Ontario Health

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MyPractice: General Surgery Report

Technical Appendix

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1. Introduction

Physicians and administrators in Ontario are dedicated to quality improvement; however, they do not always have the comparable data they need to inform their quality improvement efforts. To help address this gap, Ontario Health creates customized and confidential reports for the primary care, long term care and hospital sectors.

Using existing health administrative databases, the *MyPractice:* General Surgery (MPGS) reports provide general surgeons who perform appendectomy, cholecystectomy and hernia repair procedures data about their opioid prescribing patterns and share change ideas to help drive quality improvement.

To assist users of these reports, this technical appendix provides details on the methodology to derive the cohort (i.e. how the selected general surgery records were extracted), link opioid dispensing data to surgical discharge records, and link surgeons to the discharge records. As well, definitions, data sources, and analytical methods are provided for each of the indicators presented in the report. Below is a table of updates to the Technical Appendix:

Version	Date	Change
1	July 2020	Original Technical Appendix
2	March 2021	Addition of a new fee code for appendectomy: S207. This code was effective April 1, 2020
3	May 2022	Addition of four new fee codes for virtual palliative care consultations and support as part of the cohort exclusions list: K092, K093, K094, K095. These codes were effective July 1, 2021

2. Indicator and Report Development Process

Ontario Health used an indicator and report development process that included a comprehensive review of the scientific evidence, internal consultation and external consultation. The work was supported by ICES in consultation with a Scientific Committee that consists of clinical leaders, scientists and researchers on the topic of opioid prescribing and pain management for the selected general surgeries.

The report layout was developed based on known audit and feedback principles, extensive consultation with stakeholders and a user centered design approach. Usability interviews were conducted to collect feedback from general surgeons. As well, the final report, including the data, was validated by general surgeons.

For more information about the *MyPractice:* General Surgery Report, email us at PracticeReport@ontariohealth.ca

3. Data Sources

Administrative databases that were used to generate this report included: The Discharge Abstract Database (DAD) and the *National Ambulatory Care Reporting System* (*NACRS*), *Canadian Institute for Health Information (CIHI)* for hospital and same-day surgery records; the Ontario Health Insurance Plan (OHIP) database, *Ministry of Health (MOH)* for physician claims data; the Registered Persons Database (RPDB), *MOH* for patient demographic and vital statistics data; and the Narcotics Monitoring System (NMS), *MOH* for narcotics dispensing data outside of hospital.

These data sets were linked using encoded identifiers and analyzed at ICES.

4. Identification of the Patient Cohort and Opioid Dispensation for the Report

The report includes patients who have undergone selected general surgeries. We first identified surgical cases through the DAD and NACRS. Secondly, these surgeries were attributed to the primary attending general surgeon using OHIP physician billing claims. The third step involved linking those surgeries to opioid dispensation data in the NMS to identify patients who were dispensed opioids post surgical discharge. For details, please see below.

4.1 Identify General Surgical Cases from DAD and NACRS

4.1.1 Rationale for Cohort Inclusion and Exclusion

The report applied certain inclusion and exclusion criteria when extracting patient records from the DAD (inpatient procedures) and NACRS (outpatient procedures) to ensure a homogeneous cohort was established.

- The report includes patients who have undergone inpatient and outpatient laparoscopic appendectomies and cholecystectomies. Open appendectomies and cholecystectomies are excluded because the volumes were very low (between January 1st and March 31st 2019, there were less than 100 cases of each) and a homogenous cohort of laparoscopic cases was favoured.

- For hernia repairs, the report includes patients who have undergone open and laparoscopic procedures in the outpatient setting exclusively. The data from the January 1st – March 31st 2019 time period showed that nearly 90% of inpatient hernia repairs were performed in a single facility. Also, high variability in length of stay and opioid dispensation measures were presented within the inpatient hernia repair cohort. To maximize comparability, the inpatient hernia repair records were excluded.

