

# *Medical Marijuana: What does the Research Say?*

In 1999, the Congressionally chartered Institute of Medicine (IOM), part of the National Academy of Sciences (NAS), did the most extensive review of the medical literature on marijuana to date and concluded that “[t]he accumulated data indicate a potential therapeutic value for cannabinoid drugs, particularly for symptoms such as pain relief, control of nausea and vomiting, and appetite stimulation.” They also concluded there was “substantial consensus among experts in the relevant disciplines on the scientific evidence about potential medical uses of marijuana.”<sup>1</sup>

Since that time, numerous other studies about therapeutic and palliative benefits of medical marijuana as well as some of the risks associated with its use have emerged. Below are some of the key findings and most recent studies concerning medical marijuana and its derivatives; this summary is not, however, a summary of all the scientific literature.

In general, research supports the IOM report finding that medical marijuana is safe and effective in controlling chronic pain, alleviating nausea and vomiting associated with chemotherapy, treating wasting syndrome associated with AIDS, and controlling muscle spasms due to multiple sclerosis and epilepsy.<sup>2,3</sup>

**Cancer and Chemotherapy:** Studies of medical marijuana and cancer have focused both on the ability of medical marijuana to alleviate the symptoms of chemotherapy and the potential for cannabinoids to reduce the growth of certain types of cancer. A 2003 review of the literature concluded cannabinoids exert palliative effects in cancer patients by preventing nausea, vomiting and pain and by stimulating appetite.<sup>4</sup> In addition to helping with the side-effects of treatment, several studies have suggested that cannabinoids may stop many kinds of cancers from growing and spreading, including pancreatic,<sup>5</sup> lung,<sup>6</sup> leukemic,<sup>7</sup> melanoma,<sup>8</sup> oral,<sup>9</sup> lymphoma<sup>10</sup> and other kinds of cancer.<sup>11</sup>

A significant proportion of oncologists support medical marijuana as an option for their patients. Survey data from a 1990 random sample study, before any states had approved medical use, shows that 44% of oncologists had recommended cannabis to at least some of their patients, and more said they would do so if the laws were changed. Of the respondents expressing an opinion, a majority (54%) thought cannabis should be available by prescription.<sup>12</sup>

**Multiple Sclerosis:** Several studies have demonstrated the efficacy of medical marijuana and its derivatives in reducing spasticity and pain in multiple sclerosis (MS) patients. For example, in a randomized controlled trial, Rog et al found that cannabis-based medicine is effective in reducing pain and sleep disturbance in MS patients with central neuropathic pain.<sup>13</sup> Similarly, double-blind randomized controlled studies demonstrated significant improvements in spasticity as well as in measures of disability, cognition, mood, sleep and fatigue among patients taking cannabis-based medications.<sup>14, 15</sup> A 2004, study also found that cannabis helped alleviate problems with bladder dysfunction in MS patients and improved patient self-assessment of pain, spasticity and sleep quality.<sup>16</sup>

**HIV/AIDS:** Medical marijuana has been effective in treating both the symptoms of HIV/AIDS and the side effects of some of the antiretroviral medications used to treat it. For example, medical marijuana has been found

especially effective at treating neuropathic pain, a common symptom among those living with HIV/AIDS. In a double-blind randomized clinical trial, Ellis et al found the proportion of subjects achieving at least some pain relief was significantly greater with cannabis (46%) compared to placebo (18%). The authors noted that smoked cannabis was generally well-tolerated.<sup>17</sup> See also Abrams et al.<sup>18</sup>

Medical marijuana also seems to help with nausea and weight loss among people living with HIV/AIDS. In a 2005 survey of HIV-positive medical marijuana users, 93 percent said the drug helped decrease nausea and other symptoms, 56 percent said their nausea was “much better,” while 37 percent said it was a “little better.”<sup>19</sup> In a 2007 double-blind clinical trial published in *JAIDS*, Haney et al found that HIV-positive marijuana smokers increased daily caloric intake and body weight with few adverse effects.<sup>20</sup>

Finally, a recent study by researchers at Mt. Sinai Hospital suggests that marijuana or its derivatives have potential to inhibit a type of human immunodeficiency virus (HIV) found in late-stage AIDS. They found that marijuana receptors located on immune cells -- called cannabinoid receptors CB1 and CB2 -- can influence the spread of the virus.<sup>21</sup>

**Pain:** Numerous studies have affirmed the analgesic effects of medical marijuana. In his recent review of the literature, Kraft concluded that, while the evidence did not support the use of marijuana for acute pain, “in chronic pain and (painful) spasticity, an increasing number of randomized, double-blind, placebo-controlled studies have shown some efficacy of cannabinoids.”<sup>22</sup> As suggested above, marijuana has been especially effective for neuropathic pain, and an increasing body of research indicates that is helpful for chronic pain as well.<sup>23,24,25,26</sup>

