

# **Economic Benefit of Subcutaneous Rapid Push versus Intravenous Immunoglobulin Infusion Therapy in Adult Patients with Primary Immune Deficiency**

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# BACKGROUND

# Treatment of PID patients: IVIG vs SCIG

- Immunoglobulin replacement therapy has become the treatment of choice for patients with primary immune deficiency (PID)<sup>1</sup>
- Immunoglobulin can be administered by intravenous (IVIG) or subcutaneous (SCIG) infusion<sup>2,3</sup>
- IVIG and SCIG were associated with comparable efficacy and safety profiles<sup>4</sup>
- Switching from IVIG to SCIG was shown to improve quality of life of PID patients<sup>5-7</sup>
- Rapid-push SCIG, which does not require a pump, was shown to be preferred by adult PID patients compared to pump infusion administration<sup>8</sup>

<sup>1</sup>Berger, 2008 Immunol Allergy Clin North Am 28:413-37; <sup>2</sup>Berger, 2004 Clin Immunol 112: 1-7; <sup>3</sup>Lemieux, 2005 Mol Immunol 42: 839-48; <sup>4</sup>Chapel, 2000 J Clin Immunol 20: 94-100; <sup>5</sup>Gardulf, 2004 J Allergy Clin Immunol 114: 936-42; <sup>6</sup>Kittner, 2006 J Clin Immunol 26: 400-5; <sup>7</sup>Nicolay, 2006 J Clin Immunol 26: 65-72; <sup>8</sup>Shapiro, 2010 J Clin Immunol 30: 301-7

# Economic evaluations of IVIG vs SCIG

- Studies in Sweden<sup>9</sup>, Germany<sup>10</sup>, the UK<sup>11</sup>, and France<sup>12</sup> showed that home-based SCIG was 25% to 75% less costly than hospital-based IVIG for the public healthcare system; however, in Canada, the reduction was evaluated as only 10%<sup>13</sup>
- Hospital costs were reduced in all contexts, and the difference between Canada and other countries was due to:
  - In Canada, the cost of immunoglobulin represented 85% of total costs while it represented only 70% and 58% of total costs in France and UK, respectively
  - In Sweden, Germany and France, immunoglobulin SCIG was less costly than IVIG, but in Canada, the cost of immunoglobulin was the same for the two options
  - In UK, the cost of SCIG infusion was very low
- No study has compared the costs associated with rapid-push SCIG versus hospital-based IVIG

<sup>9</sup>Gardulf, 1995 Lancet 345: 365-9; <sup>10</sup>Hogy, 2005 Eur J Health Econ 6: 24-9; <sup>11</sup>Liu, 2005 [www.rep.bham.ac.uk/2005/IgRT.pdf](http://www.rep.bham.ac.uk/2005/IgRT.pdf). (Accessed 19 Oct 2011); <sup>12</sup>Beauté, 2010 Clin Exp Immunol 160: 240-5; <sup>13</sup>Membe, 2008 Immunol Allergy Clin North Am 28: 861-74

# Objective

- To evaluate the economic impact of the rapid push SCIG compared to IVIG infusion therapy in adult PID patients in the context of the Adult SCIG Home Infusion Program based at St-Paul's Hospital in Vancouver

