

# The General Practice Services Committee

---

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

**Final Report: Evaluation of the Chronic Obstructive Pulmonary Disease (COPD) Payment Incentives to March 31, 2011**

**Prepared by**

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

**February 2013**

This report has been prepared by Hollander Analytical Services Ltd. for the project funder 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**

## HIGHLIGHTS OF FINDINGS

- In terms of unadjusted costs, the average, annual costs for patients who did, and did not, receive incentive based care for COPD were \$6,709 and \$7,521 respectively. When one adjusts for the impacts of age, gender and RUB distributions, the costs were \$6,678 and \$7,536 respectively.
- When we adjust for age, gender, RUB, and attachment level, costs for patients who received incentive based care, compared to those who did not, were \$6,933 and \$7,429, respectively. This resulted in a net cost avoidance (over and above the costs of the incentives themselves), based on adjusted data, of \$10.9 million for fiscal 2010/11.
- In terms of hospital utilization, patients who received incentive based care had fewer days in hospital per 1,000 patients both across time and care levels.
- There were more readmissions per 1,000 admissions for patients who received incentive based care for RUB 3 patients. The number of readmissions were fairly even for RUB 4 patients, and were lower for RUB 5 patients.
- Finally, for patients who received incentive based care, the length of time spent in hospital per admission was less than for patients who did not receive incentive based care.
- The above results were maintained when one adjusted for differences in age, gender, RUB and attachment level.

## TABLE OF CONTENTS

Highlights of Findings .....	i
1. Introduction .....	1
2. Methods .....	2
3. Services, RUBs and Sample Selection .....	2
4. Patterns of Hospital Utilization .....	11
5. Adjusted Cost Utilization and Hospital Data .....	19
6. Discussion.....	30

## 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 the Chronic Obstructive Pulmonary Disease (COPD) incentive to March 31, 2011.

It should be noted that in this report we focus on people with somewhat higher care needs. Thus, the analyses in this report typically focus on people with a RUB level of 3 or higher. In addition, it is recognized that there may be some false positives, or very low care needs COPD patients. Thus, in order to ensure that our analysis is based on active patients, who need at least a modest amount of service, we have limited the patients in the analysis to those who have had at least five services in a given year. In addition, prior analyses have indicated that relatively few patients who received incentive based care had fewer than five GP services in a year.

Many readers of this report will have been trained in a health related discipline and will be familiar with concepts from the field of epidemiology such as age and sex standardization. Epidemiology deals with the correlates of disease in a population and most of the analysis focuses on populations. For example, one would age and sex standardize mortality rates across provinces to the population distribution of Canada as a whole to obtain, for example, Standardized Mortality Rates (SMRs).

However, many social science disciplines also adjust data to control for confounds based on differential age and sex distributions (and distributions in other key variables). Thus, epidemiological standardization is actually a sub-set of a broader concept of “Adjustment” which “encompasses both standardization and other procedures from removing the effects of factors that distort or *confound* comparison.”<sup>1</sup> In our analysis we adjust for differences in age, sex, RUB and attachment level distributions in relation to costs and utilization. However, the mathematics of standardizing for these variables is the same as for standardizing in epidemiology. The difference is that our outcome variables are not related to SMRs, or incidence or prevalence rates of a disease in a population, rather they are related to cost and utilization patterns for an experimental group and a comparison group. In this report we have used what is referred to as indirect standardization, the same approach used by the BC Ministry of Health.

---

<sup>1</sup> Schoenbach, V.J. & Rosamond, W.D. (2000). *Understanding the Fundamentals of Epidemiology: An Evolving Text*. Chapel Hill, North Carolina: University of North Carolina at Chapel Hill, p. 131.

## 2. METHODS

In order to derive a group of patients who were comparable, and may or may not have received incentive based care, and to exclude extreme outliers, we excluded:

- People who died in the year.
- People with hospital costs greater than \$100,000.
- People with billings for more than 25 payees.
- People with less than five GP services in the year.
- People who were estimated to be in a long term care facility during the 2010/11 fiscal year.

The overall findings seem to indicate that the use of incentives appears to increase costs for people with low to moderate care needs (i.e., RUB 3). The pattern, however, seems to change for RUBs 4 and 5. This change appears to be the result of people having higher care needs and greater hospital costs.

## 3. SERVICES, RUBS AND SAMPLE SELECTION

The GPSC expressed an interest in obtaining more information about services and RUB levels. In fiscal 2010/11, there were 46 patients on the COPD registry who had no services. For RUBs, RUB 0 (zero) is a holding category for patients who could not be placed in RUBs 1 to 5. There were 535 patients at RUB 0. The following tables exclude patients at RUB 0 and patients with no services in the fiscal year.

Table 1 presents detailed information on the number of patients who received at least one service and were at least at RUB 1. As can be seen in Table 1, there were relatively few patients who received incentive based care both in absolute numbers, and in relation to the percentage of people who did not receive incentive based care, for people who had one to four services. Our selected sample is in the shaded area in Table 1. Tables 1 and 2 also include comparative, raw, or unadjusted, cost data for patients who did, and did not, receive incentive based care. Table 3 shows the number of patients at each intersection between the number of services and RUB levels. There is clearly a direct relationship between RUB level and the number of services. Table 3 shows that more people with low number of services were at low RUB levels and more people with high numbers of services were at higher RUB levels.

