

## ADMINISTRATIVE HEALTH DATA: DRUG DATA

### DRUG DATABASE

### I. Overview

### [Drug Data Summary]

**Drug Database** - contains prescription drug claims from the Drug Programs Information Network, an electronic, on-line, point-of-sale prescription drug database. Initiated in 1994, it connects Manitoba Health and Healthy Living (MHHL) and all pharmacies in Manitoba to a central database maintained by MHHL. Information about pharmaceutical dispensations is captured in real time for all Manitoba residents (including Registered First Nations), regardless of insurance coverage or final payer. DPIN facilitates payment administration for eligible drug costs, incorporating functions such as real-time adjudication, and collects high-quality data on all prescriptions issued to Manitobans, such as drug, dosage, and prescription date. Note that the prescription's indication (the physician's prescribing intent) is not collected and must be inferred from other data.

#### SUMMARY DESCRIPTION

Since its inception in 1994, DPIN has implemented 4 main carriers and several related programs for all prescriptions with a Drug Identification Number (DIN - [MCHP Glossary Term](#)) or Product Information Number ([list of PINs from MHHL](#)). Each program can have a different formulary, or listing of drugs eligible for coverage (C1 being the most restrictive), and the listings are subject to change. (In 2004, for example, MHHL adopted a process of considering the review of *new* drugs from the Common Drug Review. This FPT (federal/provincial/territorial agency) reviews new drugs and provides Formulary recommendations for same; older drugs are not currently assessed.) Health care providers are requested and, in some cases, required to use only drugs listed in the formularies unless there is a valid medical reason to use a non-formulary drug.

#### DPIN PROGRAMS

1. **Personal Pharmacare Program (C1)** [[Manitoba Pharmacare website](#)] - implemented in 1994, the objective of this universal program is "to protect residents of Manitoba from financial hardships resulting from expenses for prescription drugs as provided for in The Prescription Drugs Cost Assistance Act and Regulations" (Office of the Auditor General, 2006). The deductible for the Pharmacare program is based on annual family income (as of April 1, 1996), and benefits apply only after an application giving permission to the Provincial Drug Programs (PDP) Unit to access taxable family income data from Canada's Revenue Agency (CRA). To become eligible for coverage, drugs under consideration must be reviewed and compiled by the Manitoba Drug Standards and Therapeutics Committee, followed by final approval from the Minister of Health. Approved drugs are subsequently entered in the Manitoba Drug Benefits and Interchangeability Formulary ([MCHP Glossary Term](#)). The PDP maintains the Pharmacare Formulary (containing over 5,000 drugs (DINs) for 2006), and the list of drugs is divided into three parts:
  - Part I - eligible for Pharmacare benefits under all prescribed circumstances
  - Part II - eligible for Pharmacare benefits under specified conditions
  - Part III - considered for Pharmacare benefits under EDS (Exception Drug Status) on a case by case basis

#### Personal Pharmacare (C1)

2. **Personal Care Home (PCH) Drug Program (C2)** - implemented as a carrier in September, 1995 (formerly known as the Nursing Home Drug Program). While PCHs are administered by the Regional Health Authorities, the drug program is provincially based and administered by Pharmacare. Funding for this program is not included in PDP appropriations (budgeted

#### Personal Care Home (C2)

funds). There is no deductible required to be paid out-of-pocket by those resident in PCHs.

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|--|--|
| 3. <b>Employment and Income Assistance Drug Program (C3)</b> - implemented as a carrier in September, 1995 (formerly known as the Family Services Drug Benefits Program). Funding for this program is not included in PDP appropriations (budgeted funds). There is no deductible required to be paid out-of-pocket by recipients of this program.   | <b>Employment and Income Assistance (C3)</b> |
| 4. <b>Palliative Care Drug Access Program (C4)</b> - implemented as a carrier December 9, 2002. There is no deductible.  | <b>Palliative Care (C4)</b>                  |
| 5. <b>Non-adjudicated transactions</b> - represent a 5th category of transactions not covered in the C1-C4 programs (approximately 15% of all prescriptions). Non-adjudicated claims are submitted for screening of possible inappropriate use (e.g., drug-drug interactions) before dispensation but do not undergo regular review for possible payment by the Government of Manitoba. This serves as an incentive for the dispensing pharmacy to send all prescription claim information into MHHL for screening, regardless of the prescription's final payer(s). | <b>Non-Adjudicated Transactions</b>          |
| 6. <b>Ancillary programs/non-drug products</b> - ancillary programs cover, for example, prosthetic/orthotic devices. Some non-drug products possess a Product Information Number (PIN) (e.g., crutches) and are likely to show up in the C3 program and the non-adjudicated claims data.   | <b>Ancillary</b>                             |

Note - Client files are also included in the drug database; they contain drug program client applications for payment of pharmaceutical dispensation costs above income-based deductibles for Pharmacare (C1).