- The report excludes inpatient length of stay that is greater than or equal to7 days post-surgery in order to capture only lower risk and quick recovery surgical procedures (i.e. we removed cases that likely had complications that may require prolonged pain management). Between

January 1st and March 31st 2019, 93.8% of inpatient surgical cases had a length of stay within 6 days post-surgery.

4.1.2 Detailed Specifications

The following approach is used to identify qualifying general surgical cases from the DAD and NACRS:

Criteria	Specifications
Inclusion	Laparoscopic appendectomy from inpatient (DAD) or same day surgery (NACRS): The first invention Canadian Classification of Health Interventions (CCI) code in 1.NV.89.DA Laparoscopic cholecystectomy from inpatient (DAD) or same day surgery (NACRS): The first invention CCI code in 1.OD.57.DA; 1.OD.89.DA; 1.OD.89.DT; 1.OD.89.EC Laparoscopic and open hernia repair from same day surgery (NACRS): The first invention CCI code in 1.SY.80^^ with location code in B and LW (Lower abdominal region: femoral, inguinal, pudendal, retroperitoneal – bilateral (B) and unilateral (LW)), or UP (upper abdominal region, umbilical)
Exclusion	a. Aged < 18 years old or >115 years old b. Non-Ontario resident c. Missing institution number d. Missing birthdate e. Sex not in “Male” or “Female” f. Records that died within 7 days of discharge or death date is invalid, i.e. death date was before admission date g. Records that had used palliative care services, i.e. if there were any OHIP or DAD codes indicating palliative care treatment in the 180-day period prior to the surgical discharge, including day of discharge. See *Appendix B* for a list of the palliative care codes. h. Records having at least one Opioid Maintenance Therapy (OMT) prescription dispensed within 30-days prior to the surgical admission date, excluding day of admission. See *Appendix C* for a list of the drug names. i. Having a most responsible diagnosis of primary or secondary malignant neoplasm: • ICD-10-CA codes: C15-C26; C78 and C79 j. Inpatient records with a total length of stay of 7 days or longer k. Discharged to locations other than to home or a place of residence l. Out-of-hospital or cancelled/abandoned procedures

4.2 Link Surgical Hospitalization Data to Surgeons

4.2.1 Purpose of Linkage

The report is designed to report opioid dispensing data back to the general surgeon who performed the procedure as a primary attending surgeon. The select general surgery patient cohort that was generated from the DAD and NACRS is linked with specific OHIP fee codes via the encoded patient identifier to identify 1) the general surgeon who performed the procedure as the primary surgeon since DAD and NACRS do not have linkable physician identifiers, and 2) hernia repairs that are inguinal/femoral and umbilical exclusively.

With regards to hernia repairs, inguinal/femoral and umbilical cases were chosen for inclusion by the Scientific Committee based on their clinical judgement and a review of all hernia repairs data. Inguinal/femoral and umbilical cases represent a good target population for hernia repair surgeries needing less opioids and that is representative of lower risk and quick recovery general surgeries. By including these types of hernia repairs exclusively, we tried to make the entire cohort of general surgeries (laparoscopic appendectomies and cholecystectomies, and open and laparoscopic hernia repairs) a homogenous lower risk group.

4.2.2 Algorithm for General Surgeon and Hernia Repair Linkage

The algorithm for linking specific OHIP fee codes via the encoded patient identifier is described below:

- Admission date (DAD/NACRS) =< Service date (OHIP) =< Discharge date (DAD/NACRS)

- Use the following fee codes and associated fee suffix code (fee suffix=A: physician performed procedure, if surgical procedure) from OHIP physician billing claims data, to identify the surgeon who performed the procedure, and billed for providing the service, as a primary attending surgeon:

    - Inguinal and or femoral hernia repair fee code: S323, S332
    - Appendectomy fee code:
        - For data prior to March 31, 2020: S205, S206
        - For data beginning April 1, 2020: S207
    - Cholecystectomy fee code: S287

General surgery cases that were linked to general surgeons using the above method were included in both the surgeon level and provincial level analysis. General surgery cases that were not linkable to surgeons using the defined method were not included in the surgeon level or provincial level analysis.

