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COMMENTARY

Preventing and Managing Chronic Disease in the Work Environment: Using the *Total Worker Health* Approach

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ABSTRACT

Occupational health hazards can exacerbate pre-existing chronic diseases and can also lead to the onset of new job-related chronic diseases. A comprehensive strategy to eliminate the root causes of chronic diseases in America should include not only those causes arising from lifestyle influences beginning in childhood but also those diseases that are caused by workplace hazards or are made worse by workplace conditions. Interactions between pre-existing chronic diseases that adolescents and young adults carry with them into the work environment, and those that are caused by work itself, are complex and require a framework that enables an integrated approach to workplace health promotion and health protection. An important feature of the *Total Worker Health* (TWH) approach to worker safety, health, and well-being is its programmatic adaptability. As new national health strategies emerge, such as the *Make America Healthy Again* initiative aimed at chronic disease elimination, the TWH approach can support such initiatives by contributing to preventing and managing chronic disease in the work environment. This Commentary describes those aspects of the TWH approach that can be adapted to support the new national health initiative to eliminate chronic diseases.

1 | Introduction

The prevalence of chronic disease in younger Americans has risen to unprecedented levels in the past 20 years. The number of children with chronic disease is large and growing. The results of a recently published national study found that chronic disease prevalence in children ages 5–17 years of age has risen from 22.5% in 1999/2000 to 30.21% in 2017/2018 [1]. Another study found that the health of U.S. children has deteriorated from 2007 to 2023 across a broad spectrum of indicators [2].

Similarly, an increasing number of American adults are dealing with multiple chronic health conditions [3]. Nearly 52% of adults have at least one major chronic disease such as cancer, heart disease, diabetes mellitus, hypertension, asthma, or obesity [4, 5], 42% suffer from two or more conditions, and 12% have at least five conditions [6, 7]. Mental illness is estimated to occur in more than one in five U.S. adults [8]. These findings about chronic disease in children and adults have broad implications for the workforce itself. While chronic diseases can be a barrier to employment [9], many Americans with chronic diseases are employed, but struggle to manage their chronic conditions in the work environment [10–13].

2 | Interactions Between Personal and Occupational Risk Factors

A holistic view of the interaction between personal risk factors (PRFs) and occupational risk factors (ORFs) in causing or

worsening a chronic disease is essential to understanding and ensuring the effectiveness of any initiative aimed at chronic disease elimination [14]. While examining the effect of PRFs and ORFs separately is the common epidemiological approach in disease causation science, studying the effects of risk factors in isolation may miss potential synergistic effects and cumulative burdens [14, 15]. The following theoretical examples illustrate four types of interactions between lifestyle-related chronic diseases, as PRFs, and work-related hazards, as ORFs [16].

2.1 | Combined Effects

A chronic disease, such as cardiovascular disease, and occupational exposure to physical factors, such as cumulative trauma and forceful movements, are both independent risk factors for musculoskeletal disorders, and their combined effect is greater than for either one [17]. Similarly, a chronic disease like hypertension (PRF) and occupational exposure to the chemical dioxin (ORF) are both independent risks for ischemic heart disease, and missing their combined effect would be harmful to the individual worker [18].

2.2 | Increased Susceptibility

Exposure to a chemical like chromium (ORF) can increase susceptibility to a dermatological disease like eczema: psoriasis (PRF) can modify the risk of a health effect from exposure to a chemical like chromium [19]. An ORF, like an animal handling job in individuals with a chronic disease like atopy (PRF), can result in serious allergic reactions impairing work ability [20]. A chronic condition like atopy (PRF) is a risk for occupationally-related asthma (ORF). A dusty job as a baker (ORF) is a risk factor for a chronic disease like COPD (PRF). One ORF, like COPD, can be a risk for another ORF, like asthma [21].

2.3 | Take-Home Exposures

Another important connection between work-related hazards and the health of children concerns the bringing of toxic agents from work to home. Workplace hazards in a parent's occupation can affect their children's health through the "take-home" pathway [22]. Take-home exposures occur when a worker contaminates family living spaces with disease-causing agents such as metals (lead), agricultural pesticides, hydrocarbon solvents, and asbestos fibers originating in the workplace that can travel on a worker's skin, hair, clothes, and shoes [23]. Children of workers in industry sectors like construction, agriculture, janitorial services, and auto repair may be particularly affected by take-home exposures contributing to chronic disease development [24].