Several key data fields are available, depending on the unit of analysis, which may be the drug, the prescription (dispensed prescription), and/or the person receiving the drug. Other derived measures are available from the MCHP Concept Dictionary.

#### KEY DATA FIELDS

- **Drug Identification Number (DIN - [MCHP Glossary Term](#))** - an 8-digit number assigned by the Drugs Program (Health Canada) to each drug approved for use in Canada in accordance with the Food and Drug Regulation. The same drug (e.g. Amoxicillin, 250 mg capsules) can have a number of different DINs associated with it (for example, due to different manufacturers, different dosage forms, routes or strengths ). DIN is used as a linkage key for DPIN data sets. DIN can be grouped using one of two drug classification systems, as described in the following MCHP concepts:
  1. **Anatomical Therapeutic Chemical (ATC)** - developed by the World Health Organization (in combination with the measure of Defined Daily Dose (DDD)) and available from the MCHP Master Formulary
  2. **American Hospital Formulary System (AHFS)** - developed by the American Society of Health System Pharmacists
- **Generic name** - of drug, or chemical description (e.g., ibuprofen is the drug name for the brand name drug, Advil®)
- **Brand name** - product description (e.g., Valium® is the brand name for the chemical (generic name) diazepam)
- **Strength** - the potency of the drug/chemical, usually measured in metric weight (e.g., micrograms, milligrams, grams) and described as the strength of the product's active ingredient. Obtained from the Master Formulary File (coding from Health Canada's [Drug Product Database \(DPD\)](#)). Also available from the DIN Master File (e.g. 250 mg, 250MG/5ML) but

#### Drug-Based

limited because information is often incomplete (e.g. 250 MG but missing the /5 ML).

- **Route of administration** - how or by what the route the drug is administered or given access to the body; examples of 'routes' include: oral, rectal, parenteral or transdermal. Obtained from the Master Formulary File (coding from Health Canada's [Drug Product Database \(DPD\)](#)). Also available from the DIN Master File, but limited because no labeling format is available.
- **Dosage form** - the form in which a product (DIN) is administered (e.g., tablet, liquid, suppository, solution). A product (brand) name can have more than one dosage form; each dosage form will have its own DIN. Obtained from the Master Formulary File (coding from Health Canada's [Drug Product Database \(DPD\)](#)). Also available from the DIN Master File, but limited because no labeling format is available.
- **Drug Identification Number (DIN)**
- **Quantity of medication dispensed for the claim (metric amount)** - valid only for solid dosage forms
- **Date prescription dispensed**
- **Days of medication supplied** (mandatory field)
- **Total prescription cost** (sum of ingredient cost of medication and professional (dispensing) fee)
- **Personal Health Identification Number [PHIN; PROVID in the DPIN]** - a scrambled linkage key for DPIN data files, helping to link together a person's consecutive prescription dispensations.
- **Demographic data fields**
  - **Birth date** - available in DPIN, but the Registry birth date field is recommended for use.
  - **Sex** - available in DPIN, but the Registry sex variable is recommended for use.
  - **Family membership** - defines/identifies a family unit within a drug coverage program
  - **Client location** - municipal code and first three (3) digits of the postal code (the Forward Sortation Area, or FSA)
- **Manitoba Health and Healthy Living program information**
  - **Coverage program field** - program under which the drug was dispensed (C1 to C4 or non-adjudicated)
  - **Prescriber ID** - scrambled ID for physician or dentist who prescribed the medication
  - **Deductibles for the Pharmacare Program (C1):**
    - Paid - amount going towards annual income-based deductible
    - Satisfied - amount of family's deductible met to date, not including the current claim
    - Toward - amount of claim going toward annual family deductible

Prescription -  
Based

Person-Based

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MCHP DATA  
VALIDATION  
STUDIES

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- Office of the Auditor General: *Audit of the Pharmacare Program, Manitoba Health*, 2006. Full report [[http://www.oag.mb.ca/reports/PHARMACARE\\_APR06.pdf](http://www.oag.mb.ca/reports/PHARMACARE_APR06.pdf)]

## ADMINISTRATIVE HEALTH DATA: DRUG DATA

### DRUG DATABASE

### II. Data Strengths and Tools

### [Drug Data Summary]

Manitoba is one of the few provinces in Canada with a population-based drug network connecting all pharmacies in real time. Pharmacoepidemiologic databases provide advantages characteristic of [Administrative Data](#), facilitating studies of utilization, appropriateness and effects of drugs in large numbers of people. Such studies can provide an estimate of the probability of the beneficial versus adverse effects of drugs in populations.

