Perinatal Services BC
An agency of the Provincial Health Services Authority

Validity of pre-pregnancy Body Mass Index (BMI) information derived from a population-based perinatal database

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Learning Objectives

1. To describe one of Perinatal Services BC's (PSBC's) quality assurance processes related to the BC Perinatal Data Registry (BCPDR)

2. To provide information on the validity/reliability of BC perinatal data that are widely utilized for surveillance and research purposes

3. To facilitate discussion on innovative strategies to improve quality of BMI data in administrative databases

The BCPDR

- Data abstracted from obstetrical and neonatal medical charts for ~99% births in BC
- PSBC's mandate directly supported by operation and maintenance of the BCPDR
- Vision for the BCPDR is to "… be an industry-leading system for collecting relevant high-quality perinatal data that directly supports optimal neonatal, maternal and fetal health for BC residents" (PSBC, 2011)

Perinatal Services BC (2011). Perinatal data registry system development: business case.

The BCPDR – Data Collection

Standardized Provincial Perinatal forms

Electronic entry (70%)

Medical Record

~300+ data elements

Hospital Perinatal Database ~ 50 facilities

Imports
- CIHI (30%)
- ADT

Home Births

Data Collection at PSBC

BC Vital Stats

BC Ministry of Health

BCPDR
~700,000 + births

Data outputs

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The BCPDR – Data Use

Data widely utilized by PSBC and external stakeholders for:

- Planning
- Surveillance
- Clinical practice assessment
- Guidelines
- Research and more

Data Quality and the BCPDR

Routine quality checks

- Data collection and analysis (hospital-level)
- Consolidation and quality assurance (provincial-level)

Validation studies

- Historical - small-scale studies focussed on specific geographies or data quality issues
- Current – evaluation of all data fields (≥10% complete)
  - Reliability & validity
  - Missing data
  - Comprehensiveness

PSBC Data Field Evaluation Framework

Evaluation Attributes

1. Reliability/Validity
   - Are the data reproducible?
   - Measure agreement between PDR and re-abstracted data

Compare existing BCPDR data to re-abstracted data for sample of records

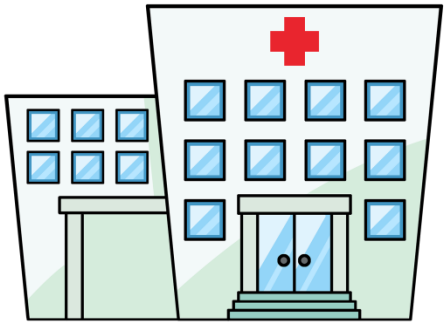
2. Completeness
   - What is the extent of missing data?
   - Measure proportion of missing or unknown data

3. Comprehensiveness
   - Is the scope/coverage appropriate and relevant?
   - Identify redundancies and gaps

Provincial Chart Re-Abstraction Project

Multi-stage stratified random sample

- Stage #1: Facility-level sample
  - Maternity care facilities (n=52) + home births
  - Stratified by peer group and Health Authority + place of original abstraction for home births = 15 possible strata
  - Randomly selected facilities within each stratum



Provincial Chart Re-Abstraction Project

Multi-stage stratified random sample (cont.)

- Stage #2: Chart-level sample
  - Delivery and newborn episodes charts
  - Discharge dates from April 1/10 to March 31/12
  - Oversampled more complex cases based on total length of stay and hospital transfer
  - Disproportional random sampling from facility
  - 1,110 maternal charts + 1,164 baby charts = 2,264 total charts

