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Final Report:

Institutional Response to Diabetes and Its Complications (IRDC)—

An Evaluation of the Quality of Diabetes Care



Diabetes Initiative for the Americas (DIA)

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Summary

Diabetes care and education are among the most important aspects in the fight against diabetes. Improvement in diabetes control is linked to better quality of life and survival. The present project was funded by the Declaration of the Americas on Diabetes (DOTA) and the Pan American Health Organization (PAHO). The aim of the study was to assess the quality of care for people with diabetes mellitus (DM) in four outpatient clinics in The Bahamas, one specialized clinic in Jamaica, and two hospitals in Saint Lucia. The study was an audit of medical records. Initially, the study was planned to be done only in outpatient clinics; but it was found that clinics in Saint Lucia do not keep patient records. Therefore, the audit was conducted in two hospitals in that country. Overall, 563 patient charts were reviewed (Jamaica, 297; Saint Lucia, 147; and The Bahamas, 119) by trained data-collectors.

Eye examinations were reported to have been performed in 19% of cases, with the largest figure being reported in The Bahamas and the lowest in Jamaica. Foot examinations were reported to have been performed only in 25.2% of charts and were more frequently reported in The Bahamas (58%) than in the other sites. The lowest proportion of charts with reported foot examination was Saint Lucia (2.9%). Overall, 51% of cases were reported to have blood pressures of 140/90 mmHg or higher. The proportion was similar in the three sites. A fasting glucose of 8 mmol/L or higher was found in 66.7% of cases and was the most frequent in Saint Lucia (67.9%) and the lowest in The Bahamas (52.2%). Overall, 64.3% of patients were found to have poor glycemic control ($HbA_{1c} > 8\%$ or $FBG > 8 \text{ mmol/L}$). The proportion of patients with poor control varied from 38% in The Bahamas to 71.8% in Jamaica.

Many incomplete records were found in all seven sites. A very low proportion of records had information on important aspects of the medical history such as smoking or alcohol use, as well as explanations being given to patients. In most cases in The Bahamas, and in all of the cases in Saint Lucia, the height of patients was not recorded; and as a result of this, it was impossible to calculate the Body Mass Index (BMI).

As has been seen in previous reports, diabetes care in the three studied sites was found not to follow international standards. The proportion of persons with poor glycemic control reported here for the participating clinic in Jamaica and the two hospitals in Saint Lucia is comparable to previous studies in the Caribbean, but it was considerably lower in the centers in The Bahamas. The main predictors of good glycemic control were nutritional advice and non-pharmacological treatment such as diet, exercise, and weight reduction. In addition, patients in clinics in The Bahamas were shown to have achieved better glycemic control.

Given the high burden that diabetes presents to the Caribbean and the current trend in diabetes prevalence observed worldwide, there is an urgent need to act now and foster prevention strategies in order to achieve additional gains in years of life expectancy and quality of life.

Introduction

Care and education are among the most important aspects in the fight against diabetes. Improvement in diabetes control is linked to better quality of life and survival. One of the most important challenges for public health in the field of diabetes is to monitor the quality of care with the aim of introducing measures which can assure better outcomes. The available information suggests that diabetes care in Latin America and the Caribbean is sub-optimal.

The World Health Organization (WHO)¹ has defined different categories of services that should be made available for people with diabetes. These range from basic care services to more specialized services offered at diabetes centers in tertiary care referral facilities which provide a comprehensive range of health care services. The levels of diabetes care given will depend on the level of development and resources as illustrated below in Figure 1.

Figure 1: Options for Level of Diabetes Care given the Level of Development and Resources

		Level of Care		
		<i>Primary</i>	<i>Secondary</i>	<i>Tertiary</i>
Level of Service	<i>Minimal</i>	<ul style="list-style-type: none"> - Paramedical staff - Basic diagnostics - Essential drugs 	<ul style="list-style-type: none"> - Physician - Basic education - Basic treatment of complications 	Diabetes team
	<i>Desirable</i>	<ul style="list-style-type: none"> - Physician - Basic education - Basic treatment of complications 	Diabetes team	Diabetes unit
	<i>Optimal</i>	Diabetes team	Diabetes unit	Diabetes centre

(Adapted from WHO *Guidelines for the Development of a National Programme for Diabetes Mellitus*)

According to WHO¹, a diabetes team should be comprised of a physician and a professional educator. This is the fundamental configuration for provision of quality diabetes care and education. A diabetes unit should be comprised of a diabetologist/endocrinologist, or an internist with special diabetes training, a professional educator and at least three additional multidisciplinary diabetes care professionals such as a podiatrist, a dietitian and a nephrologist.

Some studies have illustrated that the quality of care for persons with diabetes in the region has been suboptimal. An evaluation of diabetes care in Trinidad & Tobago between 1993 and 1998

reported that more than 60% of patients were found to have poor glycemic control. Foot care was reported, in the respective years, only for 6% and 2% of patients, eye care for 1% and 9% of patients, and dietary counseling for 35% and 64% of patients. Barbados, Trinidad & Tobago, and Tortola, British Virgin Islands participated in a collaborative study of quality of diabetes care in private and public clinical settings and overall 47% of patients in Barbados, 61% in Trinidad & Tobago, and 37% in Tortola were found to have poor glycemic control. Foot and eye exams were found in less than 20% and 9% of patients, respectively².

In Jamaica, a multicenter evaluation reported quality of diabetes care in three clinics. Overall, 60% of the patients included in the Jamaican evaluation were considered to have poor glycemic control (fasting glycemia ≥ 8 mmol/L or post prandial glucose ≥ 10 mmol/L); only 11% had recorded foot care, 6% eye care, 11% dietary counseling, and 1% exercise counseling³.

The Declaration of the Americas on Diabetes (DOTA) is a document that outlines a strategic set of goals for the improvement of health among people with diabetes in the Americas. DOTA is also a coalition of diabetes-related organizations founded in 1996 by PAHO, and the International Diabetes Federation (IDF), with the support of the pharmaceutical industry. The DOTA strategic plan includes four major areas⁴:

- ✚ Diabetes Education
- ✚ Diabetes Epidemiology (Quality of Care and Surveillance)
- ✚ Diabetes Public Awareness
- ✚ Children/Adolescents and Diabetes National Diabetes Programs

During the past few years, DOTA has facilitated various initiatives in the region such as strategic planning workshops for non-governmental organizations (NGOs) in Barbados, Bolivia, and Panama. These have facilitated organizational development and national diabetes program development, the QUALIDIAB project in Latin America and diabetes education courses in various sites, including Barbados in 2001. These regional initiatives are meant to promote better health for people living with diabetes.

