

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

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

### **Final Preliminary Report on Clinical Indicators for Patients with Diabetes**

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## HIGHLIGHTS OF FINDINGS

- Patients who received incentive based care also received more recommended tests than patients who did not receive incentive based care. For example, for A1C test, patients with no incentive based care received 29% of the recommended number of tests over the seven year period. Patients with five or more years of incentive based care, received 84.7% of the number of recommended tests over the seven year period.
- Taking all four types of tests together (i.e., A1C Tests, Eye Exams, Lipid Tests and Microalbumin Tests), patients with no incentive based care received 46.9% of the recommended tests over a seven year period, while patients with five or more years of incentives received 82% of the number of recommended tests.
- Patients who received incentive based care for diabetes were less likely to die than those who did not. We looked at people who were alive on April 1, 2006 and had, or had not, received incentive based care between April 2003 and March 2006. Over the next four years (April 2006 to March 2010) 12.8% of people who had not received incentive based care died compared to 10.1% of patients who had received incentive based care.
- The above findings held consistently across years with diabetes to March 31, 2003; attachment to practice levels; RUB levels; and age and sex groups. Patients with higher levels of testing over time were also less likely to die.

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## **1. INTRODUCTION**

To date we have focused primarily on utilization and cost data in comparing patients who did and did not receive incentive based care. This was done as another researcher was focusing on clinical indicators. That contract has concluded and, thus, we shall also be producing reports on clinical indicators going forward.

Having now looked at the data in some detail, we are of the view that this is a complex area in which a wide range of variables can have an impact on the results. Thus, this is an initial, preliminary report that presents some main findings to stimulate discussion. More sophisticated analyses will be conducted on clinical indicators in the future. The findings presented in this report are mixed, but interesting. Overall it appears that people who received incentives based care had slightly poorer health outcomes. However, it should be noted that people who are in greater need may be more likely to receive incentive based care so the results may be based on a combination of the patient's original condition and the fact that, as a consequence, they received more medical attention.

The data do, however, clearly show that patients who received incentives based care received more recommended tests, in the appropriate amounts, than patients who did not receive incentive based care. In addition, it also appears that people who received incentive based care were less likely to die than people who did not receive such care.

## **2. METHODS**

### **2.1 Introduction**

In this study, we set out to review the non-financial impact of incentives on patients with diabetes over the seven year period from April 2003 to March 2010. We did this by reviewing various laboratory tests recommended for patients with diabetes and by reviewing the incidence of a number of diseases and conditions associated with diabetes.

We looked at 'health' as an absence of diseases and medical procedures related to diabetes. In particular, we reviewed patients who were on the diabetes registry in 2002/03 and attempted to review their health over the seven year period by looking at the 2009/10 registries.

It was decided that some aggregate indicator of relative health was required for our analysis in addition to RUBs. Based on the data available we decided to develop a "Relative Health Indicator" (in future, other aggregate indicators could be considered). The registries of 2009/10 for congestive heart failure, hypertension, chronic kidney disease, cerebrovascular disease, coronary angioplasty procedures, dialysis, stroke, and transplants were reviewed to determine the case date, that is, the date each patient was started on a registry. For each patient we determined the length of time from March 31, 2003 to the patient's case date. This we termed 'disease free years'. A patient who did not appear on a registry would have seven disease free years for that particular disease. The sum of the disease free years for the nine conditions was termed the relative health indicator. This allowed us to look at all indicators at the same time and to see the overall impact of a number of variables such as age, RUB, and incentives.

The maximum relative health indicator would be 63, representing seven years without any of the nine conditions. For the relative health indicators all conditions received an equal weighting. In future, this could be adjusted to give a higher weighting for more serious conditions. The overall results were similar to the disease free years data.

## **2.2 Patients Reviewed**

Our study group included all patients on the diabetes registry created in 2010 who were alive and had a case date on or before March 31, 2003, the year before incentives payments for diabetic patients began. Screens were added to select those patients who had at least five GP services and a RUB higher than 2 in 2002/03. Patients were excluded who had hospital costs greater than \$100,000 or who were in a facility in 2002/03. Patients who did not have MSP coverage, had no reviewed medical tests in the seven years, or were under twenty years of age were also excluded.

## **2.3 Testing**

For the first part of the study where we looked at testing and disease free years, we excluded all patients who died prior to April 1, 2010. Later we reviewed the patients who died.

## **2.4 Death Rates**

We used different groups and applied further screens to the data when we examined death rates. In the previous sections we had a group of patients with 5 or more years with incentives. Using this grouping in an analysis of death rates would not be a fair comparison to the group with no incentives since having five or more years of incentives would imply at least five years of life after the start of the study. We also wanted to eliminate those patients who might be near death at the start of the study since they most likely were not selected as candidates for incentives. Thus, we eliminated all patients who were 85 or older as of March 31, 2003 and excluded all deaths in the first three years. The groups used for comparison were those who had an incentive in the first three years and those who did not. We then compared death rates for these two groups for a number of different categories for the period April 2006 to March 2010.

