MyPractice
General Medicine

A physician-level report for quality care in General Medicine

Background and Indicator Details

MARCH 13, 2025

GEMINI

Ontario General Medicine Quality Improvement Network

Ontario Health

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Introduction

The Ontario General Medicine Quality Improvement Network (GeMQIN)[1] is a provincial program delivered by Ontario Health in partnership with the GEMINI data collaborative.[2] GeMQIN is a data-driven community of practice focused on improving the quality of inpatient general medicine care.

GeMQIN uses data from GEMINI to create practice reports at the individual physician level (MyPractice: General Medicine Report[3]) and the hospital level (OurPractice: General Medicine Report[4]). These personalized, confidential reports inform physicians and hospitals about their clinical care patterns and patient outcomes. Quality indicators focus on length of stay, readmission, in-hospital mortality, routine bloodwork, advanced imaging, appropriate blood transfusion, and ordering of sedative-hypnotic medications. Hospital-level reports provide risk-adjusted comparisons across the network.

This document provides background information regarding the data sources used, inclusion criteria, indicator selection, contextual interpretation, and specific details for each indicator presented in the MyPractice*:* General Medicine reports.

Data Collection and Management

The data for this report were collected by GEMINI. Established in 2015, GEMINI is one of Canada's largest hospital data and analytics resources. GEMINI is a hospital research collaborative based out of Unity Health Toronto and currently holds data on over 2.4 million admissions from more than 30 Ontario hospitals.[2] With data for all medical (including general medicine, cardiology, oncology, etc.) and intensive care hospitalizations, GEMINI data covers approximately 60% of all adult medical and intensive care beds across Ontario.

Both administrative and clinical data from hospital information systems are extracted and shared with GEMINI directly from hospitals participating in GeMQIN. Administrative data include defined variables, such as patient demographics, admission and discharge dates, and diagnosis codes standardized for reporting to the Canadian Institute for Health Information (CIHI). Clinical data include variables such as patient vital signs, laboratory test results, imaging, interventions, and medication orders. GEMINI receives hospital data every 3 months and has established analytical processes to handle the volume and range of data collected, along with workflows for de-identification, quality control, standardization, and validation. The methodology for ensuring data quality has been rigorously validated, demonstrating 98% to 100% accuracy across key data elements compared to the gold-standard chart review.[5] GEMINI data are collected through research ethics board-approved protocols and are governed by the GEMINI data governance policies.

Inclusion Criteria

MyPractice physician reports include hospitalizations that meet the following criteria:

1. Discharged during the reporting period
2. Total length of in-hospital stay less than 14 days
    a. Patients with long lengths of stay are excluded because it may not be reasonable to attribute their care to a single physician based on typical physician shift scheduling
3. Admitted to or discharged from the general internal medicine department or hospitalist service at a participating hospital

We attribute each hospitalization to one physician based on criteria defining the admitting physician, the discharging physician, and the most responsible physician. Physician attribution strategies are tailored and developed in collaboration with each hospital based on their specific model of clinical care.

Physicians with more than 50 unique hospitalizations during the reporting period are included in the report.

Patient Diagnoses

The MyPractice: General Medicine reports present indicators stratified by patient diagnosis groups. We use the Clinical Classifications Software Refined (CCSR)[6] to group Canadian ICD-10-CA[7] codes into clinically meaningful diagnosis groups. These diagnosis groups are based on the most responsible ICD-10-CA discharge diagnosis, as reported in the CIHI's Discharge Abstract Database (DAD).[8] The CCSR approach allows us to aggregate more than 70,000 unique ICD-10-CA diagnosis codes into ~540 mutually exclusive categories across 22 body systems. Some diagnosis codes are cross-classified into more than 1 category because individual ICD-10-CA codes can describe multiple conditions, or a condition and a common symptom/manifestation. We define patient diagnosis based on the default CCSR code. When a proxy most responsible discharge diagnosis is present (diagnosis type 6), that code is used in place of the most responsible discharge diagnosis (diagnosis type M).

CCSR codes are designed for ICD-10-CM codes. GEMINI has developed an algorithm to reliably map CCSR categories to Canadian ICD-10-CA codes. The algorithm is an open source resource freely available to the public[9] and has been validated by clinical experts.[10]

Indicator Selection

The MyPractice: General Medicine report includes 7 indicators that were selected by the GeMQIN Report Development Committee (comprising the program's provincial clinical leads, physicians and interdisciplinary health professionals, hospital administrators, quality improvement experts, and researchers). A focus of GeMQIN in the coming years will be to further develop quality indicators that are relevant to hospital medicine through consultation with an expert indicator committee. Feedback and/or participation in future indicator selection is welcome at GeMQIN@OntarioHealth.ca.

