

# Letters

## COMMENT & RESPONSE

### Gastroschisis and Autism— Dual Canaries in the Californian Coalmine

**To the Editor** We note the report on the gastroschisis incidence rising 3.1-fold from 1995 to 2012.<sup>1</sup> The 20-fold variation across California mirrors the 10-fold variation across Canada,<sup>2</sup> where the distribution pattern closely mirrored cannabis consumption and from where a cannabis-adjusted odds ratio (OR) of 3.54 (95% CI, 2.22-5.63) has been reported.<sup>3</sup>

Several clues suggest cannabis is likely also involved in California. Statewide gastroschisis incidence rose 2.84-fold from 2005 to 2012, while last month cannabis use in northern California rose 2.56-fold from 8.41% to 21.55% from the periods 2006 to 2008 to 2014 to 2016 in the National Survey of Drug Use and Health (NSDUH). Combining the midrange county rates supplied in Figure 2A<sup>1</sup> with published birth, population, and NSDUH data, it can be shown that the gastroschisis rate increased in the NSDUH 1R northern 15 counties (OR, 2.33; 95% CI, 1.91-2.83) compared with the rest of the state for the whole period of 1995 to 2012.

Anderson et al<sup>1</sup> found rurality was a risk factor for cannabis use, which fits with the burgeoning cannabis industry. Timber production was a probable surrogate marker, and US National Parks are known to accommodate substantial cannabis plantations. Moreover, as various potent herbicides and rodenticides, including carbofuran, are used in commercial operations and contaminate the water table, these also need to be considered as novel indirect toxins.

Gastroschisis follows cannabis use in many places, including Australia, Canada, Mexico, North Carolina, and Washington. Mechanistically, this is consistent with the appearance of cannabinoid type 1 receptors on the omphal vitelline vessels from the ninth week of gestation and documented occurrence of cannabis arteritis.<sup>4</sup>

The real possibility clearly needs to be considered that the global rise in cannabis use may underlie the dramatic rise in gastroschisis in many locations. Indeed, since heart and brain defects, including anencephaly and brain impairments consistent with autistic deficits, are also well described in the congenital cannabis exposure literature together with Down

syndrome, it may be that a wide variety of defects could be related to the budding industry.

The potential link with the autism spectrum, including cannabis-dependent, dose-related, and rampant neurexin-neurologin-mediated synaptic dehiscence, is of particular concern. The rapidly growing autism epidemic in Colorado is matched by an autism hotspot in the northern cannabis zone of California,<sup>5</sup> which has likely become even hotter since that study was conducted.

Careful substance-spatiotemporal analyses of positive and negative correlation are indicated to investigate causal relationships. The possibility of worldwide multiorgan cannabis-induced, cannabinoid type 1 receptor-mediated severe clinical teratology has not been widely canvassed.

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