## **3. FINDINGS RELATED TO THE COMPLEXITY OF ONE'S HEALTH CONDITION – DISEASE FREE YEARS**

We found that a number of factors influenced the health indicator: the number of years a person had diabetes prior to April 2003, the patient's age at that time, and the person's gender. Initially, we saw that the number of years with an incentive negatively influenced the disease free years and thus the Relative Health Indicator. Testing compliance increased as the number of years of incentives increased. Our conclusion from this was not that patients with incentives were less healthy, but that their health problems were identified earlier because they were being more frequently tested for various conditions. In other words, what we initially defined as a health indicator seemed to break down when we compared groups with incentives to those without because of the differences in testing. As a result of the above dilemma, we then

examined death rates for the two groups. We did find that the group with incentives had a lower death rate, and reached a higher age, than the group without incentives.

Table 1 presents the nine conditions, and the average number of disease free years for each condition. The sum of the disease free years, across all nine conditions is the value used for the Relative Health Indicator (i.e., the higher the score the greater the relative health). As can be seen in Table 2, the score of the Relative Health Indicator (RHI) decreases, as RUBs increase, for example, the overall score for RUB 3 is 55.79 but it is 47.94 for RUB 5. As can be seen in Table 2, the RHI decreases by the number of years a person has had diabetes, and the number of years the patient has received incentive based care for diabetes. The RHI also decreases as patients get older, and was generally lower for males than for females. The relative health indicator was also lower for patients with a higher degree of testing compliance. This has led us to conclude that the decrease in the relative health indicator as the number of years with incentives increases is more a result of earlier detection of disease rather than an indication of poorer health. We further examined the relationship between the relative health indicator and testing compliance. We found that for both patients who had incentives and patients who did not have incentives, the less testing that was done the higher the health indicator. Finally, it was found that there was no difference in the RHI by the level of attachment to practice.

**Table 1: Average Disease Free Years for Diabetes Patients from 2002/03, for Patients Who Did Not Die in the Period, Across Nine Conditions**

	Average Disease Free Years								
	CHF	Hypertension	Chronic Kidney Disease	Cerebrovascular Disease	Coronary Artery Bypass Graft	Coronary Angio-plasty Procedures	Dialysis	Stroke	Transplant
<b>All</b>	6.42	2.47	6.59	5.50	6.67	6.57	6.86	6.83	6.99
<b>Years With Diabetes to Mar 31, 2003</b>									
<b>0-1</b>	6.58	2.83	6.74	5.88	6.78	6.68	6.91	6.88	6.99
<b>2-5</b>	6.49	2.45	6.67	5.61	6.73	6.62	6.90	6.85	6.99
<b>6-9</b>	6.35	2.31	6.53	5.32	6.62	6.50	6.84	6.81	6.99
<b>10 or More</b>	6.11	2.23	6.28	4.95	6.45	6.41	6.75	6.77	6.96
<b>Years With a Diabetes Incentive</b>									
<b>0</b>	6.47	2.98	6.62	5.73	6.75	6.68	6.86	6.84	6.97
<b>1</b>	6.38	2.60	6.57	5.48	6.67	6.58	6.83	6.83	6.97
<b>2</b>	6.39	2.52	6.59	5.44	6.67	6.55	6.85	6.82	6.99
<b>3</b>	6.39	2.38	6.59	5.46	6.68	6.56	6.86	6.83	6.99
<b>4</b>	6.45	2.31	6.58	5.45	6.65	6.53	6.87	6.83	6.99
<b>5 or more</b>	6.40	2.19	6.58	5.41	6.63	6.53	6.88	6.83	6.99

Source: British Columbia Ministry of Health Services, Primary Care Data Repository, Fiscal 2009/10.

**Table 2: Average Relative Health Indicators for Diabetes Patients from 2002/03, for Patients Who Did Not Die in the Period**