High-quality administrative data are collected on all prescriptions issued to residents of Manitoba, and multiple years of data permit studying change over time for numerous variables. Such extensive historical data is important for studying the determinants of health and assessing the impact of disease on the population. For example, prescription drug records can be used in combination with hospital separations and physician billing claims to construct algorithms for monitoring the prevalence of selected chronic diseases in Manitoba (Lix et al., 2006).

This section describes several analytical approaches and concepts relevant and appropriate for use with the drug database.

- [ACG](#) - can be used, for example, to adjust for confounding bias
- [Concurrency](#) - two or more drugs dispensed simultaneously
- [Dose Intensity](#) - types and numbers of prescription drugs using the measures of Defined Daily Dose (DDD) and Prescribed Daily Dose (PDD)
- [Duration of Use](#) - medication interval and exposure calculations
- [Persistence](#) (Adherence/Compliance) - continuing a course of therapy
- [Calculating Costs/Expenditures for Pharmaceuticals](#)
- [Key Events and Dates in the Manitoba Health Care System 1990 - 2003 \[pdf\]](#) - compiled by Fred Toll, 2003. "The purpose and aim of the documentation is to provide researchers at the Manitoba Centre for Health Policy and elsewhere with key dates of events which might be related to the provision of health care services and changes which might affect the use of health care services".

### MCHP CONCEPTS AND TOOLS

- [Compendium of Pharmaceuticals and Specialties](#) - the definitive Canadian source of drug information, providing a listing of proprietary and non-proprietary drugs (more information at [Canadian Pharmacists Association](#))
- [Canadian Agency for Drugs and Technologies in Health](#)
  - [Common Drug Review \(CDR\)](#) - "conducts objective, rigorous reviews of the clinical and cost effectiveness of new drugs, and provides formulary listing recommendations to the publicly funded drug plans in Canada (except Québec)." Note these reviews apply to *new* drugs only.
  - [Canadian Optimal Medication Prescribing & Utilization Service \(COMPUS\)](#) - "identifies evidence-based best practices in drug prescribing and use."
- [Manitoba Drug Benefits and Interchangeability Formulary \(C1 Pharmacare\)](#): updates are made available every 3-4 months, and are incorporated annually by Manitoba Health and Healthy Living (MHHL) into the DPIN data (DIN Master File). Single source products are

### OTHER DRUG DATA RESOURCES



distinguished from multisource products in MHHL Submission Requirements. Drug manufacturers are required to report changes such as the following: new indications, new strengths and formulations, and changes to DIN, product name, manufacturer/distributor, price, and benefit status. Each new formulary has 3 components, as noted at the MHHL website:

- Revised Manitoba Drug Interchangeability Formulary: [Manitoba Drug Interchangeability Formulary Regulation](#)
- Revised Prescription Drugs Cost Assistance Act: [Act](#) and [Regulation](#) (listing drugs related to the Act)
- New Bulletins: for example, changes in coverage for [Proton Pump Inhibitors](#)

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## STUDIES THAT HAVE USED MCHP DRUG DATA

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### DRUG DATABASE

### III. Data Cautions

### [Drug Data Summary]

The drug databases are very large, requiring efficient programming approaches. The minimum amount of information, both records and fields, should be kept when processing this data. A SAS macro *\_getdpin* has been developed as a standard method of pulling DPIN claims. It correctly processes the 15-month files, and removes duplicates across providers.

Services not captured in the drug data are noted below, as well as key issues and recommendations for working with drug data.

Services not captured in the drug database include:

- Hospital pharmacies for Manitoba residents
- Nursing stations
  - Ward stock
  - Registered First Nations (RFN) people - about 20% of dispensed prescriptions to RFN are not captured, representing about 1% of all prescriptions dispensed outside hospitals.
- Outpatient visits at CancerCare Manitoba
- Personal care homes which obtain drugs through a hospital pharmacy (an estimated 25% of PCHs) (Doupe et al., 2006)

#### DATA COMPLETENESS

#### RECOMMENDATIONS

1. **Duplicate records** - should always be removed. Details available internally.
2. **Identification of drugs** - requires certain steps to be followed, as laid out in the internal MCHP concept Use and Identification of Specific Drugs in Clinical Research. Other issues to consider when identifying drugs include:
  - Longitudinal changes in treatment indications (e.g., aspirin shifting from analgesic use to arteriosclerotic event prevention)
  - Changes over time in drug names, DINs, and ATC codes
  - Multiple indications (confounding by indication) - the same drug may be used in different ways, depending upon the condition it is intended to treat and on other drugs being taken concurrently.

