**Supplementary Online Content**


Meier EA, Troost JP, Anthony JC. Extramedical use of prescription pain relievers by youth aged 12 to 21 years in the United States: national estimates by age and by year. *Arch Pediatr Med*. Published online May 7, 2012. doi:10.1001/archpediatrics.2012.209.


**eAppendix.** Methods.
**eTable.** Unweighted and Weighted Risk Estimates by Age on the Date of the Survey Assessment.


This supplementary material has been provided by the authors to give readers additional information about their work.

**eAppendix.** Methods.

This appendix provides additional details on the research project's approach, supplementing what is described in the methods section of the manuscript. The National Survey on Drug Use and Health (NSDUH) computer-assisted self-interview presents survey questions in logical 'stem-and-branch' format, with one or more initial 'stem' or 'feeder' questions followed by appropriate 'branch' questions that gather details about what the individual marked in response to the stem questions. The central NSDUH research team at SAMHSA and Research Triangle Institute create standard variables of the type described below, which are distributed with the public use datasets and made available via the SAMHDA worldwide web portal http://www.icpsr.umich.edu/icpsrweb/SAMHDA/, last accessed February 2, 2012).

Newly incident users are identified by the NSDUH research team by comparing each individual's age on the date of assessment (AGE2) with the reported age at first drug use of a specific type (e.g., extra-medical use of a prescription opioid compound, ANALAGE). By specification, the newly incident users in any given survey year are individuals who meet one of these conditions:

ANALAGE = AGE2 (i.e., onset age = assessment age)
ANALAGE = AGE2 – 1 (i.e., onset age = assessment age minus one)

Identified in this fashion, the newly incident users then can be sorted according to values of the age of first use variable (ANALAGE), the NSDUH 'year of first use' variable (ANALYFU), and the value of a calendar year variable (YEAR). Each calendar year's unweighted and weighted cumulative incidence proportion is based on a numerator that includes the newly incident users in the calendar year of the survey (based on the ANALYFU value equal to the value for the survey YEAR variable). Accordingly, as explained in the manuscript, due to its focus on newly incident users, this project imposes some degree of constraint on memory or reporting problems that must be faced in other projects, where the samples of drug users have had to think back over many years in order to report age of first use or year of first use.

In accordance with this specification for a newly incident user, we cross-classified all newly incident users using the AGE2, ANALAGE, ANALYFU, and YEAR variable values. For each discrete value of age of first use in the range from 12 to 21 cross-classified with each discrete value of year from 2004 to 2008, we identified these newly incident users and assigned them to the appropriate calendar year-age cell to form the cumulative incidence numerators displayed in eAppendix and the eTable. The cumulative incidence denominators in eAppendix and the eTable represent the unweighted sum of each cell's newly incident users plus the 'never users' in that cell. Cell-by-cell, all individuals for whom there was evidence of 'past onset' use were excluded from the denominator for point estimation of the cumulative incidence proportion, with the evidence of past use coming from the 'stem' question described below. With respect to any given age-year cell of Appendix Table e1, these 'past onset users' had started to use at a prior age and prior year, and as such, were no longer 'at risk' of starting to use. The 'never users' in each denominator cell were 'at risk' of starting to use at that age and in that year, but did not do so. The 'newly incident users' also were 'at risk' of starting to use at that age and in that year, and did so (based on the self-report evidence from the AGE2, ANALAGE, ANALYFU, and YEAR variables).

A note about variance estimation for complex survey sample data may be in order with respect to the issue of 'exclusion' of the past onset users and survey participants older than 21 years of age. Incorrect variance estimates can be obtained when sampled participants are excluded from the variance estimation part of the analysis plan, even when these participants logically should be excluded from the point estimation part of the analysis plan. The Stata 'svy' protocols specify the use of a 'subpopulation' command when the goal is to produce a point estimate for any subpopulation's parameter, ensuring correct derivation of both a point estimate and the point estimate's variance. In our research approach, we used the Stata 'svy' subpopulation command in order to derive weighted estimates for the cumulative incidence proportions for each calendar year value from 2004 through 2008, cross-classified with each age value from 12 to 21, as well as the appropriate variance estimates. Thus, the 'past onset' users and the 22+ year old participants were 'excluded' via the appropriate 'svy' subpopulation command. Readers attempting their own analyses of the NSDUH public use datasets may wish to consult a biostatistics expert in these matters of variance estimation because incorrect variance estimates, 95% confidence intervals, and tests of statistical

significance can be obtained when 'subsetting IF' statements or equivalent 'KEEP and DROP' statements are used in place of the Stata 'svy' subpopulation command.