4.3 Obtain Opioid Dispensing Data and Link to Surgical Cases

Opioid Dispensing Data

In this report we only considered opioids dispensed for pain management. Opioids for cough, antidiarrheal products and Opioid Maintenance Therapy (methadone maintenance therapy or buprenorphine/naloxone) and injectable mixtures or injectable in cassette were excluded.

Link to Surgical Cases

Opioid dispensing data from the NMS is linked with procedures from the DAD and NACRS by the encoded patient identifier. If an opioid was dispensed during the admission period or within 7 days post-surgery discharge date (inclusive), it was attributed to the index surgery.

Calculation notes:

- If a surgical record had more than one opioid dispensation with the same Drug Identification Number (DIN), dispensation date, prescriber, quantity and day supply: only one dispensation was kept and additional presumed duplicates were excluded. Between January 1st and March 31st 2019, there were less than 6 cases with duplicate dispenses.

- For records with more than one opioid dispensation within the selected period: the analysis was conducted on the initial dispensation date only. Note: In rare cases, patients had more than 1 opioid dispensed on the same initial date. Those are likely prescribed at the same time and were counted together to get a total MEQ on that dispensing day.

- If an opioid dispensation was eligible to be assigned to more than one surgery, it was assigned only to the surgery with discharge date closest to the dispensing date.

4.4 Exclusion of Patients with Pre-Operative Opioid Dispensing History

4.4.1 Rationale

Studies suggest that pre-operative opioid use is associated with increased post-operative opioid consumption and is also one of the risk factors for persistent post-operative opioid use.[1-2] This report excludes surgical procedures with pre-operative opioid dispensation(s) in the NMS in order to keep the cohort as homogenous as possible. This decision reflects that there are a small number of procedures with pre-operative use in the data (The data from the January 1st – March 31st 2019 time period showed that 4.3% of procedures had pre-operative opioid dispensations), and that there are differences in opioid dispensing and consumption for these procedures versus procedures without pre-operative opioid use.

4.4.2 Definition of Pre-Operative Opioid Use

Procedures with pre-operative opioid dispensations are excluded. This is defined as patients who have had opioids dispensed for pain management in the NMS within 6 months prior to the admission date and the duration of therapy (estimated by the dispensation date plus the days of medication supplied) overlapped with the admission date. This included all previous prescriptions by any prescriber.

5. Indicator Details

5.1 Case Volume

INDICATOR DESCRIPTION	***Indicator description***	Total number of eligible surgeries linked to the primary attending surgeon as per the linkage method stated above during the reporting period
	HQO Reporting tool/product	N/A
	Type	N/A
	External Alignment	N/A
	Other reporting	N/A
	Accountability	N/A
OTHER RELEVANT INFORMATION	***Stratification***	N/A
	Reporting level	Surgeon level
	Reporting period	Latest biannual data
	Data source / data elements	DAD, NACRS, OHIP
	Limitations / Caveats	N/A
	Comments	1) A small number of procedures were not linked to a surgeon. According to an analysis based on January 1st – March 31st 2019 data, less than 7% laparoscopic appendectomy cases and less than 2% of laparoscopic cholecystectomy cases were not linked to surgeons using the linkage methods stated above and were not included in the surgeon or provincial level analyses. For hernia repair cases, a larger portion (nearly 27% of cases extracted from NACRS) were not linked to a surgeon using the linkage methods stated above. However, a 1:1 ratio was not expected, as OHIP codes are broader for hernia repairs than for appendectomies and cholecystectomies, and include some hernia repair types not representing lower risk and quick recovery surgeries (e.g. prudential and retroperitoneal hernia repairs). Surgeon mapping permitted their exclusion from the cohort. Only the lower risk and quick recovery hernia repair types (inguinal/femoral and umbilical) were included in the surgeon level or provincial level analyses. 2) The method used was to identify the primary surgeon who performed the procedure. Therefore, surgeons, such as medical residents, students, and trainees who have an eligible specialty and a

		CPSO number but did not bill to OHIP as a primary attending surgeon were not linked to any procedures.

