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| **About the Measure** |
| **Domain:** | Sickle Cell Disease Pain |
| **Measure:** | Treatment Response: Medication Use |
| **Definition:** | The clinical response to treatment as measured by medication use. |
| **Purpose:** | This measure enables clinicians to use outcomes to investigate how a patient is responding to treatment. |
| **Essential PhenX Measures:** | Medication Inventory [140301] |
| **Related PhenX Measures:** | Substances - Lifetime Use [31102] |
| **Measure Release Date:** | Not Applicable |

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| **About the Protocol** |
| **Protocol Release Date:** | Not Applicable |
| **PhenX Protocol Name:** | Oral Morphine Milligram Equivalents |
| **Keywords:**  | Department of Health and Human Services, HHS, Centers for Medicare and Medicaid Services, CMS, Centers for Disease Control and Prevention, CDC, morphine, opioid, conversion factor, converting opioids, sickle cell, sickle cell disease, SCD, sickle cell disease pain |
| **Protocol Name from Source:** | Opioid Oral Morphine Milligram Equivalents (MME) Conversion Factors |
| **Description:** | This protocol is a table containing conversion factors that enables different opioid medications to be converted to consistent units.  |
| **Specific Instructions:** | None |
| **Protocol:** | **Opioid Oral Morphine Milligram Equivalent (MME) Conversion Factorsi,ii**

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| **Type of Opioid (strength units)** | **MME Conversion Factor** |
| Buprenorphine film/tabletiii (mg) |  |
| Buprenorphine patchiii (mcg/hr) |  |
| Buprenorphine filmiii (mcg) |  |
| Butorphanol (mg) | 7 |
| Codeine (mg) | 0.15 |
| Dihydrocodeine (mg) | 0.25 |
| Fentanyl buccal or SL tablets, or lozenge/trocheiv (mcg) | 0.13 |
| Fentanyl film or oral sprayv (mcg) | 0.18 |
| Fentanyl nasal sprayvi (mcg) | 0.16 |
| Fentanyl patchvii (mcg) | 7.2 |
| Hydrocodone (mg) | 1 |
| Hydromorphone (mg) | 4 |
| Levorphanol tartrate (mg) | 11 |
| Meperidine hydrochloride (mg) | 0.1 |
| Methadoneviii (mg) | 3 |
| >0, ≤20 | 4 |
| >20, ≤40 | 8 |
| >40, ≤60 | 10 |
| >60 | 12 |
| Morphine (mg) | 1 |
| Opium (mg) | 1 |
| Oxycodone (mg) | 1.5 |
| Oxymorphone (mg) | 3 |
| Pentazocine (mg) | 0.37 |
| Tapentadolix (mg) | 0.4 |
| Tramadol (mg) | 0.1 |