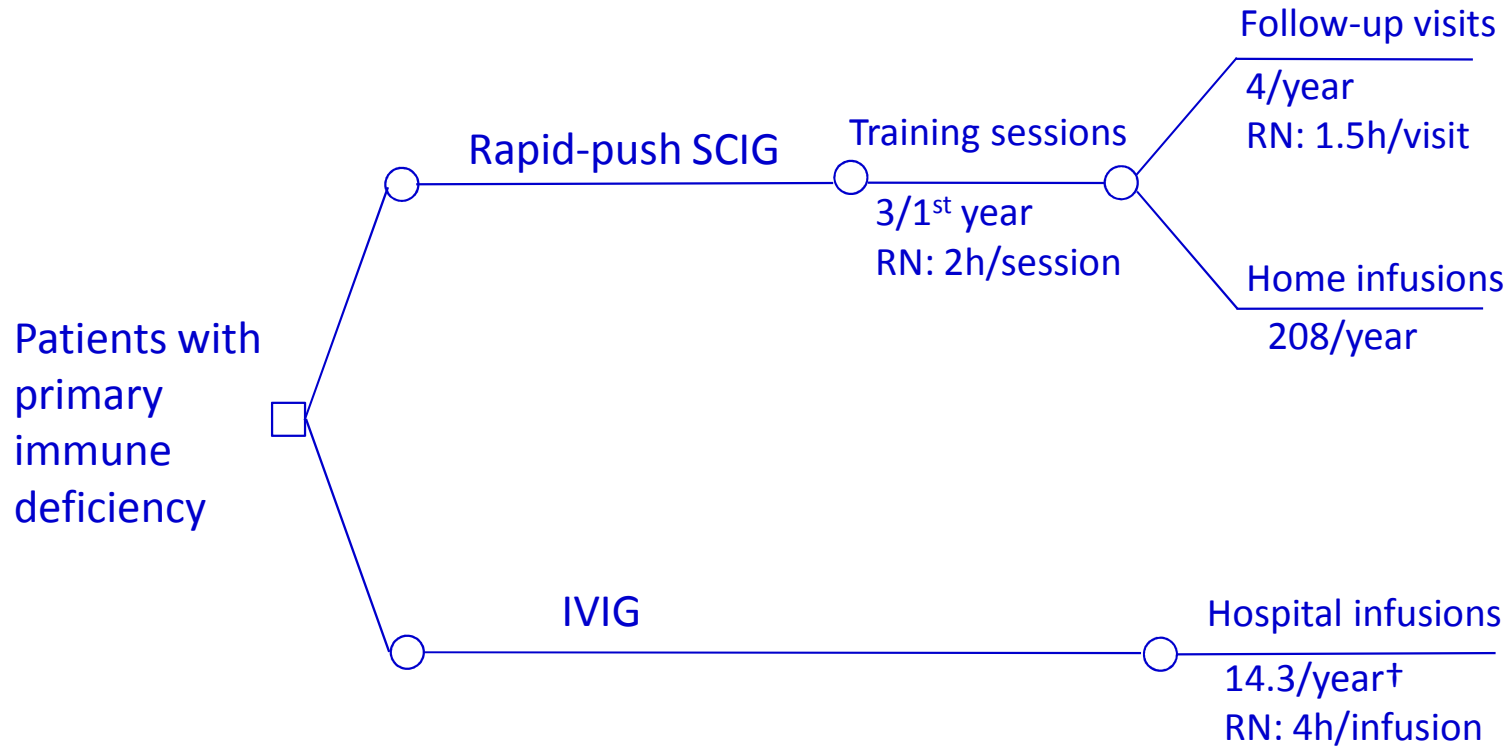
# METHODOLOGY

# Economic model - design

- **Type of economic evaluation:** cost-minimization model
- **Target population:** PID patients receiving immunoglobulin therapy
- **Immunoglobulin replacement therapy:**
  - IVIG
  - SCIG using the rapid-push method (Winged Needle Butterfly Infusion set)
  - *Assumption:* same efficacy and safety for both comparators
- **Perspective:** Ministry of Health
  - Costs included: direct medical costs (supplies and personnel)
  - *Assumptions:* drug costs not included since similar for both comparators (focused analysis); IVIG pump cost not included
- **Time horizon:** three years



# Economic model: treatment pathway\*



RN: registered nurse

\*based on current practice at the Adult SCIG Home Infusion Program, St-Paul's Hospital in Vancouver

† weighted average (2/3 patients 13 visits, 1/3 patients : 17 visits)

# Economic model

## Annual resource use and unit costs

Resources	SCIG*	IVIG†	Unit costs	Cost sources
Infusion supplies (number)	208 -	- 14.3	1.15/unit 13.54/unit	Ministry of Health Product Distribution Center (2011)
RN (hours)	-	57.2	35.00/hr	British Columbia Nurses' Union (2011)
RN Manager (hours)				British Columbia Nurses' Union (2011)
•1st year	12	-	52.50/hr	
•2nd and 3rd years	6	-		
Unit clerk (hours)	-	5.72	19.86/hr	Hospital Employees' Union (2011)
Scheduling clerk (hours)	-	7.15	20.77/hr	Hospital Employees' Union (2011)
Ward aid (hours)	-	5.72	19.86/hr	Hospital Employees' Union (2011)

\*SCIG infusion set: Winged Needle butterfly, 4 times a week

†For IVIG, cost of the pump was excluded for a conservative estimate

# Budget impact model-design

- **Type of model:** population based
- **Target population:** PID patients in BC (BC Central Transfusion Registry - 456 patients)
- **Comparators:**
  - IVIG
  - Rapid-push SCIG
- **Perspective:** Ministry of Health
  - Costs included: direct medical costs (same as cost-minimization model)
- **Time horizon:** three years
- **Switching rates:**
  - 50% PID switch from IVIG to SCIG (conservative estimation)
  - Assumption based on a study of Canadian and US PID patients (81% preferred SCIG compared to hospital-based IVIG)<sup>7</sup>