	Patients	Average Age	Years With Diabetes to Mar 31, 2003	Average Relative Health Indicator			
				All	R.U.B. 2002/03		
					3	4	5
<b>All</b>	102,220	60.6	5.25	54.91	55.79	52.20	47.94
<b>Years With Diabetes to Mar 31, 2003</b>							
<b>0-1</b>	25,172	58.2	0.95	56.26	57.05	54.09	49.53
<b>2-5</b>	35,044	60.4	3.87	55.32	56.04	52.79	49.14
<b>6-9</b>	26,259	61.9	8.01	54.27	55.19	51.25	47.29
<b>10 or More</b>	15,745	62.6	10.61	52.91	54.18	49.80	44.94
<b>Years With a Diabetes Incentive</b>							
<b>0</b>	22,137	59.1	4.57	55.90	56.82	53.66	49.01
<b>1</b>	8,283	59.3	5.02	54.90	55.97	52.16	46.96
<b>2</b>	10,309	59.6	5.19	54.82	55.71	52.09	48.30
<b>3</b>	13,629	60.4	5.32	54.75	55.65	51.86	47.65
<b>4</b>	15,837	61.0	5.47	54.67	55.52	51.80	47.67
<b>5 or more</b>	32,025	62.1	5.66	54.45	55.30	51.34	47.50
<b>Age Group</b>							
<b>20-44</b>	12,429	37.7	4.69	59.98	60.35	59.16	54.72
<b>45-54</b>	20,280	50.6	4.67	57.38	57.99	54.79	52.19
<b>55-64</b>	28,676	60.0	5.17	54.84	55.76	51.72	47.48
<b>65-74</b>	27,470	69.8	5.68	52.65	53.69	49.56	45.81
<b>75-</b>	13,365	79.4	5.96	51.23	52.30	48.54	45.48
<b>Gender</b>							
<b>Females</b>	50,862	60.3	5.28	55.62	56.26	53.68	49.68
<b>Males</b>	51,358	60.8	5.23	54.21	55.33	50.65	46.67
<b>Attachment to Practice Group</b>							
<b>1. 00% - 59%</b>	6,559	54.8	5.31	54.76	55.80	52.88	48.80
<b>2. 60% - 79%</b>	32,961	59.2	5.35	54.61	55.60	52.14	47.46
<b>3. 80% - 89%</b>	29,091	61.4	5.26	54.73	55.62	51.95	47.87
<b>4. 90% or More</b>	33,609	62.4	5.14	55.38	56.12	52.30	48.40

Source: British Columbia Ministry of Health Services, Primary Care Data Repository, Fiscal 2009/10.



#### **4. TESTS FOR DIABETES PATIENTS**

Part of the diabetes guideline provides suggested testing frequency. We looked at A1C testing and eye exams as well as lipid testing and tests for microalbumin over the seven year period. When we calculated the average number of tests over the period, we used the guideline to set a maximum per year to ensure the results were not skewed by a patient having a large number of tests in a single year. For example, for A1C tests, the maximum number of test used per year in our calculations was set at two. The group of patients who had five or more years of incentives in the period had an average of 11.9 A1C tests compared to 4.1 for those with no incentives. For each of the tests, the average amount of testing increased with the number of years patients received incentives. In general, testing increased with the number of incentives a patient received, with the length of time a person had diabetes, and with attachment to practice. There was little difference in testing based on RUB. Table 3 provides data on the total number of tests over the seven year period for four types of recommended tests. As can be seen, the longer the period for which a patient received incentive based care, the larger the number of tests. This clearly indicates that incentive based care facilitates guidelines based care.

We used the set maximum of tests to establish a target number of tests for the period. Using that target as the base we calculated a testing compliance as the percentage of tests a patient received compared to the target. For example, for each patient we added the number of A1C tests they received in each of the seven years using a maximum of two per year and calculated this sum as a percentage of 14. The expected number of tests over the seven year period used for calculating the compliance percentage were 14 for diabetes, 3 for eye exams, 3 for lipid testing, and 7 for microalbumin. The overall testing compliance was calculated as the average compliance of the four tests. The highest compliance was for lipid testing. Other tests showed very similar compliance patterns. Overall testing compliance ranged from 82% for those who had 5 or more years with incentives to 46.9 percent for those without incentives. The results support the conclusion that the use of incentives has resulted in a significant difference in testing. Table 4 presents the percentage of tests conducted based on the recommended number of tests per year for each type of test. These findings are also reflected in Figures 1 and 2.

**Table 3: Compliance Numbers for Diabetes Patients from 2002/03 for Patients Who Did Not Die in the Period**

	Number of Patients	Average No of Tests Over 7 Years			
		A1C Tests	Eye Exams	Lipid Testing	Microalbumin
<b>All</b>	102,220	9.3	2.5	4.8	3.9
<b>Years With Diabetes to Mar 31, 2003</b>					
<b>0-1</b>	25,172	8.3	2.0	4.7	3.5
<b>2-5</b>	35,044	9.2	2.3	4.9	3.9
<b>6-9</b>	26,259	9.7	2.8	4.9	4.1
<b>10 or More</b>	15,745	10.5	3.5	5.0	4.3
<b>Years With a Diabetes Incentive</b>					
<b>0</b>	22,137	4.1	1.7	3.8	1.8
<b>1</b>	8,283	8.2	2.2	4.5	3.4
<b>2</b>	10,309	9.4	2.4	4.8	3.9
<b>3</b>	13,629	10.3	2.7	5.0	4.3
<b>4</b>	15,837	11.1	2.8	5.2	4.6
<b>5 or more</b>	32,025	11.9	3.1	5.4	5.0
<b>Attachment to Practice Group</b>					
<b>1. 00% - 59%</b>	6,559	7.8	2.1	4.3	3.4
<b>2. 60% - 79%</b>	32,961	8.9	2.4	4.7	3.7
<b>3. 80% - 89%</b>	29,091	9.6	2.6	4.9	4.0
<b>4. 90% or More</b>	33,609	9.7	2.7	5.0	4.1
<b>R.U.B. 2002/03</b>					
<b>3</b>	82,908	9.3	2.5	4.8	3.9
<b>4</b>	14,386	9.1	2.7	4.8	3.7
<b>5</b>	4,926	9.4	2.8	4.9	3.7

