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Brief Commentary

Recent Developments in Prescription Opioid-related Dispensing and Harm Indicators in Ontario, Canada

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Consumption of prescription opioids (POs) in Canada has steeply risen through the years 2000 – 2010 to population levels which are second only to the United States in global comparison; in this context, key indicators of PO-related morbidity and mortality harms also increased sharply, similar to developments in the US (1). These developments have been most pronounced in Ontario, Canada's most populous province, featuring both the highest – and continuously rising – dispensing levels of strong POs compared to other Canadian provinces during this period (2,3). Specifically, non-medical PO use (NMPOU) in Ontario's general adult population (from 2.8% in 2008 to 7.7% in 2010) sharply increased, and both PO-related admissions to publicly funded substance abuse treatment programs (10,564 in 2005/06 to 20,138 in 2010/11) and PO-related overdose deaths (258 in 2005 to 467 in 2010) as key harm indicators doubled during this period (4-6).

These unison upward trends were interrupted post-2010, when developments of main PO-related indicators began to diverge in different directions. Specifically, dispensing levels (in Defined Daily Doses based on retail pharmacy dispensing data representative for Canada) of strong POs (-18.7%) – overall decreased in 2010 - 2013, mainly related to substantive dispensing reductions of oxycodone formulations (-44.2%) but partly offset by increases in hydromorphone (+56.0%) and fentanyl (+15.9%) (3,7). NMPOU rates in the general population decreased significantly by more than half (to 1.9% in 2012 and 2.8% in 2013); PO-related treatment admissions fell slightly to 18,323 (-9%) in 2012/13 (4,6). While oxycodone-related overdose deaths (174 to 121; -30%) declined substantively, overall PO-related deaths however continued to rise, from 467 in 2010 to 577 in 2013 (+24%), with rising levels of overdose fatalities related to most other PO-formulations contributing to an overall rising death toll (Fig. 2)(5).

The present epidemiological observations from Ontario make for a compelling case study in the analysis of PO-related harms and policy. While oxycodone formulations were responsible for extensive proportions of increases in strong PO dispensing and PO-related harms (specifically: overdose mortality) in Ontario pre-2010, changes related to this particular PO formulation drove respective recent reductions in overall PO dispensing as well as (oxycodone-related) deaths (2,8). A crucial intervention here likely was the Ontario government's decision (in March 2012) to delist controlled-release oxycodone formulations (e.g., Oxycontin and its successor product Oxy-Neo) from the provincial drug formulary, and hence to delete it from eligibility for reimbursement from the public drug plan (mostly extending coverage to individuals on social assistance programs) (9). While this "hard" policy intervention can explain the imminent reductions in oxycodone-dispensing observed starting in 2012, it however cannot account for reductions in overall NMPOU and oxycodone-related fatalities in imminently prior years. Rather, we believe that key possible explanations of these developments include "soft" population-level factors. Concretely, the period

