**Overprescribing of opioids**

*Daily Dose*:

patients/prescriptions (using patient IDs) that are greater than/to 50-milligram milliequivalents/day as being at elevated risk of overdose, and those 90-morphine mg milliequivalents/day as being at very high risk.

Morphine milligram equivalents (MME) for opioids:

|  |  |
| --- | --- |
| **Drug** | **Oral conversion to get MEDD** |
| CODEINE | 0.125 |
| FENTANYLa | 2 |
| HYDROCODONE | 1 |
| HYDROMORPHONE HCL | 4 |
| MEPERIDINE HCL | 0.1 |
| METHADONE HCL | 4b |
| MORPHINE SULFATE | 1 |
| OXYCODONE HCL | 1.5 |
| OXYMORPHONE HCL | 3 |
| PROPOXYPHENE | 0.2 |
| TRAMADOL | 0.1 |

a: keep in mcg/hr and use this factor-do not adjust to match units

b: CDC reference notes conversion factor for methadone increases at higher doses: 1-20 mg/day 4; 21-40 mg/day 8; 41-60 mg/day 10; >60 -80 mg/day 12.

*Doctor-shopping behavior*:

A shopping event is defined as at least 1 day of overlapping dispensing of opioids written by two or more different prescribers, and involving 3 or more pharmacies. Another possibility is to perform sensitivity analysis and extend the minimum time necessary to consider that prescriptions overlapped from 1 day to 4 days. Both approaches attempt to strict the conditions for misuse in order to eliminate legitimate overlap. Overlap occurs when a prescription was dispensed during the days’ supply of another dispensed prescription and includes the same or different opioids (Cepeda, Fife, Chow, Mastrogiovanni, & Henderson, 2012, 2013).

Data cleanup - inclusion suggestions:

* Subjects with at least one dispensing of any opioid (strong, weak, immediate release, extended release or in combination formulation)
* Subjects with 3 months of data prior to the index date (date of first opioid dispensing in the database)
* Pharmacies that consistently supplied data to the LRx database during the entire study period.

*Co-prescribing*:

Our approach - Co-prescribing can be defined as physician prescribing both opioids and benzodiazepine in the same prescription.

Creating interval in which the prescription took effect as the interval starting on the day the prescription was filled and lasting up to the number of day’s supply provided in the prescription for opioid prescription and benzodiazepine prescription. For a baseline analysis, concurrent use is defined as having at least one day of overlap in a given calendar year. Alternative definitions of concurrent opioid/baseline can be considered in sensitivity analyses (Sun et al., 2017).

Special cases:

* Buprenorphine products are listed but do not have an associated MME conversion factor. These buprenorphine products, as partial opioid agonists, are not expected to be associated with overdose risk in the same dose-dependent manner as doses for full agonist opioids.
* Methadone

*References*

Cepeda, M. S., Fife, D., Chow, W., Mastrogiovanni, G., & Henderson, S. C. (2012). Assessing opioid shopping behavior: a large cohort study from a medication dispensing database in the US. *Drug Safety*, *35*(4), 325–334. https://doi.org/10.2165/11596600-000000000-00000

Cepeda, M. S., Fife, D., Chow, W., Mastrogiovanni, G., & Henderson, S. C. (2013). Opioid shopping behavior: how often, how soon, which drugs, and what payment method. *Journal of Clinical Pharmacology*, *53*(1), 112–117. https://doi.org/10.1177/0091270012436561

Sun, E. C., Dixit, A., Humphreys, K., Darnall, B. D., Baker, L. C., & Mackey, S. (2017). Association between concurrent use of prescription opioids and benzodiazepines and overdose: retrospective analysis. *BMJ*, *356*, j760. https://doi.org/10.1136/bmj.j760