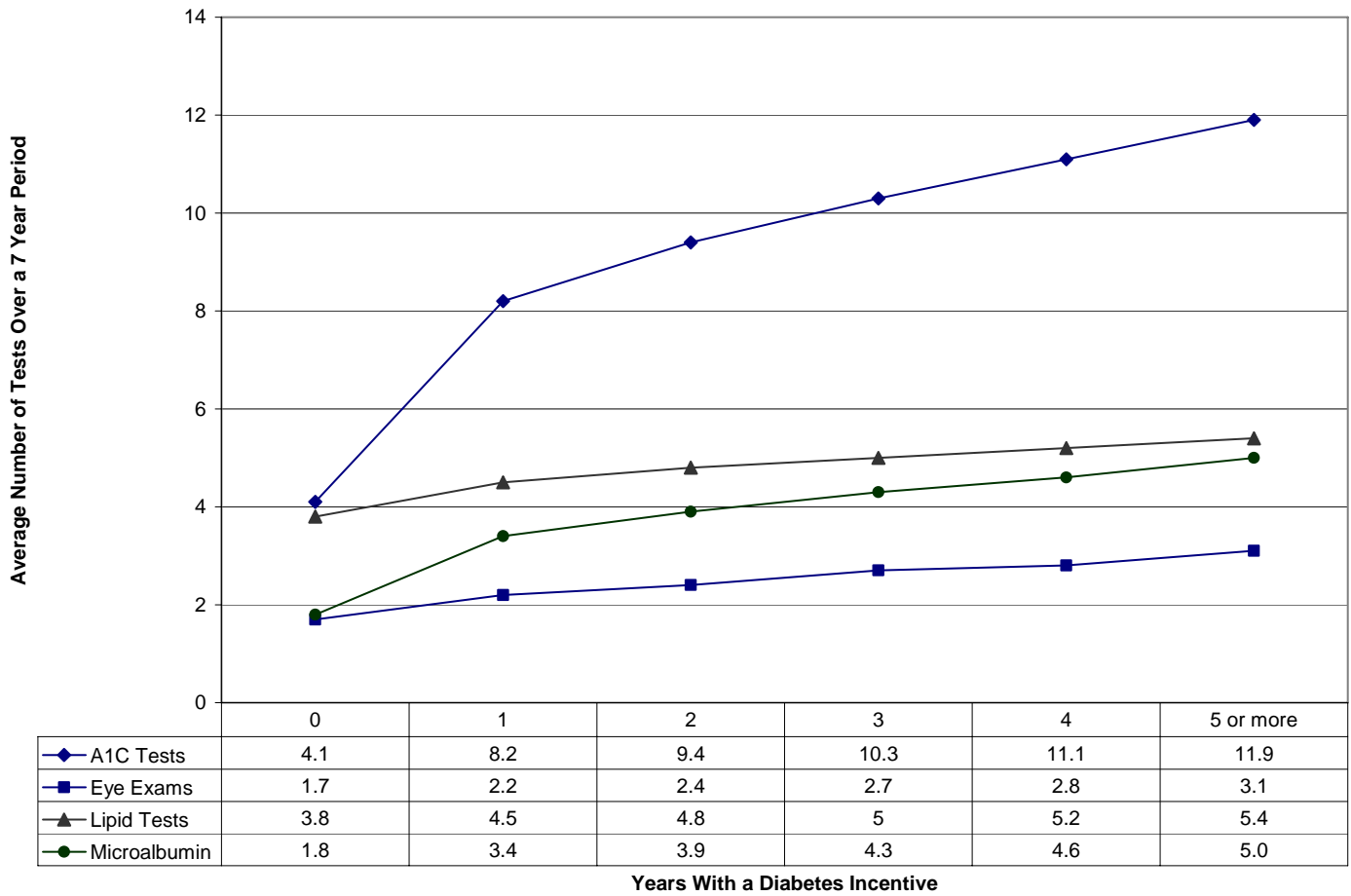
Source: British Columbia Ministry of Health Services, Primary Care Data Repository, Fiscal 2009/10.