It should be noted that Tables 1 to 3 refer to our initial selection of patients. Once the patients were selected we applied some of our screens (excluding RUB levels and the number of services) (see Methods section). Once the screens were applied, the number of people in the analysis dropped from 107,325 (Table 2) to 94,762 (Table 4), Table 4 presents data on the patients in our analysis. After we applied the RUB and services screens 81,487 patients remained in our analysis. As can be seen in Tables 2 and 4, costs increase the more services one has and the higher the RUB level. Tables 4 and 5 indicate unadjusted annual costs of \$7,521 for patients who did not have an incentive compared to \$6,709 for patients who did receive incentive based care. Tables 5 to 8 show the comparative, unadjusted costs for people who did, and did not,

receive incentive based care in fiscal 10/11, overall and by RUB level. These Tables also show cost breakdowns for fiscal 09/10 and 10/11.

**Table 1: Patients with COPD for RUBs 1 to 5 and at Least One GP Service (April 2010 to March 2011)**

COPD	Number of Patients	% of Patients	Number of Patients with Related Incentive		% of Patients with Related Incentive By Services		Average Total Cost		% of Patients with Related Incentive Within Service Group
			No	Yes	No	Yes	No	Yes	
<b>All</b>	107,325	100.0	79,116	28,209	100.0	100.0	8,748	7,507	26.3
<b>GP Services</b>									
<b>01</b>	2,120	2.0	2,040	80	2.6	0.3	1,695	1,676	3.8
<b>02</b>	2,773	2.6	2,597	176	3.3	0.6	2,119	1,521	6.3
<b>03</b>	3,507	3.3	3,071	436	3.9	1.5	1,984	1,288	12.4
<b>04</b>	4,356	4.1	3,690	666	4.7	2.4	2,224	1,243	15.3
<b>05</b>	5,091	4.7	4,142	949	5.2	3.4	2,351	2,117	18.6
<b>06</b>	5,427	5.1	4,226	1,201	5.3	4.3	2,496	2,001	22.1
<b>07</b>	5,649	5.3	4,239	1,410	5.4	5.0	2,809	2,532	25.0
<b>08</b>	5,621	5.2	4,133	1,488	5.2	5.3	3,271	2,388	26.5
<b>09</b>	5,366	5.0	3,812	1,554	4.8	5.5	4,180	2,729	29.0
<b>10-14</b>	22,088	20.6	15,340	6,748	19.4	23.9	4,946	3,878	30.6
<b>15-19</b>	13,679	12.7	9,410	4,269	11.9	15.1	7,253	5,785	31.2
<b>20 or More</b>	31,648	29.5	22,416	9,232	28.3	32.7	20,658	15,524	29.2
<b>Resource Utilization Band</b>									
<b>1</b>	674	0.6	674	.	0.9	.	471	.	0.0
<b>2</b>	4,632	4.3	4,253	379	5.4	1.3	854	896	8.2
<b>3</b>	52,137	48.6	38,504	13,633	48.7	48.3	2,890	3,015	26.1
<b>4</b>	27,161	25.3	18,885	8,276	23.9	29.3	7,686	6,776	30.5
<b>5</b>	22,721	21.2	16,800	5,921	21.2	21.0	25,698	19,292	26.1

Source: British Columbia Ministry of Health Services, Primary Care Data Repository, Fiscal 2010/2011.

**Table 2: Patients with COPD For Rubs 1 to 5 and at Least One GP Service (April 2010 to March 2011)**

COPD	Number of Patients	% of Patients	Number of Patients with Related Incentive		% of Patients with Related Incentive By Services		Average Total Cost		% of Patients with Related Incentive Within Service Group
			No	Yes	No	Yes	No	Yes	
<b>All</b>	107,325	100.0	79,116	28,209	100.0	100.0	8,748	7,507	26.3
<b>1. Rub 1 or 2 with Less than 5 GP services</b>	3,483	3.2	3,332	151	4.2	0.5	551	482	4.3
<b>2. Rub 1 or 2 with 5 or More GP services</b>	1,823	1.7	1,595	228	2.0	0.8	1,323	1,170	12.5
<b>3. Rub 3,4,5 with Less than 5 GP services</b>	9,273	8.6	8,066	1,207	10.2	4.3	2,656	1,424	13.0
<b>4. Rub 3,4,5 with 5 or More GP services</b>	92,746	86.4	66,123	26,623	83.6	94.4	10,083	7,877	28.7

Source: British Columbia Ministry of Health Services, Primary Care Data Repository, Fiscal 2010/2011.

**Table 3: Patients with COPD for Rub 1 to 5 and at Least One GP Service (April 2010 to March 2011)**

COPD	Number of Patients	Number of Patients Resource Utilization Band					% of Patients Resource Utilization Band				
		1	2	3	4	5	1	2	3	4	5
<b>All</b>	107,325	674	4,632	52,137	27,161	22,721	100.0	100.0	100.0	100.0	100.0
<b>GP Services</b>											
<b>01</b>	2,120	346	854	823	68	29	51.3	18.4	1.6	0.3	0.1
<b>02</b>	2,773	168	763	1,663	126	53	24.9	16.5	3.2	0.5	0.2
<b>03</b>	3,507	68	662	2,465	235	77	10.1	14.3	4.7	0.9	0.3
<b>04</b>	4,356	30	592	3,171	442	121	4.5	12.8	6.1	1.6	0.5
<b>05</b>	5,091	19	494	3,803	621	154	2.8	10.7	7.3	2.3	0.7
<b>06</b>	5,427	14	369	4,063	799	182	2.1	8.0	7.8	2.9	0.8
<b>07</b>	5,649	7	266	4,074	1,037	265	1.0	5.7	7.8	3.8	1.2
<b>08</b>	5,621	4	170	3,985	1,146	316	0.6	3.7	7.6	4.2	1.4
<b>09</b>	5,366	3	121	3,563	1,247	432	0.4	2.6	6.8	4.6	1.9
<b>10-14</b>	22,088	7	247	12,656	6,435	2,743	1.0	5.3	24.3	23.7	12.1
<b>15-19</b>	13,679	1	54	5,716	4,920	2,988	0.1	1.2	11.0	18.1	13.2
<b>20 or More</b>	31,648	7	40	6,155	10,085	15,361	1.0	0.9	11.8	37.1	67.6

Source: British Columbia Ministry of Health Services, Primary Care Data Repository, Fiscal 2010/2011.