The latest analysis of QUALIDIAB⁵ included data from 13,513 patients from centers in Argentina, Brazil, Chile, Colombia, Paraguay and Venezuela⁵. Results showed that 57% of those with type 2 DM were found to have blood glucose levels over 7.7 mmol/L, while 60% were found to have blood pressures higher than 140/90 mmHg, only 37% had a dilated eye examination, and 79% had had their feet examined during the previous year.

The Ministry of Health in Chile conducted an evaluation of care using the QUALIDIAB questionnaire in about 8,100 patients. Only 12% of patients had a glycated hemoglobin (HbA1c) test, while 82% had a fasting blood glucose test. A total of 71% of those using blood glucose and 18% of those with HbA1c values had poor control (fasting glucose >139 mg/dL [7.71 mmol/L] HbA1c >10 %)⁶.

Studies such as the Diabetes Control & Complication Trial (DCCT)⁷ and the United Kingdom Prospective Diabetes Study (UKPDS)⁸ have shown that improving glycemic control can reduce the incidence and mortality due to some diabetic complications. Glycemic control is therefore fundamental to the management of diabetes. The American Diabetes Association's (ADA)⁹ recommended glycemic goals for adults with diabetes include HbA1c $< 7.0\%$ and preprandial plasma glucose levels between 5.0 – 7.2 mmol/L.

Objectives

General Objective

To assess the quality of care for people with diabetes in health-care settings in The Bahamas, Jamaica, and Saint Lucia.

Specific Objectives

- ✎ To measure the proportion of people receiving foot and eye examinations, HbA1c, and lipid.
- ✎ To evaluate the proportion of people receiving diabetes education, and diet and exercise counseling.

Methodology

Firstly, an assessment of the 'structure' of the participating centers in the study was undertaken. Secondly, country teams comprising the PAHO official in charge of non-communicable diseases and a national official from the Ministry of Health or the Diabetes Association were established. These teams then recommended which clinics and medical offices would be used in the study. This was followed by an assessment of various aspects of the processes and outcomes of quality of diabetes care issues from items in selected medical records.

An audit of medical records was conducted in one private diabetes clinic in Jamaica, four public clinics in The Bahamas, and two major hospitals in Saint Lucia. A systematic random sample of 15% and 17% of patients seen in the clinics were selected in the sites in Jamaica and The Bahamas respectively. In Saint Lucia all patients who were discharged from the two participant hospitals with a diagnosis of diabetes were included.

The information was collected using the questionnaire in Annex 1. Data were collected by trained officers in all seven sites. Data were computer captioned, processed and analyzed at the PAHO headquarters' office in Washington, DC. Initially, the study was planned to be done only in outpatient clinics, but it was found that clinics in Saint Lucia do not keep patient records. Therefore, the audit was conducted in the two hospitals. Data were collected from March to December 2002.

Results

Structural Measures

Table 1 provides information on characteristics of the centers and the service providers where the survey took place. There were four outpatient clinics in The Bahamas, one outpatient clinic in Jamaica, and two hospitals in Saint Lucia. Physicians providing diabetes care in the clinics in Jamaica and The Bahamas were required to have additional training, but those in Saint Lucia were not. There were also regular continuing medical education activities in The Bahamas (4 times per year) and Jamaica (60 hours per year).

Table 1: Characteristics of Medical Services in The Bahamas, Jamaica and Saint Lucia (selected clinics)

Country	Type of Service	Physicians require additional training	Regular CME* activities for doctors	Frequency
Bahamas 1	Outpatient Clinic	✓	✓	4 times/year
Bahamas 2	Outpatient Clinic	✓	✓	4 times/year
Bahamas 3	Outpatient Clinic	✓	✓	4 times/year
Bahamas 4	Outpatient Clinic	✓	✓	4 times/year
Jamaica	Outpatient Clinic	✓	✓	60 hours/year
Saint Lucia 1	Hospital	No	No	-
Saint Lucia 2	Hospital	No	No	-

* CME = Continued Medical Education

Table 2 shows information on the availability of services in participating centers. There were ophthalmology services in the clinic in Jamaica and the two hospitals in Saint Lucia while patients in the four clinics in Bahamas were seen by an ophthalmologist in other centers. Overall all the clinics offered ophthalmologist consultations and laser treatment was available. Nutrition advice was available in all participating centers. A podiatrist was available in two clinics in The Bahamas and in the clinic in Jamaica. Diabetes education, physical exercise advice, and dental services were all available in the outpatient clinics in The Bahamas and Jamaica, but not in the hospitals in Saint Lucia.

Table 2: Services Available in Selected Clinics in The Bahamas and Jamaica and in Two Hospitals in Saint Lucia

Country	Services Available at the Centers						
	<i>Eye exam</i>	<i>Eye Laser Treatment</i>	<i>Nutrition Advice</i>	<i>Podiatrist</i>	<i>Diabetes education</i>	<i>Exercise Advice</i>	<i>Dental Services</i>
Bahamas 1	*	✓	✓	*	✓	✓	✓
Bahamas 2	*	✓	✓	✓	✓	✓	✓
Bahamas 3	*	✓	✓	✓	✓	✓	✓
Bahamas 4	*	✓	✓	*	✓	✓	✓
Jamaica	✓	✓	✓	✓	✓	✓	✓
Saint Lucia 1	✓	✓	✓				
Saint Lucia 2	✓	✓	✓				

* provided at another facility

Table 3 shows the availability of laboratory services in participating centers. One of the clinics in The Bahamas and the clinic in Jamaica as well as the hospitals in Saint Lucia had their own laboratory services. Three of the clinics in The Bahamas sent patients to an outside laboratory for service.

