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The missing math of the fentanyl crisis

What dose of opioids do people who use illicit fentanyl consume in a day? We measured the supply, surveyed participants, and estimated the daily oral-morphine equivalent.

PRIMARY ESTIMATE — DAILY MORPHINE MILLIGRAM EQUIVALENTS (MME), PER PERSON

8,888

MME every day

A typical participant consumes the equivalent of **almost 9,000 mg of oral morphine — daily.**

Mean of 2,000,000 bootstrap draws · 95% prediction interval 157–41,761 MME · Los Angeles, 2023–2026

HOW WE GOT THERE — FOUR STEPS

01

Quantify the supply

509 fentanyl samples, quantified by LC-MS. Mean purity **12.5%** (range 0.1%–65%).

02

Survey the people

47 participants reported route + daily amount. Mean **1.07 g** raw product/day.

03

Convert to MME

Route-specific bioavailability (mean **51%**) + fentanyl→morphine factors (mean **183**) from literature.

04

Model the uncertainty

Bootstrap, **2,000,000 draws**; five sensitivity analyses stress-test the assumptions.

98% smoke or vaporize (46 of 47 participants); 30% also inject; 15% insufflate.

Dabbing is the most common smoking method — **79% of participants who smoke** (companion study, under review — talk below).

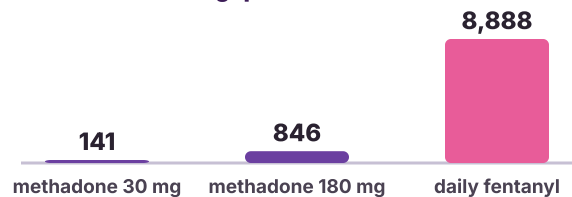
One street gram ≈ 125 mg fentanyl ≈ 1,250 hospital ampules (100 µg each) — ~100× a daily opioid-naïve IV analgesia dose.

Guideline vs. exposure — same linear scale



CDC chronic-pain guidance urges caution above 90 MME/day (Dowell et al.).

The treatment-scale gap



Stabilization does not require matching illicit MME — see caveat below.

Holds up under conservative assumptions: the most restrictive model — purity inversely correlated with quantity, smoking-only bioavailability — still estimates **5,125 MME/day, ≈57×** the 90-MME guideline.

WHY IT MATTERS

Tolerance is profound. A dose that maintains a regular user endangers anyone without tolerance — one supply, very different risk.

Induction has a math problem. Starting methadone (20–40 mg ≈ 94–188 MME) sits far below real exposure — one reason fentanyl-era initiation is harder.

Stabilizing ≠ matching. Cross-tolerance means MOUD need not equal illicit MME — but higher induction/maintenance dosing may be warranted.

AT THIS MEETING ▶

Characterizing “Dabbing” as a Novel, Dominant Route of Fentanyl Administration in Southern California

M. Godvin · Oral Session 21
Mon June 15 · 2:15 PM · Room B110

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