**Stem ('Feeder') Question To Start Module on Extra-Medical Pain Reliever Use**

"These questions [in this module] are about the use of pain relievers. We are not interested in your use of *over-the-counter* pain relievers such as aspirin, Tylenol, or Advil that can be bought in drug stores or grocery stores without a doctor's prescription. Card A shows pictures of some different types of prescription pain relievers and lists the names of some others. These pictures show only pills, but we are interested in your use of any form of prescription pain relievers that were not prescribed for you or that you took only for the experience or feeling they caused."

Measures of the extra-medical use of prescription-type pain relievers in the respondent's lifetime, the past year, and the past month were developed from responses to post-stem 'branching' questions of the following type, which asks about recentness of use (i.e., asked only when individuals indicated 'ever' use): "How long has it been since you last used any prescription pain reliever that was not prescribed for you, or that you took only for the experience or feeling it caused?"

The focus of this research project was on prescription opioids, and the following list of prescription pain relievers was presented via a "Pill Card A" (Pain Relievers): (1) Darvocet®, Darvon®, or Tylenol® with Codeine; (2) Percocet®, Percodan®, or Tylox®; (3) Vicodin®, Lortab®, or Lorcet®/Lorcet Plus®; (4) Codeine; (5) Demerol®; (6) Dilaudid®; (7) Fioricet®; (8) Fiorinal®; (9) Hydrocodone; (10) Methadone; (11) Morphine; (12) OxyContin®;  (13) Phenaphen® with Codeine; (14) Propoxyphene; (15) SK-65®; (16) Stadol® (no picture); (17) Talacen®; (18) Talwin®; (19) Talwin NX®; (20) Tramadol (no picture); and (21) Ultram®.

**OxyContin® Use**

Some additional specific questions about extra-medical use of OxyContin® were asked, such as "How long has it been since you last used OxyContin that was not prescribed for you or that you took only for the experience or feeling it caused?"

**Ever used pain relievers extra-medically**

Have you ever, even once, used any type of prescription pain reliever that was not prescribed for you or that you took only for the experience or feeling it caused?"

**Age when first used pain relievers nonmedically**

How old were you the first time you used any prescription pain reliever that was not prescribed for you or that you took only for the experience or feeling it caused?

**These details about methods, as well as details about other parts of the survey protocol, can be found in this source material:**

Substance Abuse and Mental Health Services Administration. Results from the 2008 National Survey on Drug Use and Health: National Findings (Office of Applied Studies, NSDUH Series H-36, HHS Publication No. SMA 09-4434). Rockville, MD: Rockville, MD: Substance Abuse and Mental Health Services Administration, 2009.

**eTable.** Unweighted and Weighted Risk Estimates by Age on the Date of the Survey Assessment*

**Risk Estimate, % by Age**

| Year | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 |
|------|------|------|------|------|------|------|------|------|------|------|
| **2004** | 11 | 19 | 55 | 84 | 79 | 61 | 50 | 34 | 21 | 15 |
| | 2777 | 2995 | 2913 | 2777 | 2577 | 2453 | 2149 | 1840 | 1722 | 1697 |
| **2005** | 16 | 23 | 41 | 64 | 78 | 60 | 32 | 33 | 23 | 28 |
| | 2822 | 2954 | 2960 | 2947 | 2795 | 2502 | 2062 | 1834 | 1722 | 1711 |
| **2006** | 19 | 19 | 42 | 57 | 81 | 64 | 48 | 34 | 28 | 11 |
| | 2696 | 2901 | 2894 | 2877 | 2761 | 2552 | 2008 | 1784 | 1618 | 1717 |
| **2007** | 10 | 14 | 40 | 44 | 69 | 69 | 43 | 40 | 32 | 17 |
| | 2624 | 2785 | 2682 | 2768 | 2716 | 2600 | 2130 | 1872 | 1731 | 1674 |
| **2008** | 12 | 23 | 52 | 69 | 71 | 67 | 64 | 37 | 23 | 21 |
| | 2550 | 2696 | 2749 | 2849 | 2840 | 2669 | 2349 | 1993 | 1781 | 1804 |

*Unweighted number of young people who qualified as newly incident extra-medical users of prescription opioid compounds (*numerator*) and the corresponding unweighted number at risk of starting to engage in such use (*denominator*), after exclusion of individuals with extra-medical use in prior years, cross-classified by age and the calendar year for onset of first drug use.