

# **British Columbia Ministry of Health Services and the General Practice Services Committee**

---

## **Evaluation of the Full Service Family Practice Incentive Program and the Practice Support Program**

### **Final Report on Complex Care**

**Prepared by**

**Marcus J. Hollander, PhD  
Angela Tessaro, BA**

**June 2009**

This report has been prepared by Hollander Analytical Services Ltd. for the project funded by the BC General Practice Services Committee. The authors are solely responsible for the content of the report. The opinions expressed are those of the authors and do not necessarily reflect the views or policies of the GPSC, the BC Ministry of Health Services or the British Columbia Medical Association.



**Hollander Analytical Services Ltd.**  
300 – 895 Fort Street  
Victoria, BC, V8W 1H7

**Tel: (250) 384-2776**  
**Fax: (250) 389-0105**  
**info@hollanderanalytical.com**

## TABLE OF CONTENTS

1. Introduction .....	1
2. Methods .....	1
3. Findings .....	2
3.1 Findings Regarding Comparative Costs for Patients Who Did, and Did Not, Receive Incentive Based Care .....	2
3.2 Standardized Costs .....	3
3.3 Additional Analyses .....	8

## 1. INTRODUCTION

The General Practice Services Committee (GPSC) has contracted with Hollander Analytical Services Ltd. to conduct an evaluation of incentive payments instituted under the Full Service Family Practice Incentive Program (FSFPIP). As part of the project to evaluate the FSFPIP, a range of analyses have been conducted on administrative health data. This report presents data on Complex Care.

## 2. METHODS

This analysis focuses on complex care patients. Complex care patients are defined as those who are on at least two of the seven designated registries, for people with various conditions, who received some service from a GP in the year. Thus, the universe of patients are those who received GP services for two or more of the seven designated conditions in the fiscal year. Starting in 2007/08 fiscal year such patients were eligible for complex care incentive payments. Thus, from the defined universe of patients some received incentive based services and some did not. In this report we present data on the differences in cost and utilization of health services (MSP, Pharmacare and hospitals) and compare those who did and did not receive incentive based care.

In order to maximize the validity of the analysis a number of screens were applied in order to derive comparable populations for analysis. The screens were as follows:

- Exclude patients with less than 5 GP services (our standard exclusion criterion to ensure patients in the analysis are active patients).
- Exclude people who died in fiscal 2007/08.
- Exclude people who were in a long term care facility at the end of the 2006/07 fiscal year.
- Exclude people with expenditures of more than \$100,000 for hospital costs (we wanted to ensure that we were including people living at home, and were not spending inordinate amounts of time in the hospital).
- Exclude people who received services from more than 25 payees in a year.

A wide range of methodological and cost based analyses were conducted for this project. Table 1 provides the distribution of GP services used by complex care patients who did, and did not, receive incentive based care. Table 1 shows the distribution of all patients compared to patients selected for analysis. As can be seen, our procedure of selecting RUBs 3, 4 and 5 patients who had at least five services included 237,651 of a total of 276,125 patients or 86% of the patients. Finally, it should also be noted that some GPs received block funding for patients. This block funding was seen to be equivalent to the provision of six services per year. Thus, the block funded patients are included in this analysis.

**Table 1: Number of Patients with Complex Care for April 2007 to March 2008**

	Number of Patients	Number of Patients					
		Resource Utilization Band					
		0	1	2	3	4	5
<b>All</b>	276,125	2,401	1,657	13,255	136,087	69,985	52,740
<b>GP Services</b>							
<b>0</b>	230	58	0	37	104	19	12
<b>01</b>	5,391	232	839	2,178	1,826	193	123
<b>02</b>	7,027	169	378	2,227	3,733	373	147
<b>03</b>	8,759	143	194	2,160	5,438	634	190
<b>04</b>	10,340	139	103	1,729	7,132	979	258
<b>05</b>	11,674	141	62	1,405	8,324	1,420	322
<b>06</b>	12,069	127	28	1,025	8,608	1,834	447
<b>07</b>	11,958	114	15	682	8,492	2,106	549
<b>08</b>	11,854	91	7	470	8,267	2,311	708
<b>09</b>	11,458	87	10	306	7,725	2,508	822
<b>10 or More</b>	185,365	1,100	21	1,036	76,438	57,608	49,162

Source: British Columbia Ministry of Health Services, Primary Care Data Repository, June 2009.