**Table 4: Compliance Percentages for Diabetes Patients from 2002/03 for Patients Who Did Not Die in the Period**

	Compliance Rating % Actual to Expected				
	All Tests	A1C Tests (14)	Eye Exams (3)	Lipid Testing (3)	Microalbumin (7)
<b>All</b>	70.4	66.4	64.7	94.7	55.8
<b>Years With Diabetes to Mar 31, 2003</b>					
<b>0-1</b>	64.5	59.0	55.2	93.8	50.0
<b>2-5</b>	69.3	65.5	61.8	94.8	55.2
<b>6-9</b>	73.1	69.6	69.2	94.9	58.7
<b>10 or More</b>	77.6	74.9	79.0	95.3	61.4
<b>Years With a Diabetes Incentive</b>					
<b>0</b>	46.9	29.0	47.3	86.1	25.4
<b>1</b>	64.7	58.7	58.8	93.3	47.9
<b>2</b>	70.9	67.3	64.6	96.0	55.8
<b>3</b>	74.9	73.3	68.0	97.2	61.3
<b>4</b>	78.4	79.0	71.0	97.7	65.9
<b>5 or more</b>	82.0	84.7	73.9	98.0	71.4
<b>Attachment to Practice Group</b>					
<b>1. 00% - 59%</b>	63.1	56.0	56.7	90.7	49.0
<b>2. 60% - 79%</b>	68.4	63.4	62.8	94.0	53.5
<b>3. 80% - 89%</b>	71.9	68.6	66.4	95.3	57.2
<b>4. 90% or More</b>	72.5	69.3	66.8	95.6	58.2
<b>R.U.B. 2002/03</b>					
<b>3</b>	70.5	66.6	64.1	94.9	56.4
<b>4</b>	69.8	65.0	67.1	93.8	53.3
<b>5</b>	70.8	67.0	69.3	94.0	52.9

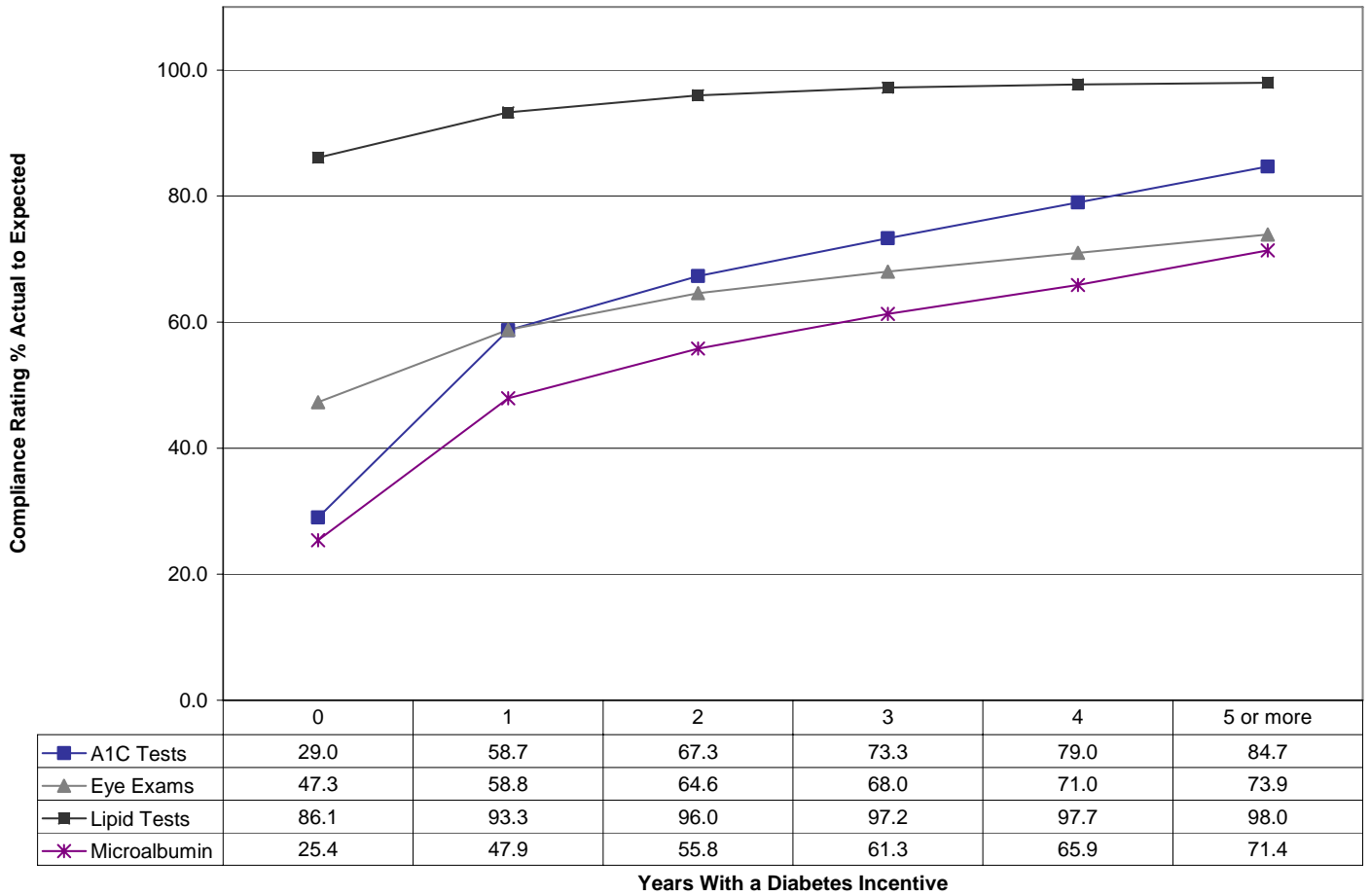
Source: British Columbia Ministry of Health Services, Primary Care Data Repository, Fiscal 2009/10.

