

Introduction to the Special Issue: Tobacco Control Strategies for Medically At-Risk Youth*

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Tobacco use and exposure to secondhand smoke (SHS) are significant behavioral health problems that can result in a range of well-documented negative health consequences for children and adolescents (Gold et al., 1996; Prokhorov, Emmons, Pallonen, & Tsoh, 1996; US Department of Health and Human Services [USDHHS], 2000). The American Academy of Pediatrics (AAP) has issued a number of policy statements in the past 5 years that have identified tobacco prevention and cessation as well as SHS reduction as issues that are crucial to children's health (AAP, 2001; Winickoff, Hillis, Palfrey, Perrin, & Rigotti, 2003b). Likewise, current national health objectives (Healthy People 2010) include reducing the initiation of tobacco use among children and adolescents, increasing cessation attempts by current smokers, and reducing the proportion of youngsters who are regularly exposed to tobacco smoke in the home (Centers for Disease Control and Prevention [CDC], 2004; USDHHS, 2000). The most recent US Surgeon General's report has also brought the topic of children's involuntary exposure to SHS to the national forefront once again (USDHHS, 2006).

Although these are important health objectives for all children, they are especially important for children with a chronic illness, whose risks for tobacco-related health problems are magnified because of their vulnerable health status. Disease and treatment-related complications and toxicities that accompany many childhood chronic illnesses are likely to be exacerbated by cigarette smoking and exposure to SHS. High-risk groups include, but are not limited to children with medical conditions including asthma, cancer, cancer survivors, cystic fibrosis, diabetes, and those with elevated cardiovascular risk factors.

There is a critical need to examine and evaluate tobacco prevention and control efforts for medically at-risk children and adolescents, as the estimates of morbidity and mortality attributable to tobacco use and SHS exposure in these vulnerable populations are

likely significant.¹ Investigators from a broad array of disciplines, with research agendas in tobacco control and health promotion, were invited to submit manuscripts for this special issue. Authors were selected that represented a balanced, yet broad cross-section of expertise in that they worked with children across different disease groups as well as healthy children.

No forum has existed, to date, for the purpose of providing an exchange of information among researchers conducting tobacco-related studies with pediatric populations. Clearly, there are gaps in existing knowledge and a lack of focus on critical issues that could significantly advance the field. The articles presented in this special series provide a critical evaluation of the medical, psychological, behavioral, and public health aspects of tobacco control initiatives for children with chronic medical conditions and identify challenges for future pediatric tobacco control research. The goal of this issue was to expand tobacco control research efforts beyond the primary medical settings to medically at-risk children treated in specialty clinics.

The articles in this series are organized around four content areas: (a) developmental and psychosocial aspects of cigarette smoking onset and prevention; (b) smoking cessation; (c) reduction of SHS exposure; and (d) outcomes/endpoints for tobacco trials and related measurement issues. This special issue provides evidence of scientific progress to date in these respective areas and also addresses future tobacco initiatives. Several recurrent

¹The articles included in this series are based on a conference related to tobacco control strategies for medically at-risk youth that was sponsored and funded by the National Cancer Institute, the National Heart, Lung, and Blood Institute, the National Institute of Child Health and Human Development, and St. Jude Children's Research Hospital in Memphis, TN. The primary aim of the scientific working conference was to bring together a panel of experts to provide an interdisciplinary dialogue around current and promising approaches to tobacco control in medically at-risk children, adolescents, and their families.

*This article is based on the proceedings from the conference, "Tobacco Control Strategies for Medically At-Risk Youth", held on October 6–8, 2005 at St Jude Children's Research Hospital in Memphis, TN.

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Journal of Pediatric Psychology 33(2) pp. 113–118, 2008

doi:10.1093/jpepsy/jsm134

Advance Access publication January 11, 2008

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themes and issues are evident throughout the special issue. This brief introduction provides background information that served to justify the special series and also highlights the relevant questions that set the stage for discussion in each of the articles.

Smoking and Exposure Rates

One might expect that youngsters with chronic medical problems would avoid carcinogens, particularly if their health care provider counseled them about tobacco-related health risks during their treatment. The majority of published studies that have examined the smoking prevalence among youngsters treated for a chronic medical condition have focused largely on adolescents with asthma, cancer, and cancer survivors. Collective results from several studies suggest there is considerable variability in documented smoking rates among youngsters with chronic illness.

