Developing an Interactive Web-based Health and Social Atlas

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Atlas Development

- **2006**
  - First CHR Health and Social Atlas

- **2007**
  - Second Edition

- **2007-08**
  - Issues with paper based atlas

- **2009**
  - Interactive Web Atlas

- **2010-11**
Data Types

- Health status and inequalities
- PCN (Primary Care Network) data
- Hospital utilization
- Surveillance
- Health outcomes
- Census
- Survey
First Health and Social Atlas

Preterm <37 Weeks Gestation (1999-2004)
Live Births, Alberta Perinatal Health Program

In the Calgary Health Region, the rate of preterm birth was 9.3% in 2002. The Alberta preterm rate in the same year was 8.5% and the Canadian preterm rate was 7.5%. The rate in the Calgary Health Region was 9.3% in 2004.
Problems with Static Atlas

- Only one geographic level (social district)
- Limited on metadata
- Limited on number of indicators, multiple years, overlays,…
- No option to compare indicators
- Tedious and time consuming to develop and update
GIS Based Web Atlas

- Online (web) interactive reporting of location-based data
- User always access to up-to-date data
- Dynamic reports that complement current static reports
GIS Based Web Atlas

- Brings together text, maps, charts and tables (content rich)

- Allows exploration of data behind the reports, makes data available in different formats and geographic levels

- Examine patterns and trends
Architecture
Domains & Themes

Social Environment
- Population
- Unemployment
- SES
- Aboriginal

Health Conditions
- Life Expectancy
- Notifiable Diseases
- Hospitalization rate

Child Health
- Maternal Factors
- BMI
- Injury ED & HD
- Immunization

Adult Health
- Population sub-groups
- Injury

Senior Health
- LTC
- Senior Care
- Life Expectancy
- Injury ED & HD

CHRPS
- Nutrition
- Physical Activity
- Alcohol
- Smoking
- BMI
- Depression
### Ranges/ Rates Panel

**Domain**

- Social Environment
- Unemployment

**Theme**

- Unemployed, Age 15-24 (2006) (%)

**Classes**

- 9
- 8.1
- 7.8
- 6.8

- (4)
- (4)
- (4)
- (3)

**Metadata / Export Data**

- Source: Census Canada 2006 - Calgary Health Region: 8.1%

**CHR Rate**

- Click to isolate a class on the map
Symbols / Counts Panel

Domain
Theme
Indicator
Year (If time series data is available)
Display change over time (animation)
Display values on the map
Metadata / Export Data

CHR Total

Social Environment
Total Population
Child Population (Age 0 to 19)
Child Population (Age 0 to 19), 1992 to 2007 (total children)

Source: Alberta Health Care Insurance Plan Stakeholder Registry
Data - Calgary Health Region; 315,902 total children
26. Age-Standardized Mortality Rate

Description

Directly age-standardized mortality rate (DSMR) per 100,000 pop

The directly age-standardized mortality rate is the mortality rate that would exist in a standard population (in this case the 1991 Canadian population), if they had the same age-specific mortalities as the study population.

Data Sources

- Numerator: Vital Statistics, Alberta
- Denominator: Alberta Health Care

Stratification Factors

- Geography
  - Social District
  - Primary Care Net
- Gender
  - Females
  - Males
- Cause
  - All Causes
  - Lung Cancer
  - Breast Cancer
  - Prostate Cancer
  - Colorectal Cancer
  - All Causes
  - Non-communicable
  - Injury
  - Cardiovascular Disease

Coding Required

<table>
<thead>
<tr>
<th>Cause</th>
<th>ICD-10</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Causes</td>
<td></td>
</tr>
</tbody>
</table>

Time Aggregation

<table>
<thead>
<tr>
<th>Cause</th>
<th>Time Aggregation</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Causes</td>
<td>Numerator: Three years (calendar years)</td>
</tr>
<tr>
<td></td>
<td>Denominator: Three years (fiscal years)</td>
</tr>
</tbody>
</table>

Identified Data Quality Issues

Mortality Data

The Vital Statistics database from Alberta Health Services is used without a valid address or postal code, which is why the mortality data may not be classified into social districts. Therefore, the number of deaths used to calculate the DSMR is smaller than the actual number of deaths for some social districts. Due to the difference in the CHF in the earlier years, as a result, the DSMR may be underestimated for these social districts. CHF estimates are also underestimated if 2000-2005 data are used.

