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Outcomes Research in Diabetes



# Access to Cardio-Metabolic Care in People with Schizophrenia

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# Acknowledgements

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  - Dr. Scott Patten
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# Schizophrenia: A Serious Mental Illness

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- Prevalence: 1% of the Canadian population<sup>1</sup>.
- Associated with considerable morbidity<sup>2</sup>:
  - Positive symptoms
  - Negative symptoms
- Increased risk of mortality<sup>2,3</sup>.

# Metabolic Abnormalities and Schizophrenia

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- Schizophrenia is associated with:
  - Overweight/obesity<sup>4</sup>
  - Dysglycemia/type 2 diabetes<sup>5,6</sup>
  - Dyslipidemia<sup>7,8</sup>
  - Metabolic syndrome<sup>9-12</sup>
  - Cardiovascular disease (CVD)<sup>13,14</sup>

# Access to Cardiovascular Care in Schizophrenia

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- Schizophrenia is associated with:
  - Low rates of treatment for metabolic abnormalities<sup>8</sup>
  - Decreased likelihood of meeting diabetes performance measures (e.g. A1c testing, lipid testing, eye exams)<sup>15</sup>
  - Decreased access to cardiac revascularization procedures<sup>16</sup>

# Limitations of Available Studies

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- Selected subgroups of people with schizophrenia<sup>11,12</sup>
- No non-schizophrenic comparison group<sup>8,12</sup>
- Older time frame<sup>6,7,13</sup>
- No information regarding differential impact of sex or age
- Limited information regarding physician care of cardiovascular risk and CVD in people with schizophrenia

# Study Objectives

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- To compare in people with and without schizophrenia:
  - Prevalence of cardiovascular risk factors and CVD, while examining the differential impact of socio-demographic variables on this relationship;
  - Access to general care including general practitioners (GP), emergency department (ED) encounters, and hospitalizations;
  - Access to specialist care and revascularization procedures for people with diabetes or coronary artery disease.



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# Methods

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# Study Methods

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- Ethics approval – University of Alberta Health Research Ethics Board.
- Retrospective period prevalence study.
- Individuals 20 years of age and older.
- Timeline: Jan 1, 1995 – Dec 31, 2006.

# Databases of Alberta Health and Wellness

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- Alberta Health and Wellness:
  - Discharge abstract database
  - Physician claims data
  - Ambulatory care classification system



# Study Design and Cohort Identification

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- Schizophrenia cohort: physician claims and hospitalization data: ICD-9-CM 295.X or ICD-10-CA F20.X.<sup>17</sup>
- Individuals who did not meet criteria for schizophrenia were used as comparator cohort.

# CV Risk Factors and CVD Identification

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- CV Risk Factors:
  - Diabetes<sup>18</sup>
  - Hypertension<sup>19</sup>
  - Dyslipidemia<sup>13</sup>
- CVD:
  - Stroke<sup>20</sup>
  - Congestive heart failure (CHF)<sup>20</sup>
  - Acute coronary syndrome (ACS)<sup>20</sup>
  - Previous myocardial infarction (MI)/ischemic heart disease (IHD)/arrhythmia<sup>13</sup>
  - Coronary Artery Disease (CAD): CHF, ACS, MI, IHD, or arrhythmia
  - CVD: stroke, CHF, ACS, MI, IHD, or arrhythmia

# Access To General Care

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- General practitioner (GP) encounters
- Hospitalizations
- Emergency department (ED) encounters

# Access to Specialist Care

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- Diabetes:
  - Endocrinologist
  - Internist
  - Ophthalmologist
  - Nephrologist
- Coronary artery disease:
  - Cardiologist
  - Internist
  - Revascularization: CABG/PTCA

# Analysis

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- Multivariable logistic regression to adjust for potentially confounding variables:
  - Age
  - Sex
  - Subsidized healthcare premiums
  - Urban or rural dwelling (access to care models only)
- Differential impact of socio-demographic variables examined by including interaction terms in models.