**Table 4: Screened Patients with COPD by Services, RUBs and Costs (April 2010 to March 2011)**

COPD	Number of Patients	% of Patients	Number of Patients with Related Incentive		% of Patients with Related Incentive By Services		Average Total Cost		% of Patients with Related Incentive Within Service Group
			No	Yes	No	Yes	No	Yes	
<b>All</b>	94,762	100.0	68,158	26,604	100.0	100.0	6,486	6,389	28.1
<b>1. Rub 1 or 2 with Less than 5 GP services</b>	3,227	3.4	3,077	150	4.5	0.6	528	484	4.6
<b>2. Rub 1 or 2 with 5 or More GP services</b>	1,611	1.7	1,384	227	2.0	0.9	1,232	1,170	14.1
<b>3. Rub 3,4,5 with Less than 5 GP services</b>	8,437	8.9	7,253	1,184	10.6	4.5	1,959	1,371	14.0
<b>4. Rub 3,4,5 with 5 or More GP services</b>	81,487	86.0	56,444	25,043	82.8	94.1	7,521	6,709	30.7

Source: British Columbia Ministry of Health Services, Primary Care Data Repository, Fiscal 2010/2011.

**Table 5: Average Annual Cost Summaries by Year for All Patients with COPD**

All RUBs \*

Averages		COPD Incentive			
		No		Yes	
		Year		Year	
		200910	201011	200910	201011
Average	<b>GP Amount</b>	783	800	1,016	997
	<b>Specialist Amount</b>	704	739	583	608
	<b>Diag Fac Amount</b>	542	546	531	519
	<b>GP Specialist and Diag Fac Amounts</b>	2,029	2,085	2,131	2,124
	<b>Pharmacy Costs</b>	1,426	1,388	1,533	1,466
	<b>Hospital Costs</b>	3,899	4,048	3,155	3,119
	<b>Total Costs</b>	7,353	7,521	6,819	6,709
	<b>Patients</b>	54,424	56,444	17,796	25,043

Source: British Columbia Ministry of Health Services, Primary Care Data Repository, Fiscal 2010/2011.

**Table 6: Average Annual Cost Summaries By Year for All Patients with COPD for RUB 3**

**Resource Utilization Band 3**

<b>Averages</b>		<b>COPD Incentive</b>			
		<b>No</b>		<b>Yes</b>	
		<b>Year</b>		<b>Year</b>	
		<b>200910</b>	<b>201011</b>	<b>200910</b>	<b>201011</b>
<b>Average</b>	<b>GP Amount</b>	531	533	759	735
	<b>Specialist Amount</b>	316	332	256	269
	<b>Diag Fac Amount</b>	369	371	365	357
	<b>GP Specialist and Diag Fac Amounts</b>	1,215	1,236	1,379	1,361
	<b>Pharmacy Costs</b>	1,061	1,003	1,181	1,110
	<b>Hospital Costs</b>	806	790	657	650
	<b>Total Costs</b>	3,082	3,029	3,218	3,121
	<b>Patients</b>	28,660	29,187	8,650	12,264

Source: British Columbia Ministry of Health Services, Primary Care Data Repository, Fiscal 2010/2011.

**Table 7: Average Annual Cost Summaries By Year for All Patients with COPD for RUB 4**

**Resource Utilization Band 4**

<b>Averages</b>		<b>COPD Incentive</b>			
		<b>No</b>		<b>Yes</b>	
		<b>Year</b>		<b>Year</b>	
		<b>200910</b>	<b>201011</b>	<b>200910</b>	<b>201011</b>
<b>Average</b>	<b>GP Amount</b>	853	859	1,056	1,046
	<b>Specialist Amount</b>	722	759	587	605
	<b>Diag Fac Amount</b>	620	618	577	562
	<b>GP Specialist and Diag Fac Amounts</b>	2,195	2,236	2,219	2,213
	<b>Pharmacy Costs</b>	1,602	1,550	1,696	1,604
	<b>Hospital Costs</b>	3,328	3,376	2,535	2,600
	<b>Total Costs</b>	7,124	7,163	6,450	6,417
	<b>Patients</b>	15,092	15,657	5,579	7,769

Source: British Columbia Ministry of Health Services, Primary Care Data Repository, Fiscal 2010/2011.

**Table 8: Average Annual Cost Summaries By Year for All Patients with COPD for RUB 5**

**Resource Utilization Band 5**

<b>Averages</b>		<b>COPD Incentive</b>			
		<b>No</b>		<b>Yes</b>	
		<b>Year</b>		<b>Year</b>	
		<b>200910</b>	<b>201011</b>	<b>200910</b>	<b>201011</b>
<b>Average</b>	<b>GP Amount</b>	1,358	1,393	1,578	1,561
	<b>Specialist Amount</b>	1,723	1,735	1,373	1,441
	<b>Diag Fac Amount</b>	899	889	865	850
	<b>GP Specialist and Diag Fac Amounts</b>	3,980	4,017	3,817	3,852
	<b>Pharmacy Costs</b>	2,157	2,137	2,133	2,125
	<b>Hospital Costs</b>	13,013	13,153	10,179	9,967
	<b>Total Costs</b>	19,150	19,307	16,128	15,945
	<b>Patients</b>	10,672	11,600	3,567	5,010

Source: British Columbia Ministry of Health Services, Primary Care Data Repository, Fiscal 2010/2011.