Table 3: Availability of Medical Tests in Clinics in The Bahamas and Jamaica and in Two Hospitals in Saint Lucia

Country	Services and Tests Available at the Centers						
	Laboratory	Venous blood glucose	HBA1C	Lipid profile	Serum creatinine	Urinalysis	EKG
Bahamas 1	*						*
Bahamas 2	✓	✓		✓	✓	✓	✓
Bahamas 3	*						*
Bahamas 4	*						*
Jamaica	✓	✓	✓	✓	✓	✓	✓
Saint Lucia 1	*	✓	✓	✓	✓	✓	✓
Saint Lucia 2	*	✓	✓	✓	✓	✓	✓

* provided at another facility

Table 4: Demographic Characteristic of Patients (by country)

	Total	Bahamas	Jamaica	Saint Lucia
<i>Total</i>	563	119	297	147
Gender (p<0.01)				
Male	34.2%	19.7%	37.4%	39.7%
Female	65.8%	80.3%	62.6%	60.3%
Age Group (p<0.01)				
<45 years	17.4%	7.7%	16.2%	29.9%
45-64 years	44.9%	43.6%	46.8%	41.9%
65+ years	37.7%	48.7%	37.1%	28.2%
Payment System (p<0.01)				
Fee for service	63.4%	51.3%	99.7%	
Insurance	29.8%	20.2%		98.0%
Other	3.9%	16.0%		2.0%
Not Charted	2.8%	12.6%	0.3	
Reason (p<0.01)				
Follow up	57.7%	77.3%	78.5%	
Newly Diagnosed DM	5.7%	.8%	2.7%	15.6%
Acute emergency	1.4%	2.5%	.3%	2.7%
Blood pressure control	1.4%			5.4%
Complications	7.6%		4.0%	21.1%
Other	3.9%	14.3%	.7%	2.0%
Not Charted	22.2%	5.0%	13.8%	53.1%
Diabetes Type (p<0.01)				
Type 1	6.6%	5.0%	9.4%	2.0%
Type 2	55.1%	83.2%	61.3%	19.7%
Other	1.2%	4.2%		1.4%
Not charted	37.1%	7.6%	29.3%	76.9%

Process and Outcome Measures

Overall, 563 patient charts were reviewed (Table 4). The number of charts by country was Jamaica 297, Saint Lucia 147 and 119 in The Bahamas. The percentage of females was 65.8% and varied somewhat among sites from 60% in Saint Lucia to 80% in The Bahamas. Most (44.9%) patients were between 45 and 64 years of age. The percentage of patients with 65 and more years varied from 28.2% in Saint Lucia to 48.7% in The Bahamas. All cases in Saint Lucia were covered by the National Medical Insurance while patients in the Jamaican clinics paid a fee for services. A variety of payment modalities were used in The Bahamas.

Most (77%) cases in the outpatient clinics (Jamaica and The Bahamas) were follow-up visits, while the inpatient services in Saint Lucia admitted most patients because of complications (21%). In these sites (Saint Lucia) 53% of the cases did not have a reason for hospitalization charted. Overall only 6.6% of reviewed charts were classified as type 1 diabetes. The proportion of patients with type 1 diabetes varied between 2.0% in Saint Lucia to 9.4% in Jamaica. Overall 37.1% of charts did not classify patients by diabetes type. The largest number of unclassified cases was found in Saint Lucia with 76.9%.

Table 5: Diabetes Care in Clinics in The Bahamas and Jamaica and in Two Hospitals in Saint Lucia

Characteristics of Charts Reviewed in Participating Clinics	<i>Total</i>	<i>Bahamas</i>	<i>Jamaica</i>	<i>Saint Lucia</i>
Family history taken ($p<0.01$)	33.2%	36.1%	31.0%	35.4%
Other DM in family ($p<0.01$)	25.8%	22.7%	25.9%	27.9%
Smoking habit recorded $p<0.001$)	15.6%	32.8%	15.2%	2.7%
Current smoker ($p<0.44$)	4.4%	5.0%	4.4%	4.1%
Alcohol intake recorded ($p<0.01$)	13.5%	13.5%	13.1%	1.4%
Currently consumes alcohol ($p<0.11$)	13.5%	13.5%	3.7%	8.2%
Body weight measured ($p<0.01$)	80.1%	98.3%	99.3%	26.5%
Height measured ($p<0.01$)	50.4%	3.4%	94.3%	0%
Urinalysis done ($p<0.01$)	47.8%	94.1%	41.4%	23.1%
Serum creatinine done ($p<0.01$)	48.5%	86.6%	21.5%	72.1%
EKG done ($p<0.82$)	42.8%	44.5%	43.1%	40.8%
Lipid exam done ($p<0.01$)	38.8%	78.2%	36.7%	3.4%

Table 5 shows characteristics of the reviewed charts in participating clinics. Overall, 33.2% of the charts registered that a family history of diabetes was taken. The largest number of charts where a family history was taken was in The Bahamas (36.1%). Smoking and alcohol intake were recorded in 15.6% and 13.5% of cases respectively with the largest proportion reported in The Bahamas.

Body weight and height were reported in 80.1%, and 50.4% of cases. The lowest proportion of cases with reported body weight was in Saint Lucia (26.5%) where there were no heights recorded (0%). Urinalysis and serum creatinine were reported to have been done in 47.8% and 48.5% of cases respectively with less frequency in Saint Lucia (23%) and Jamaica (21%) respectively. Electrocardiogram results were reflected in 42.8% of charts, with the largest number of cases with results in The Bahamas (44.5%) and the lowest in Saint Lucia (40.8%). Lipid exams were reported in 38.8% of charts; the largest proportion of cases with lipid exams was found in The Bahamas (78.2%) and the lowest in Saint Lucia (3.4%).

Table 6: Diabetes Care in Clinics in The Bahamas and Jamaica and in Two Hospitals in Saint Lucia (cont'd)

Characteristics of Charts Reviewed in Participating Clinics	Total	Bahamas	Jamaica	Saint Lucia
Foot exam performed (p<0.01)	25.2%	58.0%	23.2%	2.7%
Foot sensation explored (p<0.01)	32.0%	60.5%	33.0%	6.8%
Home blood monitoring (p<0.01)	5.7%	8.4%	7.4%	0%
Nutritional advice recorded (p<0.01)	48.8%	63.0%	47.5%	40.1%
Diabetes education (p<0.01)	49.9%	60.5%	57.2%	26.5%
Exercise counseling (p<0.01)	30.9%	31.1%	43.8%	4.8%
Eye exam performed (p<0.01)	19.0%	23.5%	16.5%	20.4%
Dilated eye exam (p<0.01)	13.5%	17.6%	18.5%	0%
Had results eye exam (p=0.01)	7.7%	*	1.3%	4.8%
Aspirin treatment indicated	4.1%	0%	7.7%	0%
Dental exam recorded (p<0.01)	9.2%	37.0%	1.0%	3.4%
Erectile dysfunction recorded (p<0.09)**	8.4%	8.7%	11.7%	1.8%

* at another eye clinic

** only males included

Foot examination was reported only in 25.2% of charts (Table 6), and it was more frequently reported in The Bahamas (58.0%) than in the other sites. The country with the lowest proportion of charts with reported foot examination was Saint Lucia (2.7%). Foot sensation exploration was reported in 32.0% of cases, with the highest proportion in The Bahamas (60.5%) and the lowest in Saint Lucia (6.8%). The proportion of charts reflecting the use of home blood glucose monitoring was 5.7%, with the highest proportion reported in The Bahamas (8.4%) and the lowest in Saint Lucia (0%).