2.4 | Transgenerational Effects

An additional driver of chronic disease in children, and persisting throughout their lives, is the exposure of their parents to occupational reproductive hazards [25, 26]. These work exposures can lead to reduced fertility, birth defects, and childhood cancers, as well as to lifelong chronic diseases. Occupational reproductive hazards include chemical, radiological, biological, and psychological exposures—all of which are potentially amenable to prevention strategies [27].

Interactions between pre-existing chronic diseases that adolescents and young adults carry with them into the work environment from childhood, and those that are caused by work itself, are complex and require an integrated approach to health promotion directed at lifestyle behaviors and health protection directed at workplace hazards.

3 | Health Promotion and Health Protection

The increasing prevalence of working Americans with chronic diseases increases the need for employers to consider approaches that can be used in the work environment to support workers suffering from chronic diseases. Promoting healthy behaviors on an individual level ("health promotion"), together with ensuring that the health of workers is protected from occupational safety and health hazards ("health protection"), are both critical in preventing and managing chronic disease in the work environment.

The workplace can serve as a platform to promote individual behavior changes that can prevent the progression of pre-existing chronic diseases. These interventions can include improvements in dietary intake, cessation of tobacco smoking, increases in physical activity, stress reduction, weight control, medication management, and mental health support [10, 28]. Workplace health promotion activities can ameliorate the burden that workers of all ages with chronic diseases face in the work environment.

In a recent poll, 75% of employees with chronic health conditions said that they needed to manage their conditions during regular work hours by taking a break while at work or taking time off because of them [12]. Tailored accommodation, flexible work arrangements, and adaptive job tasks for workers with chronic diseases, especially those in physically demanding jobs, can be facilitated through workplace health promotion programs that are designed to mitigate the effects of chronic disease and sustain employability [29, 30].

While workplace health promotion activities can positively influence the course of pre-existing chronic diseases, occupational exposures can cause the development of new chronic diseases. These harmful exposures can include: (1) physical, chemical, and biological agents; (2) work-related psychosocial stressors like shift work, long hours of work, and bullying; and (3) harmful organizational practices like inadequate staffing, mandatory overtime, and uncivil supervision [31]. Protection from health hazards that cause occupationally-related chronic diseases, for example, cancer, lung diseases, hearing loss, and musculoskeletal disorders, among others, through implementation of an occupational safety and health program is a critical contributor to reducing the burden of chronic disease. While health promotion efforts are important, health promotion has been found to be more successful when combined with occupational safety and health protective activities [31].

4 | Integration of Health Promotion and Health Protection—*Total Worker Health* Approach

The *Total Worker Health* approach encompasses policies, programs, and practices that integrate health *protection* from work-related hazards with *promotion* of prevention efforts to advance worker well-being [32–35]. The rationale for integration of health promotion and health protection in the TWH approach is based on four principles [28, 32].

First, a worker's risk of chronic disease is increased by exposures to occupational hazards *and* individual risk-related behaviors that can lead to chronic disease. Second, workers at the highest risk from work hazards are also those most likely to engage in risky individual behaviors that lead to chronic disease. Third, integrating health promotion with occupational health protection (as opposed to offering wellness programs without occupational health protection) may reduce workers' skepticism about participating in health promotion activities aimed at their pre-existing chronic diseases. Fourth, an integrated approach benefits not only the individual worker but also the work organization and the healthcare system itself [28, 32].

The TWH approach can be implemented in any workplace using a workbook entitled the *Fundamentals of Total Worker Health Approaches*, which provides tips, examples, and links to tools [36].

