

Poison center exposure calls involving fentanyl, buprenorphine, and methylphenidate transdermal patches in the United States

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Background

- Transdermal product formulations are designed to provide an alternative route of administration of opioid or stimulant drugs prescribed for treatment of conditions such as chronic pain and opioid use disorder.
- Transdermal products may be used for abuse and misuse due to their higher content compared to other

Objectives

- Quantify US trends in intentional abuse and misuse exposures to fentanyl, buprenorphine, and methylphenidate transdermal patches, as well as sublingual buprenorphine tablets/films as a comparator.

Methods

- Using Researched Abuse, Diversion and Addiction Related Surveillance (RADARS®) System Poison Center Program data for the surveillance period 2018 to 2022, a negative binomial regression was used to compute trends in exposures.
- Unadjusted and adjusted by prescriptions dispensed exposure population rate changes were computed.



Table 1. Intentional Abuse/Misuse and Unintentional Pediatric Exposures to Transdermal Products

N (%)	Fentanyl Transderm. Patch	Bup. Transderm. Patch	Methylphen. Transderm. Patch	Bup. Tablets/Films
Intentional Abuse/Misuse	520	28	7	3,367
Dermal	171 (32.9)	20 (71.4)	5 (71.4)	4 (0.1)
Oral	325 (62.5)	7 (25.0)	2 (28.6)	2,812 (83.5)
Other Routes	56 (10.8)	1 (3.6)	0 (0)	653 (19.4)
Major Effect	138 (26.5)	4 (14.3)	0 (0)	310 (9.2)
Death	2 (0.4)	0 (0)	0 (0)	8 (0.2)
Pediatric (<6)	109	6	7	3,755
Dermal	61 (56.0)	2 (33.3)	3 (42.9)	41 (1.1)
Oral	57 (52.3)	4 (66.7)	4 (57.1)	3,705 (98.7)
Other Routes	8 (7.3)	0 (0)	0 (0)	97 (2.5)
Major Effect	11 (10.1)	1 (16.7)	0 (0.0)	121 (3.2)
Death	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)

Key Findings:

- Major medical outcome or death results from a notable proportion of fentanyl and buprenorphine transdermal formulation intentional exposures and pediatric exposures
- Two deaths were reported for fentanyl transdermal patches
- Non-dermal routes are very frequent among intentional abuse/misuse and unintentional pediatric exposures among transdermal formulations
- Exposure population rates significantly declined for fentanyl patches but there was no significant change when adjusted for prescriptions dispensed. Rate change for buprenorphine and methylphenidate patches was not significant with or without adjustment for prescriptions dispensed

Results

Figure 1. Transdermal Fentanyl Exposure Routes

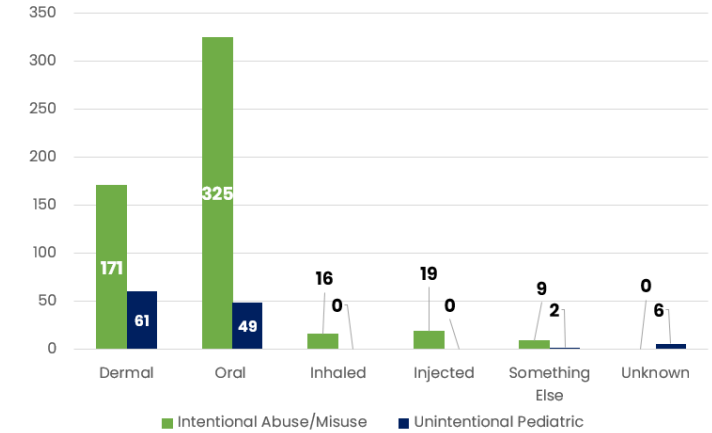
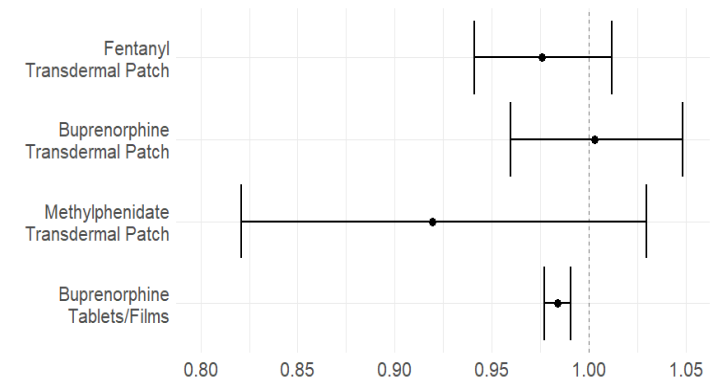


Figure 2. Rate of Change Adjusted for Prescriptions Dispensed



Limitations

- The main limitation of this study is the total exposures for transdermal formulations were low for the three drugs researched and may lack the necessary power to detect significant results.

Disclaimer: This research was conducted by the Researched Abuse, Diversion and Addiction-Related Surveillance (RADARS®) System. RADARS System is supported by pharmaceutical manufacturers, government, and non-government agencies for surveillance, research and reporting services. RADARS System is the property of nonprofit Denver Health and Hospital Authority (DHHA), a political subdivision of the State of Colorado. No subscriber participated in the conception, analysis, drafting, or review of this project. This study was funded by Nutriband Inc.