



# Cost-effectiveness Analysis of Government-insured Eye Care Services by Optometrists in Prince Edward Island: An Example of Diabetic Retinopathy Screening

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# Introduction

- Diabetic retinopathy (DR) is one of the leading causes of vision loss and blindness in Canada (CNIB, 2009)
  - In 2006, ~ 500,000 Canadians had some form of DR (PHAC, 2011)
- Screening plays an important role in early detection and intervention to prevent the progression of DR
  - Only 66% of individuals with diabetes had an eye examination in the past two years (CCHS, 2007)
- Collaborative efforts amongst professionals, including ophthalmologists and optometrists, may effectively increase access to DR screening (COS, 2012)
- In PEI, provincial health plan currently does not cover eye examination by optometrists for diabetic patients

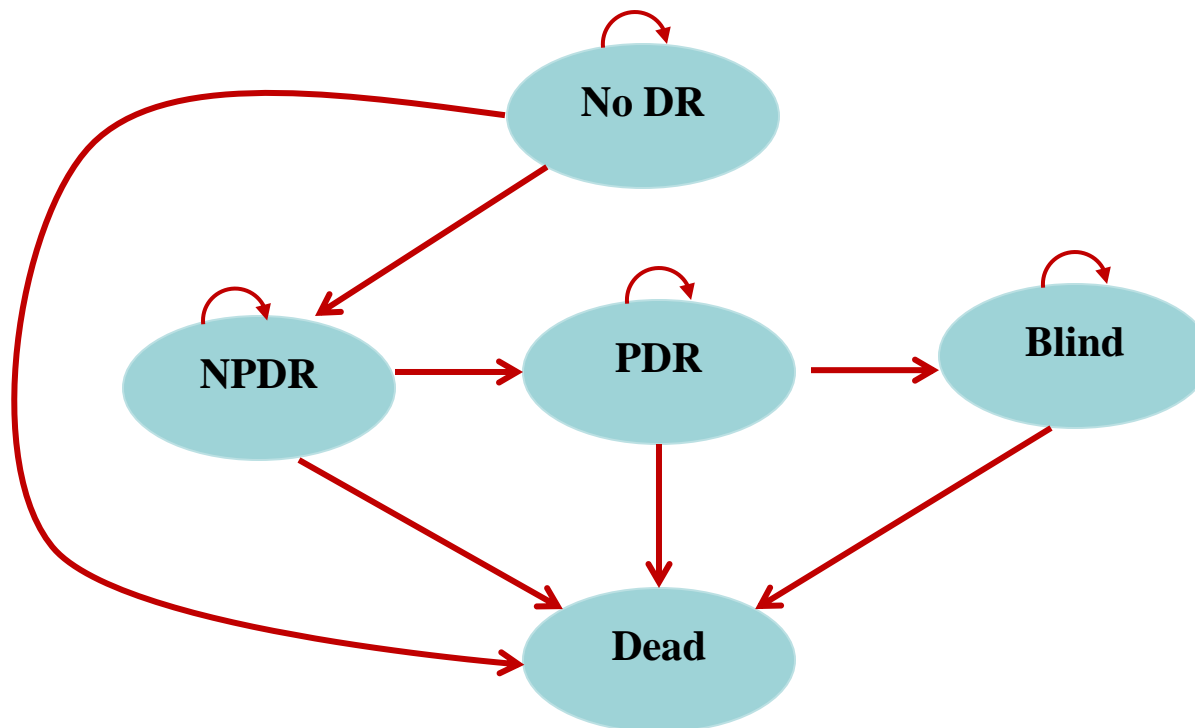
# Objective

To compare cost and effectiveness of annual eye examination by ophthalmologists (current policy) versus by ophthalmologists and optometrist (new policy) for diabetic patients in PEI

# Methods

- Cost-utility analysis (CUA)
- Decision-analytic model (Markov model)
  - diabetic patients aged 35+ were followed over their lifetime
  - a cycle length of 1 year
- Healthcare system's perspective
- Interventions
  - **Current scenario:** eye examination is done by ophthalmologists
  - **New policy scenario :** government insured eye examination by both ophthalmologists & optometrists
- Outcomes: ICER (\$/QALY)
- One-way sensitivity analysis
- Discount rate: 5% both costs and outcomes

# Model Schematic



DR diabetic retinopathy; NPDR non-proliferative diabetic retinopathy;  
PDR proliferative retinopathy