Nutritional advice and diabetes education were reported in 48.8% and 49.9% of the charts, with the highest proportion of cases in The Bahamas (63% and 60%) and the lowest in Saint Lucia (40% and 26%). Exercise counseling was reported for 30.9% of cases with the highest proportion in Jamaica (43.8%). Eye examinations were reported in 19.0% of cases with the largest figure being reported in The Bahamas and the lowest in Jamaica. Dilated eye examination was reported in 13.5% of charts and varied from 0% in Saint Lucia to 18.5% in Jamaica. The results of the eye examination were found only in 7.7% of cases. Cases from clinics in The Bahamas were seen in an eye clinic that was located at another facility, and therefore, results might be reflected with less frequency in these charts.

Overall prevention treatment with aspirin was reported only in the Jamaican clinic (7.7%). Only 9.2% of charts reported on dental examination. The proportion of cases with dental examination varied from 1% in Jamaica to 37% in The Bahamas. Erectile dysfunction was reported in 8.4% of charts, with the highest proportion in Jamaica (11.7%) and the lowest in Saint Lucia (1.8%). Four patients died (2 in Saint Lucia and The Bahamas respectively) before the charts were reviewed.

Table 7: Age, Height, Weight, and Cholesterol Measures in Study Countries

Type of Measure	Value	Total	Bahamas	Jamaica	Saint Lucia
<i>Age (years)</i>	Mean	58.7883	62.08	59.31	54.38
	N	529	117	290	122
	SD	14.76	12.46	14.76	15.83
	Min	19.56	23.00	19.56	22.50
	Max	103.02	92.00	103.02	98.00
	Median	59.65	63.00	60.09	54.06
<i>Height (cms)</i>	Mean	164.88	154.38	165.03	-
	N	284	4	280	-
	SD	9.130	10.837	9.038	-
	Min	145	145	145	-
	Max	195	170	195	-
	Median	164.00	151.25	164.00	-
<i>Weight (Kgs)</i>	Mean	79.79	88.05	77.54	74.08
	N	458	114	295	49
	SD	17.158	19.003	15.878	13.505
	Min	46	47	47	46
	Max	154	149	154	124
	Median	77.75	86.94	77.00	72.27
<i>Total Cholesterol (mmol/L)</i>	Mean	5.393	5.63	5.19	-
	N	205	98.00	106.00	-
	SD	1.2614	1.13	1.33	-
	Min	2.4	3.32	2.40	-
	Max	10.3	10.28	8.70	-
	Median	5.36	5.53	5.12	-
<i>HDL Cholesterol (mmol/L)</i>	Mean	1.435	1.37	1.50	1.05
	N	199	92.00	105.00	2.00
	SD	.6622	.41	.82	.21
	Min	.7	.70	.68	.90
	Max	7.4	2.77	7.40	1.20
	Median	1.30	1.30	1.30	1.05
<i>LDL Cholesterol (mmol/L)</i>	Mean	3.633	3.70	3.56	3.83
	N	182	90.00	89.00	3.00
	SD	1.1290	1.07	1.19	1.24
	Min	1.0	1.40	1.00	2.40
	Max	8.5	8.50	6.60	4.60
	Median	3.62	3.65	3.54	4.50

Table 7 shows mean of numerical variables such as age, height, weight, total cholesterol, HDL cholesterol, and LDL cholesterol. Mean age was the highest in The Bahamas (62.08 years) and the lowest in Saint Lucia (54.38). Height was not reported in any of the Saint Lucian charts, and in most of the charts from The Bahamas. The mean height in Jamaica was 165.03 cm. The mean weight was 79.79 kg and varied from 74.08 kg in Saint Lucia to 88.05 kg in The Bahamas. Mean total cholesterol, HDL cholesterol, and LDL cholesterol were 5.40 mmol/L, 1.43 mmol/L, and 3.63 mmol/L respectively. There was not much variation of these indicators among the sites.

Table 8 shows the mean values of triglycerides, Systolic Blood Pressure (SBP), Diastolic Blood Pressure (DBP), Body Mass Index (BMI), glycemia, and glycated hemoglobin (HbA1c). The mean value for triglycerides was 1.37 mmol/L, and varied from 1.22 mmol/L in Saint Lucia to 1.42 mmol/L in The Bahamas. Only 3 cases in Saint Lucia reported results of the triglycerides test. Mean SBP and DBP were 133 mmHg and 81 mmHg. SBP varied somewhat with the highest mean figure being found in The Bahamas (140 mmHg) and the lowest in Saint Lucia (129 mmHg). Mean BMI was 28.8 kg/m². BMI was not calculated for Saint Lucia and (most cases) for The Bahamas due to missing information on the height of patients.

There was a large variation in mean fasting glycemia among sites. Mean fasting glycemia was 10.44 mmol/L, and was the highest in Jamaica (10.98 mmol/L) and the lowest in The Bahamas (8.60mmol/L). HbA1c was reported in 166 charts. The mean figure was 8.43% and varied from 7.89% in The Bahamas to 11.51% in Saint Lucia.

Table 8: Mean Triglycerides, Systolic and Diastolic Blood Pressure (SBP, DBP), Body Mass Index (BMI), Glycemia and Glycated Hemoglobin (HbA1c)

Measure Type	Values	Total	Bahamas	Jamaica	Saint Lucia
Triglycerides (mmol/L)	Mean	1.371	1.42	1.33	1.22
	N	204	98.00	103.00	3.00
	SD	.8000	0.86	0.74	0.63
	Min	.5	0.45	0.50	0.54
	Max	6.0	5.97	4.28	1.77
	Median	1.14	1.15	1.10	1.35
SBP (mmHg)	Mean	133.10	140.32	132.22	129.02
	N	544	113.00	294.00	137.00
	SD	22.169	21.55	21.92	21.99
	Min	80	105.00	80.00	80.00
	Max	240	200.00	240.00	200.00
	Median	130.00	140.00	130.00	130.00
DBP (mmHg)	Mean	81.22	80.87	81.39	81.23
	N	485	113	235.00	137
	SD	12.663	13.112	12.94	11.864
	Min	40	40	60.00	50
	Max	160	120	160.00	110
	Median	80.00	80.00	80.00	80.00