**Figure 1: Total number of Tests for Four Types of Tests Over Seven Years**



Source: British Columbia Ministry of Health Services, Primary Care Data Repository, Fiscal 2009/10.

**Figure 2: Percentage of Testing Compliance for Four Types of Tests Over Seven Years**



Source: British Columbia Ministry of Health Services, Primary Care Data Repository, Fiscal 2009/10.

## **5. INCENTIVE BASED CARE AND DEATHS**

An unexpected finding was that incentive based care appears to reduce the death rate for people with diabetes. As noted previously, to mitigate against age related anomalies due to mortality, we excluded patients who were 85 years of age or older on March 31, 2002. Given the seven year period of incentives, these 85 year olds would have been 93 years of age on March 31, 2010. Separate analyses were conducted for all age groups and were a bit more striking. However, it is our view that Table 5 presents a more conservative estimate.

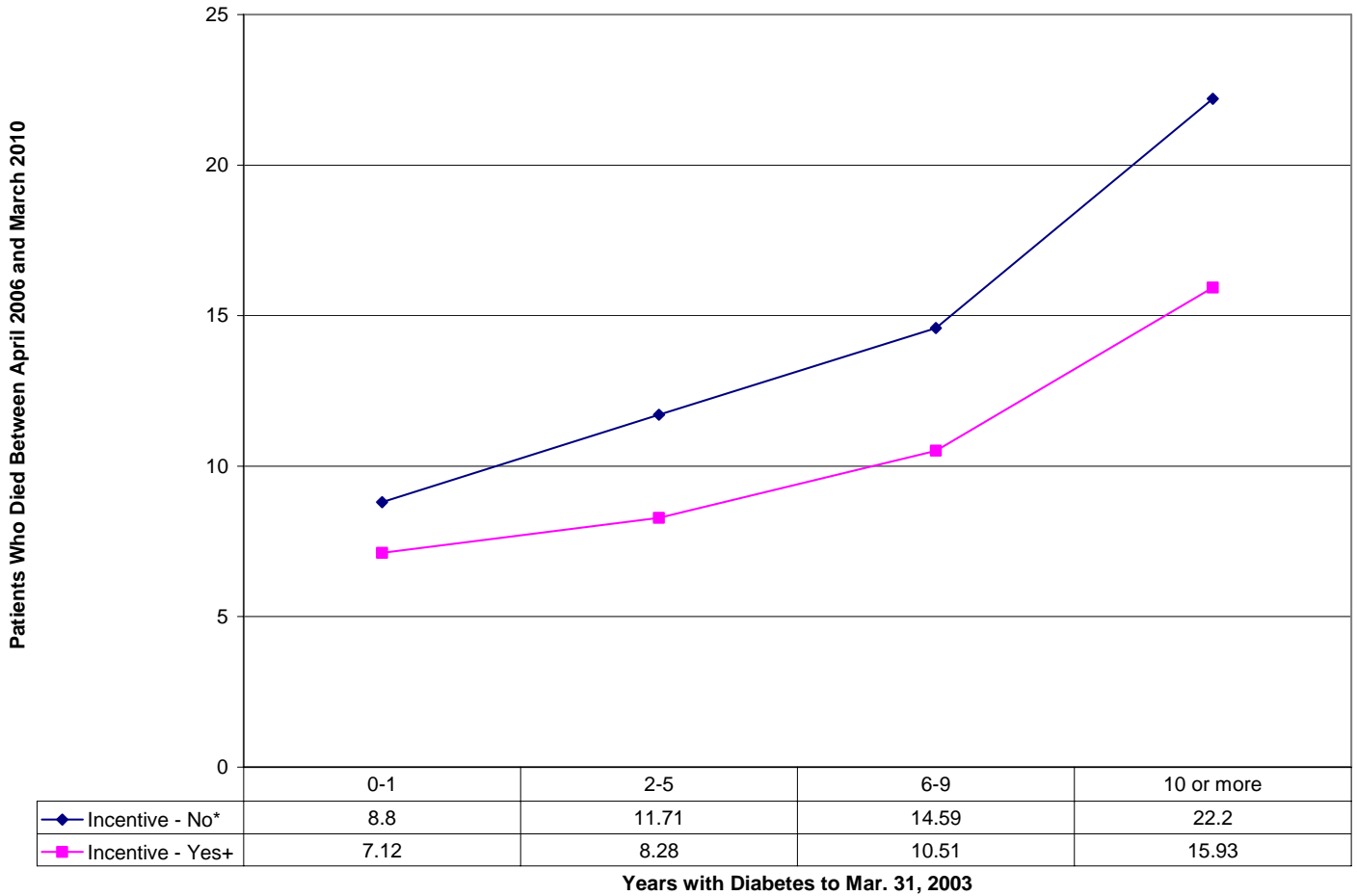
As can be seen in Table 5, and Figure 3, for patients who were alive on March 31, 2006, some 12.8% of patients who did not have incentive based care prior to April 2006 died over the next four years (fiscal 2006/07 to 2009/10). The comparable percentage for those who received incentive based care prior to April 2006 was 10.1%. In each case, for the groups of years without diabetes the percentage of people who died was lower for those who received incentive based care. The percentage also decreased as attachment to practice increased. The percentage of people who died was lower within each attachment group. It was also lower in each age and RUB group, and for females compared to males, and for patients with a greater overall testing compliance (see Figure 4).