<sup>7</sup>Nicolay, 2006 J Clin Immunol 26: 65-72

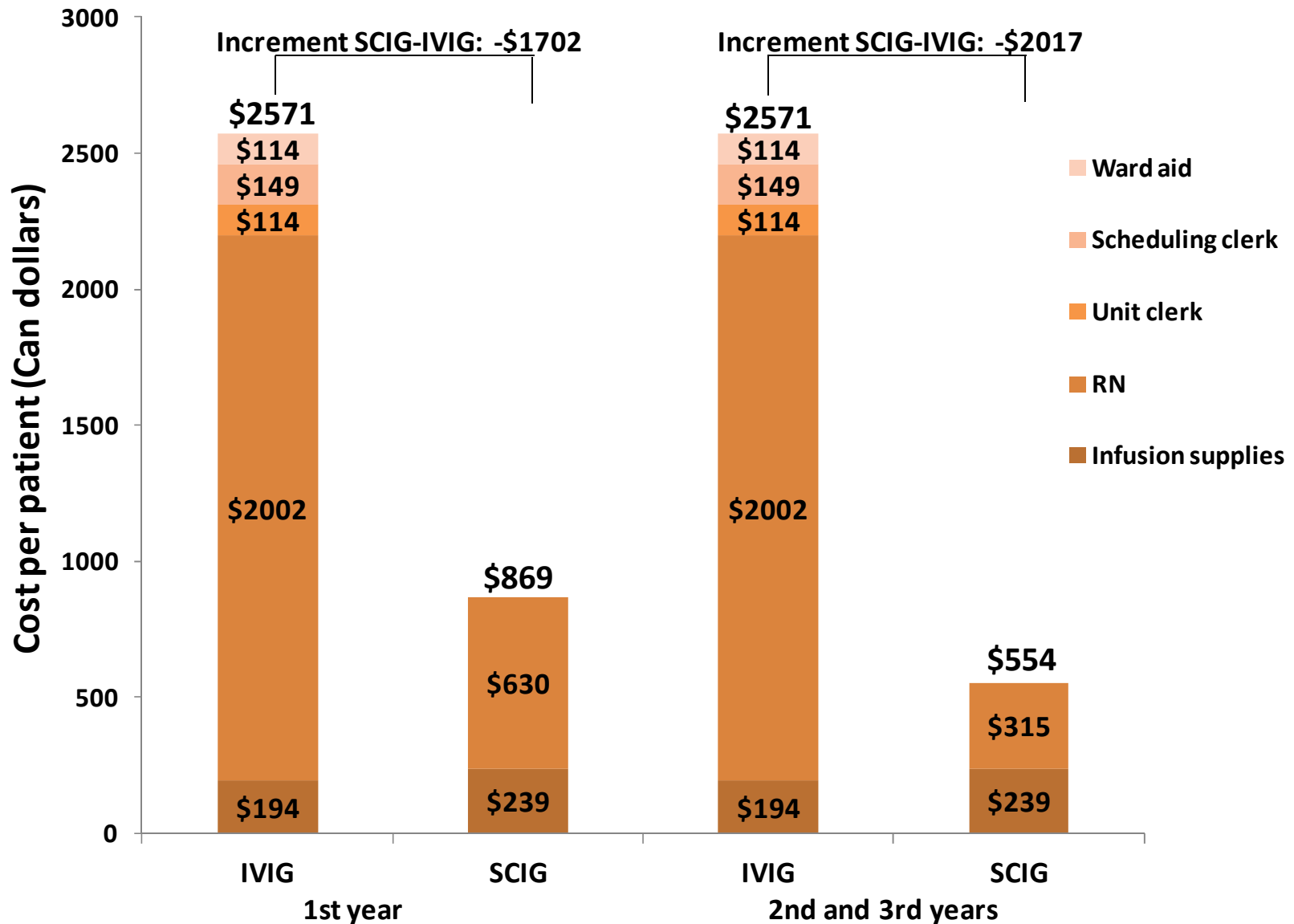
# Sensitivity analyses

- **Cost-minimization model parameters**
  - Annual number of visits for IVIG patients: low 13, high 17 (base case 14.3)
  - Duration of visit for IVIG patient: 6h (base case 4h)
  - SCIG with pump (quadfurcated tubing safety sub-Q infusion set + adapting tubing - unit cost: \$17.90 +\$9.60 once a week; infusion pump-annual cost: \$180\*)
- **Budget impact model**
  - Scenario A: low resource for IVIG (13 visits, 4h/visit)
  - Scenario B: high resource for IVIG (17 visits, 6h/visit)
  - Scenario C: increased switch rate to 75% (base case 50%)
  - Scenario D: SCIG with pump (base case rapid push which does not require a pump)