#### **4. PATTERNS OF HOSPITAL UTILIZATION**

Table 9 presents unadjusted data, for RUBs 3 to 5 for a number of hospital based indicators by year. As can be seen, patients who received incentive based care consistently had fewer hospital days per 1,000 patients.

As can be seen in Tables 9 to 12, patients at RUB 3 who received incentive based care consistently had more readmissions. The numbers were fairly even for RUB 4 and were generally lower for RUB 5 patients who received incentive based care. The higher rate of readmissions for RUB 3 patients may, possibly, be an artifact of hospital coding. Patients who had not been diagnosed with COPD by their GP, and who had other health issues, may not have been coded as COPD by the hospital. There were, as expected, significant increases in hospital days per 1,000 patients as one moved from RUB 3 to RUB 5. Finally, for “net” hospital admissions (admissions excluding transfers and day care) there was a consistent pattern, overall and by RUB level, in admissions over time between fiscal 2009/10 and fiscal 2010/11 such that patients who received incentive based care had fewer “net” admissions.

The next series of Tables (Tables 13 to 16) provide data on hospital lengths of stay for different definitions of admission. “Admissions” are all admissions less day care admissions. “Stays” are admissions less day care admissions and transfers. “Episodes” are admissions less day care and transfers, and less readmissions within 30 days. As can be seen from these tables, the average length of stay is shorter, overall and across RUB levels, for patients who received incentive based care.

**Table 9: Average Annual Service Summaries by Year for All Patients with COPD Who Did Not, and Did, Receive Incentive Based Care for All RUBS**

All RUBs \*

Averages		COPD Incentive			
		No		Yes	
		Year		Year	
		200910	201011	200910	201011
GP Services	17.9	18.3	19.3	18.8	
Specialist Services	9.2	9.5	7.6	8.0	
Diag Fac Service	37.0	37.4	35.9	35.6	
GP Specialist and Diag Fac Services	64.1	65.1	62.8	62.4	
Hospital Days per 1000 Patients	3544.7	3717.7	2885.9	2870.0	
Hospital Admissions Incl Transfers and Day Care per 1000 Patients	741.8	757.5	650.5	663.3	
Hospital Day Care Days per 1000 Patients	299.3	307.1	267.5	289.7	
Hospital Transfers per 1000 Patients	33.3	32.5	25.8	21.1	
Net Admissions per 1000 Patients (excluding Transfers and Day Care)	409.2	417.9	357.2	352.5	
Readmission Within 7 days per 1000 net Admissions	62.9	63.2	49.6	59.5	
Readmission Within 15 days per 1000 net Admissions	102.1	102.5	89.2	94.7	
Readmission Within 30 days per 1000 net Admissions	152.0	153.4	137.3	141.3	
Age	71.4	71.3	71.9	71.5	
Attachment to Practice	79.2	78.8	83.2	82.8	
Patients	54,424	56,444	17,796	25,043	

Source: British Columbia Ministry of Health Services, Primary Care Data Repository, Fiscal 2010/2011.

**Table 10: Average Annual Service Summaries by Year For All Patients with COPD Who Did Not, and Did, Receive Incentive Based Care: RUB 3**

**Resource Utilization Band 3**

Averages		COPD Incentive			
		No		Yes	
		Year		Year	
		200910	201011	200910	201011
GP Services	12.5	12.5	13.8	13.2	
Specialist Services	4.4	4.5	3.6	3.9	
Diag Fac Service	26.8	27.1	26.7	26.6	
GP Specialist and Diag Fac Services	43.8	44.0	44.1	43.7	
Hospital Days per 1000 Patients	712.8	702.3	610.6	590.8	
Hospital Admissions Incl Transfers and Day Care per 1000 Patients	304.1	307.5	259.4	268.5	
Hospital Day Care Days per 1000 Patients	196.0	204.3	165.2	176.9	
Hospital Transfers per 1000 Patients	2.8	2.4	0.5	1.4	
Net Admissions per 1000 Patients (excluding Transfers and Day Care)	105.3	100.9	93.8	90.3	
Readmission Within 7 days per 1000 net Admissions	24.5	23.1	23.4	34.3	
Readmission Within 15 days per 1000 net Admissions	38.8	38.0	32.1	46.1	
Readmission Within 30 days per 1000 net Admissions	56.0	52.0	65.4	56.9	
Age	70.3	70.2	71.0	70.6	
Attachment to Practice	82.7	82.7	87.2	86.6	
Patients	28,660	29,187	8,650	12,264	

Source: British Columbia Ministry of Health Services, Primary Care Data Repository, Fiscal 2010/2011.



**Table 11: Average Annual Service Summaries by Year For All Patients with COPD Who Did Not, and Did, Receive Incentive Based Care: RUB 4**

**Resource Utilization Band 4**

Averages		COPD Incentive			
		No		Yes	
		Year		Year	
		200910	201011	200910	201011
GP Services	19.5	19.5	20.2	19.9	
Specialist Services	9.5	9.8	7.8	8.0	
Diag Fac Service	40.9	41.4	38.3	37.7	
GP Specialist and Diag Fac Services	69.9	70.7	66.3	65.6	
Hospital Days per 1000 Patients	3028.3	3063.4	2276.9	2383.4	
Hospital Admissions Incl Transfers and Day Care per 1000 Patients	786.3	795.5	670.2	689.3	
Hospital Day Care Days per 1000 Patients	351.5	360.2	321.4	338.7	
Hospital Transfers per 1000 Patients	24.0	21.1	16.1	15.3	
Net Admissions per 1000 Patients (excluding Transfers and Day Care)	410.8	414.3	332.7	335.3	
Readmission Within 7 days per 1000 net Admissions	43.4	45.5	33.9	46.1	
Readmission Within 15 days per 1000 net Admissions	70.0	72.5	57.1	70.2	
Readmission Within 30 days per 1000 net Admissions	103.7	107.2	92.7	102.5	
Age	72.2	72.0	72.1	71.9	
Attachment to Practice	78.1	77.6	81.8	81.8	
Patients	15,092	15,657	5,579	7,769	

Source: British Columbia Ministry of Health Services, Primary Care Data Repository, Fiscal 2010/2011.