Population Data

Canada has a government-financed universal health-care system. All eligible residents are covered by the provincial care insurance plan. However, only eligible residents who applied to the registry under the plan are covered. Therefore, the number of deaths used to calculate the DSMR is smaller than the actual number of deaths for some social districts. Due to the difference in the CHF in the earlier years, as a result, the DSMR may be underestimated for these social districts. CHF estimates are also underestimated if 2000-2005 data are used.

Indicator Limitation

DSMR should be used for comparison purposes only, as it does not reflect the underlying cause of death.
Overlay additional Layers on the map

Communities
- PCN
- SD
- GSA

Neighborhoods
- FSA
- First Nation

Municipal Districts
- Residential Area
- Parks
- Industrial Area
- Calgary Quadrants
- Electoral Districts

…
Main Map Area

- More localities names (for small towns/hamlets) are displayed when zoomed in.
- Can switch between SD, PCN anytime for the same indicator.
- If PCN is grayed out, it means the data for the selected indicator is not available for this geographic level.
- If the data for an indicator is not available for the current geographic level, indicator name is assigned a *.

Overlay area name is displayed when the mouse is hovered on top of it.
Main Map Area (Cont.)

Ctrl+Click to open scorecard.

For time series (multiple year) data

SD-3
Social District Profile

Individuals Who Consume Less than 5 Servings of Fruit and Vegetables per Day (2006-2008): 66.6%  
Average Female Life Expectancy at Birth (2004-2006): 84 years

detailed report on SD-3...
Main Map Area (Selection)

Click to select Social District or PCN and to open selection window

Information about Selection

Selected SD

Value of the indicator For selected SD

Synthetic Information

Save Selection

Main Map Area (Selection)
Synthetic Information button opens all indicators values for the selected area from the selected Theme in both Range (rate) and Symbols (counts) with CHR value and minimum and maximum values.
Information about Selection (Cont.)

Temp. Selection Manager

Temporary selections manager

- memorize current selection
- load
- clear
- intersection
- union
- invert current selection
- subtraction

Name your selection:

- display memorized selections
Save a Project

Save a Project
Or an url

Save a project or an Url

Url for current view and indicator:

CodeDomCH=se&n&curCodeThemeCH=totpop&typindCH=C&curCod
endCH=chpop&cuserieCH=2007

A project can store imported data, selection, user comments.
Name it
to be able to recall it later:

my_project

It is stored in xml format and can be shared with other users.
Tables

- Provides basic statistics for indicator data like mean, min, max, sum, variance, standard deviation
- Provides Histogram and Frequency Distribution
- Compare two variables – R² value
- Calculate new indicators based on a formula
- Export table
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>01 - SD-1</td>
<td>90,367</td>
<td>7,583</td>
<td>316</td>
</tr>
<tr>
<td>02 - SD-2</td>
<td>75,418</td>
<td>4,437</td>
<td>181</td>
</tr>
<tr>
<td>03 - SD-3</td>
<td>84,968</td>
<td>4,645</td>
<td>214</td>
</tr>
<tr>
<td>04 - SD-4</td>
<td>40,773</td>
<td>5,191</td>
<td>225</td>
</tr>
<tr>
<td>05 - SD-5</td>
<td>71,754</td>
<td>10,143</td>
<td>597</td>
</tr>
<tr>
<td>06 - SD-6</td>
<td>58,529</td>
<td>4,853</td>
<td>273</td>
</tr>
<tr>
<td>07 - SD-7</td>
<td>71,083</td>
<td>7,113</td>
<td>466</td>
</tr>
<tr>
<td>08 - SD-8</td>
<td>58,359</td>
<td>7,061</td>
<td>700</td>
</tr>
<tr>
<td>09 - SD-9</td>
<td>45,385</td>
<td>5,257</td>
<td>537</td>
</tr>
<tr>
<td>10 - SD-10</td>
<td>60,358</td>
<td>5,363</td>
<td>334</td>
</tr>
<tr>
<td>11 - SD-11</td>
<td>54,779</td>
<td>6,934</td>
<td>532</td>
</tr>
<tr>
<td>12 - SD-12</td>
<td>37,633</td>
<td>5,979</td>
<td>526</td>
</tr>
<tr>
<td>13 - SD-13</td>
<td>87,641</td>
<td>10,393</td>
<td>672</td>
</tr>
<tr>
<td>14 - SD-14</td>
<td>95,602</td>
<td>7,024</td>
<td>480</td>
</tr>
<tr>
<td>15 - SD-15</td>
<td>73,976</td>
<td>5,072</td>
<td>517</td>
</tr>
<tr>
<td>16 - SD-16</td>
<td>54,602</td>
<td>6,109</td>
<td>620</td>
</tr>
<tr>
<td>17 - SD-17</td>
<td>12,669</td>
<td>2,434</td>
<td>325</td>
</tr>
<tr>
<td>18 - SD-18</td>
<td>96,037</td>
<td>7,952</td>
<td>761</td>
</tr>
<tr>
<td>19 - SD-19</td>
<td>59,635</td>
<td>4,718</td>
<td>321</td>
</tr>
<tr>
<td>Total</td>
<td>1,238,799</td>
<td>119,153</td>
<td>8,592</td>
</tr>
</tbody>
</table>
A new indicator can be calculated based on existing indicators using mathematical formulas.
### AHS - 2009 Atlas of Calgary and Area