Contextual Interpretation

These data are intended to be used to help general medicine physicians and care teams understand the quality of general medicine care and inform quality improvement efforts. There are sometimes large differences in practice and outcomes between physicians within a hospital. In general, these differences are not explained by differences in case-mix or patient characteristics between physicians because general medicine physicians take care of whichever patients are admitted when they are on service, resulting in a "quasi-randomization" of patients.[11]

However, there may be subtle differences in practice patterns that require knowledge of local context to interpret (e.g., some physicians work 4-week blocks and others work 2-week blocks; some physicians attend more on hospitalist teams while others are on clinical teaching units). Thus, we encourage physicians and care teams to interpret these data with local context in mind. This context-driven interpretation is especially important given that the COVID-19 pandemic has impacted hospitals in different ways and to varying degrees.

Indicator Details

Table 1: Length of Stay

Indicator Name	Length of stay
Description	The median time from admission to discharge in all hospitalizations attributed to a given physician during the reporting period
Unit of Analysis	Hospitalization
Calculation	Median number of days 1. Identify all hospitalizations attributed to a given physician and discharged during the reporting period 2. Apply transfer exclusion defined below 3. Calculate total length of stay as the difference between date/time of admission and date/time of discharge, in days. 4. Sort length of stay values for all admissions attributed to a given physician 5. Select the middle value, representing the 50th percentile length of stay
Exclusion	Encounters that were transferred in from, or transferred out to, another acute care institution • Coded transfers are based on the DAD fields “Institution From” and “Institution To”
Source	Hospital data standardized for reporting to the CIHI DAD
Risk Adjustment	None
Desired Value	No clear desired direction. A shorter length of stay may reflect more efficient use of resources, while a longer length of stay may reflect more thorough care. Interpret in the context of your hospital’s processes of care, case load, and other local clinical context
Comments	This indicator measures median total number of in-hospital days for a given physician, including alternate level of care days

Table 2: 7-Day Readmission

Indicator Name	7-day readmission
Description	The 7-day readmission rate for a given physician during the reporting period
Unit of Analysis	Episode of care An episode of care includes all contiguous inpatient hospitalizations admitted to any medical or intensive care service within GeMQIN. Episodes involving interfacility transfers are linked regardless of diagnosis. An acute care transfer is assumed to have occurred if either of the following criteria are met: • An admission to a medical or intensive care service at a GeMQIN hospital occurs within 7 hours after discharge from another GeMQIN hospital, regardless of whether the transfer is coded • An admission to a medical or intensive care service at a GeMQIN hospital occurs within 7–12 hours after discharge from another GeMQIN hospital, and at least 1 hospital has coded the transfer ○ Coded transfers are based on the DAD fields “Institution From” and “Institution To” For episodes of care involving acute care transfers, readmissions are attributed to the last hospital from which the patient was discharged before readmission
Calculation	Rate: numerator ÷ denominator (calculation equivalent to arithmetic mean)
Exclusions	Episodes with an invalid health card number

Denominator	Total number of episodes of care attributed to a given physician and discharged within the reporting period
	Exclusions from the denominator:
	• Episodes with discharge as death
	  ○ DAD discharge disposition codes: 07, 72, 73, 74
	• Episodes with at least 1 record for palliative care
	  ○ ICD-10-CA code Z51.5 as diagnosis type M
	• Episodes with at least 1 record for mental health
	  ○ CIHI major clinical category 17 as diagnosis type M
	• Episodes where the last record is a self sign-out
	  ○ DAD discharge disposition codes: 06, 61, 62, 65, 66, 67
	• Episodes where the last hospital has coded a transfer out to a non-GeMQIN acute care institution
	  ○ This indicates that the patient was transferred to a hospital outside of GeMQIN; in which case, readmission cannot be attributed to any physician
	  ○ Coded transfers out are based on the DAD field “Institution To”