The other methodological issue had to do with the impact on the findings of using a cut off of 5 GP services. It was found that while there were some differences, the general trend remained the same in terms of costs irrespective of the number of services provided (0, 5 or 10). However, it is our view that using the five services cut-off rule was the most appropriate selection criterion.

### 3. FINDINGS

#### 3.1 Findings Regarding Comparative Costs for Patients Who Did, and Did Not, Receive Incentive Based Care

Table 2 provides a general comparative overview of costs for people who were considered to be complex care patients in both fiscal 2006/07 and 2007/08. Table 2 presents data for each fiscal year separately, thus the analysis is not a pre-post analysis. What can be seen in Table 2 is that while the 2006/07 costs were reasonably similar for people who received incentives compared to those who did not, there were considerable differences in 2007/08. For RUB 3, patients the costs for people who received incentive based care were higher in 2007/08 due primarily to the costs of the incentives themselves. However, for RUBs 4 and 5 the costs for

those who received incentives were lower than they were in the previous year, and were lower than the costs for people who did not get incentive based care.

**Table 2: Average Annual Costs for Complex Care Patients**

Cost Components	R.U.B. Base Year											
	3				4				5			
	Complex Care Incentive				Complex Care Incentive				Complex Care Incentive			
	No		Yes		No		Yes		No		Yes	
200607	200708	200607	200708	200607	200708	200607	200708	200607	200708	200607	200708	
<b>GP Amount</b>	405	421	456	1,013	629	655	677	1,209	985	1,078	1,039	1,584
<b>Specialist Amount</b>	304	307	314	292	756	751	742	591	1,775	1,803	1,745	1,383
<b>Diag Fac Amount</b>	394	379	432	431	681	643	714	615	961	909	1,014	860
<b>GP Specialist and Diag Fac Amounts</b>	1,103	1,107	1,202	1,736	2,066	2,049	2,133	2,416	3,721	3,790	3,798	3,828
<b>Hospital Costs</b>	743	706	695	601	3,425	3,323	3,219	2,174	11,736	13,297	11,351	9,308
<b>Pharmacare Cost</b>	907	969	1,194	1,305	1,296	1,410	1,523	1,543	1,755	1,897	1,880	1,878
<b>Total Costs</b>	2,753	2,782	3,091	3,643	6,787	6,783	6,875	6,133	17,212	18,984	17,030	15,015

Source: British Columbia Ministry of Health Services, Primary Care Data Repository, June 2009.

We also conducted a pre-post analysis where we looked at changes from 2006/07 to 2007/08. However, there were factors which affected this analysis negatively. It turned out that many more people had higher RUB levels in 2007/08 compared to 2006/07 in the group which received incentives, compared to the group which did not receive incentives. This skewed the analysis. It should be pointed out that the incentives were applied in fiscal 2007/08 and it may be that GPs were selective in the people to whom they provided incentive based care. That is, they may have provided incentive based care to those whom they felt needed extra care because of their condition. Thus, the data for 2006/07 and 2007/08 does not reflect a deterioration of clients who received incentive based care. Rather, it appears that GPs selected the people who were most in need in 2007/08 and provided incentive based care to these individuals.

Further analyses were conducted to address the year over year aspect of the analysis. Table 3 presents the data for people who were at the same level of care in both 2006/07 and 2007/08. As can be seen, the same pattern emerges where there is a cost reduction for people who received incentives based care in fiscal 2007/08 for RUBs 4 and 5.