**Define the table columns:**

- **Social District**
- **spop_s_2007**
- **sel1_0507_n_per1000**

**Define the table title:**

- **Social District (13 units)**

<table>
<thead>
<tr>
<th>Social District</th>
<th>65 and Above, Senior Population (2007)</th>
<th>Aged 65 and Above, All Inj (2005/06-2006/07)</th>
</tr>
</thead>
<tbody>
<tr>
<td>01 - SD-1</td>
<td>7,683</td>
<td>316</td>
</tr>
<tr>
<td>02 - SD-2</td>
<td>4,457</td>
<td>161</td>
</tr>
<tr>
<td>03 - SD-3</td>
<td>4,645</td>
<td>214</td>
</tr>
<tr>
<td>04 - SD-4</td>
<td>5,191</td>
<td>226</td>
</tr>
<tr>
<td>05 - SD-5</td>
<td>10,143</td>
<td>597</td>
</tr>
<tr>
<td>06 - SD-6</td>
<td>4,853</td>
<td>273</td>
</tr>
<tr>
<td>07 - SD-7</td>
<td>7,113</td>
<td>486</td>
</tr>
<tr>
<td>08 - SD-8</td>
<td>7,861</td>
<td>700</td>
</tr>
<tr>
<td>09 - SD-9</td>
<td>5,257</td>
<td>557</td>
</tr>
<tr>
<td>10 - SD-10</td>
<td>5,353</td>
<td>334</td>
</tr>
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<td>6,954</td>
<td>532</td>
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<td>12 - SD-12</td>
<td>5,879</td>
<td>526</td>
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<tr>
<td>13 - SD-13</td>
<td>10,396</td>
<td>672</td>
</tr>
<tr>
<td>14 - SD-14</td>
<td>7,624</td>
<td>480</td>
</tr>
<tr>
<td>15 - SD-15</td>
<td>5,672</td>
<td>517</td>
</tr>
<tr>
<td>16 - SD-16</td>
<td>6,109</td>
<td>520</td>
</tr>
<tr>
<td>17 - SD-17</td>
<td>2,434</td>
<td>326</td>
</tr>
<tr>
<td>18 - SD-18</td>
<td>7,952</td>
<td>761</td>
</tr>
<tr>
<td>19 - SD-19</td>
<td>4,718</td>
<td>321</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>119,163</strong></td>
<td><strong>8,592</strong></td>
</tr>
</tbody>
</table>

**Type of table:**

- Simple table (list of indicators)

**Table export formats:**

- Clipboard

[Alberta Health Services](https://www.albertahealthservices.ca)
Map your own data

Import data for geographical level "Social District"
paste your data here (Ctrl+V or right click/paste)
geographical code must be the first column:

<table>
<thead>
<tr>
<th>code</th>
<th>Family Physician</th>
<th>Total Population</th>
<th>Family Physician</th>
</tr>
</thead>
<tbody>
<tr>
<td>01 53</td>
<td>90367</td>
<td>5.864972833</td>
<td></td>
</tr>
<tr>
<td>01 53</td>
<td>90367</td>
<td>5.864972833</td>
<td></td>
</tr>
<tr>
<td>02 30</td>
<td>75496</td>
<td>3.973720462</td>
<td></td>
</tr>
<tr>
<td>02 30</td>
<td>75496</td>
<td>3.973720462</td>
<td></td>
</tr>
<tr>
<td>03 66</td>
<td>84968</td>
<td>7.767630167</td>
<td></td>
</tr>
<tr>
<td>03 66</td>
<td>84968</td>
<td>7.767630167</td>
<td></td>
</tr>
<tr>
<td>04 62</td>
<td>48773</td>
<td>12.71195128</td>
<td></td>
</tr>
<tr>
<td>04 62</td>
<td>48773</td>
<td>12.71195128</td>
<td></td>
</tr>
<tr>
<td>05 61</td>
<td>71754</td>
<td>8.501268222</td>
<td></td>
</tr>
<tr>
<td>05 61</td>
<td>71754</td>
<td>8.501268222</td>
<td></td>
</tr>
<tr>
<td>06 26</td>
<td>58529</td>
<td>4.442242307</td>
<td></td>
</tr>
<tr>
<td>06 26</td>
<td>58529</td>
<td>4.442242307</td>
<td></td>
</tr>
<tr>
<td>07 95</td>
<td>71083</td>
<td>13.36465822</td>
<td></td>
</tr>
<tr>
<td>07 95</td>
<td>71083</td>
<td>13.36465822</td>
<td></td>
</tr>
</tbody>
</table>

decimal separator: ○ comma ○ period

open a model import excel file...

Successful join with 19 rows on 19 with:
- 2 integer variable(s)
  (=> Foreground analysis)
- 1 float variable(s)
  (=> Background analysis)
After closing that window (ok

Load Data

Read Data
Map your own data (Cont.)
Memorize maps and then create output of all of your selected maps.
Output (Theme Maps)

Already Created Maps (Combination of Theme maps)
# Viewing Atlas by Indicator Selection

## AHS - 2009 Atlas of Calgary and Area

### Criteria

<table>
<thead>
<tr>
<th>Domains:</th>
<th>Social Environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Themes:</td>
<td>Total Population</td>
</tr>
<tr>
<td>Geog. levels:</td>
<td>all levels</td>
</tr>
<tr>
<td><strong>Date:</strong></td>
<td>2007</td>
</tr>
</tbody>
</table>

### Keywords

- enter a search key:

### Indicator (click here to sort)

- Child Population (Age 0 to 19), 1992 to 2007
- Adult Population (Age 20 to 64), 1992 to 2007
- Senior Population (Age 65 and Above), 1992 to 2007
- Child Population (Age 0 to 19), 1992 to 2007
- Adult Population (Age 20 to 64), 1992 to 2007

### Indicator's description

**definition**

**Definition**
Percentage of total population between 0 and 19 years of age.

**source:** Alberta Health Care insurance Plan Stakeholder Registry Data

**unit:** %

**Geog. levels:** Neighborhoods, Primary Care Network, Social District
Age and Sex Standardized, Individuals Who Consume Less than 5 Servings of Fruit and Vegetables per Day (2006-2008)

Domain: Calgary Health Region Population Survey

Theme: Daily Nutrition Criteria

Indicator: Age and Sex Standardized, Individuals Who Consume Less than 5 Servings of Fruit and Vegetables per Day (2006-2008)

Indicator's description: Standardized rates are calculated using the same method with 1991 Canadian population as the standard population.

Geog. levels: Social District


Unit: %
Key Benefits

- Multiple ways to investigate health and social issues
- Explore spatial (geographical) pattern and trends across the region
- Visualize data at multiple levels
- A repository of current and historic data
- Linkage with existing reports and evaluations
Key Benefits

- Identify health inequalities and establish priority areas
- Brings together text, maps, charts and tables
- Dynamic reports that complement current static reports
What’s Next???

An Atlas for Whole Alberta (Alberta Health Services)

- Restricting Access
  - Different access levels
  - (Policy and Decision Makers, Managers, Staff, Public)

- More Indicators

- More Geographic Levels
Questions/Comments

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