**Table 5: Health Indicators for Diabetes Patients 2002/03 Death Rates For Patients Alive March 31, 2006 Excluding Patients 85 and Over as of March 31, 2002**

	All			Incentive before April, 2006					
				No			Yes		
	Number of Patients	Deaths	% who Died	Number of Patients	Deaths	% who Died	Number of Patients	Deaths	% who Died
<b>All</b>	83,347	9,070	10.88	24,992	3,188	12.76	58,355	5,882	10.08
<b>Years With Diabetes to Mar 31, 2003</b>									
<b>0-1</b>	19,681	1,528	7.76	7,557	665	8.80	12,124	863	7.12
<b>2-5</b>	28,100	2,626	9.35	8,718	1,021	11.71	19,382	1,605	8.28
<b>6-9</b>	21,636	2,507	11.59	5,695	831	14.59	15,941	1,676	10.51
<b>10 or More</b>	13,930	2,409	17.29	3,022	671	22.20	10,908	1,738	15.93
<b>Attachment to Practice Group</b>									
<b>1. 00% - 59%</b>	5,660	997	17.61	2,309	452	19.58	3,351	545	16.26
<b>2. 60% - 79%</b>	27,384	3,819	13.95	8,812	1,336	15.16	18,572	2,483	13.37
<b>3. 80% - 89%</b>	23,817	2,476	10.40	6,447	788	12.22	17,370	1,688	9.72
<b>4. 90% or More</b>	26,486	1,778	6.71	7,424	612	8.24	19,062	1,166	6.12
<b>R.U.B. 2002/03</b>									
<b>3</b>	66,233	5,961	9.00	19,137	1,969	10.29	47,096	3,992	8.48
<b>4</b>	12,372	1,908	15.42	4,228	736	17.41	8,144	1,172	14.39
<b>5</b>	4,742	1,201	25.33	1,627	483	29.69	3,115	718	23.05
<b>Age Group</b>									
<b>20-44</b>	9,471	167	1.76	4,040	80	1.98	5,431	87	1.60
<b>45-54</b>	15,231	597	3.92	4,614	216	4.68	10,617	381	3.59
<b>55-64</b>	22,215	1,522	6.85	5,814	492	8.46	16,401	1,030	6.28
<b>65-74</b>	23,438	3,165	13.50	6,412	1,062	16.56	17,026	2,103	12.35
<b>75-</b>	12,992	3,619	27.86	4,112	1,338	32.54	8,880	2,281	25.69
<b>Gender</b>									
<b>Females</b>	40,860	3,535	8.65	13,280	1,297	9.77	27,580	2,238	8.11
<b>Males</b>	42,487	5,535	13.03	11,712	1,891	16.15	30,775	3,644	11.84
<b>Overall Testing Compliance</b>									
<b>00-49%</b>	16,724	2,045	12.23	13,548	1,510	11.15	3,176	535	16.85
<b>50-74%</b>	23,877	2,971	12.44	7,724	1,092	14.14	16,153	1,879	11.63
<b>75% or more</b>	42,746	4,054	9.48	3,720	586	15.75	39,026	3,468	8.89

Source: British Columbia Ministry of Health Services, Primary Care Data Repository, Fiscal 2009/10.