### 3.2 Standardized Costs

We compared the results related to costs on a standardized basis. Age standardization is commonly used in epidemiological analyses when one wants to age standardize two different things, such as disease rates, across the general population. However, the principle which

underlies the concept of standardization is that one standardizes against the population of relevance. This is particularly the case with specialized populations. In this study we initially tried to standardize to all people at RUB 3 or higher but there were some two million people in the group and the age distribution was very different compared to the age distribution of people in our population. For example, in the RUB 3 or more population some 40% of females were under 60 years of age, whereas the comparable figure for our population was 10%. Thus, we decided to standardize the two groups; those who did and did not get incentive based care, to the total number of people that we included in our analysis. We standardized by age, gender and RUB level. Table 4 presents data on the overall breakdown of all people in our analyses. Table 5 presents data for each RUB level that is standardized for age and gender.

**Table 3: Year Over Year Average Annual Cost Summaries for Complex Care Patients at the Same Level of Care in Each Year**

Cost Components	Year Over Year RUB											
	RUB 3				RUB 4				RUB 5			
	Complex Care Incentive				Complex Care Incentive				Complex Care Incentive			
	No		Yes		No		Yes		No		Yes	
	200607	200708	200607	200708	200607	200708	200607	200708	200607	200708	200607	200708
<b>GP Amount</b>	389	407	434	997	654	679	674	1,248	1,112	1,168	1,096	1,675
<b>Specialist Amount</b>	280	283	286	270	766	764	750	633	1,923	1,875	1,759	1,565
<b>Diag Fac Amount</b>	373	356	406	406	705	643	724	658	1,031	950	1,052	976
<b>GP Specialist and Diag Fac Amounts</b>	1,042	1,046	1,125	1,673	2,125	2,086	2,148	2,539	4,065	3,993	3,907	4,216
<b>Hospital Costs</b>	655	650	601	549	3,183	2,920	2,975	2,147	13,161	13,439	11,490	10,063
<b>Pharmacare Cost</b>	827	868	1,134	1,202	1,382	1,532	1,552	1,697	2,212	2,528	2,071	2,444
<b>Total Costs</b>	2,525	2,564	2,860	3,423	6,691	6,537	6,675	6,383	19,438	19,959	17,469	16,723

Source: British Columbia Ministry of Health Services, Primary Care Data Repository, June 2009.

**Table 4: Factors Related to Standardization: Distribution of Complex Care Patients by RUB, Gender, and Age Group: Fiscal 2007/08**

		No of Patients				All	% of Patients
		Resource Utilization Band					
		3	4	5			
Gender	Client Age Group						
Females	0 - 44	3,726	1,731	541	5,998	2.8	
	45 - 59	10,358	4,119	2,175	16,652	7.7	
	60 - 69	10,916	5,033	2,818	18,767	8.7	
	70 - 79	14,410	8,281	5,118	27,809	12.8	
	80 and over	14,289	10,380	7,916	32,585	15.0	
Males	0 - 44	3,023	1,150	550	4,723	2.2	
	45 - 59	12,058	5,267	3,251	20,576	9.5	
	60 - 69	15,556	7,560	4,821	27,937	12.9	
	70 - 79	17,479	10,492	7,474	35,445	16.3	
	80 and over	10,580	8,429	7,299	26,308	12.1	
<b>Gender</b>							
Females		53,699	29,544	18,568	101,811	47.0	
Males		58,696	32,898	23,395	114,989	53.0	
<b>Client Age Group</b>							
0 - 44		6,749	2,881	1,091	10,721	4.9	
45 - 59		22,416	9,386	5,426	37,228	17.2	
60 - 69		26,472	12,593	7,639	46,704	21.5	
70 - 79		31,889	18,773	12,592	63,254	29.2	
80 and over		24,869	18,809	15,215	58,893	27.2	
<b>All</b>		112,395	62,442	41,963	216,800	100.0	

Source: British Columbia Ministry of Health Services, Primary Care Data Repository, June 2009.

**Table 5: Average Annual Costs for Complex Care Patients Standardized by Gender and Age Within RUB Group: Fiscal 2007/08**

Cost Components	Resource Utilization Band					
	3		4		5	
	Complex Care Incentive		Complex Care Incentive		Complex Care Incentive	
	No Incentive	Incentive	No Incentive	Incentive	No Incentive	Incentive
<b>GP Amount</b>	408	967	641	1,175	1,066	1,555
<b>Specialist Amount</b>	303	275	762	598	1,841	1,458
<b>Diag Fac Amount</b>	373	404	645	610	889	876
<b>GP Specialist and Diag Fac Amounts</b>	1,084	1,646	2,048	2,383	3,796	3,889
<b>Hospital Costs</b>	764	539	3,784	2,177	14,276	9,594
<b>Pharmacy Costs</b>	911	1,195	1,300	1,497	1,679	1,879
<b>Total Cost</b>	2,759	3,381	7,132	6,056	19,752	15,362

Source: British Columbia Ministry of Health Services, Primary Care Data Repository, June 2009.