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# Results

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# Study Cohort Demographics

	Schizophrenia (n = 28,832; 1.2%)	No Schizophrenia (n = 2,281,636; 98.8%)	Unadjusted Comparison
Male	14,644 (50.8%)	1,128,788 (49.5%)	OR: 1.05 95% CI: 1.03 – 1.08
Age (mean; S.D.; min – max)	47.6 years; 16.8; 20 - 107	45.3 years; 16.6; 20 – 109	Mean diff: 2.33 years p < 0.001
Subsidized healthcare premiums	16,971 (58.9%)	468,215 (20.5%)	OR: 5.54 95% CI: 5.41 – 5.67
Urban dwelling	24,625 (85.4%)	1,898,234 (83.2%)	OR: 1.18 95% CI: 1.14 – 1.22

# Prevalence of CV Risk Factors

	Schizophrenia (n = 28,832; 1.2%)	No Schizophrenia (n = 2,281,636; 98.8%)	Unadjusted Comparison (OR; 95% CI)
Diabetes	2,959 (10.3%)	126,817 (5.6%)	1.94; 1.87 – 2.02
Hypertension	6,533 (22.7%)	480,949 (21.1%)	1.10; 1.07 – 1.13
Dyslipidemia	6,618 (23.0%)	478,668 (21.0%)	1.12; 1.09 – 1.15
Number of CV risk factors			
0	17,111 (59.3%)	1,484,968 (65.1%)	0.78; 0.77 – 0.80
1	7,981 (27.7%)	543,107 (23.8%)	1.23; 1.19 – 1.26
2	3,091 (10.7%)	217,356 (9.5%)	1.14; 1.10 – 1.18
3	649 (2.3%)	36,205 (1.6%)	1.43; 1.32 – 1.55

# Prevalence of CVD

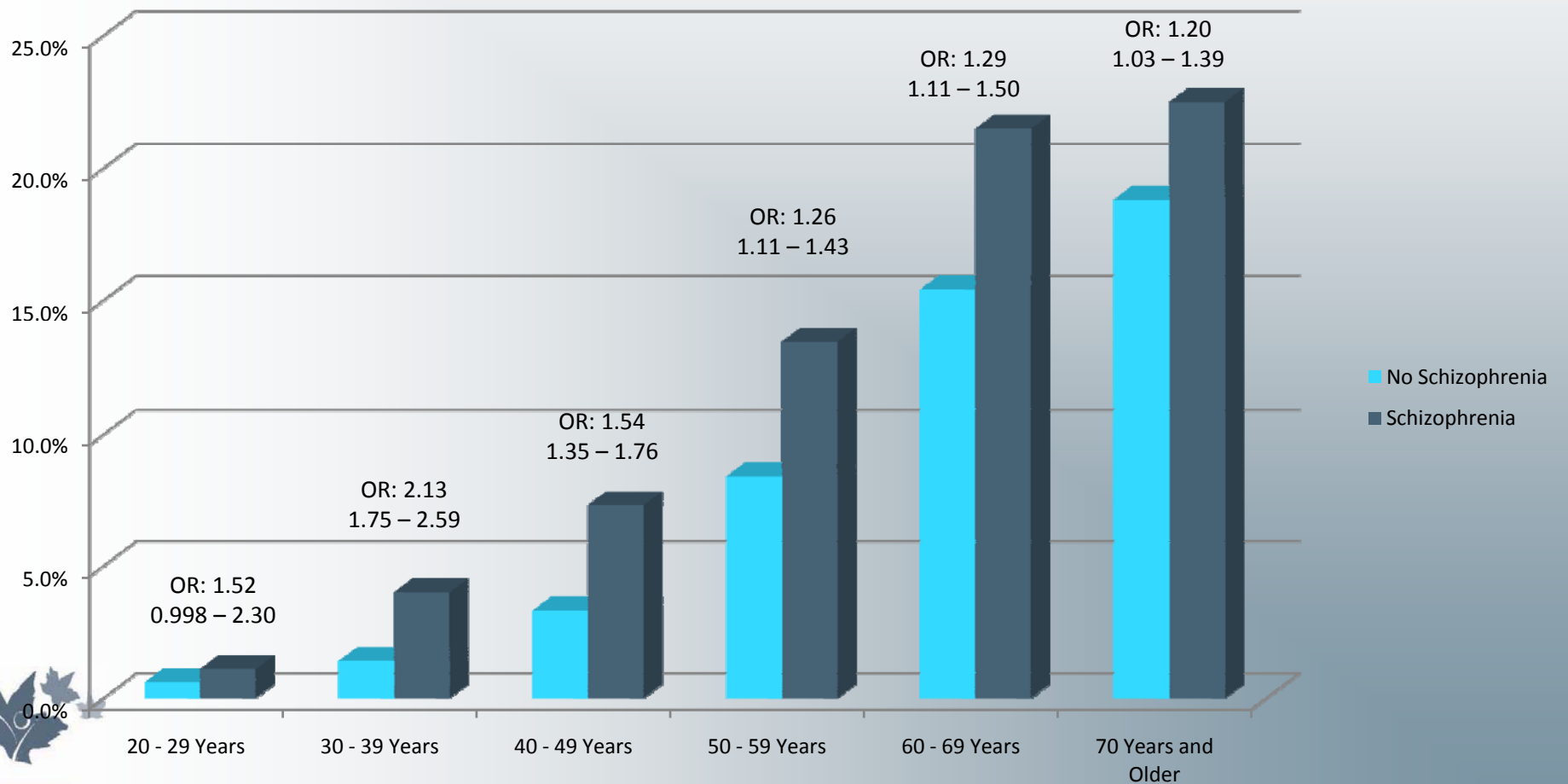
	Schizophrenia (n = 28,832; 1.2%)	No Schizophrenia (n = 2,281,636; 98.8%)	Unadjusted Comparison (OR; 95% CI)
Stroke	2,564 (8.9%)	98,315 (4.3%)	2.17; 2.08 – 2.26
Congestive Heart Failure (CHF)	2,160 (7.5%)	86,122 (3.8%)	2.07; 1.98 – 2.16
Acute Coronary Syndrome (ACS)	630 (2.2%)	45,912 (2.0%)	1.09; 1.01 – 1.18
MI/IHD/Arrhythmia	5,596 (19.4%)	312,837 (13.7%)	1.52; 1.47 – 1.56
Coronary Artery Disease (CAD)	6,465 (22.4%)	342,392 (15.0%)	1.64; 1.59 – 1.68
Cardiovascular Disease (CVD)	7,627 (26.5%)	387,312 (17.0%)	1.76; 1.71 – 1.81