\*2 pumps at \$450/patient, amortized over 5 years

# RESULTS

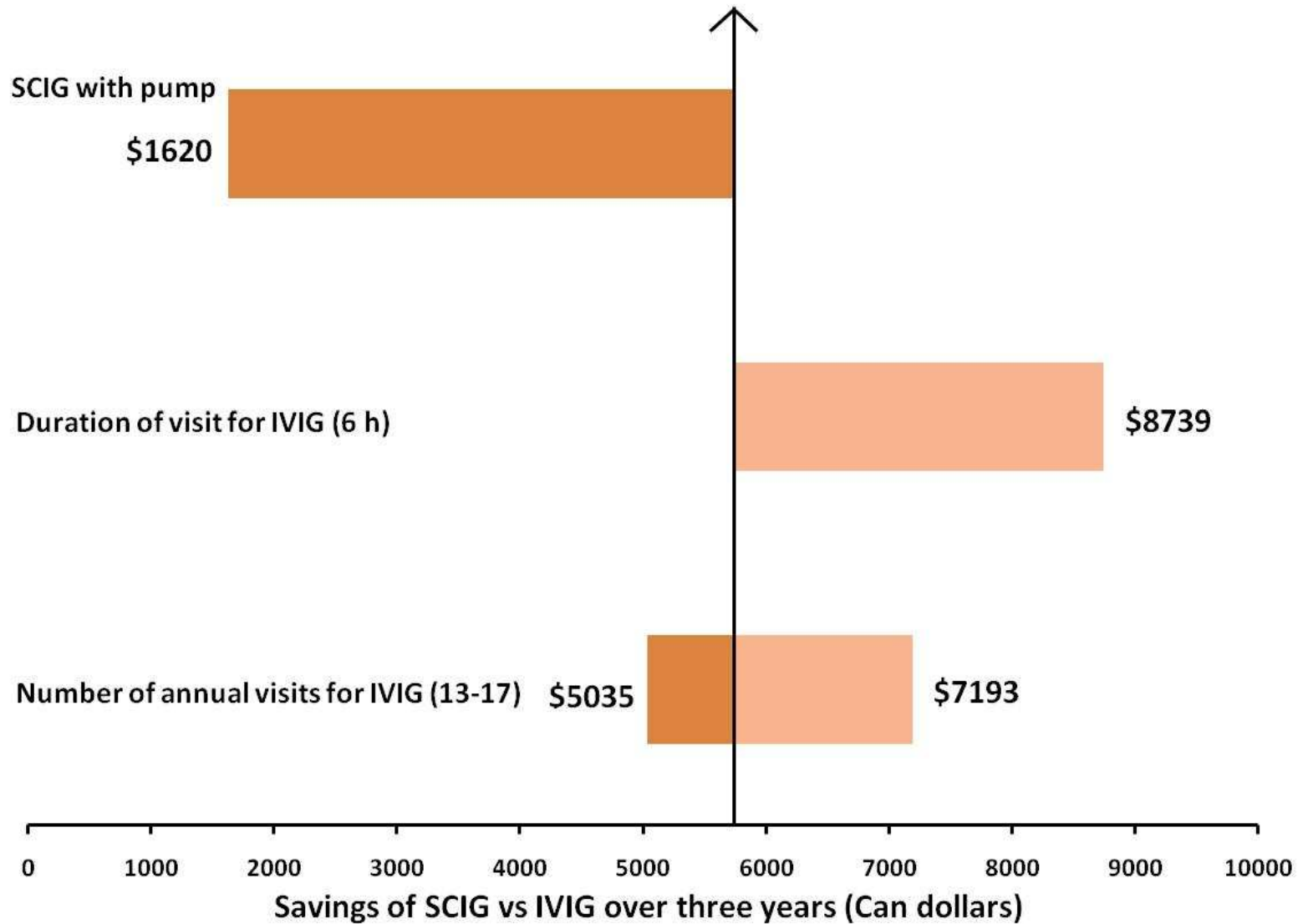
# Cost-minimization model



➤ **Incremental saving with SCIG over three years: \$5736/patient**

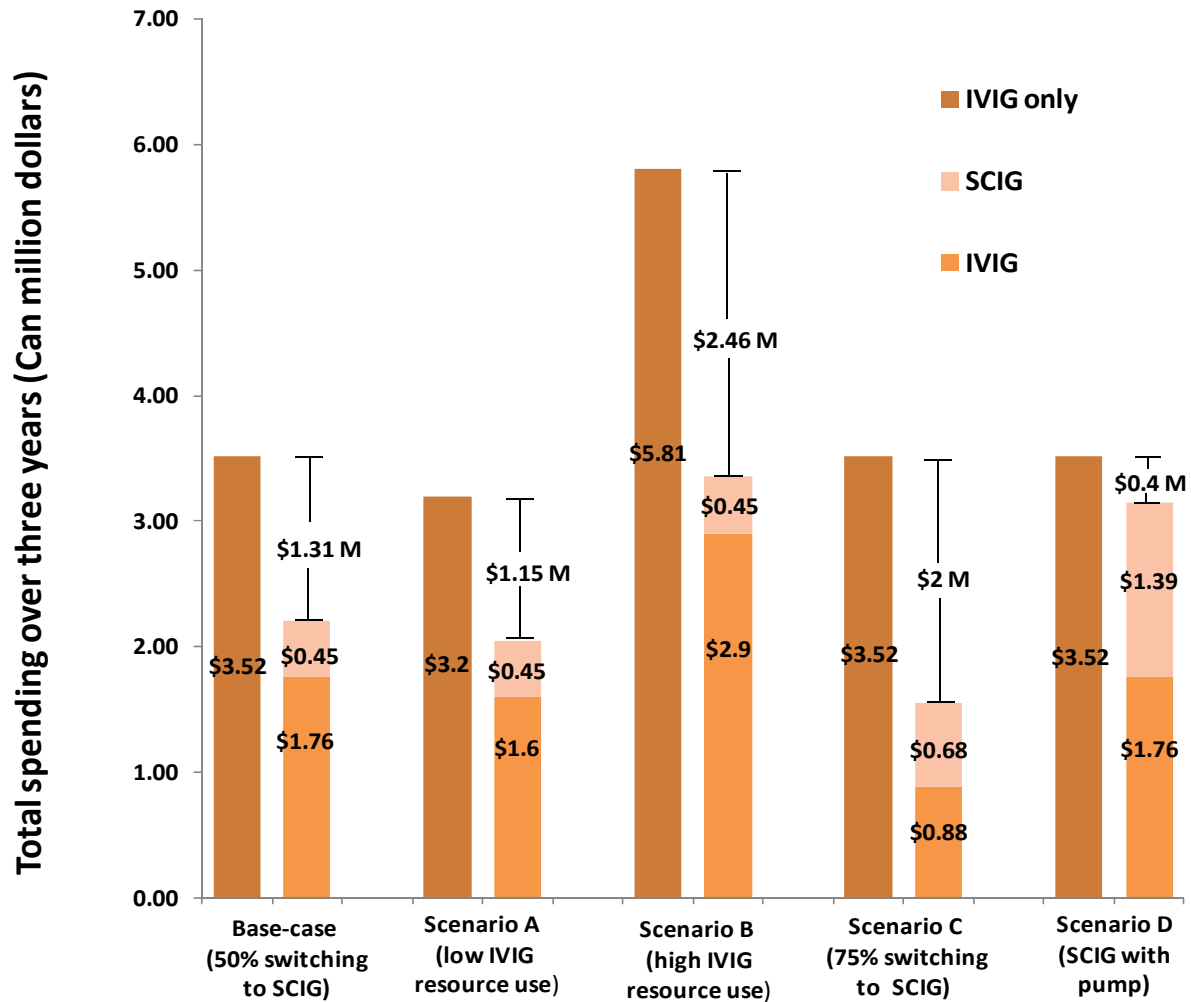
# Cost-minimization model-sensitivity analysis

Base case: \$5736 per patient



# Budget impact model - Base case and sensitivity analyses

## BC Registry: 456 PID patients



### Base case and sensitivity analyses



# Conclusions

- SCIG vs IVIG: savings of \$5736/patient over three (3) years
- Switching of 50% of BC PID patients from IVIG to SCIG: savings of \$1.31 M over three years for the Ministry of Health
- Results are fairly robust to variation in key model parameters but sensitive to using a SCIG option with pump

## Limitations and future research

- Indirect costs (productivity loss, cost borne by patients) were not taken into account in the model
- Population of patients with secondary immune deficiencies was not considered in the budget impact model
- Future research is needed to evaluate the full economic impact of SCIG versus IVIG

**Thank you**