**Table 12: Average Annual Service Summaries by Year For All Patients with COPD Who Did Not, and Did, Receive Incentive Based Care: RUB 5**

**Resource Utilization Band 5**

Averages		COPD Incentive			
		No		Yes	
		Year		Year	
		200910	201011	200910	201011
GP Services	30.2	31.2	31.1	31.1	
Specialist Services	21.9	21.7	17.2	18.0	
Diag Fac Service	58.7	57.8	54.2	54.0	
GP Specialist and Diag Fac Services	110.7	110.7	102.5	103.1	
Hospital Days per 1000 Patients	11880.0	12187.9	9356.0	9203.8	
Hospital Admissions Incl Transfers and Day Care per 1000 Patients	1854.5	1838.5	1568.3	1589.6	
Hospital Day Care Days per 1000 Patients	502.7	494.1	431.5	490.2	
Hospital Transfers per 1000 Patients	128.5	123.8	102.3	78.4	
Net Admissions per 1000 Patients (excluding Transfers and Day Care)	1223.3	1220.6	1034.5	1021.0	
Readmission Within 7 days per 1000 net Admissions	81.0	79.6	63.1	71.7	
Readmission Within 15 days per 1000 net Admissions	132.0	129.7	117.9	117.7	
Readmission Within 30 days per 1000 net Admissions	197.2	195.7	175.6	179.3	
Age	73.3	73.4	73.5	73.0	
Attachment to Practice	71.2	70.7	75.9	75.0	
Patients	10,672	11,600	3,567	5,010	

Source: British Columbia Ministry of Health Services, Primary Care Data Repository, Fiscal 2010/2011.

**Table 13: Average Hospital Stays by Year for All Patients with COPD Who Did, and Did Not, Receive Incentive Based Care, and Who were Admitted to Hospital (Excluding Day Care)**

All RUBs \*

Averages		COPD Incentive			
		No		Yes	
		Year		Year	
		200910	201011	200910	201011
Patients with AC Stays	14,251	15,016	4,163	5,753	
Total AC Admissions	24,087	25,425	6,816	9,356	
Total AC Stays	22,273	23,590	6,357	8,827	
Total AC Episodes	18,887	19,971	5,484	7,580	
Total AC Days	176,628	192,509	46,597	64,617	
Average Acute Care Admissions (Admissions Excluding Day Care)	1.69	1.69	1.64	1.63	
Average Acute Care Admissions Excluding Transfers	1.56	1.57	1.53	1.53	
Average Acute Care Episodes (Readmissions Combined with Admission)	1.33	1.33	1.32	1.32	
Average Length of stay per regular admission	7.33	7.57	6.84	6.91	
Average Length of stay per hospital stay	7.93	8.16	7.33	7.32	
Average Length of stay per hospital episode	9.35	9.64	8.50	8.52	

Source: British Columbia Ministry of Health Services, Primary Care Data Repository, Fiscal 2010/2011.

**Table 14: Average Hospital Stays by Year for All Patients with COPD Who Did, and Did Not, Receive Incentive Based Care, and Who were Admitted to Hospital (Excluding Day Care): RUB 3**

**Resource Utilization Band 3**

Averages		COPD Incentive			
		No		Yes	
		Year		Year	
		200910	201011	200910	201011
Patients with AC Stays	2,571	2,515	677	950	
Total AC Admissions	3,099	3,014	815	1,124	
Total AC Stays	3,018	2,945	811	1,107	
Total AC Episodes	2,849	2,792	758	1,044	
Total AC Days	14,812	14,536	3,853	5,076	
Average Acute Care Admissions (Admissions Excluding Day Care)	1.21	1.20	1.20	1.18	
Average Acute Care Admissions Excluding Transfers	1.17	1.17	1.20	1.17	
Average Acute Care Episodes (Readmissions Combined with Admission)	1.11	1.11	1.12	1.10	
Average Length of stay per regular admission	4.78	4.82	4.73	4.52	
Average Length of stay per hospital stay	4.91	4.94	4.75	4.59	
Average Length of stay per hospital episode	5.20	5.21	5.08	4.86	

Source: British Columbia Ministry of Health Services, Primary Care Data Repository, Fiscal 2010/2011.

**Table 15: Average Hospital Stays by Year for All Patients with COPD Who Did, and Did Not, Receive Incentive Based Care, and Who were Admitted to Hospital (Excluding Day Care): RUB 4**

**Resource Utilization Band 4**

Averages		COPD Incentive			
		No		Yes	
		Year		Year	
		200910	201011	200910	201011
Patients with AC Stays	4,568	4,797	1,407	1,931	
Total AC Admissions	6,562	6,816	1,946	2,724	
Total AC Stays	6,200	6,486	1,856	2,605	
Total AC Episodes	5,557	5,791	1,684	2,338	
Total AC Days	40,398	42,325	10,910	15,886	
Average Acute Care Admissions (Admissions Excluding Day Care)	1.44	1.42	1.38	1.41	
Average Acute Care Admissions Excluding Transfers	1.36	1.35	1.32	1.35	
Average Acute Care Episodes (Readmissions Combined with Admission)	1.22	1.21	1.20	1.21	
Average Length of stay per regular admission	6.16	6.21	5.61	5.83	
Average Length of stay per hospital stay	6.52	6.53	5.88	6.10	
Average Length of stay per hospital episode	7.27	7.31	6.48	6.79	

Source: British Columbia Ministry of Health Services, Primary Care Data Repository, Fiscal 2010/2011.