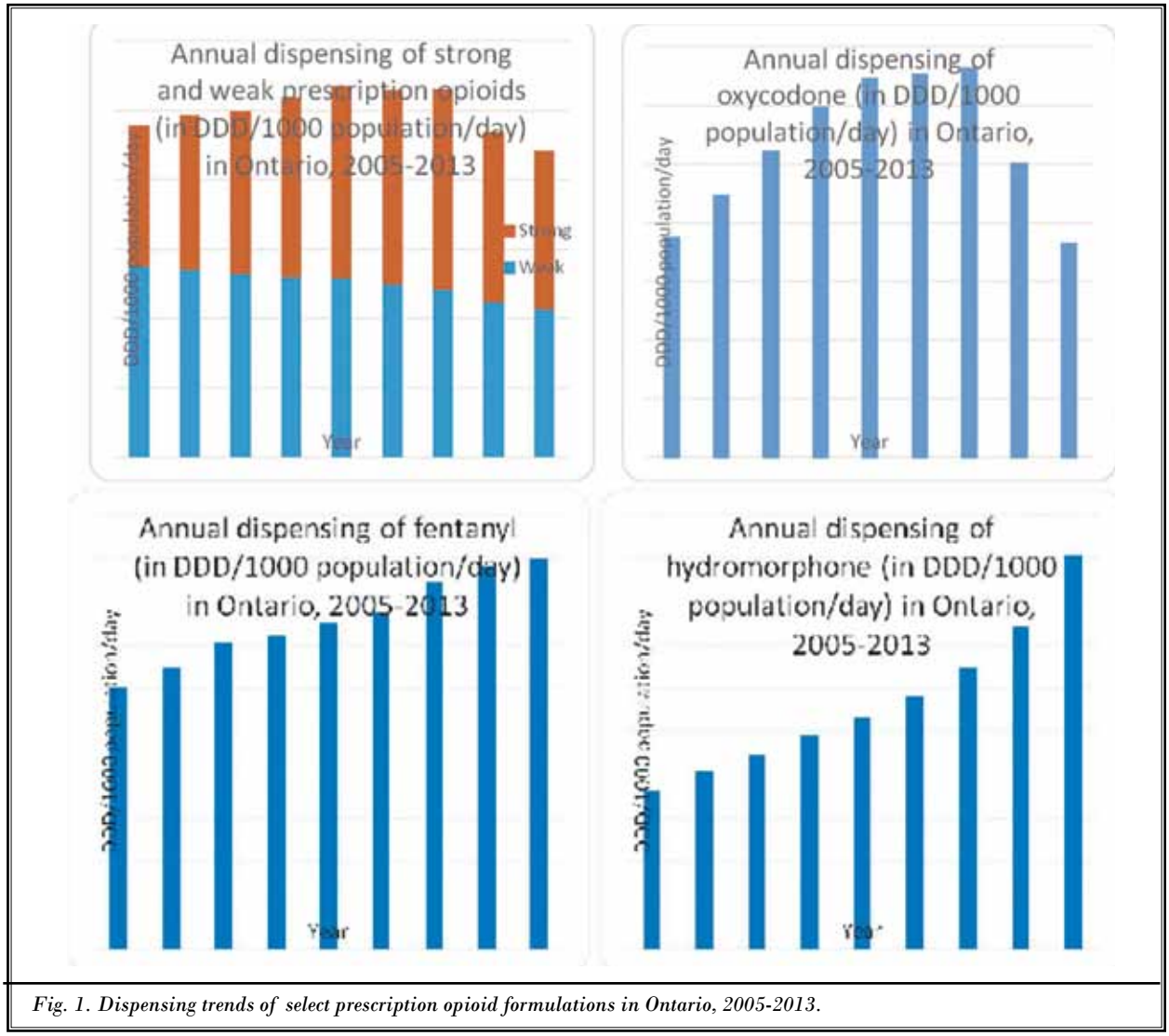

Fig. 1. Dispensing trends of select prescription opioid formulations in Ontario, 2005-2013.

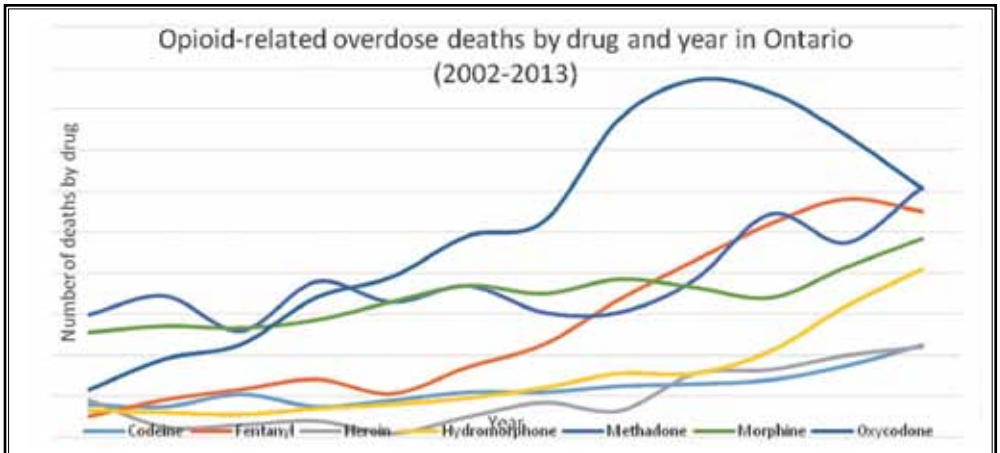

Fig. 2. *Opioid-related overdose deaths by drug and year in Ontario (2002 – 2013).*

beginning in 2010 was characterized by extensive mass/social media reporting about the phenomenon of increased PO prescribing and harms, featuring numerous reports of rising PO-related deaths, addiction, diversion, crime – including prosecutions of malpracticing physicians – with primary focus on Oxycontin (9,10). It can be reasonably assumed that intensive media coverage may have influenced both physician prescribing behavior as well as choices by potential non-medical users of POs, possibly leading to reductions in NMPOU as well as PO-related morbidity and/or mortality (11-13). While the phenomenon of NMPOU has been inconsistently defined and measured, it may be that a substantive proportion of people engaging in lower-intensity forms (e.g., occasional or opportunistic) of NMPOU reduced these activities in the context of increased media attention, changing social awareness, etc. Furthermore, reductions in oxycodone-related deaths specifically can likely be explained with decreasing oxycodone availability and exposure leading to lesser fatal drug-taking episodes.

These developments – despite the above-noted oxycodone-related reductions – stand in contrast with further continuous increases in dispensing and fatalities related to other strong PO formulations (e.g., fentanyl, hydromorphone, morphine), but also heroin, resulting in a continuously increasing overall PO-related mortality toll. These dynamics suggest a partial substitution effect in which observed reductions in oxycodone dispensing and related harms (e.g., mortality) have been partially compensated by those related to other strong PO formulations, yet where prior levels of some key indicators (e.g., overall PO dispensing, NMPOU, treatment demand) have not reached previous levels (3). Though the continuous increases in PO-related mortality trends deviate from declining trends in NMPOU or PO-related treatment demand, an important consideration may be that PO-related mortality predominantly may occur primarily in high-risk PO users, e.g., individuals with long/high-dose PO use histories or patterns, co-use of other drugs, dependence, etc. (14-16). While recent soft or hard interventions in Ontario mainly focused on Oxycontin availability and related problems and may have reduced select PO-related harm outcomes, these appear to have shown little effect yet for the overall PO-related mortality toll on a population level.

We see these developments as further evidence for previous observations that restrictive interventions focusing selectively on individual POs are likely to be limited in impact on a population level due to dynamics of elasticity and substitution in PO availability and use; it appears that, consequently, PO-related harm outcomes (specifically including mortality) are likely to comprehensively decline only when substantive actual reductions of overall PO dispensing occur, and parallel substitution effects on key indicators can be avoided (9,17,18). Consequential measures may need to include targeted system interventions that aim to curtail the shifting of PO prescribing between – similarly hazardous – strong POs based on best clinical evidence, together with a better understanding of and targeted interventions for the hard core of non-medical users (specifically those at high-risk for overdose). These measures – given the public or single-payer nature of the health care system – should be easier to implement in Canada compared to the US. While reduced NMPOU and PO-related treatment demand constitute positive developments in the specific context of Ontario, the overall PO-related public health toll in Ontario remains high, and urgently requires both the implementation and monitoring of broader and further effective interventions on the population level.

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