As can be seen there is still greater overall cost for people at RUB 3 who received incentive based care. However, costs are lower for RUBs 4 and 5. The difference is particularly striking for RUB 5 where the age and gender standardized average annual cost was \$19,752 for people who did not receive incentives based care compared to \$15,362 for those who did.

Finally, the overall, standardized comparison is presented in Table 6. There are many ways to calculate comparative costs. This table compares people who received incentive based care with those who did not. This analysis is probably the most liberal in terms of the size of the difference between the two groups (for example, comparing the incentive group for 2006/07 versus 2007/08 would probably result in a lower number as the base cost in 2006/07 is lower for the incentive group than the non-incentive group, resulting in a smaller difference in costs for the year over year analysis for the group which received incentives). We note this point because of the significant difference in overall costs of some \$837 per person in favour of the group which received more incentive based care (i.e., \$7,308 minus \$6,471). This is a big difference, even if one assumes that the true difference is about half of \$837, or some \$420. Spread across the 91,056 patients who received incentive based care in both 2006/07 and 2007/08 this would result in a cost avoidance of some \$38.2 million. If one uses the full \$837 per person cost avoidance figure, the overall total would be some \$76.2 million. Costing is a complex issue in that the types of reductions noted above cannot be directly classed as “savings” because hospital beds have not been closed. Nevertheless, the above noted cost avoidance figures clearly indicate greater value for money in the overall health care system, and appear to make the system more efficient. They also reflect a potential payback on the investment in incentive based care.



**Table 6: Average Annuals Costs for Complex Care Patients Standardized by RUB, Gender, and Age Group: Fiscal 2007/08**

Cost Components	Complex Care Incentive	
	No Incentive	Incentive
<b>GP Amount</b>	602	1,141
<b>Specialist Amount</b>	733	597
<b>Diag Fac Amount</b>	551	555
<b>GP Specialist and Diag Fac Amounts</b>	1,887	2,292
<b>Hospital Costs</b>	4,249	2,764
<b>Pharmacy Costs</b>	1,172	1,415
<b>Total Cost</b>	7,308	6,471

Source: British Columbia Ministry of Health Services, Primary Care Data Repository, June 2009.

It should be noted, that until further analyses are conducted, the potential efficiencies noted above should be treated with caution. The above analysis includes people on the seven registries, and other people not on the registries but designated by GPs as having at least two of the seven conditions. The proportion of this non-registry group was relatively high, and their average costs were lower than the costs for people on the registries. There could be a number of explanations for this, for example, the average annual cost varies between registries, even within RUB groups. Thus, the lower cost, non-registry patients may have had a disproportionate number of people with conditions which had a lower annual cost. There are a number of possible explanations for this finding and they will be investigated in greater depth in the future. However, because of this finding, the above data should be treated with caution. Table 7 presents the same data as Table 6 but is calculated only on people who were on the seven registries used for complex care. As can be seen, the standardized annual cost for patients who received incentive based care, and had a minimum of five services, was greater than the annual cost for people who did not receive incentive based care. However, it is also important to note that if one looks at patients with a minimum of 10 GP services per year, the finding of lower, standardized costs for people who received incentive based care re-asserts itself. This finding is presented in Table 8. Thus, clearly more analysis is required.

**Table 7: Average Annuals Costs for Complex Care Patients Standardized by RUB, Gender, and Age Group: Fiscal 2007/08 (Minimum 5 Services – Registry Patients Only)**

Cost Components	Complex Care Incentive	
	No Incentive	Incentive
GP Amount	599	1,194
Specialist Amount	736	693
Diag Fac Amount	551	627
GP Specialist and Diag Fac Amounts	1,887	2,514
Hospital Costs	4,252	3,401
Pharmacy Costs	1,166	1,664
<b>Total Cost</b>	<b>7,305</b>	<b>7,580</b>

Source: British Columbia Ministry of Health Services, Primary Care Data Repository, June 2009.