**Table 16: Average Hospital Stays by Year for All Patients with COPD Who Did, and Did Not, Receive Incentive Based Care, and Who were Admitted to Hospital (Excluding Day Care): RUB 5**

**Resource Utilization Band 5**

Averages		COPD Incentive			
		No		Yes	
		Year		Year	
		200910	201011	200910	201011
Patients with AC Stays	7,112	7,704	2,079	2,872	
Total AC Admissions	14,426	15,595	4,055	5,508	
Total AC Stays	13,055	14,159	3,690	5,115	
Total AC Episodes	10,481	11,388	3,042	4,198	
Total AC Days	121,418	135,648	31,834	43,655	
Average Acute Care Admissions (Admissions Excluding Day Care)	2.03	2.02	1.95	1.92	
Average Acute Care Admissions Excluding Transfers	1.84	1.84	1.77	1.78	
Average Acute Care Episodes (Readmissions Combined with Admission)	1.47	1.48	1.46	1.46	
Average Length of stay per regular admission	8.42	8.70	7.85	7.93	
Average Length of stay per hospital stay	9.30	9.58	8.63	8.53	
Average Length of stay per hospital episode	11.58	11.91	10.46	10.40	

Source: British Columbia Ministry of Health Services, Primary Care Data Repository, Fiscal 2010/2011.

**5. ADJUSTED COST UTILIZATION AND HOSPITAL DATA**

To summarize, Tables 17 and 18 provide basic, unadjusted data on numbers of patients and costs by age, gender and attachment to practice. As can be seen in Table 18, the average, annual unadjusted costs for COPD patients who did not, and did, receive incentive based care were \$7,521 and \$6,709, respectively.

When one adjusts for differences in the distribution of age, gender and RUB levels, annual costs are still lower for patients who received incentive based care, compared to those who did not. Table 19 presents data on comparative costs by RUB level. For RUB 3, annual costs were higher for patients who received incentive based care. For RUBs 4 and 5 the reverse is true, as the annual costs for patients who received incentive based care was lower than for patients who did not. Essentially, all of the savings are in hospital costs.

Table 20 shows the overall annual costs adjusted for RUB, age and gender, for RUBs 3, 4 and 5 combined. The average, annual, adjusted cost for patients who did not receive incentive based care was \$7,536, while it was \$6,678 for those who did receive incentive based care. However, this group also had a higher percentage of attachment to practice. Because there is an

inverse relationship between attachment to practice and costs, it may also be appropriate to adjust for attachment levels which we do below.

In terms of hospital utilization, data by RUB level is presented in Table 21 and, overall, in Table 22. These data are adjusted for age, gender and RUB level and contain much of the same information contained in Tables 9 to 16. While there are some differences, the overall results of shorter lengths of stay, and the number of hospital days per 1,000, for patients who received incentive based care continued to hold.

With regard to adjustments by age, gender, RUB and attachment level, overall costs were lower for patients who received incentive based care. Tables 23 and 24 present comparative, average, annual, adjusted, total costs by RUB and shows that total costs were lower for patients who received incentive based care for RUBs 4 and 5. The annual costs for patients who received incentive based care were \$6,933 compared to \$7,429 for those who did not (see Table 24). Table 25 indicates that in terms of hospital related figures, those who received incentive based care still had shorter lengths of stay and fewer hospital days than patients who did not receive incentive based care.

Our analysis is based on a selected sample. There are some patients who are outside our selection parameters who also receive incentive based care. Thus, the total cost of COPD incentives is greater than the total cost of incentives in our sample. However, cost avoidance data are limited to our sample. Thus, in order to obtain a bottom line estimate of the cost implications of incentives we include all costs for incentives and compare these costs to the costs potentially avoided due to the use of incentive payments.

The bottom line appears to be that the COPD incentive resulted in a cost avoidance of \$10.9 million in fiscal 2010/11 (see Table 26). The overall costs of the incentive payments were fully recovered through efficiencies, and there was an additional cost avoidance, over and above the cost of the incentives, of \$10.9 million.

**Table 17: Number of Patients with COPD Who Did, and Did Not, Receive Incentive Based Care (April 2010 to March 2011)**

Averages for COPD	Incentive							
	No				Yes			
	Number of Patients				Number of Patients			
	Resource Utilization Band				Resource Utilization Band			
	All	3	4	5	All	3	4	5
<b>All</b>	56,444	29,187	15,657	11,600	25,043	12,264	7,769	5,010
<b>Client Age Group</b>								
<b>45 - 59</b>	9,135	5,138	2,403	1,594	3,735	1,941	1,110	684
<b>60 - 69</b>	15,457	8,927	3,941	2,589	6,662	3,571	1,986	1,105
<b>70 - 79</b>	17,123	8,797	4,894	3,432	8,296	4,069	2,570	1,657
<b>80 and over</b>	14,729	6,325	4,419	3,985	6,350	2,683	2,103	1,564
<b>Gender</b>								
<b>Females</b>	28,403	15,099	7,924	5,380	12,172	6,163	3,809	2,200
<b>Males</b>	28,041	14,088	7,733	6,220	12,871	6,101	3,960	2,810
<b>Attachment to Practice</b>								
<b>1. Less than 40%</b>	2,114	671	572	871	508	124	158	226
<b>2. 40% - 59%</b>	8,851	3,430	2,643	2,778	2,945	985	968	992
<b>3. 60% - 79%</b>	13,303	5,859	4,018	3,426	5,206	2,058	1,741	1,407
<b>4. 80% - 89%</b>	10,509	5,604	2,913	1,992	4,779	2,276	1,536	967
<b>5. 90% or More</b>	21,667	13,623	5,511	2,533	11,605	6,821	3,366	1,418

Source: British Columbia Ministry of Health Services, Primary Care Data Repository, Fiscal 2010/2011.