# Prevalence of CV Risk and CVD: Adjusted Models

	Adjusted Comparison* (OR; 95% CI)	Stratified Analyses
Diabetes	1.57; 1.49 – 1.62 <sup>§</sup>	Age and sex
Hypertension	0.85; 0.82 – 0.88 <sup>§</sup>	Age and subsidy
Dyslipidemia	1.10; 1.07 – 1.14 <sup>§</sup>	Age and sex
Stroke	1.79; 1.70 – 1.88 <sup>§</sup>	Age and subsidy
CHF	1.71; 1.62 – 1.81	Not necessary
ACS	0.88; 0.80 – 0.96 <sup>§</sup>	Sex and subsidy
MI/IHD/Arrhythmia	1.37; 1.32 – 1.41 <sup>§</sup>	Age
CAD	3.10; 2.83 – 3.60 <sup>§</sup>	Age and sex
CVD	1.60; 1.54 – 1.65 <sup>§</sup>	Age and sex

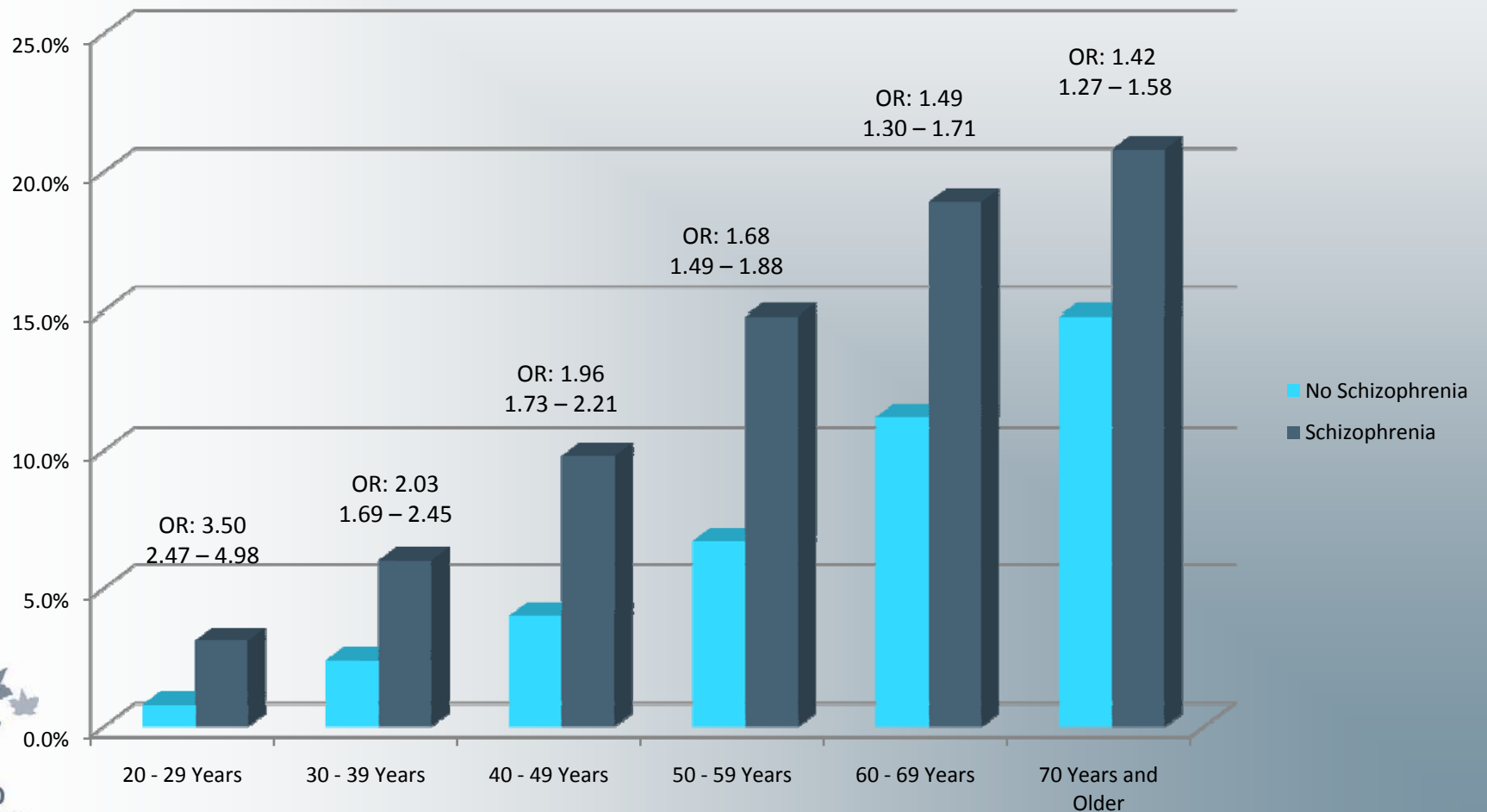
# Diabetes Model

## ■ Prevalence of diabetes in males:



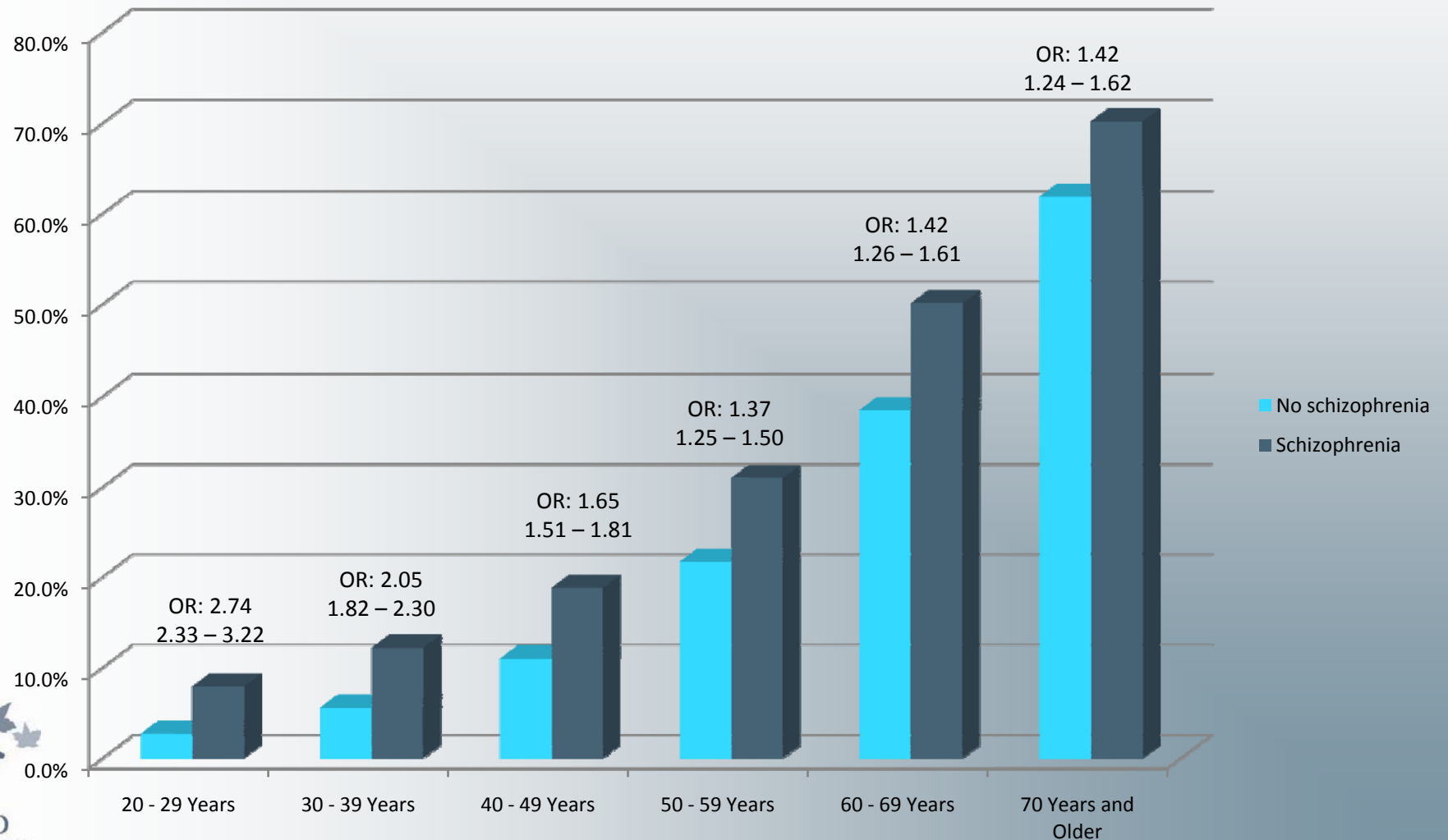
# Diabetes Model (Cont.)