5.2 Percentage of Patients who were Dispensed at Least one Opioid within 7 days Post-Surgery

INDICATOR DESCRIPTION	***Indicator description***	This indicator measures the percentage of patients who received at least one opioid dispensation within 7 days post-surgery, among those who had a selected general surgery procedure performed during the reporting period. Percentage of patient opioid dispensations within 7 days post-surgery among all eligible general surgeons were percentile ranked for comparison.
	HQO Reporting tool/product	N/A
	Type	N/A
	External Alignment	N/A
	Other reporting	N/A
	Accountability	N/A
DEFINTION & SOURCE INFORMATION	***Unit of analysis***	Percentage
	Calculation	**Numerator** Number of cases having 1 or more opioids dispensed between admission date and 7 days post discharge date.
		Denominator Total number of linked select general surgical cases during the reporting period.
		Methods $\frac{\text{Number of select general surgery cases having 1 or more opioid dispensations between admission date and 7 days post discharge date during the reporting period}}{\text{Total number of select general surgery cases during the reporting period}}$ X 100% **Percentile Ranking** 1) Percentile rank the percentage of patient opioid dispensations within 7 days post-surgery, including all general surgeons in this period, except those with suppressed values due to small denominator, i.e. total number of select general surgery cases during the reporting period >0 and <6.

		2) Categorize the percentile rank of percentage of patient opioid dispensations within 7 days post-surgery for each general surgeon: a. If the rank is <25th percentile, then it is colour coded as green and is considered as "lower than" the most of their peers. b. If the rank is between 25th and 60th percentile, then it is colour coded as yellow and is considered as "similar to" many of their peers. c. If the rank is >=60th percentile, then it is colour coded as red and is considered as "higher than" most of their peers.
		Stratification N/A
		Reporting period Biannual, over time trending for percentage of patients who received at least one opioid dispensation within 7 days post-surgery
		Reporting level Surgeon level, provincial level
		Adjustment None
	Data source / data elements	DAD, NACRS, OHIP, NMS
OTHER RELEVANT INFORMATION	***Limitations / Caveats***	N/A
	Comments	This indicator is important to help general surgeons understand their patients' opioid dispense patterns and variations in their prescribing versus other surgeons in Ontario. • A study that measured opioid prescribing after surgery in Ontario, United States and Sweden found large variability in the use of opioids after surgery in different countries; in Ontario, over 78% of patients in Ontario filled opioid prescriptions after 4 surgery types, including laparoscopic appendectomy and laparoscopic cholecystectomy, compared with only 11% in Sweden. [3]

5.3 Median Total Opioid Dose Initially Dispensed within 7 Days Post-Surgery

INDICATOR DESCRIPTION	***Indicator description***	This indicator measured the median total opioid dose, in milligrams of morphine equivalents (MEQ), initially dispensed within 7 days post-surgery. • All opioids dispensed on the initial dispensing date between admission date to 7 days post discharge date were included. • Note: In rare cases, patients have more than 1 opioids dispensed on the same initial date. Those are likely prescribed at the same time and are counted together to get a total MEQ on that dispensing day. The median was only calculated among patients having opioids dispensed during this period, i.e. patients without opioid dispensations were excluded. In addition, the median total MEQ value was translated to number of pills of the most commonly dispensed opioid by the general surgeon for easy interpretation. Median total MEQ values of all eligible general surgeons were percentile ranked for comparison.
	HQO Reporting tool/product	N/A
	Type	N/A
	External Alignment	N/A
	Other reporting	N/A
	Accountability	N/A
DEFINTION & SOURCE INFORMATION	***Unit of analysis***	Milligram morphine equivalents (mg MEQ)
	Calculation	**A. The median total opioid dose dispensed within 7 days post-surgery** **1)** Calculate the MEQ of the opioid prescription that was dispensed on the initial opioid dispensation date within 7 days post discharge of a surgical procedure. Calculation method was adapted from *the Canadian Guideline for Safe and Effective Use of Opioids for Chronic Non-Cancer Pain (2010).* See *Appendix D* for details. **2)** For each surgical case, if there is more than one opioid dispensed on the initial opioid dispensation date, then calculate the total MEQ dispensed in the initial opioid dispensation date between admission date to 7 days post discharge date by adding all MEQs dispensed on that initial date. **3)** For each surgeon, calculate the median total MEQ among all patients who have had opioids dispensed on the initial dispensation date during this period. **B. Identify the most common drug class and strength dispensed, and calculate number of pills of this combination that represents the median total MEQ**