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Measure Type	Values	Total	Bahamas	Jamaica	Saint Lucia
BMI (kg/m ²)	Mean	28.7764	38.8136	28.6330	-
	N	284	4	280	-
	SD	5.75226	12.87428	5.50596	-
	Min	18.14	25.19	18.14	-
	Max	55.65	55.65	47.67	-
	Median	27.73	37.21	27.69	-
Glycemia (mmol/L)	Mean	10.4427	8.60	10.98	10.75
	N	482	95.00	250.00	137.00
	SD	4.63249	3.10	4.71	5.05
	Min	2.50	3.38	8.00	2.50
	Max	28.94	21.55	27.89	28.94
	Median	9.57	7.92	10.17	10.27
HbA _{1c} (%)	Mean	8.4357	7.89	8.75	11.51
	N	166	96.00	59.00	11.00
	SD	2.35115	1.89	2.62	1.96
	Min	4.40	4.40	5.00	7.90
	Max	16.00	11.90	16.00	14.00
	Median	8.00	7.35	9.00	11.60

Table 9: Classification of Blood Pressure, Fasting Glycemia, HbA_{1c}, BMI, Cholesterol, HDL, LDL and Triglycerides

Classification Values	Total	Bahamas	Jamaica	Saint Lucia
BP classification (mmHg) (p=0.73)				
<140/90	49.0%	48.7%	47.7%	51.8%
≥140/90	51.0%	51.3%	52.3%	48.2%
Fasting Glycemia classification (mmol/L) (p=0.01)				
<7.0	25.7%	34.4%	21.5%	27.7%
7.0-7.9	7.6%	13.3%	7.3%	4.4%
≥8.0	66.7%	52.2%	71.3%	67.9%
HbA_{1c} classification (%) (p<0.01)				
<7.1	33.7%	38.5%	32.2%	-
7.1-7.9	14.5%	22.9%	1.7%	-
≥8.0	51.8%	38.5%	66.1%	-
Poor control (p<0.01)				
Yes	64.3%	38.0%	71.8%	69.6%
No	35.7%	62.0%	28.2%	30.4%
BMI classification				
Underweight	0.4%	-	.4%	-
Normal	23.3%	-	23.3%	-
Overweight	43.4%	-	43.4%	-
Obesity	27.6%	-	27.6%	-
Morbid obesity	5.4%	-	5.4%	-
Cholesterol classification (mmol/L) (p=0.01)				
<5.18	57.0%	31.6%	50.9%	-
≥5.18	43.0%	68.4%	49.1%	-

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Classification Values	Total	Bahamas	Jamaica	Saint Lucia
HDL classification (mmol/L)(p=0.03)				
≥0.91	92.0%	88.0%	96.2%	-
<0.91	8.0%	12.0%	3.8%	-
LDL classification (mmol/L (p=0.33)				
<3.37	41.2%	37.8%	44.9%	-
≥3.37	58.8%	62.2%	55.1%	-
Triglycerides classification (mmol/L) (p=0.24)				
<2.27	86.8%	83.7%	89.3%	-
≥2.27	13.2%	16.3%	10.7%	-

Table 9 reports on the classification of blood pressure, fasting blood glucose, HbA1c, BMI, and lipid profile. Overall 51.0% of cases were reported to have blood pressures of 140/90 mmHg or more. The proportion was similar in the three sites. A fasting blood glucose of 8 mmol/L or more was found in 66.7% of cases and this was more frequent in Jamaica (71.3%), and the lowest was seen in The Bahamas (52.2%). An HbA1c of over 8% was found in 51.8% of cases with the highest proportion being in Jamaica (66.1%). When the results of the fasting blood glucose levels and the HbA1c were combined, 64.3% of all patients reviewed were found to have poor control (HbA1c ≥ 8% or FBG ≥ 8 mmol/L). The proportion of patients with poor control varied from 38.0% in The Bahamas to 71.8% in Jamaica.

Overall, 43.0% of patients were found to have a total cholesterol of 5.18 mmol/L or above. The proportion of people with high cholesterol was higher in The Bahamas (68.4%) than in Jamaica (49.1%). Only 8% of cases were reported with low HDL cholesterol (<0.91 mmol/L), fluctuating between 3.8% in Jamaica and 12.0% in The Bahamas. High LDL cholesterol (≥3.37 mmol/L) was reported in 58.8% of cases (62.2% in The Bahamas and 55.1% in Jamaica). High triglycerides (≥2.27 mmol/L) were found in 13.2% of cases (16.3% in The Bahamas and 10.7% in Jamaica).

Table 10: Recorded Antidiabetic Treatment

Antidiabetic Treatment	Total	Bahamas	Jamaica	Saint Lucia
Treatment				
Insulin & Oral Hypoglycemics	4.6%	1.7%	5.1%	6.1%
Only Insulin	24.0%	13.4%	10.1%	60.5%
Only Oral Hypoglycemics	58.3%	82.4%	67.3%	20.4%
None	13.1%	2.5%	17.5%	12.9%
Oral hypoglycemics				
Metformin	42.5%	52.9%	52.5%	13.6%
Glibenclamide	14.7%	2.5%	18.2%	17.7%
Glicazide	19.0%	64.7%	10.1%	-
Non-pharmacological treatment				
None	95.2%	82.4%	98.7%	98.6%
Weight Reduction	0.7%	3.4%	-	-
Physical Exercise	1.1%	0.8%	1.3%	.7%
Both	3.0%	13.4%	-	.7%

Table 10 shows information on anti diabetic treatment by country. Most patients were treated with only oral hypoglycemics (58.3%). The proportion of patients treated with oral medication varied from 20.4% in Saint Lucia to 82.4% in The Bahamas. Overall 24% of patients were

receiving only insulin, and this proportion varied from 10.1% in Jamaica to 60.5% in Saint Lucia. Smaller proportions of patients were taking a combination of oral antidiabetics and insulin. Overall 13.1% of the charts had no pharmacological treatment recorded. The highest proportion of charts with no indication of pharmacological treatment was found in Jamaica (17.5%), and the lowest was found in The Bahamas (2.5%).

Table 11 reports on the relation of good glycemic control to age, gender, diabetes type and other characteristics of the patient care provided. Only age and serum creatinine were significantly related to good glycemic control in The Bahamas and Saint Lucia, respectively. The proportion of patients with good glycemic control increased with age in the clinics in The Bahamas ($p=0.041$). Those patients tested for serum creatinine were least likely to have good glycemic control ($p=0.019$) in Saint Lucia.