**Figure 3: Percentage of Patients Who Died Between April 2006 and March 2010 For Patients Who Did and Did Not Receive Incentive Based Care Between April 2003 and March 2006 By the Length of Time They Had Diabetes Prior to March 31, 2003**



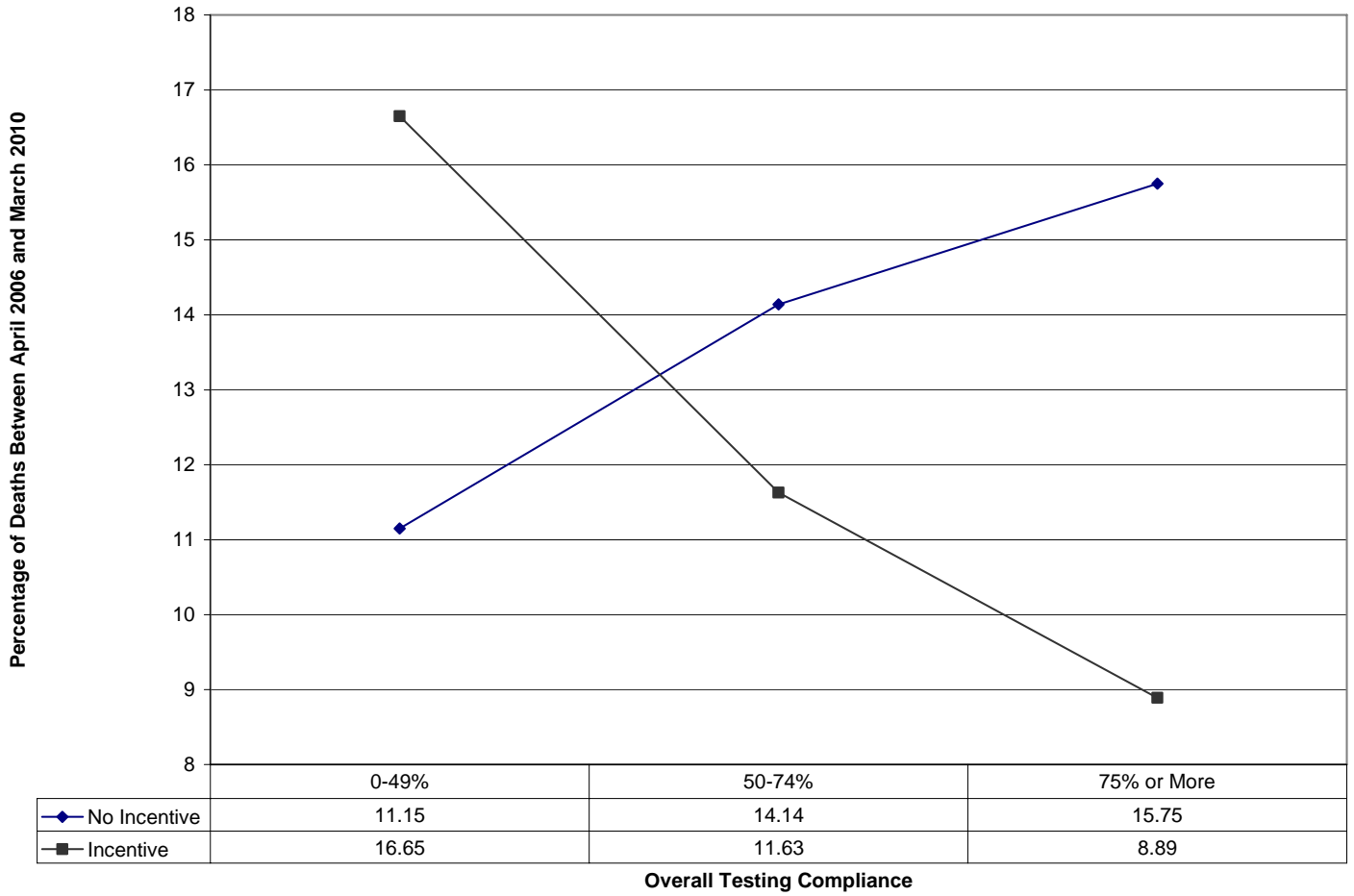
Source: British Columbia Ministry of Health Services, Primary Care Data Repository, Fiscal 2009/10.

\* Did not receive Incentive Based Care Between April 2003 and March 2006

+ Received Incentive Based Care Between April 2003 and March 2006



**Figure 4: Percentage of Deaths Between April 2006 and March 2010, For Selected Patients, by Overall Testing Compliance**



Source: British Columbia Ministry of Health Services, Primary Care Data Repository, Fiscal 2009/10.