**Table 8: Average Annuals Costs for Complex Care Patients Standardized by RUB, Gender, and Age Group: Fiscal 2007/08 (Minimum 10 Services – Registry Patients Only)**

Cost Components	Complex Care Incentive	
	No Incentive	Incentive
GP Amount	762	1,288
Specialist Amount	893	789
Diag Fac Amount	641	678
GP Specialist and Diag Fac Amounts	2,296	2,756
Hospital Costs	5,629	4,166
Pharmacy Costs	1,367	1,772
<b>Total Cost</b>	<b>9,292</b>	<b>8,694</b>

Source: British Columbia Ministry of Health Services, Primary Care Data Repository, June 2009.

### 3.3 Additional Analyses

One of the issues which can confound matters in analyzing incentive based care is that people who do not receive a particular type of incentive, for example complex care, may receive incentive based care for other conditions, for example diabetes. Also, people who do receive incentive based care for one condition may also receive such care for other conditions. Thus, we decided to look at various combinations in regard to complex care.

Tables 9, 10 and 11 present data on different combinations of incentive based care. What is interesting to note, and what provides a particularly clean comparison, is the cost for people who only received the complex care incentive, and those who received no incentive at all. While the cost for people who only received complex care incentives was higher than for those who received no incentive for RUB 3, the opposite was the case for RUBs 4 and 5. In fact, the cost difference is particularly striking for RUB 5 (see Table 11) with the cost for people who only received complex care incentives at \$13,989 compared to a cost of \$19,556 for people who received no incentives based care.

**Table 9: Summaries of Average Annual Costs by Incentive Groups For Complex Care Patients for RUB 3: Fiscal 2007/08**

Cost Components	Incentives Groups							
	Complex Care Plus Diabetes and CHF	Complex Care Plus CHF	Complex Care Plus Diabetes	Complex Care Only	Diabetes and CHF	CHF	Diabetes	None
<b>GP Amount</b>	1,305	1,131	1,018	909	657	516	492	382
<b>Specialist Amount</b>	349	312	270	271	283	277	298	301
<b>Diag Fac Amount</b>	553	512	396	401	479	478	381	361
<b>GP Specialist and Diag Fac Amounts</b>	2,207	1,955	1,684	1,581	1,419	1,271	1,171	1,044
<b>Hospital Costs</b>	1,075	1,042	435	591	783	1,006	565	762
<b>Pharmacare Cost</b>	1,970	1,257	1,300	1,074	1,926	1,056	1,229	810
<b>Total Costs</b>	5,252	4,255	3,418	3,245	4,128	3,333	2,965	2,616

Source: British Columbia Ministry of Health Services, Primary Care Data Repository, June 2009.

**Table 10: Summaries of Average Annual Costs by Incentive Groups for Complex Care Patients for RUB 4: Fiscal 2007/08**

Cost Components	Incentives Groups							
	Complex Care Plus Diabetes and CHF	Complex Care Plus CHF	Complex Care Plus Diabetes	Complex Care Only	Diabetes and CHF	CHF	Diabetes	None
<b>GP Amount</b>	1,556	1,391	1,232	1,108	906	763	744	610
<b>Specialist Amount</b>	683	607	623	553	552	637	831	772
<b>Diag Fac Amount</b>	768	695	615	575	754	617	667	648
<b>GP Specialist and Diag Fac Amounts</b>	3,006	2,694	2,470	2,236	2,212	2,017	2,242	2,031
<b>Hospital Costs</b>	3,410	3,401	1,956	2,120	4,069	3,659	3,353	3,776
<b>Pharmacare Cost</b>	2,285	1,419	1,776	1,262	2,512	1,202	1,832	1,230
<b>Total Costs</b>	8,702	7,514	6,202	5,619	8,794	6,879	7,427	7,037

Source: British Columbia Ministry of Health Services, Primary Care Data Repository, June 2009.