**Table 18: Total Cost of COPD for Patients Who Did, and Did Not, Receive Incentive Based Care (April 2010 to March 2011)**

Averages for COPD	Incentive							
	No				Yes			
	Total Costs				Total Costs			
	Resource Utilization Band				Resource Utilization Band			
All	3	4	5	All	3	4	5	
<b>All</b>	7,521	3,029	7,163	19,307	6,709	3,121	6,417	15,945
<b>Client Age Group</b>								
<b>45 - 59</b>	6,215	2,491	6,579	17,668	5,568	2,401	5,871	14,064
<b>60 - 69</b>	6,574	2,683	6,611	19,932	5,884	2,766	5,747	16,210
<b>70 - 79</b>	7,656	3,279	7,268	19,429	6,918	3,374	6,671	16,002
<b>80 and over</b>	9,168	3,607	7,855	19,450	7,972	3,731	7,027	16,519
<b>Gender</b>								
<b>Females</b>	7,381	3,102	7,374	19,400	6,570	3,227	6,630	15,834
<b>Males</b>	7,663	2,951	6,946	19,226	6,840	3,014	6,212	16,031
<b>Attachment to Practice</b>								
<b>1. Less than 40%</b>	15,643	4,028	10,240	28,140	17,344	4,680	12,985	27,341
<b>2. 40% - 59%</b>	11,664	3,740	9,333	23,666	11,439	3,862	9,114	21,231
<b>3. 60% - 79%</b>	9,279	3,433	8,243	20,490	8,783	3,717	7,450	17,843
<b>4. 80% - 89%</b>	6,735	3,012	7,047	16,752	6,542	3,269	6,369	14,518
<b>5. 90% or More</b>	4,338	2,634	5,075	11,897	4,181	2,756	4,820	9,520

Source: British Columbia Ministry of Health Services, Primary Care Data Repository, Fiscal 2010/2011.

**Table 19: Annual Costs for COPD Patients Adjusted for Gender and Age Group within RUB (April 2010 to March 2011)**

	Resource Utilization Band					
	3		4		5	
	COPD Incentive		COPD Incentive		COPD Incentive	
	No Incentive	Incentive	No Incentive	Incentive	No Incentive	Incentive
<b>GP Amount</b>	534	731	858	1,047	1,391	1,566
<b>Specialist Amount</b>	333	267	760	604	1,740	1,431
<b>Diag Fac Amount</b>	372	355	619	561	892	845
<b>GP Specialist and Diag Fac Amounts</b>	1,239	1,354	2,237	2,211	4,023	3,842
<b>Hospital Costs</b>	791	645	3,374	2,600	13,139	9,986
<b>Pharmacy Costs</b>	1,005	1,105	1,548	1,610	2,136	2,127
<b>Total Cost</b>	3,035	3,104	7,159	6,421	19,298	15,956
<b>Attachment to Practice</b>	82.75	86.51	77.67	81.73	70.69	74.89
<b>Attachment to Practice, Excluding Incentives</b>	81.88	83.89	76.73	79.17	69.70	72.51

Source: British Columbia Ministry of Health Services, Primary Care Data Repository, Fiscal 2010/2011.

**Table 20: Annual Costs for COPD Patients Adjusted for RUB, Gender, and Age Group (April 2010 to March 2011)**

	COPD Incentive	
	No Incentive	Incentive
<b>GP Amount</b>	802	992
<b>Specialist Amount</b>	743	601
<b>Diag Fac Amount</b>	549	514
<b>GP Specialist and Diag Fac Amounts</b>	2,093	2,108
<b>Hospital Costs</b>	4,051	3,111
<b>Pharmacy Costs</b>	1,392	1,459
<b>Total Cost</b>	7,536	6,678
<b>Attachment to Practice</b>	78.83	82.77
<b>Attachment to Practice, Excluding Incentives</b>	77.92	80.21

Source: British Columbia Ministry of Health Services, Primary Care Data Repository, Fiscal 2010/2011.

**Table 21: Service Rates for COPD Patients Adjusted for Gender and Age Group within RUB (April 2010 to March 2011)**

	Resource Utilization Band					
	3		4		5	
	COPD Incentive		COPD Incentive		COPD Incentive	
	No Incentive	Incentive	No Incentive	Incentive	No Incentive	Incentive
<b>GP Services</b>	12.5	13.2	19.5	19.9	31.1	31.2
<b>Specialist Services</b>	4.5	3.8	9.8	7.9	21.8	17.9
<b>Diag Fac Service</b>	27.1	26.4	41.4	37.7	58.0	53.8
<b>GP Specialist and Diag Fac Services</b>	44.1	43.4	70.7	65.5	110.8	102.9
<b>Hospital Days per 1000 Patients</b>	703.8	586.8	3,057.4	2,387.1	12,158.0	9,259.2
<b>Hospital Admissions Incl Transfers and Day Care per 1000 Patients</b>	308.5	266.4	796.1	687.2	1,840.8	1,585.5
<b>Hospital Day Care Days per 1000 Patients</b>	205.0	175.5	361.4	336.3	497.6	484.5
<b>Hospital Transfers per 1000 Patients</b>	2.4	1.4	21.0	15.5	123.7	78.3
<b>Net Admissions per 1000 Patients (excluding Transfers and Day Care)</b>	101.1	89.6	413.7	335.5	1,219.5	1,022.7
<b>Readmission Within 7 days per 1000 net Admissions</b>	23.1	34.0	45.4	46.2	79.6	71.6
<b>Readmission Within 15 days per 1000 net Admissions</b>	38.0	45.8	72.3	70.7	129.7	117.2
<b>Readmission Within 30 days per 1000 net Admissions</b>	51.9	56.7	107.0	102.9	195.8	178.5
<b>Average Length of stay per regular admission</b>	4.8	4.5	6.2	5.8	8.7	8.0
<b>Average Length of stay per hospital stay</b>	4.9	4.6	6.5	6.1	9.6	8.6
<b>Average Length of stay per hospital stay episode</b>	5.2	4.9	7.3	6.8	11.9	10.4

Source: British Columbia Ministry of Health Services, Primary Care Data Repository, Fiscal 2010/2011.