## ■ Prevalence of diabetes in females:



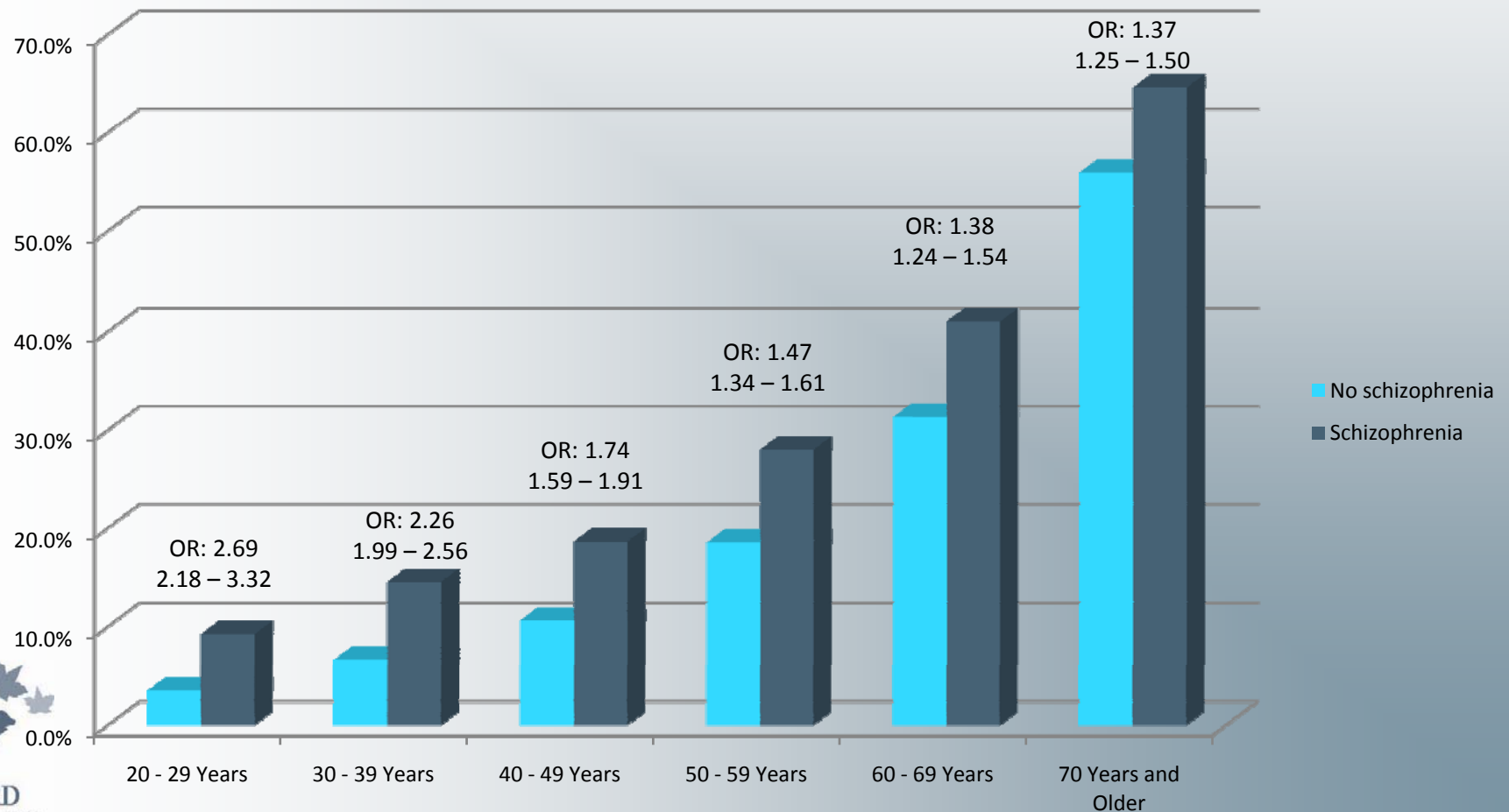
# Cardiovascular Disease Model

## ■ Prevalence of CVD in males:



# Any CVD Model (Cont.)

## ■ Prevalence of CVD in females:



# General Care

	Schizophrenia (n = 28,832; 1.2%)	No Schizophrenia (n = 2,281,636; 98.8%)	Unadjusted Comparison (OR; 95% CI)
GP Encounter	28,768 (99.8%)	2,244,086 (98.4%)	7.52; 5.88 – 9.61
Hospitalizations	22,733 (78.8%)	921,899 (40.4%)	5.50; 5.34 – 5.66
ED Encounter	25,810 (89.5%)	1,571,347 (68.9%)	3.86; 3.72 – 4.01
Psychiatrist Encounter	25,235 (87.5%)	187,228 (8.2%)	78.5; 75.8 – 81.3



# Specialist Care in People With Diabetes

	Schizophrenia (n = 2,959)	No Schizophrenia (n = 126,817)	Unadjusted Comparison (OR; 95% CI)	Adjusted Comparison* (OR; 95% CI)
Endocrinologist	210 (7.1%)	9,657 (7.6%)	0.93; 0.80 – 1.07	0.91; 0.78 – 1.04
Internist	2,634 (89.0%)	105,753 (83.4%)	1.61; 1.44 – 1.81	1.62; 1.44 – 1.82
Nephrologist	167 (5.6%)	7,102 (5.6%)	1.01; 0.86 – 1.18	0.96; 0.82 – 1.12
Ophthalmologist	1,984 (67.0%)	91,856 (72.4%)	0.77; 0.72 – 0.84	0.81; 0.75 – 0.88

# Specialist Care in People with CAD

	Schizophrenia (n = 6,465)	No Schizophrenia (n = 342,392)	Unadjusted Comparison (OR; 95% CI)	Adjusted Comparison* (OR; 95% CI)
CABG or PTCA	352 (5.4%)	37,961 (11.1%)	0.46; 0.42 – 0.51	0.51; 0.46 – 0.57
Cardiologist	3,087 (47.7%)	196,112 (57.3%)	0.68; 0.65 – 0.72	0.72; 0.69 – 0.76
Internist	5,707 (88.3%)	285,950 (83.5%)	1.49; 1.38 – 1.60	1.58; 1.46 – 1.71

# Limitations

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- Use of administrative data: potential for misclassification exists;
- Unable to assess impact of antipsychotic medications on relationship between schizophrenia and CV risk or CVD;
- Unable to assess impact of clinical and lifestyle variables: smoking status, body mass index, control of CV risk or CVD

# Strengths

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- Population-based design: highly generalizable.
- Recent time frame – data ended December 31, 2006.
- Use of a non-schizophrenic comparator group.
- Evaluation of differential impact of socio-demographic factors.

# Key Points

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- Individuals with schizophrenia:
  - Have a higher prevalence of CV risk and CVD.
  - Accessed the general health system more frequently than their non-schizophrenic counterparts.

# Key Points

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- Prevalence of CV risk and CVD varies by age, sex, and need for subsidized healthcare premiums.
- Despite the increased prevalence of CVD, people with schizophrenia were less likely to visit a cardiologist or undergo revascularization.



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# Questions?

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