The workbook focuses on five *Defining Elements of TWH*, which can be adapted to address pre-existing and new-onset chronic diseases. First, it is critical for leaders at all levels of an organization to demonstrate commitment to worker health. Second, line managers should consider structuring job tasks to both protect individual workers against health hazards and promote healthy behaviors on the part of every worker. Third, worker engagement should be promoted and supported throughout the design and implementation phases of a TWH program. Fourth, the employer should ensure worker confidentiality and privacy within the TWH program. Fifth, an initial assessment of existing organization policies, programs, and practices relevant to health should be conducted at the outset. A determination should be made by the organization about how policies, programs, and practices relate to one another. Obvious areas of overlap must be identified to eliminate confusion, and opportunities for future integration should be noted. Implementing a program with these TWH fundamentals leads to a work environment that can both mitigate threats to worker safety and health and enhance the overall well-being of the workforce [36].

A critical value of the *Total Worker Health* approach to workforce safety, health, and well-being lies in its programmatic adaptability. For example, the TWH approach can support the goals of the US Department of Heath and Human Services' *Healthy People 2030*—a five-decade-long national disease prevention and health promotion initiative [37]. As new ideas and initiatives emerge in our national health conversation, the *Total Worker Health* approach can also play an important role in new national health initiatives.

5 | New National Initiative

On February 13, 2025, President Trump issued Executive Order 14212 entitled "*Establishing the President's Make America Healthy Again Commission*." The Executive Order provides that the policy of the federal government is "to aggressively combat the critical health challenges facing our citizens... including a focus on reversing chronic disease" [38, sect. 2]. After outlining the increasing burden of chronic diseases such as cancer, obesity, diabetes mellitus, fatty liver, asthma, and autism, especially in children, the Executive Order established the President's *Make America Healthy Again* Commission. The Commission was required to submit to the President a *Make Our Children Healthy Again Assessment Report* (Assessment) within 100 days, and a *Make Our Children Healthy Again Strategy Report* (Strategy) within 180 days [38].

While the Assessment and the Strategy are focused on eliminating the root causes of chronic childhood diseases, children soon become adults and enter the workplace. In fact, the Assessment makes it explicit that "today's children are tomorrow's workforce..." [39, p. 5]. For some children, the transition from school to work occurs at a young age. Federal and state laws allow children to work in the agricultural industry [40]. These jobs can result in serious injuries and fatalities [41].

6 | Assessing the Drivers for Childhood Chronic Diseases

Released on May 22, 2025, the Assessment identified four major drivers for the increase in childhood chronic diseases and the early onset of adult diseases that present "the clearest opportunity for progress" [39, p. 5].

6.1 | Poor Diet

The *Assessment* states that children have a diet characterized by nutrient depletion and the addition of harmful chemicals. Studies show a large share of calories (67%) in U.S. diets come from ultra-processed foods (UPFs) [42]. While there is no single, universally accepted definition of UPFs, the most common classification was developed by Brazilian researchers in 2009 and is called the "NOVA" system [43].

Unlike the U.S. Department of Agriculture's *Dietary Guidelines for Americans* [44], which organizes foods into groups based on nutrient content (i.e., grains, vegetables, fruits, protein, and dairy), the NOVA Food Classification System categorizes all food products into four categories based on the extent and purpose of their industrial processing [45]. NOVA describes UPFs as "industrially manufactured food products made up of several ingredients (formulations) including sugar, oils, fats, salt, and food substances of no or rare culinary use" [42, 45, 46]. The "ultra-processed" term is based on classes of food additives that are used in extensive industrial processing, like commercial sweeteners, colors, flavorings, emulsifiers, preservatives, and modified sugars, oils, or proteins [47].

Data from the U.S. National Health and Nutrition Examination Survey for August 2021 through August 2023 found that adults

consumed 53% of their total calories from UPFs, and youth ages 1 through 18 years consumed 61.9% of their total calories from UPFs [48]. In addition to consumption data, there are studies showing that displacing healthy food choices with UPFs is associated with diet-related noncommunicable diseases [49], increases in caloric intake and weight gain [50], and increased all-cause mortality [42, 51]. While useful, the NOVA Food Classification System for UPFs lacks the definitional precision needed to be the basis of a national nutrition policy [52]. As a result, the Food and Drug Administration and the U.S. Department of Agriculture published in July of 2025 a Request for Information in the Federal Register seeking help from interested parties in developing a better definition for UPFs [53].