Table 11: Proportion with Good Glycemic Control (HbA1c<8% or Fasting Blood Glucose <8mmol/L)

Proportion	Total	Bahamas	Jamaica	Saint Lucia
Gender				
Male	32.8%	61.1%	26.7%	34.5%
Female	36.3%	61.3%	29.2%	25.0%
p	0.246	1.000	0.766	0.251
Age				
<45	31.2%	16.7%	32.4%	32.4%
45-64	32.0%	61.4%	26.8%	17.0%
65+	41.4%	69.4%	27.0%	38.7%
p	0.117	0.041	0.758	0.085
Diabetes type				
Type 1	32.4%	75.0%	29.6%	-
Type 2	39.4%	60.7%	28.7%	-
p	0.273	0.496	0.514	-
Current smoker				
Yes	21.7%	40.0%	16.7%	16.7%
No	36.5%	61.3%	22.2%	26.9%
p	0.222	0.630	1.000	1.000
Currently consumes alcohol				
Yes	40.7%	71.4%	22.2%	36.4%
No	33.3%	55.2%	25.0%	11.8%
p	0.493	0.674	1.000	0.174
Dilated eye exam performed				
Yes	34.8%	68.4%	22.0%	-
No	35.8%	60.5%	29.8%	-
p	0.893	0.606	0.299	-

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Proportion	Total	Bahamas	Jamaica	Saint Lucia
Body weight measured				
Yes	36.3	-	62.0%	-
No	33.3	-	62.0%	-
P	0.643	-	0.282	-
EKG done				
Yes	34.5	60.5%	28.6%	25.9%
No	36.6	63.2%	28.0%	33.8%
p	0.635	0.837	1.000	0.353
Serum Creatinine tested				
Yes	39.3%	63.6%	28.3%	25.0%
No	32.0%	50.0%	28.2%	47.1%
p	0.92	0.364	1.000	0.019
Blood lipid measured				
Yes	43.4%	61.0%	30.4%	20.0%
No	30.9%	66.7%	26.8%	30.8%
p	0.007	0.791	0.571	1.000
Foot exam performed				
Yes	42.2%	62.1%	25.4%	25.0%
No	33.4%	61.9%	29.2%	30.6%
p	0.084	1.000	0.630	1.000

Table 12 shows other characteristics of the care provided such as nutritional advice, diabetes education and exercise counseling, home blood glucose monitoring, dental exam, blood pressure classification and the presence of obesity or overweight (BMI>25 kg/m²) and their relation to good glycemic control. The factors significantly related to good glycemic control were nutritional advice (p=0.011) and dental exam (p=0.004) in the three-country combined dataset.

Table 12: Proportion with Good Glycemic Control (HbA1c<8% or Fasting Blood Glucose <8 mmol/L)

Proportion	Total	Bahamas	Jamaica	Saint Lucia
Nutritional advice				
Yes	41.3%	63.1%	33.1%	33.9%
No	30.3%	60.0%	23.9%	28.0%
p	0.011	0.830	0.126	0.572
Diabetes education				
Yes	37.7%	62.5%	27.4%	32.4%
No	33.9%	61.1%	29.2%	29.7%
	0.398	1.000	0.782	0.835
Exercise counseling				
Yes	37.2%	63.3%	29.4%	50.0%
No	35.1%	61.4%	27.4%	29.5%
p	0.680	1.000	0.779	0.368
Dental exam reported				
Yes	55.1%	61.0%	-	40.0%
No	33.6%	62.7%	-	30.1%
p	0.004	1.000	-	0.640

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Proportion	Total	Bahamas	Jamaica	Saint Lucia
Home Blood Glucose Monitoring				
Yes	38.5	55.6%	29.4%	-
No	35.5	62.6%	28.2%	-
p	0.834	0.727	1.000	-
BP classification (mmHg)				
<140/90	37.3%	62.7%	28.7%	30.9%
140/90+	34.4%	65.9%	25.0%	30.2%
P	0.554	0.831	0.545	1.000
Overweight or obese				
Yes	31.2%	-	30.1%	-
No	25.5%	-	25.5%	-
p	0.503	-	0.612	-

Table 13 reports on characteristics of recorded treatment and good glycemic control. The proportion of patients with good glycemic control among those receiving Metformin in The Bahamas was significantly ($p=0.008$) lower than among those not using Metformin. In the three-country combined dataset, the proportion of patients with good control among those whose records reported on the use of non-pharmacological treatment (exercise, diet, or weight reduction) was higher than among those not reporting these factors ($p=0.002$).

Table 13: Proportion with Good Glycemic Control (HbA1c<8% or Fasting Blood Glucose <8mmol/L)

Proportion	Total	Bahamas	Jamaica	Saint Lucia
Insulin use				
Yes	31.1%	50.0%	35.0%	26.3%
No	37.7%	64.3%	27.0%	39.5%
p	0.185	0.400	0.340	0.161
Aspirin treatment				
Yes	29.7%	-	30.0%	29.4%
No	36.2%	-	28.1%	30.6%
p	0.480	-	0.802	1.000
Glicazide use				
Yes	54.3%	64.7%	26.9%	-
No	31.3%	56.3%	28.4%	-
p	0.000	0.509	1.000	-
Metformin use				
Yes	28.9%	54.7%	21.0%	15.0%
No	40.8%	70.2%	36.8%	33.1%
p	0.008	0.149	0.008	0.122
Glibenclamide use				
Yes	23.4%	66.7%	20.4%	24.0%
No	38.0%	61.9%	30.1%	31.9%
p	0.014	1.000	0.217	0.484
Non-pharmacological treatment*				
Yes	72.0%	78.9%	50.0%	50.0%
No	38.3%	58.0%	27.9%	30.1%
p	0.002	0.118	0.317	0.518

*diet, physical exercise, weight reduction

Table 14 reports on logistic regression models using good glycemic control as the dependant variable and demographic and care characteristics as independent variables. Nutritional advice was positively correlated to good glycemic control in Jamaica, while Metformin use was negatively correlated to good glycemic control in The Bahamas, Jamaica and Saint Lucia. Being in the age group 65 years and older was associated with good glycemic control in Saint Lucia. Overall the three-country combined logistic regression model showed that receiving nutritional advice and attending clinics in The Bahamas [or the availability of diabetes guidelines] were positively correlated to good control; while the correlation was negative for insulin and metformin use.

