Comparison of Population Rates between the Drug Abuse Warning Network (DAWN) and the RADARS® System Poison Center Program

Key Points

1. Drug class specific intentional exposure population rates from the RADARS System Poison Center Program are highly correlated with non-medical use population rates from the Drug Abuse Warning Network (DAWN) (r=0.84 to 0.99 for oxycodone, fentanyl, hydrocodone, hydromorphone, morphine, methadone, and buprenorphine).
2. The RADARS System Poison Center Program is able to provide near real-time surveillance on prescription drug intentional exposures.

Background

Prescription opioid misuse and abuse is a major problem affecting the United States. Surveillance systems were important early indicators of the presence of the prescription opioid abuse epidemic[1] and may be effective in assessing the impact of different interventions intended to address the epidemic. The Drug Abuse Warning Network (DAWN) was a drug-related public health surveillance system, focused on the impact of drug misuse in the Nations' health care system. The DAWN system stopped collecting data after 2011. The RADARS® System provides timely, product-specific, national and regional surveillance data on prescription and illicit opioid abuse and misuse and continues today. This analysis assesses the extent to which annual prescription opioid intentional exposure population rates from the RADARS System Poison Center Program correlate with national non-medical use of prescription drug population rates from DAWN.

Methods

Programs
The RADARS System Poison Center Program obtains data from individuals within the general population and from health care providers who are seeking advice regarding potential toxic exposures, including exposures to prescription opioids and stimulants. The Poison Center Program defines intentional exposures as misuse ("an exposure resulting from the intentional improper or incorrect use of a substance for reasons other than the pursuit of a psychotropic effect"[3]), abuse ("an exposure resulting from the intentional improper or incorrect use of a substance where the patient was likely attempting to gain a high"[3]), unknown ("an exposure that is determined to be intentional but specific motive is unknown"[3]), withdrawal ("inquiry about or experiencing of symptoms from a decline in blood concentration of a pharmaceutical or other substance after discontinuing therapeutic use or abuse of that substance"[3]), and suicide ("an exposure resulting from the inappropriate use of a substance for self-harm or for self-destructive or manipulative reasons"[3]). The objective of the Poison

Center Program is to detect product-specific prescription drug abuse and misuse cases in near real-time.

DAWN was a public health surveillance system that monitored drug-related visits to hospital emergency departments (EDs). A DAWN case was any ED visit where recent drug use was implicated. DAWN captured both ED visits that were directly caused by drugs and those in which drugs were a contributing factor but not the direct cause of the ED visit. Annually, DAWN produced estimates of drug-related visits to hospital EDs for the nation as a whole and for selected metropolitan areas[2].

Both programs estimate rates of prescription opioid use that resulted in the need for medical advice. In this report, we compare population rates of the following active pharmaceutical ingredients (API): oxycodone, fentanyl, hydrocodone, hydromorphone, morphine, methadone, and buprenorphine.

Statistical Analysis

Data from 2004 through 2011 from the RADARS System Poison Center Program and DAWN were used to calculate population rates. The numerator used to calculate rates with Poison Center Program is the number of prescription opioid product mentions by intentional exposure cases. Population rates were computed by dividing the total number of intentional exposure product mentions by the extrapolated United States decennial census population estimates within the areas served by participating poison centers.

The numerator used to calculate rates in the DAWN data were the number of ED non-medical visits determined to be related to prescription opioids of interest. The denominator was the estimated United States population in a given year based on the US Census.

Data were aggregated at the year level. Population rates were scaled per 100,000. A Pearson's correlation coefficient was calculated to examine the relationship between population rates over time from both the Poison Center Program and DAWN.

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Results

Figure 1 shows the correlations for each API. All correlations were strong, ranging from 0.84 (for morphine) to 0.99 (for hydromorphone).