		1) For each surgeon, rank volumes of all eligible opioids dispensed by drug class and strength, select the top #1 combination as the preferred drug class and strength. 2) If there is a tie (>1) of the ranking for a surgeon, follow the rules below to get one drug class and strength combination: a. If same drug classes, but different strengths: use the drug class, and choose the lower strength. b. If drug classes are different: • If one is a short acting drug, and the other a long acting drug, then prioritize short acting drug over the long acting drug. • If both are short acting drugs, or both are long acting drugs, then select the lowest strength of the drug that is first alphabetically. 3) Convert the median total MEQ back to number of pills of selected drug class and strength: back calculation method was adapted from the *Canadian Guideline for Safe and Effective Use of Opioids for Chronic Non-Cancer Pain (2010)*. See *Appendix D* for details. **Notes**: • For general surgeons whose top drug class is Fentanyl, the median total MEQ is not calculated back to number of pills due to the complexity of the MEQ calculation for Fentanyl. • For general surgeons whose top drug class does not have a calculable MEQ, the median total MEQ is not calculated back to number of pills. **C. Percentile Ranking** 3) Percentile rank of median total MEQ values, including surgeons who were linked to at least one surgery and had valid median total MEQ. 4) Categorize the percentile rank of median total MEQ value: a. If the rank is <25th percentile, then it is colour coded as green and is considered as "lower than" the most of their peers. b. If the rank is between 25th and 60th percentile, then it is colour coded as yellow and is considered as "similar to" many of their peers. c. If the rank is >=60th percentile, then it is colour coded as red and is considered as "higher than" most of their peers.
		Stratification N/A
		Reporting period Biannual; over time trending available for median total MEQ

		Reporting level Surgeon level; Median total MEQ is available at provincial level
		Adjustment (risk, age/sex standardization) None
	Data source / data elements	DAD, NACRS, OHIP, NMS
OTHER RELEVANT INFORMATION	***Limitations / Caveats***	Not all opioids have a calculable MEQ value.
	Comments	It is important to measure the total opioid dose dispensed of the initial dispensation to patients within the first 7 days post-surgery: • Post surgery persistent use of opioids has been shown in studies of low-risk general surgeries.[4-6] • A recent study suggested that the quantity of opioid prescribed is associated with higher patient-reported opioid consumption.[7] • Studies also showed that opioid prescribing patterns vary widely among common general surgeries, and a large amount of opioid medications remains unused following common general surgical procedures.[8]

6. Data Interpretation Considerations

6.1 Data Suppression

Data are suppressed or complementarily suppressed as per ICES' privacy policy for the following reasons: (a) Counts or summary statistics are between 1 and 5; or (b) To prevent residual disclosure of suppressed values.

6.2 Opioid Data from NMS

The opioid data reported in this report are derived from the NMS which contains dispensing related information. Please note that: 1) opioids administered during hospitalization are not captured in NMS; and 2) patients who receive opioid prescriptions from their healthcare providers, but do not have the prescription filled, are not captured in NMS. Also, NMS data captures dispensing but not administration of opioids or the appropriateness/reasons for the dispensing.