Numerator	Total number of episodes of care that were followed by readmission to any medical or intensive care service at a GeMQIN hospital within 7 days of discharge during the reporting period
	Exclusions from the numerator:
	• Episodes where the first record is elective admission
	  ○ DAD admission category code L
	• Episodes with at least 1 record for chemotherapy for neoplasm
	  ○ ICD-10-CA code Z51.1 as diagnosis types M, 1, W, X, Y
	• Episodes with at least 1 record for palliative care
	  ○ ICD-10-CA code Z51.5 as diagnosis type = M
	• Episodes with at least 1 record for mental health
	  ○ CIHI major clinical category 17 as diagnosis type M
	• Episodes with at least 1 record for obstetric delivery
	  ○ ICD-10-CA codes O10–O16, O21–O29, O30–O37, O40–O46, O48, O60–O69, O70–O75, O85–O89, O90–O92, O95, O98, O99 with a sixth digit of 1 or 2, or Z37 recorded in any diagnosis field
	• Medical assistance in dying
	  ○ After April 2018: DAD discharge disposition code 73
	  ○ Before April 2018: DAD discharge disposition code 7 and all 3 Canadian Classification of Health Intervention codes: 1.ZZ.35.HA-P7, 1.ZZ.35.HA-P1, 1.ZZ.35.HA-N3

Data Source	Hospital data standardized for reporting to CIHI DAD
Risk Adjustment	None
Desired Value	Lower 7-day readmission rates are desirable

Comments	This indicator does not capture readmissions to hospitals outside of GeMQIN In rare cases, an episode of care may be mistakenly identified as 2 separate episodes when a patient is transferred from a GeMQIN hospital to a non-GeMQIN hospital and then back to a GeMQIN hospital The following scenario applies only to hospitals where the data provided to GEMINI does not go beyond the reporting period of the MyPractice report at the time of the development: GEMINI receives data after the inpatient has been discharged from hospital. If a patient is still hospitalized at the time of data extraction, that information will not be provided to GEMINI until the hospitalization has ended. If this particular hospitalization is a readmission, this would result in an underestimation of readmission rates because this hospitalization has not yet been counted by GEMINI. To minimize this bias, 7-day readmission rates exclude the most recent 37 days collected from each hospital. The rationale is as follows: • 7 days must have passed to allow for 7-day readmission to occur • > 95% of hospital admissions will be discharged within 30 days based on analyses of GEMINI data

Sources: Discharge Abstract Database,[8] GEMINI data,[9] MyPractice: General Medicine,[3] SCD-10-CA codes and classifications.[7]

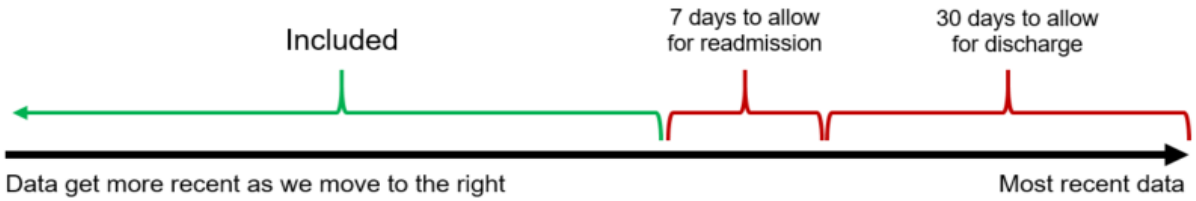

Table 3: 30-Day Readmission

Indicator Name	30-day readmission
Description	The 30-day readmission rate for a given physician during the reporting period
Unit of Analysis	Episode of Care An episode of care includes all contiguous inpatient hospitalizations admitted to any medical or intensive care service within GeMQIN. Episodes involving interfacility transfers are linked regardless of diagnosis. An acute care transfer is assumed to have occurred if either of the following criteria are met: • An admission to a medical or intensive care service at a GeMQIN hospital occurs within 7 hours after discharge from another GeMQIN hospital, regardless of whether the transfer is coded • An admission to a medical or intensive care service at a GeMQIN hospital occurs within 7–12 hours after discharge from another GeMQIN hospital, and at least 1 hospital has coded the transfer ○ Coded transfers are based on the DAD fields “Institution From” and “Institution To” For episodes of care involving acute care transfers, readmissions are attributed to the last hospital from which the patient was discharged before readmission
Calculation	Rate: numerator ÷ denominator (calculation equivalent to arithmetic mean)
Exclusions	Episodes with an invalid health card number