Note: For analyses limited to drugs, Product Information Numbers (PINs) should always be removed.

3. **Cost information** - may need to be imputed, as described in the MCHP concept [Calculating Costs/Expenditures for Pharmaceuticals](#) - for example:
  - Professional fee needs to be added to prescriptions in the C2 data set
  - Ingredient cost and professional fee needs to be added to the nonadjudicated data set.

4. **Demographic information** - should be obtained from the (more reliable) Registry database rather than using the drug data.

#### BASIC ISSUES

1. Duplicates
2. Drug selection
3. Costing
4. Demographics

- **Prescription indication:** The physician's prescribing intent is not collected and must be inferred from other data.
- **Drug effects:** Cases where the endpoint (effect) is poorly described by the coding system.
- **Drug timing:** Studying of drug effects when the timing of drug intake is critical, e.g., short-term hyperacute effects.
- **Prescription vs utilization:** uncertainty about whether an individual has actually ingested the drug. Prescriptions may not be filled, or pharmacists' instructions may not be followed (to e.g., complete a 30-day supply of drugs)
- **Drug utilization not included in DPIN:**
  - Non-prescription drugs (medication purchased over-the-counter)
  - Physician samples

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DRUG DATABASE

IV. Study Examples:  
Concepts and Data Sources

[Drug Data Summary]

**Example 1.** How does the population of Manitoba use pharmaceuticals? (Pharmaceutical Use, 1996; Pharmaceuticals: Focussing on Appropriate Utilization, 2003)

**1. Descriptive:**  
all drugs

*Data sources*

- DPIN - DIN Master/Master (Common) Formulary (e.g., DPIN.DIMST0102C1)
- All DPIN claims [C1-C3 & Non-Adjudicated]

*Relevant Concepts*

- [Concurrency](#)
- [Dose Intensity](#)
- [Duration of Use](#)
- [Persistence](#)
- [Costs/Expenditures](#)

**Example 2.** Is health-care resource use different in those designated as taking interacting drugs with statins? (Clinical Therapeutics, 2002)

**2. Analytic:**  
specific drugs

*Data sources*

- DPIN - DIN Master/Master (Common) Formulary
- Specific DPIN claims (C1-C3 & Non-adjudicated by year) - identify statins and interacting drugs

*Relevant Concepts*

- [Prevalent and Incident](#) use of pharmaceuticals - for statins
- [Duration of Use](#)
- [Concurrency](#)

Also see the MCHP concept: *Use and Identification of Specific Drugs in Clinical Research* {internal only}

**Example 3.** What proportion of “newly diagnosed”, uncomplicated persons with hypertension are prescribed an angiotension II receptor antagonist (A2RA)? (Pharmaceuticals: Focussing on Appropriate Utilization, 2003)

**3. Analytic:**  
cohort defined using ICD-9-CM diagnosis

*Data sources*

- Hospital abstracts
- Medical claims
- DPIN - DIN Master/Master (Common) Formulary
- Specific DPIN claims for A2RAs & interacting drugs from CEXPPENDC1+C2+C3+ Nonadj

*Relevant Concepts*

- Step-Up: approach to prescribing appropriately
- Diagnosis - hypertension and/or co-morbidities

**Example 4. An analytic study in which the cohort is defined using demographic characteristics -**  
 What are the physician and household determinants of inappropriate antibiotic use in children? (CMAJ, 2004)

**4. Analytic:  
 cohort defined  
 using  
 demographic  
 characteristics**

*Data sources*

- Hospital abstracts
- Medical claims
- DPIN - DIN Master/Master (Common) Formulary
- Specific DPIN claims for antibiotics (1st and 2nd line) from CEXPPEND C1+C2+C3+Nonadj

*Relevant Concepts*

- Diagnosis - viral respiratory tract infection
- **Prevalent and Incident** use of pharmaceuticals - for antibiotics
- Medication total exposure calculations

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- Einarson TR, Metge CJ, Iskedjian M, Mukherjee J. An examination of the effect of cytochrome P450 drug interactions of hydroxymethyl-glutaryl-Coenzyme A reductase inhibitors on Health Care Utilization: A Canadian population-based study. *Clinical Therapeut* 2002;24(12): 2126-2136.
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