**Irritable Bowel Disease and Crohn’s Disease:** Recent research suggests that cannabis may also be useful for patients with irritable bowel disease (IBD) or Crohn’s disease. A 2012 study found three months’ treatment with inhaled cannabis improved quality of life measurements, disease activity index, and weight gain patients with longstanding IBD.<sup>27</sup> A recent observational study suggests that cannabis can help alleviate the severity of disease symptoms and reduce the need for other medications and/or surgery.<sup>28</sup>

**Safety of Medical Marijuana:** Medical marijuana is generally safe and well-tolerated, though, like any medication, it poses some risks. Smoking of any sort can cause inflammation in the lungs and should be avoided in patients with compromised lungs. However, a recent *JAMA* article based on a 20 year longitudinal pulmonary health study suggests that some of these risks may have been overstated. The authors concluded, “[m]arijuana may have beneficial effects on pain control, appetite, mood, and management of other chronic symptoms. Our findings suggest that occasional use of marijuana for these or other purposes may not be associated with adverse consequences on pulmonary function.”<sup>29</sup> See also Russo et al.<sup>30</sup> Patients can also avoid many of the risk associated with smoking by using vaporized or edible forms of cannabis.

Compared to other medications, marijuana has low toxicity and is extremely safe. There is no known case of an overdose death from marijuana. In contrast, a review of deaths from the FDA Adverse

Reporting System between 1997 (the year the first medical marijuana program began) and 2005 showed 196 deaths from anti-emetics (medications to prevent nausea and vomiting) and 118 deaths from antispasmodics (medications that suppress muscle spasms). Opioid pain medications, which are widely prescribed, are now responsible for more accidental deaths than traffic accidents; almost 15,000 people died from prescription pain medications in 2008 alone. Some researchers have begun looking to medical marijuana as safer and less addictive analgesic alternative to prescription opioids. For example, in a recent article in the *American Journal of Hospice and Palliative Care*, Carter et al call for reclassifying cannabis both to improve palliative care and to reduce opioid-related morbidity.<sup>31</sup> In a survey of medical marijuana patients, Reiman found that 66% had used medical marijuana as a substitute for other prescription drugs, citing fewer adverse side effects, better symptom management, and less severe withdrawal symptoms.<sup>32</sup>

There is some evidence to suggest that marijuana may exacerbate psychotic symptoms, especially among young adults and/or those with pre-existing signs of psychosis.<sup>33,34,35</sup> The causal direction of the link between marijuana use and schizophrenia has not been established, and there has been no rise in the prevalence of schizophrenia over the last 50 years despite increasing rates of marijuana use in the general population.<sup>36</sup>

**Addictive Potential of Medical Marijuana and Its Role in Other Drug Use:** While marijuana use can become a problem for some, the 1999 NAS study concluded that: “few marijuana users become dependent on it...and marijuana dependence appears to be less severe than dependence on other drugs.”<sup>37</sup> According to the National Institute for Drug Abuse only about 9 percent of those who try marijuana ever become addicted,<sup>38</sup> compared to 32 percent of tobacco and 15 percent of alcohol users.<sup>39</sup> Moreover, there is no convincing evidence that marijuana is a “gateway drug.” What the gateway theory presents as a causal explanation is a statistic association between common and uncommon drugs. Marijuana is the most popular illegal drug in the United States. Therefore, people who have used less popular drugs such as heroin, cocaine, and LSD, are likely to have also used marijuana.

**Alternatives to Medical Marijuana:** Marinol, an oral medication that is currently available by prescription, is not a viable solution for many patients. Marinol contains 100 percent delta-9 THC (versus the 20 percent THC found in natural cannabis). Most patients find Marinol is too sedating and creates too many unwanted psychoactive effects.<sup>40</sup> Research has also shown that Marinol is often poorly absorbed, and patients complain that dosage is hard to monitor and control.<sup>41</sup> In addition, for patients suffering from severe nausea and vomiting or who cannot swallow, oral medications are often not viable. Smoked or inhaled cannabis provides an effective and efficient system for delivering THC (one of the active ingredients in marijuana). This rapid onset of effects, not only provides more immediate relief, but also allows patients to carefully titrate their dose to relieve their symptoms.<sup>42</sup>

**Medical Marijuana’s Impact on Overall Drug Use:** Research suggests that overall marijuana use would not increase under the tightly regulated system proposed in the New York bill. The 1999 NAS report found that: “There is broad social concern that sanctioning the medical use of marijuana might increase its use among the general population. At this point there are no convincing data to support this concern. The existing

data are consistent with the idea that this would not be a problem if the medical use of marijuana were as closely regulated as other medications with abuse potential... No evidence suggests that the use of opiates or cocaine for medical purposes has increased the perception that their illicit use is safe or acceptable.”<sup>43</sup> Since that report, several other analyses, including a 2012 study published in the *Annals of Epidemiology* examined whether or not passing medical marijuana laws impact adolescent marijuana use. The authors concluded that medical marijuana laws had no discernible effects on marijuana use: “If anything our estimates suggest that reported adolescent use may actually decrease after passing medical marijuana laws (p.211).”<sup>44</sup>

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  - <sup>9</sup> Whyte et al. (2010). Cannabinoids inhibit cellular respiration of human oral cancer cells. *Pharmacology*, 85: 328-335.
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