



The Pediatrician and Marijuana An Era of Change



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Keywords

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Key points

- The legal status of marijuana is changing on a global scale, and pediatricians must prepare for increased exposure to their patient population across all ages.
- Marijuana can be especially harmful for adolescents and is linked to impaired cognition, abnormal brain development, and mental illness.
- The pediatrician will be called to advocate for safety measures and educational programs to prevent exposure and harm in children who live in areas where marijuana becomes/is legal.
- As regulations change, research investigations focused on the medicinal properties of marijuana will expand and help determine if it has a therapeutic role within pediatrics beyond palliative care.

INTRODUCTION

The legalization of medical, and most recently recreational, marijuana in the United States presents unique challenges in the field of pediatrics. Ranging in scope from fetal life through adolescence and young adulthood, the pediatrician across multiple subspecialties will face new evolving questions and decisions about risks, therapeutic utility, appropriate counseling, research opportunities, and ethical ramifications. This shifting and uncharted territory requires extensive collaboration within the specialty to align practice norms and foster health and wellness for the population during these fluctuating and controversial times. The pediatrician will be challenged to stay abreast

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of legal status as it changes regionally, new research breakthroughs, and recommendations for education and advocacy in an environment wherein children will potentially have greater intentional or nonintentional exposure to a previously controlled substance.

MARIJUANA: CHARACTERISTICS AND CLINICAL IMPACT

Botanical properties

The plant genus *Cannabis*, from which marijuana is derived, is a subset of the plant family named Cannabaceae within the angiosperm or seed-bearing vascular plant classification. The 3 primary species of interest within this genus are *Cannabis sativa*, *Cannabis indica*, and *Cannabis ruderalis* [1]. The *C sativa* and *C indica* are most commonly harvested because *C ruderalis* is sparse and grown in more harsh environments like the Himalayas. Cannabis is a general term that refers to these 3 species of hemp plants. These plants have differing phytochemical compositions with as many as 565 constituents identified, but only 120 of these (approximately) are unique chemicals to the cannabis plant and are globally referred to as cannabinoids. Not all of them are psychoactive in their effects [2]. The most well studied include delta-9-tetrahydrocannabinol (THC) and cannabidiol (CBD). THC is predominantly responsible for the psychoactive effects, whereas CBD is often found in hemp-containing commercial commodities, such as paper, construction material, and textiles. Marijuana refers to the dried leaves, flowers, and seeds from these plants that are used for recreational and medical use. Different strains of cannabis have varying THC and CBD content altering their clinical effects.

Chemistry and mechanism of action

The human body has a natural innate system of cannabinoid receptors, ligands, and signaling molecules found throughout thought to be related to a variety of homeostatic processes, including hunger, fatigue, memory, mood, and pain [3,4]. This system, often referred to as the endocannabinoid system, has 2 primary receptors called cannabinoid receptor type 1 (CB1) and cannabinoid receptor type 2 (CB2). Both are G protein-coupled receptors. CB1 is abundant in the central nervous system, whereas CB2 is thought to have an immunomodulatory role and is found within cells related to immune function [5]. The 2 best understood endogenous ligands of these receptors are *N*-arachidonylethanolamine (anandamide) and 2-arachidonoylglycerol, which are referred to as endocannabinoids. Deficiencies or dysregulation of this system has been hypothesized to contribute to migraines, fibromyalgia, irritable bowel syndrome, depression, schizophrenia, multiple sclerosis, Parkinson disease, anorexia, and failure to thrive [6,7]. Exogenous cannabinoids, specifically THC, is known to act largely on the CB1 receptor, likely contributing to its psychoactive properties. One proposed mechanism of action is via modulation of GABA and glutamine concentrations. CBD, with almost no psychoactive properties, does not act on either CB1 or CB2; however, its specific mechanism of action remains

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