Denominator	Total number of episodes of care attributed to a given physician and discharged within the reporting period
	Exclusions from the denominator:
	• Episodes with discharge as death
	  ○ DAD discharge disposition codes: 07, 72, 73, 74
	• Episodes with at least 1 record for palliative care
	  ○ ICD-10-CA code Z51.5 as diagnosis type M
	• Episodes with at least 1 record for mental health
	  ○ CIHI major clinical category 17 as diagnosis type M
	• Episodes where the last record is a self sign-out
	  ○ DAD discharge disposition code: 06, 61, 62, 65, 66, 67
	• Episodes where the last hospital has coded a transfer out to a non-GEMINI acute care institution
	  ○ This indicates that the patient was transferred to a hospital outside of GeMQIN; in which case, readmission cannot be attributed to any physician
	  ○ Coded transfers out are based on the DAD field “Institution To”

Numerator	Total number of episodes of care that were followed by readmission to any medical or intensive care service at a GeMQIN hospital within 30 days of discharge during the reporting period
	Exclusions from Numerator:
	• Episodes where the first record is elective admission
	  ○ DAD admission category code L
	• Episodes with at least 1 record for chemotherapy for neoplasm
	  ○ ICD-10-CA code Z51.1 as diagnosis types M, 1, W, X, Y
	• Episodes with at least 1 record for palliative care
	  ○ ICD-10-CA code Z51.5 as diagnosis type M
	• Episodes with at least 1 record for mental health
	  ○ CIHI major clinical category 17 as diagnosis type M
	• Episodes with at least 1 record for obstetric delivery
	  ○ ICD-10-CA codes O10–O16, O21–O29, O30–O37, O40–O46, O48, O60–O69, O70–O75, O85–O89, O90–O92, O95, O98, O99 with a sixth digit of 1 or 2, or Z37 recorded in any diagnosis field
	• Medical assistance in dying
	  ○ After April 2018: DAD discharge disposition code 73
	  ○ Before April 2018: DAD discharge disposition code 7 and all 3 Canadian Classification of Health Intervention codes: 1.ZZ.35.HA-P7, 1.ZZ.35.HA-P1, 1.ZZ.35.HA-N3

Data Source	Hospital data standardized for reporting to CIHI DAD
Risk Adjustment	None
Desired Value	Lower 30-day readmission rates desirable

Comments	This indicator does not capture readmissions to hospitals outside of GeMQIN In rare cases, an episode of care may be mistakenly identified as 2 separate episodes when a patient is transferred from a GeMQIN hospital to a non-GeMQIN hospital and then back to a GeMQIN hospital The following scenario applies only to hospitals where the data provided to GEMINI does not go beyond the reporting period of the MyPractice report at the time of the development: GEMINI receives data after the inpatient has been discharged from hospital. If a patient is still hospitalized at the time of data extraction, that information will not be provided to GEMINI until the hospitalization has ended. If this particular hospitalization is a readmission, this would result in an underestimation of readmission rates because this hospitalization has not yet been counted by GEMINI. To minimize this bias, 30-day readmission rates exclude the most recent 60 days collected from each hospital. The rationale is as follows: • 30 days must have passed to allow for 30-day readmission to occur • > 95% of hospital admissions will be discharged within 30 days based on analyses of GEMINI data

Sources: Discharge Abstract Database,[8] GEMINI data,[9] MyPractice: General Medicine,[3] SCD-10-CA codes and classifications.[7]