6.3 Data Reported at Aggregated Level for the Three Surgeries

In consultation with our Scientific Committee, we have included only general surgeries that were considered lower risk and quick recovery. Our provincial level analyses showed that the proportion of patients with an opioid dispensed within 7 days post-surgery, and the median dispensation dose in patients, had relatively small variations between the selected appendectomy, cholecystectomy and hernia repair procedures. In addition, the recommended opioid doses for the three procedures are similar.[9-10] As such, the indicator results are aggregated and reported for the three procedures. Further investigation will be conducted to evaluate the usefulness and feasibility of reporting the indicators by procedure type.

6.4 Risk Factors that may Impact Post-Operative Opioid Prescribing

As mentioned above, certain exclusions have been applied to the cohort in an effort to create a homogeneous patient group for fair comparisons between surgeons. However, the current administrative databases do not have the full information on all pre-existing conditions/factors which may impact post-operative opioid prescribing. As such, it is challenging to assess the appropriateness of opioid prescriptions. Surgeons are encouraged to use their local data and supports to explore opportunities for improvement.

6.5 Not all Data are Shown on the Graphs

Due to scale limitations, median total MEQ values over 300 mg are not shown on the graphs. In some cases, those high values may be due to infrequent data entry errors, while in other cases, those may reflect real values. Additionally, data suppression may result in data not being shown on the graphs.

Appendix A. Table of Acronyms

ACRYNYM	TERM
CCI	Canadian Classification of Health Interventions
CIHI	Canadian Institute for Health Information
CPSO	College of Physicians and Surgeons of Ontario
DAD	Discharge Abstract Database
DIN	Drug Identification Number
MEQ	Morphine equivalence
MOHLTC	Ministry of Health and Long-Term Care
MPGS	*MyPractice:* General Surgery
NACRS	National Ambulatory Care Reporting System
NMS	Narcotics Monitoring System
OHIP	Ontario Health Insurance Plan
OMT	Opioid Maintenance Therapy
RPDB	Registered Persons Database

Appendix B. Palliative Care Patients Identified by Using Hospital and Physician Billing Claims Data

FEE CODE (OHIP)	DESCRIPTION
A945	GEN./FAM.PRACT.SPECIAL PALLIATIVE CARE CONSULTATION
C945	SPECIAL PALLIATIVE CARE CONSULT HOSP IN PATIENT
C882	TERMINAL CARE IN HOSP.G.P/F.P
C982	PALLIATIVE CARE
W872	TERMINAL CARE N.H G.P/FAMILY PRACTICE
W882	TERMINAL CARE IN CHR.HOSP.G.P.
W972	PALLIATIVE CARE
W982	PALLIATIVE CARE
K700	PALLIATIVE CARE OUT-PATIENT CASE CONFERENCE
K023	PALLIAT CARE SUPPORT INDIVID CARE 1/2 HR OR MAJOR PART
B998	SPEC VIS PALLIATIVE CARE HOME, DAYS, EVE
B966	TRAVEL PREMIUM - PALLIATIVE CARE HOME VISIT

FEE CODE (OHIP)	DESCRIPTION
B997	SPEC VIS PALLIATIVE CARE HOME, DAYS, EVE
G511	TELEPHONE MANAGEMENT OF PALLIATIVE CARE AT HOME
G512	WEEKLY PALLIATIVE CARE CASE MANAGEMENT
K092	VIRTUAL PALLIATIVE CARE CONSULTATION - TELEPHONE
K093	VIRTUAL PALLIATIVE CARE CONSULTATION - VIDEO
K094	VIRTUAL PALLIATIVE CARE SUPPORT - TELEPHONE
K095	VIRTUAL PALLIATIVE CARE SUPPORT - VIDEO
PATSERV (DAD)	**DESCRIPTION**
58	MAIN PATIENT SERVICE: PALLIATIVE CARE
ICD10 CODE (DAD)	**DESCRIPTION**
Z515	ANY DIAGNOSIS FIELD: PALLIATIVE CARE
PRVSERV OR INSERV (DAD)	**DESCRIPTION**
00121	PROVIDER OR INTERVENTION SERVICE: PALLIATIVE MEDINCE