Figure 1. RADARS System Poison Center Program and DAWN
Individual prescription opioid population rates per 100,000
2003 to 2015
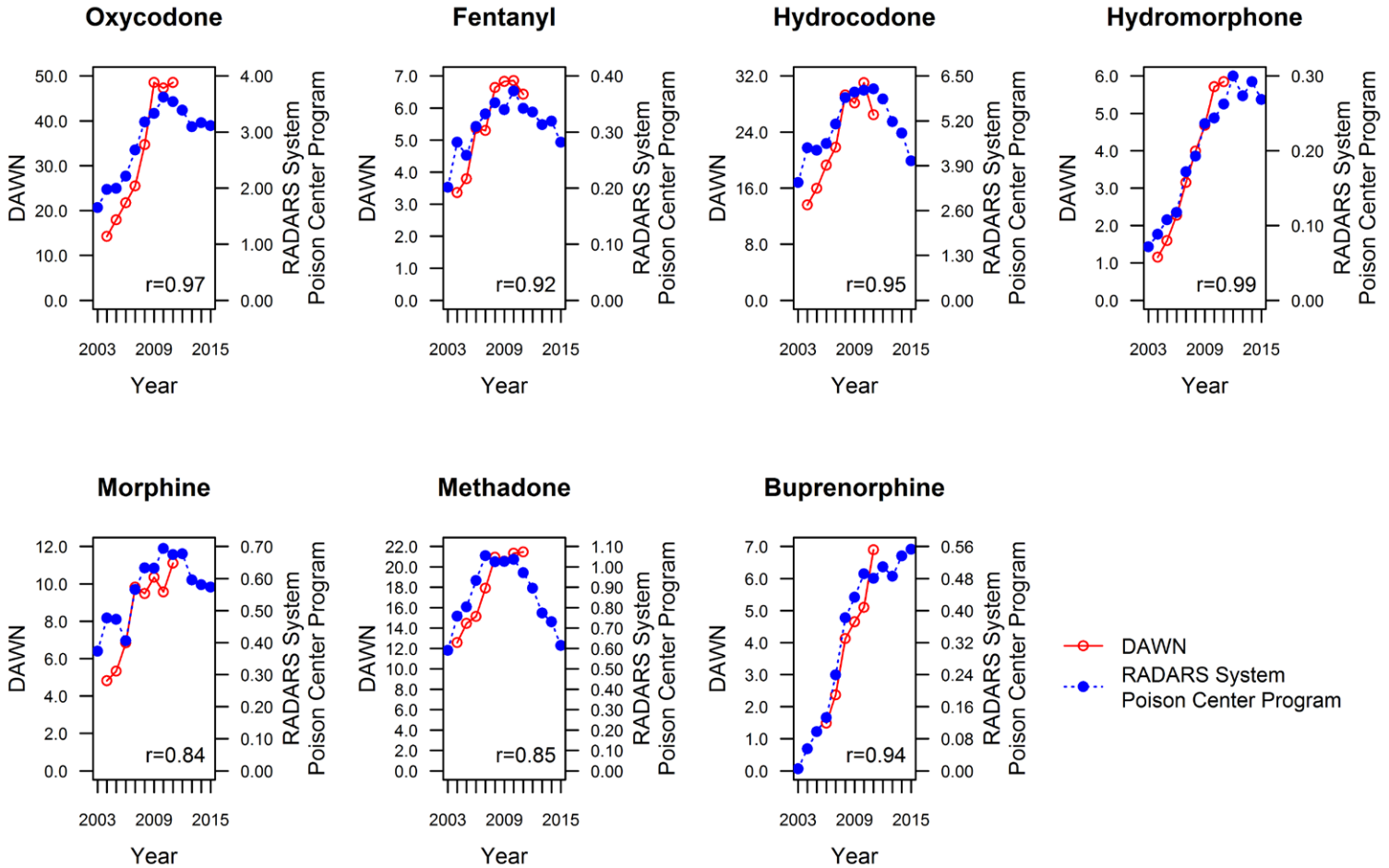
Conclusions

Intentional exposure population rates are highly correlated between the RADARS System Poison Center Program and DAWN for all APIs studied. Population rates peak in the Poison Center Program in 2010 and 2011. DAWN data are not available after 2011, so a trend beyond 2011 cannot be determined using the DAWN data. The Poison Center Program provides timely and product-specific data, which may help detect emerging prescription drug abuse and misuse problems.

Suggested Citation

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References

1. Cicero, T. J., Inciardi, J. A., & Munoz, A. (2005, October). Trends in Abuse of OxyContin® and Other Opioid Analgesics in the United States: 2002-2004. The Journal of Pain, 6(10), 662-672.
2. "Drug Abuse Warning Network (DAWN)." Drug Abuse Warning Network (DAWN) | SAMHSA. N.p., n.d. Web. 14 Dec. 2016.
3. Mowry JB, Spyker DA, Brooks DE, et al. 2014 Annual Report of the American Association of Poison Control Centers' National Poison Data System (NPDS): 32nd Annual Report. Clin Toxicol (Phila) 2015;53:962-1147.