# Model Parameters

	Mean	Range	Reference
<b>Epidemiological data</b>			
Incidence of PDR	0.002	0.001-0.020	Jones et al, 2012
Incidence of NPDR	0.069	0.050-0.100	Jones et al, 2012
Progression from NPDR to PDR	0.008	0.060-0.100	Vijan et al, 2000
Progression from PDR to blindness	0.090	0.070-0.110	Vijan et al, 2000
<b>Utilities</b>			
Diabetes	0.77	0.50-1.00	Clarke, 2002
Non-proliferative retinopathy	0.77	0.50-1.00	Clarke, 2002
Proliferative retinopathy	0.71	0.50-1.00	Brown, 1998
Blindness	0.68	0.40-0.80	Clarke, 2002
<b>Eye examination uptake rate</b>			
% diabetic patients receiving eye examination in PEI (uninsured)	0.630	0.58-0.81	CIHI, 2007
% of increase in eye examination uptake rate (insured)	0.078	0.063-0.111	Kiran et al, 2013
<b>Cost (2013 CAD)</b>			
Annual cost of NPDR	\$657	\$6-\$7,895	Happrich, 2008
Annual cost of PDR	\$2,881	\$9-\$61,580	Happrich, 2008
Consultation fee: GP	\$58.34	fixed	Health PEI, 2013
Eye examination fee: Optometrist	\$43.80	fixed	OHIP, 2013
Eye examination fee: Ophthalmologist	\$51.10	fixed	OHIP, 2013
<b>Discount rate</b>	0.05	0.00-0.10	

# Model Assumptions

- One eye examination per year
- Proportion of eye examination by ophthalmologists and optometrists in the new policy is equal (50% each)
- Detection rate by ophthalmologists and optometrists is assumed to be the same

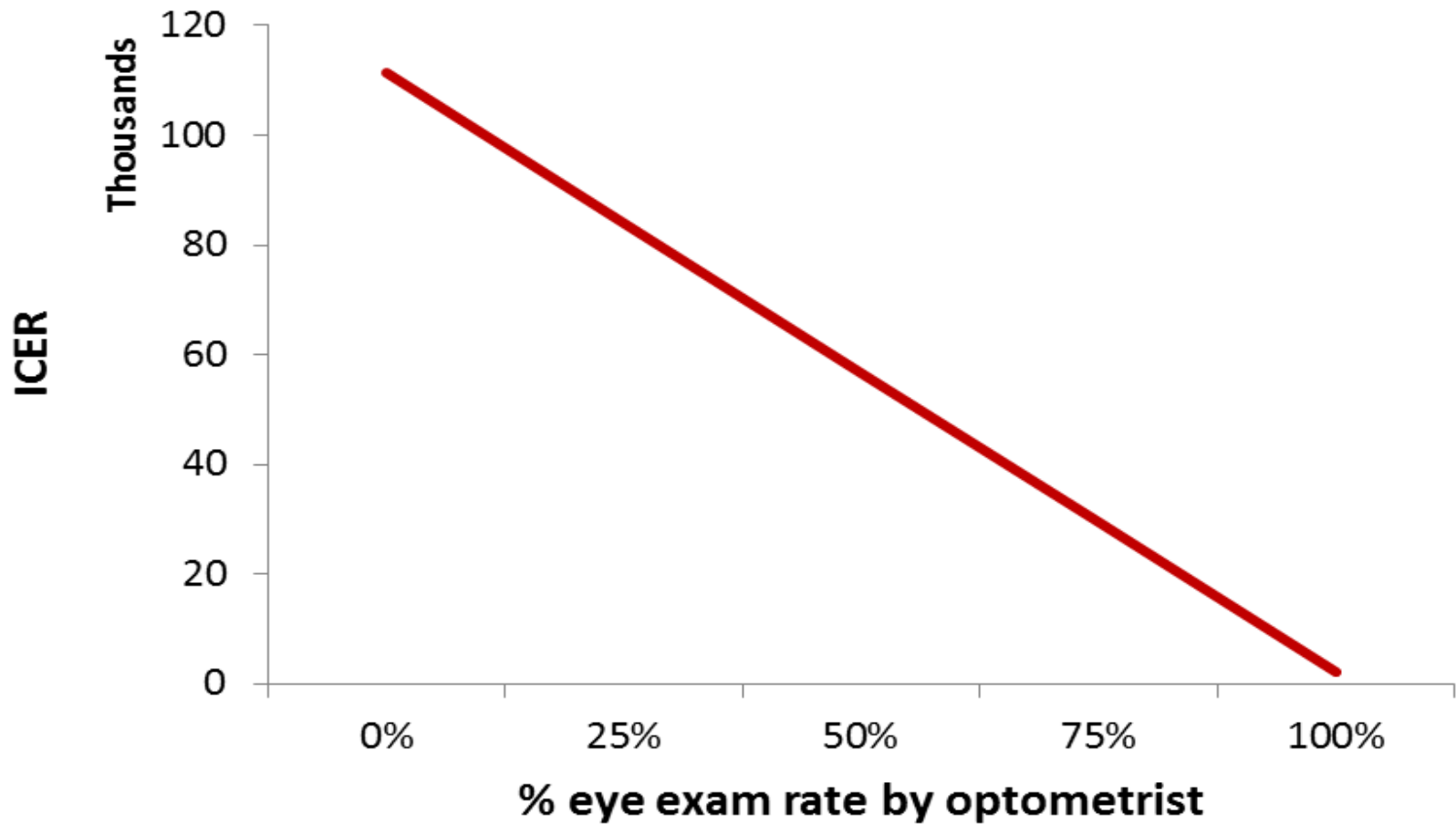
## Base-case Results\* (n= 8,392)