Appendix C: OMT Drug Name List

OPIOID MAINTENANCE THERAPY (OMT): DRUG NAME
Buprenorphine (used for OMT)
Buprenorphine HCL (used for OMT)
Buprenorphine HCL & naloxone HCL (used for OMT)
Methadone HCL (used for OMT)
Methadone (used for OMT)
Methadone mixture (used for OMT)

Appendix D. Oral Opioid Analgesic Equivalence Table

Adapted from the *Canadian Guideline for Safe and Effective Use of Opioids for Chronic Non-Cancer Pain* (2010); available at: http://nationalpaincentre.mcmaster.ca/opioid_2010/cgop_b_app_b08.html

Hydrocodone and Tramadol conversions are adapted from:
1) *Calculating Total Daily Dose of Opioids for Safer Dosage* (2016). U.S. Department of Health and Human Services: Centres for Disease Control and Prevention; available at: https://www.cdc.gov/drugoverdose/pdf/calculating_total_daily_dose-a.pdf
2) Interagency Guideline on Prescribing Opioids for Pain (2015); available at: http://www.agencymeddirectors.wa.gov/Files/2015AMDGOpioidGuideline.pdf

Oral Opioid Analgesic Equivalence Table

OPIOID	NUMBER (Mg)	RATIO (OPIOID:MORPHINE)
Morphine	30 mg	1:1
Codeine	200 mg	1:0.15
Oxycodone	15-20 mg	1:1.5
Hydrocodone	30 mg	1:1
Hydromorphone	6-7.5 mg	1:5
Meperidine	300 mg	1:0.1
Tramadol	300 mg	1:0.1
Methadone	Dose equivalence between methadone and other opioids has not been reliably established	Excluded from analyses
Transdermal fentanyl (routeadm is PATCH or TRANS PAD, or Trans Patch)	12.5 mcg/h→30-67 morphine* 25 mcg/h→60-134 mg morphine 37.5 mcg/h→135-179 mg morphine 50 mcg/h→180-224 mg morphine 75 mcg/h→270-314 mg morphine 100 mcg/h→360-404 mg morphine If 12.5 mcg/h then Fent_equiv = 1 If 25 mcg/h then Fent_equiv = 2 If 37.5 mcg/h then Fent_equiv=3 If 50 mcg/h then Fent_equiv=4 If 75 mcg/h then Fent_equiv=5 If 100 mcg/h then Fent_equiv=6 *12.5 was assumed based on a 3.8 MEQ/ug	If day supply/quantity=2 then: Fent_equiv=1 → 1:48*2 Fent_equiv=2 → 1:97*2 Fent_equiv=3 → 1:157*2 Fent_equiv=4 → 1:202*2 Fent_equiv=5 → 1:292*2 Fent_equiv=6 → 1:382*2 If day supply/quantity is not equal to 2 then adjust fentanyl day supply when <3 days to equal 3 and use the following conversion: Fent_equiv=1 → 1:48*3 Fent_equiv=2 → 1:97*3 Fent_equiv=3 → 1:157*3 Fent_equiv=4 → 1:202*3 Fent_equiv=5 → 1:292*3 Fent_equiv=6 → 1:382*3

OPIOID	NUMBER (Mg)	RATIO (OPIOID:MORPHINE)
Other Fentanyl Formulations	Fentanyl buccal or SL tablets, or lozenge (routeadm= “BUC STRIP” or “TAB SL” or “EFF TAB”)	1: 0.13
	Fentanyl film or oral spray (currently not in drug list)	1: 0.18
	Fentanyl nasal spray (currently not in drug list)	1: 0.16

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