6.2 | Chemical Exposures

Children are often exposed to chemicals such as heavy metals, per- and polyfluoroalkyl substances (PFAS), pesticides, microplastics, dioxin, and phthalates in their diet, in their clothing, as indoor pollutants, and in consumer products [39, 54–57]. The *Assessment* points out that a system that evaluates chemical classes individually may miss potential synergistic effects and cumulative burdens [39]. Exposure to environmental chemicals may have cumulative impacts that can adversely affect the sensitive phases of child development from the prenatal phase through puberty [39].

6.3 | Physical Activity

There has been a decline in physical activity among children, leading to rising obesity, mental health disorders, and cardiometabolic risks [58, 59]. U.S. children ranked 47 out of 50 in fitness performance in an international comparison study [60]. The *Assessment* also notes that chronic sleep deprivation, emotional stress, loneliness, and increased screen time on social media devices have contributed to increases in chronic physical and mental health disorders [39].

6.4 | Overmedication

The *Assessment* asserts that American children are on too much medicine and, as a result, are being subjected to overtreatment of selected chronic conditions [39]. The scope of overprescribed and increasingly-prescribed medications highlighted in the *Assessment* includes stimulant prescriptions to treat attention deficit/hyperactivity disorder (ADHD) [61]; anti-depressants for childhood depression [62]; and antipsychotic medications used "off-label" [63]; inhaled corticosteroids to control even mild cases of asthma [64]; and glucagon-like peptide-1 (GLP-1) pharmaceuticals for weight loss [65].

7 | Strategies for Research, Policy, Public Awareness, and Partnerships

On September 9, 2025, the MAHA Commission published a detailed Strategy Report [66]. The Strategy is divided into four major sets of recommendations containing over 100 specific recommendations for action: (1) advance research, (2) realign incentives, (3) increase public awareness, and (4) foster private sector collaborations.

7.1 | Research

The Strategy sets forth 23 recommended areas for future research. Among the 23 are several that touch on occupational contributors to the development of chronic diseases. For example, assessing cumulative exposure is identified as a critical area for research [66]. Research topics about exposure to microplastics and synthetics, adoption of precision technologies in agriculture, research on electromagnetic radiation, and other critical research topics are highlighted [66].

7.2 | Incentives

The Strategy includes 77 policy reforms, deregulatory actions, and agency restructuring proposals that emphasize a broad list of diet, agricultural, environmental, and healthcare recommendations [66].

7.3 | Public Awareness

The *Strategy* contains 16 recommendations for ways to "promote public awareness and knowledge of health concerns that affect children and empower parents to make informed choices by increasing transparency and access to reliable health and nutrition information" [66, p. 15]. The Strategy seeks to increase public awareness about children's exposure to fluoride, pesticides, increased computer or telephone screen time, substances like alcohol and cannabis, and vaping [66].

7.4 | Collaborations

Eighteen areas of partnerships with the private sector are presented to drive community-level education about healthy foods [66]. One type of partnership that is mentioned involves education to eliminate the causes of infertility. The Strategy states that it is important to "influence adolescent health through early adoption of lifestyles that help avoid the root cause issues that impact adult fertility in the 20s, 30s and 40s" [66, p. 18].

In addition to the lifestyle factors mentioned in the Strategy, occupational hazards can adversely affect the reproductive health of young workers, cause developmental risks in their offspring, and should be the subject of comprehensive workplace hazard management using the TWH approach [67].

8 | Conclusion

Initiatives to combat chronic childhood diseases ensure the health of the American workforce, as today's children soon become tomorrow's workers. New initiatives are needed to

mitigate the challenges facing young workers who enter the workforce already burdened with chronic diseases and to prevent the occupational risks that lead to the development of new chronic diseases. The *Total Worker Health* approach presents an opportunity to integrate workplace health promotion and protection into existing and new national health initiatives.

Author Contributions

The authors conceived and drafted the work, revised it critically for important intellectual content, gave final approval of the version to be published, and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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Ethics Statement

The authors have nothing to report.

Data Availability Statement

Data sharing is not applicable to this article, as no data sets were generated or analyzed during the current study.

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