**Table 22: Service Rates for COPD Patients Adjusted for RUB, Gender, and Age Group (April 2010 to March 2011)**

	COPD Incentive	
	No Incentive	Incentive
Attachment to Practice	78.8	82.8
Attachment to Practice, Excluding Incentives	77.9	80.2
GP Services	18.3	18.8
Specialist Services	9.5	7.9
Diag Fac Service	37.5	35.2
GP Specialist and Diag Fac Services	65.3	61.9
Hospital Days per 1000 Patients	3,715.2	2,872.1
Hospital Admissions Incl Transfers and Day Care per 1000 Patients	761.0	656.3
Hospital Day Care Days per 1000 Patients	309.6	284.7
Hospital Transfers per 1000 Patients	32.5	21.1
Net Admissions per 1000 Patients (excluding Tranfers and Day Care)	418.9	350.5
Readmission Within 7 days per 1000 net Admissions	62.9	59.8
Readmission Within 15 days per 1000 net Admissions	102.2	95.1
Readmission Within 30 days per 1000 net Admissions	153.0	141.9
Average Length of stay per regular admission	7.5	7.0
Average Length of stay per hospital stay	8.1	7.4
Average Length of stay per hospital stay episode	9.6	8.6

Source: British Columbia Ministry of Health Services, Primary Care Data Repository, Fiscal 2010/2011.

**Table 23: Annual Costs for COPD Patients Adjusted by Gender, Age Group and Attachment within RUB (April 2010 to March 2011)**

Average Total Costs			COPD Incentive	
			No Incentive	Incentive
Resource Utilization Band				
3			3,008	3,170
4			7,041	6,684
5			19,008	16,673

Source: British Columbia Ministry of Health Services, Primary Care Data Repository, Fiscal 2010/2011.

**Table 24: Annual Costs for COPD Patients Adjusted by RUB, Attachment, Gender, and Age Group (April 2010 to March 2011)**

	COPD Incentive	
	No Incentive	Incentive
<b>GP Amount</b>	796	1,007
<b>Specialist Amount</b>	735	618
<b>Diag Fac Amount</b>	548	516
<b>GP Specialist and Diag Fac Amounts</b>	2,079	2,141
<b>Hospital Costs</b>	3,958	3,329
<b>Pharmacy Costs</b>	1,391	1,462
<b>Average Total Cost</b>	7,429	6,933

Source: British Columbia Ministry of Health Services, Primary Care Data Repository, Fiscal 2010/2011.

**Table 25: Service Rates for COPD Patients Adjusted by RUB, Attachment, Gender, and Age Group (April 2010 to March 2011)**

	COPD Incentive	
	No Incentive	Incentive
Attachment to Practice	80.0	80.2
GP Services	18.2	19.1
Specialist Services	9.5	8.0
Diag Fac Service	37.5	35.2
GP Specialist and Diag Fac Services	65.1	62.4
Hospital Days per 1000 Patients	3,626.7	3,090.5
Hospital Admissions Incl Transfers and Day Care per 1000 Patients	747.3	687.6
Hospital Day Care Days per 1000 Patients	307.9	288.6
Hospital Transfers per 1000 Patients	31.2	23.3
Net Admissions per 1000 Patients (excluding Tranfers and Day Care)	408.2	375.7
Readmission Within 7 days per 1000 net Admissions	62.2	61.3
Readmission Within 15 days per 1000 net Admissions	101.1	97.1
Readmission Within 30 days per 1000 net Admissions	151.5	145.3
Average Length of stay per regular admission	7.6	7.0
Average Length of stay per hospital stay	8.1	7.5
Average Length of stay per hospital stay episode	9.6	8.7

Source: British Columbia Ministry of Health Services, Primary Care Data Repository, Fiscal 2010/2011.



**Table 26: Summary of COPD Incentive Cost Avoidance Adjusted for RUB, Attachment, Gender and Age Group (April 2010 to March 2011)**

<b>Total Cost Per Person With Incentives</b>	6,933
<b>Total Cost Per Person With Incentives Excluding Incentive Amount</b>	6,807
<b>Total Cost Per Person Without Incentives</b>	7,429
<b>Savings/Cost Per Person With Incentives Excluding Incentive Amount</b>	621
<b>Total Dollar Savings/Cost Using Standardized Rates Excluding Incentives</b>	15,558,305
<b>Total Cost of Incentives</b>	-4,636,805
<b>Net Total Dollar Savings/Costs</b>	10,921,500

Source: British Columbia Ministry of Health Services, Primary Care Data Repository, Fiscal 2010/2011.

## **6. DISCUSSION**

As noted in the report on diabetes, there is now more complexity in terms of patients who did, and did not, receive incentive based care in regard to additional incentive payments for other conditions. We were able to conduct an analysis for people who only had diabetes in that report. Unfortunately, this was not possible for COPD due to the small number of COPD only cases.