most, we need the bi-directional sharing between researchers and policymakers to understand the evidence and policies that influence health outcomes, particularly for those of social and environmental impact.

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