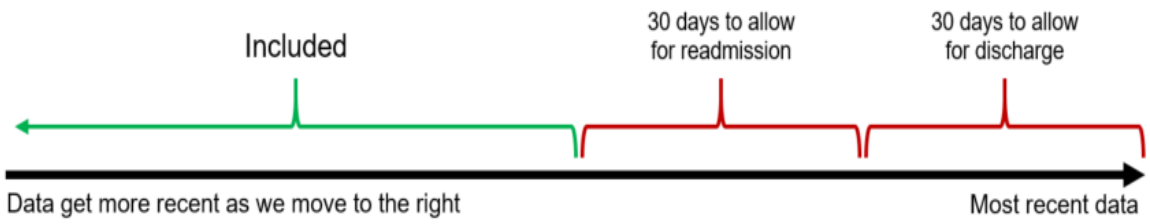

Table 4: Advanced Imaging Tests

Indicator Name	Advanced imaging tests
Description	The number of advanced imaging tests per hospitalization, in all hospitalizations attributed to a given physician during the reporting period. Advanced imaging tests include computed tomography, magnetic resonance imaging, and ultrasound. Interventional radiology is not included
Unit of Analysis	Hospitalization
Calculation	Rate: numerator ÷ denominator (calculation equivalent to arithmetic mean)
Denominator	Total number of hospitalizations attributed to a given physician that are discharged within the reporting period
Numerator	Total number of advanced imaging tests in hospitalizations attributed to a given physician and discharged during the reporting period
Data Source	Data extracted from hospital electronic patient records and standardized by subject matter experts
Risk Adjustment	None
Desired Value	No clear desired value. Fewer advanced imaging tests may reflect more efficient use of resources, while more advanced imaging tests may reflect more thorough care. Interpret in the context of your hospital's processes of care, case load, and other local clinical context
Comments	This indicator does not include advanced imaging tests ordered in the emergency department or intensive care unit Images of multiple body parts that are grouped together in the same imaging order (e.g., CT abdomen and pelvis) are treated as a single imaging test This indicator page has tabs on the top of the page to view results for individual imaging modalities. There are specific tabs for computed tomography, magnetic resonance imaging, and ultrasound A small minority of hospitals in the network do magnetic resonance imaging at a partner hospital because they do not have a machine on-site. Thus, magnetic resonance imaging orders are not captured in radiology data at these hospitals. We use Canadian Classification of Health Intervention codes (with the form 3XX40XX) as reported by hospitals to the CIHI Discharge Abstract Database to identify a magnetic resonance imaging order in these cases

Table 5: Routine Bloodwork Tests

Indicator Name	Routine bloodwork tests
Description	The number of routine bloodwork tests per hospitalization, in all hospitalizations attributed to a given physician during the reporting period. Routine bloodwork tests are defined as electrolyte tests and complete blood count tests.
Unit of Analysis	Hospitalization
Calculation	Rate: numerator ÷ denominator (calculation equivalent to arithmetic mean)
Denominator	Total number of hospitalizations attributed to a given physician that are discharged during the reporting period
Numerator	Total number of routine bloodwork tests in hospitalizations attributed to a given physician and discharged during the reporting period
Data Source	Data extracted from hospital electronic patient records and standardized by subject matter experts
Risk Adjustment	None
Desired Value	No clear desired value. Fewer routine blood tests may reflect more efficient use of resources, while more routine blood tests may reflect more thorough care. Interpret in the context of your hospital's processes of care, case load, and other local clinical context
Comments	This indicator does not include routine bloodwork tests collected in the emergency department or intensive care unit This indicator excludes tests that were not performed. We identify tests not performed based on their invalid result value Electrolyte and complete blood count tests are identified using sodium and hemoglobin measurements, respectively

Table 6: Appropriate Red Blood Cell Transfusion

Indicator Name	Appropriate red blood cell transfusion
Description	The rate of appropriate red blood cell transfusion among all red blood cell transfusions in hospitalizations attributed to a given physician during the reporting period
Unit of Analysis	Blood transfusion
Calculation	Rate: numerator ÷ denominator (calculation equivalent to arithmetic mean)
Exclusions	Red blood cell transfusions with no hemoglobin measurement within 48 hours prior to the transfusion are excluded from the numerator and denominator. These scenarios are rare, occurring in approximately 2% of blood transfusions based on analyses of GEMINI data
Denominator	Total number of red blood cell transfusions in hospitalizations attributed to a given physician that are discharged during the reporting period
Numerator	Total number of appropriate[a] red blood cell transfusions in hospitalizations attributed to a given physician that are discharged during the reporting period
Data Source	Data extracted from hospital electronic patient records and standardized by subject matter experts
Risk Adjustment	None
Desired Value	A higher rate of appropriate red blood cell transfusion is desirable
Comments	This indicator does not include transfusions issued in the emergency department or intensive care unit

[a]Appropriate blood transfusions are defined by the most recent pre-transfusion hemoglobin value < 80 g/L within 48 hours prior to transfusion. We use the date-time when the red blood cell product was issued from the blood bank instead of the date-time when the transfusion was administered because the latter value is not widely available in electronic health record data. We make the assumption that blood products will be transfused shortly after leaving the blood bank.