Table 14: Relationship between Good Glycemic Control and Demographic and Care Characteristics

Factor	Total	Bahamas	Jamaica	Saint Lucia
Gender (male=1)	0.9 (0.6-1.5)	0.8 (0.3-2.5)	0.8 (0.5-1.5)	1.2 (0.5-2.9)
Age (≥65=1)	1.3 (0.8-1.9)	1.8 (0.7-4.3)	0.9 (0.5-1.6)	2.6 (1.0-6.8)*
Received nutritional advice	1.6 (1.1-2.5)*	1.0 (0.4-2.5)	1.8 (1.0-3.2)*	2.0 (0.8-4.9)
Use insulin	0.6 (0.4-1.0)	0.3 (0.7-1.0)*	1.2 (0.6-2.5)	0.4 (0.1-1.0)*
Metformin Use	0.4 (0.2-0.6)*	0.3 (0.1-0.9)*	0.4 (0.2-0.7)*	0.1 (...-0.8)*
Country (Bahamas =1)	4.1 (2.4-6.8)*	-	-	-

*p<0.05 Data are Odds Ratio and 95% CI

Discussion

Diabetes causes an estimated 8,000 deaths in the Caribbean every year. In addition a higher proportion of people are affected by permanent and temporary disability due to diabetes, causing altogether an estimate of US\$ 800 million of indirect costs¹⁰.

According to the WHO classification for different categories of service for people with diabetes, the clinics in Jamaica and The Bahamas¹¹ may be placed in the category of diabetes centers. The hospitals in Saint Lucia that were studied did not qualify for minimum services for secondary care for people with diabetes because the medical team did not include persons such as a diabetes educator, a physical activity adviser, and a podiatrist.

The existence of guidelines is critical for providing quality care. Out of all the clinics studied only the clinics in The Bahamas had clinical guidelines in place to support the medical care of persons with diabetes. In 1995 the Commonwealth Caribbean Medical Research Council (CCMRC) published a protocol that defines guidelines for the management of diabetes in the Caribbean¹² however those guidelines were not available to providers in participating sites.

There are limitations of this study that need to be taken into account while analyzing the data. Firstly, the study is a review of medical records, and therefore what was evaluated was the written information and not the practice itself. Secondly, there were substantial differences in clinic selection; for example clinics in The Bahamas were chosen by the Ministry of Health and not at random, and therefore their data may represent more motivated practitioners. Thirdly, because the clinic in Jamaica was a large one, it was necessary to use a sample instead of reviewing all the records as was done in The Bahamas. Fourthly, the sites represent different aspects of diabetes care i.e. clinics in The Bahamas and Jamaica provide primary care, while the hospitals in Saint Lucia provide secondary care.

As has been seen in previous reports, diabetes care in the sites that were studied was found not to follow international standards. The proportion of people with poor glycemic control reported here for Jamaica and Saint Lucia is comparable to previous studies in the Caribbean, but it was considerably lower in The Bahamas. The availability of clinical guidelines in the clinics in The Bahamas may account for better outcomes shown here such as a lower proportion of patients with poor glycemic control. Although the guidelines themselves do not guarantee good practice¹³, they provide a framework for service improvement. The proportion of people with poor metabolic control in Saint Lucia may be related to the nature of the services offered at the participating centers. Hospital services are mostly for people with acute or chronic complications and therefore records from the hospital are more likely to show poor metabolic control.

Other quality-of-care indicators such as foot and eye care were found to have a very low frequency in the reviewed charts in Saint Lucia, but had a much higher frequency when compared with previous studies in Jamaica and The Bahamas. The proportion of persons who had an HbA1c test was very low, especially in Saint Lucia (11%).

In the United States of America¹⁴ (USA), it was reported that 55% of patients had received Influenza immunization, 66% of patients had received foot or eye examinations during the previous year, 89% reported having an HbA1c at least once per year, and 94% had a lipid profile done during the previous two years. However, only 21% of patients reported having all five major measures done during the previous two years. It is apparent that although in the USA not everyone is achieving good care the proportion of people receiving good care is higher than that reported here for centers in The Bahamas, Jamaica, and Saint Lucia.

Similarly, both the QUALIDIAB⁵ in six countries and the study of the Health Ministry of Chile⁶ obtained comparable results showing that diabetes care is suboptimal and needs to be improved.

Many incomplete records were found in all seven sites. A very low proportion of records had information on a medical history of smoking or alcohol use, as well as explanations being given to patients. Most charts in The Bahamas and all the charts in Saint Lucia did not have the height recorded and as a result of this it was impossible to calculate the BMI. The importance of BMI in the evaluation of patients with diabetes is a well known fact. The Bahamas protocol for the management of diabetes recommends the use of BMI for the assessment of patients in Chapter 3¹¹.

In general, nutritional advice (in the bivariate and multivariate analysis) and non-pharmacological treatment (in the bivariate analysis) were identified to be related to good

glycemic control. The importance of nutrition and exercise in diabetes management is well known¹⁵. Other factors such as serum creatinine test and dental exam (in the bivariate analysis) are not expected to increase good glycemic control and are probably related to other factors with more specific biological relation to good glycemic control. The relationship between the use of drugs such as insulin and metformin might not be a causal one and might reflect the use of these drugs in patients with poor control.

Conclusions

Although there have been efforts in the Caribbean to improve diabetes management such as the creation of the CCMRC¹² guidelines for primary care and various other guidelines in specific countries, the implementation and evaluation of the use of the guidelines has not been properly addressed. There are a number of international standards⁹ that can be used as references for the creation of guidelines targeting specific populations.

Diabetes care requires not only the availability of technologies but also adequate training of health professionals. Continued medical education needs to be organized and planned with the Ministries of Health, scientific societies, and academic institutions. Diabetes education should also be included and updated in academic programs in order to obtain sustainable results.

Medical charts need to be reviewed periodically and the results discussed with providers. The information collected in medical charts should be sufficient to evaluate the provided care and its adequacy with local and international standards. This can be achieved by using suitable instruments showing characteristics of the provided care such as the QUALIDIAB questionnaire.

It is evident from data shown here that diabetes care needs to be improved in the centers that participated in this study. These data should be used to tailor control programs to specific needs detected in each site. Many of the indicators were more favorable in The Bahamas, where diabetes guidelines are in place. Data shown here suggest that a strategy for the implementation of the existing guidelines in The Bahamas would be an adequate strategy to improve care. Our data suggest that nutritional counseling and non-pharmacological treatment such as diet, physical exercise, and weight reduction are the strategies with more possibilities of impact in improving glycemic control in the Caribbean. Given the high burden that diabetes represents for the Caribbean and the current trend in the diabetes prevalence observed worldwide, urgent action should be taken now and prevention strategies encouraged in order to achieve additional gains of years of life expectancy.