Scenario	Cost (C\$)	QALYs	Δ Cost	Δ QALYs	ICER (\$/QALY)
Current policy	123,286,770	115,082			
New policy	124,599,863	115,108	1,313,093	26	50,486

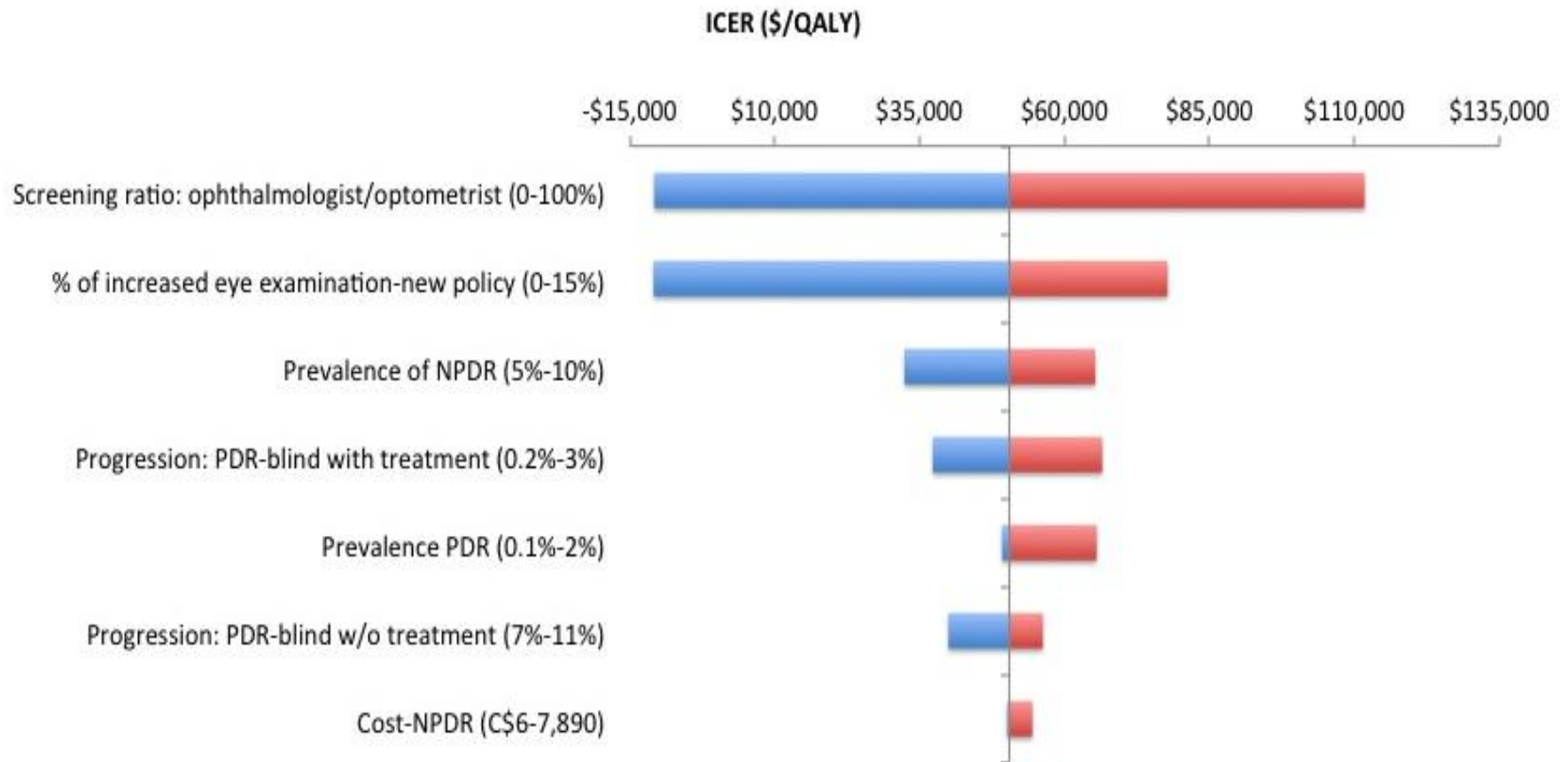
\* Discount rate of 5%



# One-way Sensitivity Analysis



# Tornado Diagram



# Limitations

- Data was obtained from other jurisdictions/countries
- Health care system perspective, i.e. indirect costs are not included
- Proportion of eye examination given by ophthalmologists/optometrists in PEI is unknown

# Conclusions

- Government insured eye examination by ophthalmologists/optometrists for diabetic patients offers better outcomes at higher costs
- Government insured eye examination by optometrists will be more cost-effective when a greater proportion of diabetes receive an examination by optometrists
- The model is most sensitive to the proportion of eye examination by optometrists and eye examination participation rate in the new policy

# Next steps

- Scenario analyses (age, sex, screening intervals, and types of diabetes)
- Probabilistic sensitivity analyses

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# Thank You

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