i The MME conversion factor is intended only for analytic purposes where prescription data are used to calculate daily MME. Use the formula: Strength per Unit × (Number of Units/Days Supply) × MME conversion factor = MME/Day. This value does not constitute clinical guidance or recommendations for converting patients from one form of opioid analgesic to another. Please consult the manufacturer’s full prescribing information for such guidance. Use of this file for the purposes of any clinical decision-making warrants caution. This is particularly true with regard to methadone (see viii below).ii National Center for Injury Prevention and Control. CDC compilation of benzodiazepines, muscle relaxants, stimulants, zolpidem, and opioid analgesics with oral morphine milligram equivalent conversion factors, 2017 version. Atlanta, GA: Centers for Disease Control and Prevention; Available at <https://www.cdc.gov/drugoverdose/resources/data.html>. For more information, send an email to Mbohm@cdc.gov.iii 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. The conversion factors for drugs prescribed or provided as part of medication-assisted treatment of opioid use disorder should not be used to benchmark against dosage thresholds meant for opioids prescribed for pain.iv The MME conversion factor for fentanyl buccal tablets, sublingual tablets, and lozenges/troche is 0.13. This conversion factor should be multiplied by the number of micrograms in a given tablet or lozenge/troche.v The MME conversion factor for fentanyl film and oral spray is 0.18. This reflects a 40% greater bioavailability for films compared to lozenges/tablets and 38% greater bioavailability for oral sprays compared to lozenges/tablets.vi The MME conversion factor for fentanyl nasal spray is 0.16, which reflects a 20% greater bioavailability for sprays compared to lozenges/tablets.vii The MME conversion factor for fentanyl patches is based on the assumption that one milligram of parenteral fentanyl is equivalent to 100 milligrams of oral morphine and that one patch delivers the dispensed micrograms per hour over a 24 hour day. Example: 25 ug/hr fentanyl patch × 24 hrs = 600 ug/day fentanyl = 60 mg/day oral morphine milligram equivalent. In other words, the conversion factor not accounting for days of use would be 60/25 or 2.4. However, since the fentanyl patch remains in place for 3 days, we have multiplied the conversion factor by 3 (2.4 × 3 = 7.2). In this example, MME/day for ten 25 ug/hr fentanyl patches dispensed for use over 30 days would work out as follows:Example: 25 ug/hr fentanyl patch × (10 patches/30 days) × 7.2 = 60 MME/day. Please note that because this allowance has been made based on the typical dosage of one fentanyl patch per 3 days, you should first change all Days Supply in your prescription data to follow this standard, i.e., Days Supply for fentanyl patches = # of patches × 3.viii The CDC MME conversion factor to calculate morphine milligram equivalents of methadone is 3. Calculating MME for methadone in clinical practice often involves a sliding-scale approach whereby the conversion factor increases with increasing dose since the conversion factor of 3 for methadone could underestimate MME for a given patient. CMS uses this conversion factor when analyzing Medicare population opioid use. CMS uses the graduated methadone MME conversion factors tocalculate MME within the Overutilization Monitoring System (OMS) for identifying and reporting potential opioid overutilizers. https://www.cdc.gov/drugoverdose/pdf/calculating\_total\_daily\_dose-a.pdf.ix Tapentadol is a mu receptor agonist and norepinephrine reuptake inhibitor. Oral MMEs are based on degree of mu receptor agonist activity, but it is unknown if this drug is associated with overdose in the same dose-dependent manner as observed with medications that are solely mu receptor agonists.  |
| **Selection Rationale:** | These conversion factors are recommended by the Centers for Medicare and Medicaid Services. Converting different opioid medications to consistent units assists in calculating the total daily dose of opioids a patient consumes. This can help identify patients who may benefit from implementing one or more measures to reduce the risk of overdose. |
| **Source:**  | https://www.hhs.gov/guidance/sites/default/files/hhs-guidance-documents/Opioid%20Morphine%20EQ%20Conversion%20Factors%20%28vFeb%202018%29.pdf |
| **Availability:** | Publicly available |
| **Life Stage:** | None |
| **Language:** | English |
| **Participant:** | None |
| **Personnel and Training Required:** | None |
| **Equipment Needs:** | None |
| **General References:** | Weiner, S. G., El Ibrahimi, S., Hendricks, M. A., Hallvik, S. E., Hildebran, C., Fischer, M. A., Weiss, R. D., Boyer, E. W., Kreiner, P. W., Wright, D. A., Flores, D. P., & Ritter, G. A. (2022). Factors associated with opioid overdose after an initial opioid prescription. *JAMA Network Open*, *5*(1), e2145691. https://doi.org/10.1001/jamanetworkopen.2021.45691 |
| **Mode of Administration:** | Secondary Data Analysis |
| **Derived Variables:** | None |
| **Requirements:** |

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| **Requirements Category** | **Required (Yes/No):** |
| Major equipment | No |
| Specialized training  | No |
| Specialized requirements for biospecimen collection  | No |
| Average time of greater than 15 minutes in an unaffected individual | No |

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| **Annotations for Specific Conditions:** | No annotations at this time |
| **Process and Review:** | Not Applicable |