Table 7: Sedative-Hypnotic Orders

Indicator Name	Sedative-hypnotic orders
Description	The proportion of hospitalizations that received at least 1 order for a sedative-hypnotic drug Note: Ideally, we would exclude patients who were prescribed sedative-hypnotic medications prior to hospital admission from the indicator; however, GEMINI does not currently hold data about pre-hospital medications. Therefore, we report a "main indicator" and a "secondary indicator" to address this
Unit of Analysis	Hospitalization
Calculation	Rate: numerator ÷ denominator (calculation equivalent to arithmetic mean)
Exclusions	Hospitalizations with an appropriate indication for sedative-hypnotics are excluded. Indications for sedative-hypnotics are based on Choosing Wisely Canada's toolkit to reduce inappropriate inpatient use of sedative-hypnotics.[12] We supplemented the Choosing Wisely list with Lexicomp's "Benzodiazepines General Statement" to include additional evidence-based indications. Lexicomp is a subscription-based resource that provides evidence-based drug referential content[13] The following are considered indications for sedative-hypnotics when they are present as most responsible discharge diagnosis, proxy most responsible discharge diagnosis, or post-admission comorbidity (diagnosis types M, 6, 2): • Panic attacks (ICD-10-CA code F41.0) • Anxiety (CCSR category: MBD005; anxiety and fear-related disorders) • Seizures (CCSR category NVS009: epilepsy; convulsions) • Catatonia (ICD-10-CA codes F06.1, F20.2) • Alcohol withdrawal (ICD-10-CA codes F10.3, F10.4) • Benzodiazepine withdrawal (ICD-10-CA codes F13.3, F13.4) • Neuroleptic malignant syndrome (ICD-10-CA code G21.0) • Serotonin syndrome (ICD-10-CA codes T43, T44, F19) • Intoxication: cocaine and other stimulants (ICD-10-CA codes F14.0, F15.0) • Palliative care (ICD-10-CA code Z51.5)
Denominator	Main indicator: number of hospitalizations that did not have a sedative-hypnotic order within 24 hours of admission Note: the main indicator excludes patients who had a sedative-hypnotic order placed in the first 24 hours of hospital admission. This is an imperfect proxy to exclude patients who were taking sedative-

	hypnotic medications before hospital admission (because they would be continued at the time of admission) Secondary indicator: number of hospitalizations, regardless of whether a sedative-hypnotic was ordered in the first 24 hours after admission Note: because orders placed in the first 24 hours do not always reflect pre-hospital medications (for example, a new order could be part of an admission order set), we also report "All orders" in a tab at the top left of the indicator page
Numerator	Main indicator: number of hospitalizations with a new sedative-hypnotic order after 24 hours post-admission in a ward-based setting Secondary indicator: when the "All orders" tab is selected, the numerator includes sedative-hypnotic orders entered at any time after admission Note: sedative-hypnotic orders initiated in the emergency department or intensive care unit (ICU) are excluded. Step-down units are not considered ICU for this exclusion because patients requiring sedation are typically not admitted to step-down units
Data Source	Data extracted from hospital pharmacy systems, processed by the GEMINI-RxNorm system,[a] and standardized/validated by subject matter experts
Risk Adjustment	None
Desired Value	A lower rate of sedative-hypnotic orders is desirable
Comments	The list of sedative-hypnotic drugs is based on Choosing Wisely Canada's toolkit for reducing inappropriate use of benzodiazepines and sedative-hypnotics among older adults in hospitals.[12] This list is supplemented with medications listed by the Ontario Ministry of Health's Narcotics Monitoring System[14] and Trazodone is added as a commonly used sleep medication. We did not include quetiapine or olanzapine because these antipsychotics have other indications The following drugs are considered sedative-hypnotics: • Alprazolam • Bromazepam • Chlordiazepoxide • Clobazam • Clonazepam • Clorazepate • Diazepam • Flurazepam • Lorazepam • Midazolam • Nitrazepam • Oxazepam

	• Temazepam • Trazodone • Triazolam • Zolpidem • Zopiclone <u>Handling “as needed” (pro re nata, or PRN) orders for medication:</u> Because not all hospitals have electronic medication administration records, GEMINI collects data on ordered medications rather than administered medications. PRN orders are included in the calculation of the numerator and are treated like standing scheduled orders for the purposes of all inclusion/exclusion criteria and calculations of the indicator The indicator cards on the left of the indicator page include detail on the percentage of hospitalizations where the only sedative-hypnotic order is a PRN order

[a]The GEMINI-RxNorm system is a highly accurate automated pipeline for medication data standardization in multisite patient data repositories.[15] The GEMINI-RxNorm system uses a combination of RxNorm tools and external datasets to permit querying of unstandardized medication data to enable research.
Sources: Choosing Wisely Canada,[12] Wolters Kluwer (Lexicomp),[13] Ontario Ministry of Health.[14]

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