With the exception of children and adolescents with asthma who have reported smoking rates comparable to (Brook & Shiloh, 1993) or greater than youngsters without asthma (Forero, Bauman, Young, Booth & Larkin, 1992; Forero, Bauman, Young, Booth, & Nutbeam, 1996; Kaplan & Mascie-Taylor, 1989, 1997; Sherman, Tosteson, Tager, Speizer, & Weiss, 1990; Tercyak, 2003), those with cancer (Tyc, Lensing, Klosky, Rai & Robinson, 2005), cystic fibrosis (Britto et al., 1998), sickle cell disease (Britto et al., 1998), and juvenile rheumatoid arthritis (Nash, Britto, Lovell, Passo, & Rosenthal, 1998) generally smoke at reduced rates relative to their healthy peers. Current smoking rates as high as 55% have been reported among children with asthma (Forero et al., 1996), while rates as low as 2% have been reported among adolescents being treated for cancer (Tyc et al., 2005). Higher smoking rates, that more closely resemble those of their healthy peers, have been reported among adolescent cancer survivors who have completed their treatment. Between 15% and 38% of adolescent survivors are reported to be current smokers (Hollen & Hobbie, 1993; Mulhern et al., 1995; Tyc, Hadley, & Crockett, 2001; Verrill, Schaeffer, Vannatta & Noll, 2000). Smoking rates are less clearly established among adolescents with diabetes (Frey, Guthrie, Loveland-Cherry, Park, & Foster, 1997; Gold & Gladstein, 1993; Shaw, McClure, Kerr, Lawton, & Smith, 1993), although more recent evidence suggests their rates may approximate those of their healthy peers (Tercyak, 2004; Tercyak et al., 2005). Overall, these smoking rates are highly alarming in light of the increased health risks of youngsters with medical conditions.

Little is known about the risk factors that contribute to smoking onset and influence smoking rates among

medically at-risk youngsters. Are there unique factors that have not yet been studied that may play a role in the smoking process? Disease course, duration, and severity, treatment-related side effects, age of onset, prognosis, degree of physical disability, and visibility of the condition are just some of the variables that may influence the likelihood of smoking behaviors among youngsters with chronic illness that have not been adequately examined. Are there qualitative and quantitative differences between medically ill children and their healthy peers that serve to delay/disrupt the usual trajectory of smoking? The supportive services traditionally offered to patients with chronic illness may also change the trajectory of tobacco use in medically at-risk pediatric populations (Larcombe, Mott, & Hunt, 2002) and is an area that should be further explored. This collective information would also be useful in informing interventions for medically vulnerable children.

As in the case for tobacco use, limited data regarding SHS exposure rates among medically at-risk children are available. Although estimates vary, results from several studies suggest that children with asthma (Huss et al., 1994; Kattan et al., 1997), cancer (Tyc et al., 2004b), sickle cell disease (West et al., 2003), cystic fibrosis (Verma, Clough, McKenna, Dodd, & Webb, 2001) and diabetes (Tercyak et al., 2005) reside in households with smokers and are, therefore, at risk for being exposed to SHS. There is also evidence that children and adolescents with cancer are exposed to SHS throughout their treatment in numerous settings and from multiple sources (Tyc, Klosky, Throckmorton-Belzer, Lensing, & Rai, 2004a). Parents and caretakers are often the child's primary source of exposure.

Tobacco Interventions and Outcomes

To date, a limited number of tobacco interventions have been conducted with chronically ill youngsters, primarily those with cancer and cancer survivors, with modest effects (Hollen, Hobbie, & Finley, 1999; Hudson et al., 2002; Tyc et al., 2003). There have been more studies examining the feasibility and efficacy of specific tobacco control interventions with smoking parents of children seen in primary child healthcare settings, with particular focus on parents of children with asthma (Severson, Andrews, Lichtenstein, Wall, & Akers, 1997; Wahlgren, Hovell, Meltzer, Hofstetter, & Zakarin, 1997; Wall, Severson, Andrews, Lichtenstein, & Zoref, 1995; Winickoff, Buckley, Palfrey, Perrin, & Rigotti, 2003a). Approaches that support smoking cessation and SHS reduction strategies in the context of the pediatric settings

are critical to overall tobacco control efforts. Interventions delivered in primary care settings, however, may not reach youngsters with more chronic medical problems and their families who are treated in specialty clinics. Therefore, identification of innovative, cost-effective strategies for delivery of tobacco interventions to children and their families in these settings and methods to improve their access to tobacco counseling services are clearly warranted.

Currently, there are no available evidence-based guidelines to direct clinician-delivered tobacco interventions with medically at-risk children in the healthcare setting. The lack of such guidelines drives important research questions. Questions arise regarding the adequacy of adapting prevention, cessation, and SHS reduction interventions found to be effective with healthy children or a subset of medically at-risk children, for use with other vulnerable populations. Revisions to the content and timing of available interventions and reliance on the motivational aspects of the treatment setting may be necessary to enhance the impact of more traditional approaches. It is not clear whether there is a need for tailored, disease-specific interventions, given the unique obstacles faced by families in the concurrent management of their child's specific disease. Whether a child's disease and treatment can be used as a "teachable moment" or an opportunity to motivate young patients and/or parents to change their smoking behaviors is an area that deserves further consideration. The challenge in the field is to design interventions that increase understanding of the magnified health risks associated with smoking and exposure, and provide an adequate dose or intensity that can be tolerated by patients and families, in light of existing medical treatment demands.