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- | | | | | | |
|----|-------------------------------------|--------------------------|-------------------------------------|----------------|----------------------|
| 8. | Reason for this consultation | 1 Follow up | 2 Newly diagnosed | | |
| | | 3 Acute emergency | 4 For blood pressure control | | |
| | | 5 Complication | 6 Other 7 Not charted | | |
| 9. | Diabetes type | 1 Type 1 | 2 Type 2 | 3 Other | 4 Not charted |

Section II

10. **Total period of observation** _____ years _____ months
11. **Was family history taken?** **1** Yes **2** No **3** Not charted
12. **Is the smoking habit of the patient asked?** **1** Yes **2** No **3** Not charted
13. **Is the intake of alcohol recorded?** **1** Yes **2** No **3** Not charted

Questions #14–19: *Please mention if these procedures have been done in past year.*

- | | | | | |
|-----|---|--------------|-------------|----------------------|
| 14. | Was eye examination done? | 1 Yes | 2 No | 3 Not charted |
| 15. | Was body weight measured? | 1 Yes | 2 No | 3 Not charted |
| 16. | Was urine analysis done? | 1 Yes | 2 No | 3 Not charted |
| 17. | Was an ECG taken? | 1 Yes | 2 No | 3 Not charted |
| 18. | Was serum creatinine measured? | 1 Yes | 2 No | 3 Not charted |
| 19. | Was serum cholesterol measured? | 1 Yes | 2 No | 3 Not charted |
| 20. | Was diabetes diagnosed during the period of observation? | 1 Yes | 2 No | 3 Not charted |

(If "No" to question #20 go to question # 23)

21. **How many estimations of glucose before the diagnosis were Fasting Blood Glucose (FBG) > 140mg% and/ or Post Prandial Blood Glucose (PPBG) > 200mg % ? _____**
22. **Which of the following non-pharmacological treatment instituted before drug therapy?**
- 1** None **2** Weight reduction **3** Physical exercise **4** Both
23. **How many visits did the patient have in the first year? _____**
24. **How many visits did the patient have in the last year? _____**

25. **What were the last two glycosylated hemoglobin (GHb), FBS & PPBS measurements ?**

Date _____ *FBS* _____ *PPBS* _____ *GHb* _____

Date _____ *FBS* _____ *PPBS* _____ *GHb* _____

26. **What is the number of HBA1c assays done in the past 12 months?** _____

Section III

27. **Is any drug treatment given currently?** **1** Yes **2** No

28. **If the answer to the question # 27 is 'Yes', please specify.**

<i>Type</i>	<i>Name</i>	<i>Daily dose</i>
<i>Oral</i>	_____	_____
	_____	_____
<i>Insulin</i>	_____	_____
<i>Others</i>	_____	_____

29. **Is Home Glucose Monitoring prescribed or used in the past 12 months?**

1 Yes **2** No **3** Not charted

Which of the following (Questions #30-35) has been prescribed or provided in the past 12 months?

30. Foot exam	1 Yes	2 No	3 Not charted
31. Nutritional Advice	1 Yes	2 No	3 Not charted
32. Diabetes education	1 Yes	2 No	3 Not charted
33. Exercise counseling	1 Yes	2 No	3 Not charted
34. Dilated eye exam	1 Yes	2 No	3 Not charted
35. Dental exam	1 Yes	2 No	3 Not charted

Section IV

36. **Does the patient receive treatment for hypertension?**

1 Yes **2** No **3** Not charted

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37. *If you have answered 'Yes' to question # 36, then **please specify.***

Drug 1 _____ Drug 2 _____

38. **What were the last readings of blood pressure measurements?**

SBP _____ DBP _____ (Date _____)

39. **What is the ECG pattern of the patient?**

1 Normal **2** Abnormal **3** Not charted

40. **Does the patient receive treatment for heart disease?**

1 Yes **2** No **3** Not charted

41. *If you have answered 'Yes' in the Question # 40 then **please specify.***

Drug 1 _____ Drug 2 _____

42. **Which surgery has the patient undergone for heart disease?**

Angioplasty _____ Coronary Artery Bypass Grafting (CABG) _____ None _____

43. **Did the patient have stroke in the past?** **1** Yes **2** No **3** Not charted

44. **Does the patient receive any treatment for the same?**

1 Yes **2** No **3** Not charted

45. *If the answer to the question # 44 is yes **please specify***

Drug 1 _____ Drug 2 _____ N/A _____

48. **What type of Diabetic retinopathy does the patient have?**

1 None **2** Background **3** Proliferative **4** Non-proliferative **5** Not charted

49. **Did the patient receive any laser photocoagulation for retinopathy?**

(check N/A if the answer to the question # 48 is None)

1 Yes **2** No **3** Not charted **4** N/A

50. **Does the patient suffer from any vision loss?** (Check the one applicable to the worst eye.)

1 None **2** Mild **3** Moderate **4** Severe

51. **Does the patient have cataract in any or both eyes?**

1 Yes **2** No **3** Not charted

AN EVALUATION OF THE QUALITY OF DIABETES CARE

52. **Have the sensations in the extremities been evaluated in the patient?**

1 Yes **2** No **3** Not charted

53. **Has the patient been diagnosed with neuropathy?**

1 Yes **2** No **3** Not charted

54. **Does the patient receive any treatment for the neuropathy ?**

(check N/A if answer to question # 53 is No)

1 Yes **2** No **3** Not charted **4** N/A

55. If the patient receives any treatment, please specify.

Drug 1 _____ Drug 2 _____ N/A _____

56. **Have peripheral pulsations of the patient been checked?**

1 Yes **2** No **3** Not charted

57. **What amputations has the patient had before?**

1 None **2** Toes **3** Forefoot **4** Above knee **5** Below knee

57. **What was the last value of the serum creatinine level?**

Serum creatinine _____ (Date _____)

58. **What was the last value of urinary protein excreted?**

Proteinuria _____ (Date _____)

59. **Does the patient receive any treatment for renal failure?**

1 Yes **2** No **3** Not charted

60. If the answer to the question # 59 is 'Yes', **check the appropriate treatment:**

1 Fluid restriction **2** Drugs **3** Peritoneal dialysis **4** Hemodialysis

61. **Did the patient have renal transplantation?** **1** Yes **2** No **3** Not charted

62. **Does the patient have any erectile dysfunction?** **1** Yes **2** No **3** Not charted

63. **Is the patient deceased?** **1** Yes **2** No **3** Not charted