**Table 11: Summaries of Average Annual Costs by Incentive Groups for Complex Care Patients for RUB 5: Fiscal 2007/08**

Cost Components	Incentives Groups							
	Complex Care Plus Diabetes and CHF	Complex Care Plus CHF	Complex Care Plus Diabetes	Complex Care Only	Diabetes and CHF	CHF	Diabetes	None
<b>GP Amount</b>	2,009	1,836	1,618	1,469	1,424	1,272	1,166	1,023
<b>Specialist Amount</b>	1,692	1,444	1,596	1,304	2,260	1,618	1,974	1,875
<b>Diag Fac Amount</b>	1,066	935	914	806	1,055	887	942	904
<b>GP Specialist and Diag Fac Amounts</b>	4,768	4,215	4,128	3,579	4,738	3,777	4,082	3,803
<b>Hospital Costs</b>	13,698	11,880	9,732	8,841	18,907	14,877	13,701	14,041
<b>Pharmacare Cost</b>	2,699	1,700	2,244	1,570	2,706	1,334	2,204	1,712
<b>Total Costs</b>	21,164	17,795	16,104	13,989	26,351	19,988	19,987	19,556

Source: British Columbia Ministry of Health Services, Primary Care Data Repository, June 2009.

Finally, there was an interest at GPSC in learning about the distribution of billings across GPs. It turns out that there are a few GPs who bill the complex care incentive quite actively. This may be because they have a high proportion of complex care patients in their practice. Nevertheless, annual billings for the top 25 billing GPs ranged from some \$140 thousand to \$285 thousand. However, the cost per patient across the GPs was relatively consistent. Table 12 presents the distribution of average annual billings for groups of 100 GPs.

**Table 12: Complex Care Incentive Amounts by Rank 2007/08**

	# of GPs	% of GPs	Patients with Incentives	Incentives	Incentive Amount	% of Total Amount	Per GP
<b>Groups Ranked From High to Low Users</b>							
1	100	3.9	19,482	47,155	12,383,361	19.4	123,834
2	100	3.9	12,941	31,468	8,064,173	12.6	80,642
3	100	3.9	10,998	26,995	6,782,802	10.6	67,828
4	100	3.9	9,384	21,955	5,550,721	8.7	55,507
5	100	3.9	8,050	19,401	4,681,974	7.3	46,820
6	100	3.9	7,059	16,150	4,021,969	6.3	40,220
7	100	3.9	6,552	15,198	3,540,686	5.5	35,407
8	100	3.9	5,873	13,146	3,101,875	4.9	31,019
9	100	3.9	5,159	11,607	2,671,079	4.2	26,711
10	100	3.9	4,539	9,587	2,307,150	3.6	23,072
11	100	3.9	4,003	8,143	1,979,508	3.1	19,795
12	100	3.9	3,717	7,524	1,675,151	2.6	16,752
13	100	3.9	3,033	6,254	1,420,881	2.2	14,209
14	100	3.9	2,610	5,072	1,220,997	1.9	12,210
15	100	3.9	2,414	4,617	1,017,624	1.6	10,176
16	100	3.9	1,931	3,917	845,313	1.3	8,453
17	100	3.9	1,684	3,027	703,237	1.1	7,032
18	100	3.9	1,574	2,695	565,634	0.9	5,656
19	100	3.9	1,126	1,982	439,106	0.7	4,391
20	100	3.9	968	1,592	341,030	0.5	3,410
21	100	3.9	819	1,198	250,752	0.4	2,508
22	100	3.9	565	871	168,726	0.3	1,687
23	100	3.9	397	552	104,276	0.2	1,043
24	100	3.9	254	341	59,271	0.1	593
25	100	3.9	157	174	28,207	0.0	282
26	49	1.9	56	56	3,720	0.0	76
<b>All</b>	<b>2,549</b>	<b>100.0</b>	<b>115,345</b>	<b>260,677</b>	<b>63,929,222</b>	<b>100.0</b>	<b>25,080</b>

Source: British Columbia Ministry of Health Services, Primary Care Data Repository, June 2009.