The few tobacco trials conducted among youngsters with chronic medical conditions have been marked by several methodological limitations including small or non-representative samples, lack of adequate control groups, reliance on self-report and lack of reliable, standardized measures of smoking status, and nicotine dependence (Britto et al., 1998; Gold & Gladstein, 1993; Nash et al., 1998). Little is known about the accuracy of self-reported smoking status among medically at-risk adolescents who report to health care providers in medical settings. Issues related to biochemical verification of smoking status and exposure as well as cost-effective strategies of maximizing accuracy of outcome, particularly in large-scale smoking interventions, have not been adequately explored in vulnerable pediatric populations. Moderate agreement between parent-reported exposure and child cotinine (a metabolite of nicotine and biomarker of SHS exposure) levels has been reported in SHS trials (Matt et al., 1999),

but these trials have largely been restricted to parents of children with asthma. Measurement reactivity and its affect on study outcomes in the pediatric medical setting is a complex and important issue that should be addressed in tobacco-related studies. Addressing some of the methodological limitations that characterize tobacco trials in medically fragile populations may also likely contribute to more effective approaches with children in general.

Although smoking and exposure rates are often reported as primary outcomes in tobacco studies, addressing how these behavioral changes are translated into risk reduction in disease complications, clinical manifestations of disease, and health outcomes in medically fragile populations, is crucial to demonstrating the clinical significance of a given intervention. What kinds of changes are meaningful to patients, families, and health care providers? Short-term measures of health status or intermediate biomarkers that predict later morbidity may be necessary to demonstrate the short-term impact of smoking interventions, particularly when disease or treatment-related adverse events may not be evident until adulthood.

Comments on the Special Issue

These and other related topics are addressed in the special series of articles that follow. The first two articles in the series focus on smoking prevention (Tercyak, Britto, Hanna, Hollen & Hudson) and cessation (Robinson, Emmons, Moolchan, & Ostroff) efforts in adolescents. Both papers recognize the value of building on the results of prevention and cessation trials conducted with the general population of adolescents unselected for illness in an effort to develop programs for medically compromised populations. They address the unique risk factors as well as psychosocial, medical, and developmental challenges that can affect smoking onset and the quitting process in medically at-risk youngsters. In the third article (Tyc, Hovell, & Winickoff), SHS intervention research conducted with healthy youngsters and those with respiratory disease is summarized and emerging issues and implications for future SHS research with pediatric populations at large are identified. The fourth article (Matt, Bernert, & Hovell) expands this discussion by proposing a novel ecological approach for measuring SHS exposure that accounts for the context and process by which children are exposed, beyond what can be measured using biomarkers. This approach suggests multiple opportunities and channels for intervention, such as the clinical setting, to reduce and prevent children's exposure to SHS.

The common theme throughout the series of articles is that improved tobacco control efforts will require

concurrent implementation of many levels of intervention (e.g., individual, environmental, social, and cultural). Although clinical programs and behavioral approaches for medically at-risk youngsters are typically targeted at the individual level, it is likely that our interventions would lead to significantly greater change if combined with state and community-wide interventions, policies, legislative actions, and media messages. The importance of continuous support for tobacco control via repeated interventions across multiple settings cannot be overstated.

The work represented in this series also highlights the need for increased and formalized interdisciplinary collaborations in the area of tobacco control for medically at-risk children. The low incidence of some childhood diseases has resulted in limited sample sizes, difficulty accruing patients to clinical trials, and studies of long duration. Multicenter collaborations could reduce these problems considerably and existing cooperative groups and consortiums could be used to accelerate the accumulation of evidence-based outcomes. Partnerships between federal agencies, private foundations, and professional organizations are also necessary to provide a research infrastructure to link collaborative efforts and further promote dissemination of useful information to health care settings and providers who work with children seen in specialty clinics. Forums and special working groups are essential to promoting ongoing dialogue about tobacco trials in children with life-compromising illnesses.

Acknowledgment

This study was supported by a grant from the National Cancer Institute, the National Heart, Lung, and Blood Institute, and the National Institute of Child Health and Human Development (CA117417).

Conflicts of interest: None declared.

Received December 15, 2006; revisions received December 9, 2007; accepted December 15, 2007

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