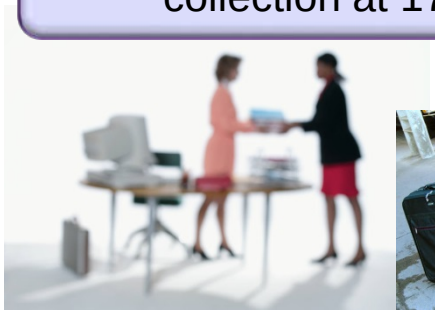
BMI variables

Provincial Chart Re-Abstraction Journey

Experienced PDR abstractors/analysts

Feb 2013 - three weeks training/pilot at BCW

Feb to Apr 2013 - primary collection at 17 sites

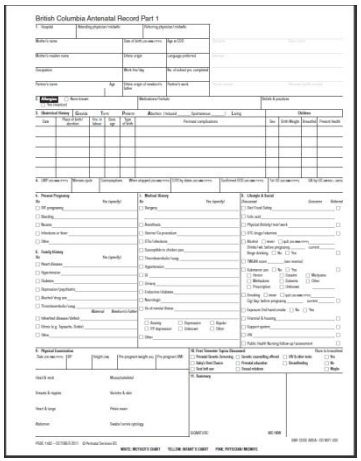


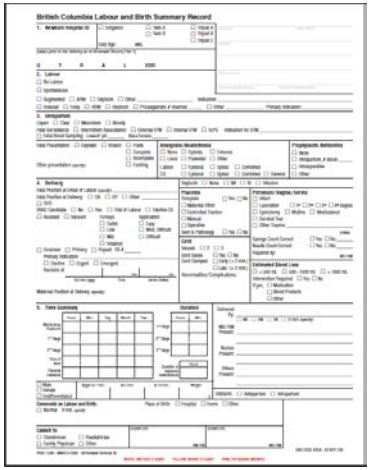
Secure File Transfer

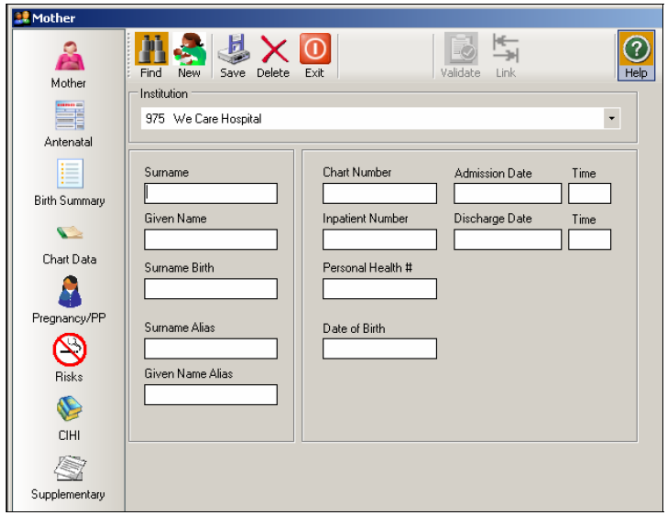
Provincial Chart Re-Abstraction Project

Data Collection

- Data entered on PSBC laptops in BCPDR screens
- Re-abstracted all fields collected from charts
  - No CIHI or ADT data
- Separate qualitative data collection tool
- Secure file transfer







Validation of pre-pregnancy BMI

Why BMI?

- Public health importance
  - Increasing prevalence of overweight and obesity as well as excess gestational weight gain in women of reproductive age
  - Increased risk for poor maternal and infant outcomes
  - May increase risk of early childhood and adult obesity in offspring

- Data
  - Used for routine surveillance and frequently requested by researchers
  - **Data must be valid to effectively inform action**

Validation of pre-pregnancy BMI

Assessing validity of BMI in re-abstraction project

- Re-abstraction of pre-pregnancy weight and height
  - Antenatal Record I and II forms
  - Triage and Assessment form
- 1,089 maternal charts (98% response rate)
  - 46% charts from complex cases (TLOS>=5 days or transfer out)
- Original BCPDR compared to re-abstracted data
  - Agreement: intra-class correlation coefficient (continuous data)
  - Proportion of missing values
  - Unweighted analysis
- Thematic analysis of qualitative feedback from re-abstractors

Validation of pre-pregnancy BMI

Results

Table 1. Agreement and percent missing for pre-pregnancy weight and height

	ICC (95% CI)	% missing	
		BCPDR (Original)	Re-abstraction
Pre-pregnancy weight	0.96 (0.96-0.97)	27.9	18.5
Height	0.89 (0.88-0.91)	23.9	18.0

- Excellent agreement (≥0.8 ICC) for all variables
  - Limitation: ICC measures only records where value was provided in both BCPDR and re-abstracted database (~70%)

Validation of pre-pregnancy BMI

Results

Table 2. Percent missing for pre-pregnancy weight and height

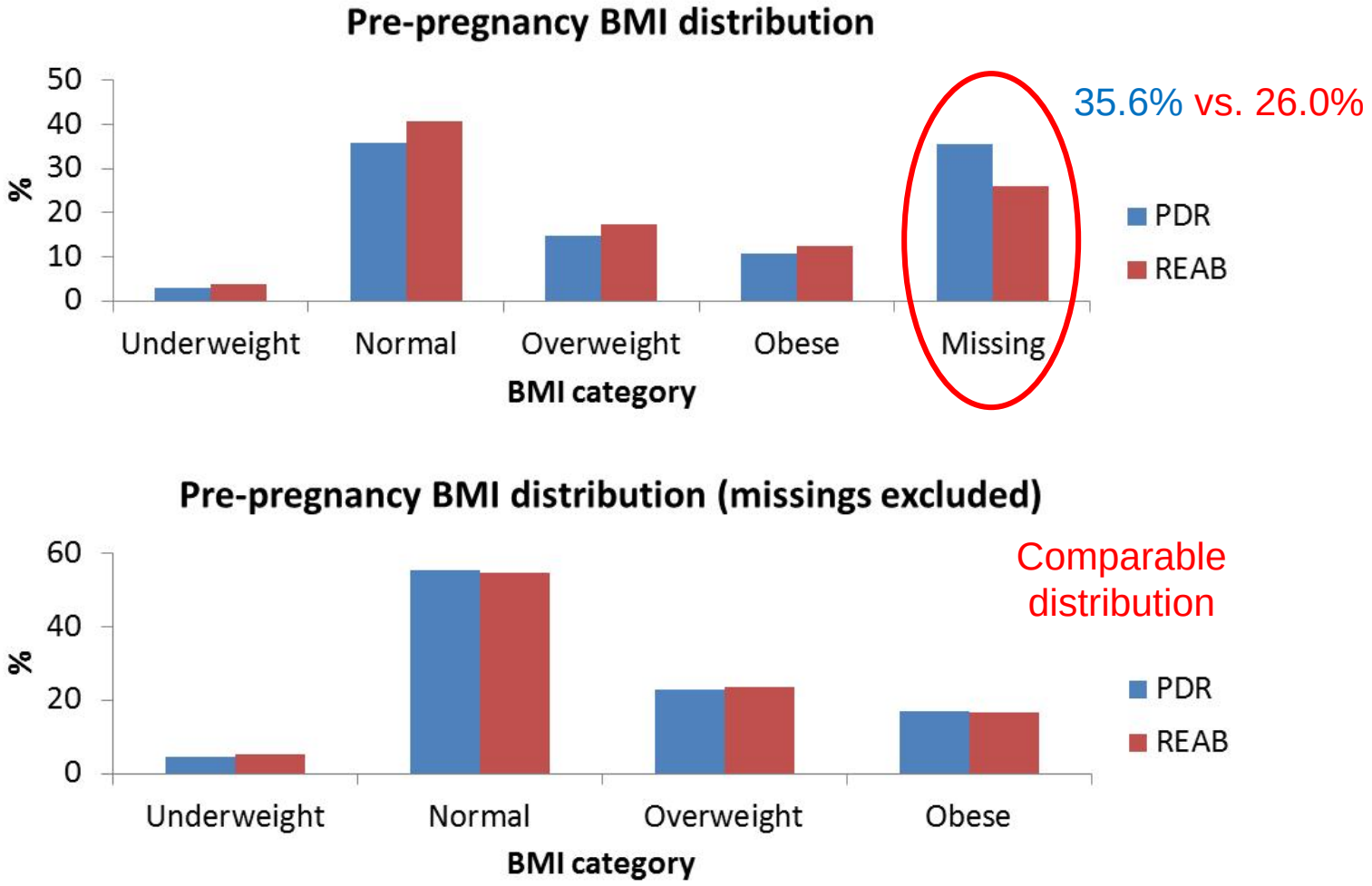
	% missing		
	Both databases	BCPDR only	Re-abstraction only
Pre-pregnancy weight	12.7	11.2	5.3
Height	15.8	12.1	2.8

- Both databases = “true” missing values
- BCPDR only = values missing in BCPDR only
- Re-abstraction only = values missing in re-abstraction only

- Re-abstraction more complete than BCPDR for both variables

Validation of pre-pregnancy BMI

Impact of differences on BMI



Validation of pre-pregnancy BMI

Challenges with chart documentation

- Information not available in chart or found elsewhere in chart
  - E.g., weight found on NB Consultation Report instead of on Antenatal Record or Triage & Assessment forms
- Inconsistent values found in chart; documented in multiple places
  - E.g., Antenatal Record I – 200 lbs; Antenatal Record II – 175 lbs
- Range given instead of precise measurement
  - E.g., 165-175 lbs
- Legibility of documentation

Validation of BMI

Discussion

- From the re-abstraction, pre-pregnancy BMI appears valid, albeit incomplete
  - Results in loss of records in analysis or imputation
- % of pre-pregnancy BMI missing in the BCPDR as a whole has decreased in the last five years (separate analysis)
  - 35.4% in 2008/09 → 24.6% in 2012/13 (preliminary)
- But completeness can be further improved as indicated by higher completion in the re-abstraction vs. BCPDR
- Results will inform strategies to improve abstraction of pre-pregnancy weight and height

Thank you!

Questions?