

THE BEGINNINGS OF

Life Insurance for Diabetics

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Just thirty years ago, a discovery was made by two young Canadian scientists, Banting and Best, which changed the lives of thousands of people. Until 1921, when insulin was first produced, the diabetic faced an uncertain future. Insulin transformed the situation; at the present time most diabetics are able to carry on work and other activities in a normal manner.

It should be recorded that in 1918 the Sun Life Assurance Society of England issued a policy to a suspected diabetic, and in 1924 had a table of diabetic extras. However, there was some lag and it was not until 1940, nearly twenty years after the discovery of insulin, that diabetics on the North American continent had any chance of getting insurance. The late Dr. H. C. Cruikshank, then Medical Officer of the Manufacturers Life Insurance Company, decided that there must be some way in which insurance could be offered to certain diabetics. He recognized that the risk could not be as-

sumed on all diabetics, but he felt sure that a goodly percentage did pay sufficient attention to treatment so that insurance with an extra premium could be offered them. Accordingly, in 1940 this Company advised its representatives that carefully selected diabetics would be considered for insurance. Since no company on this continent had ever before attempted such insurance, an extra premium was arbitrarily chosen—\$10.00 per thousand dollars of insurance for ages 30 to 45, increased slightly each year to age 60. For a few years this Company covered the field almost single-handed, but now it is possible for a diabetic to get insurance in the United States and Canada from a great many companies, either directly or by way of reinsurance.

The original premise on which the insurance for diabetics was based was that the disorder must be well-controlled and the patient supervised by his physician. In order to obtain details regarding the situation, the

agent completed a questionnaire with the assistance of the applicant (Figure 1). The applicant was required to meet the following requirements:

1. He must have been under supervision as a diabetic for at least three years.
2. He must be on a diet.
3. The blood pressure must be normal—not over 140/90.
4. The urine must be free from sugar most of the time.
5. There must be no evidence of eye changes or peripheral vascular disease.
6. There must be a normal electrocardiogram and x-ray film of the chest.
7. The dosage of insulin, if used, must not be over 50 units per day.

FIGURE 1
DATA TO BE FURNISHED BY APPLICANT

NAME	Date of Birth	
RESIDENCE		
1. Occupation	Former occupation	
2. Height	Weight	Weight 2 years ago
3. Date diabetes diagnosed		
4. Name and address of doctor making the diagnosis		
5. Are you receiving treatment or under medical supervision now?		Date last seen
6. Give name and address of doctor		
7. Do you ever stop insulin or go off diet?		
8. Is urine sugar free? (a) Now		(b) Always
9. Have you had any blood sugar estimations done?		Date of last test
10. If so, when and what were the fasting estimations?		
11. What is the diet at present? Protein gm.		
Fat gm. Carbohydrate gm.		
12. Is the diet weighed or estimated? (a) Weighed		(b) Estimated
13. State amount of insulin taken daily units.		
Time of administration		
Type— Plain units; Protamine zinc units; Globin units		
14. Have you ever had any infections, such as boils, abscessed teeth, tonsillitis, etc.?		Specify
15. Have you ever had any eye trouble?		
16. Have you ever had heart trouble?		
17. Have you ever had high blood pressure?		
18. Have you ever had any recurring or prolonged illness?		
19. Has an electrocardiogram been taken? Date		
By whom		(If cardiogram has been taken in the past, submit copy which will be returned.)
20. Was the electrocardiogram normal?		
21. Has an x-ray of the chest been taken? Date		
By whom		
22. Was the x-ray normal?		
23. Amount of insurance contemplated		
Date	Signature	

FIGURE 2
DATA TO BE FURNISHED BY PHYSICIAN

NAME OF PATIENT	Apparent age	
RESIDENCE		
1. Occupation		
2. Height	Weight	Weight 2 years ago
Weight 5 years ago		
3. Does this patient visit you regularly for supervision?		
Date of last visit	Date of first consultation	
4. What is the diet at present? Protein gm.		
Fat gm. Carbohydrate gm.		
5. How is the diet measured? Weighed		Estimated
6. How much insulin is taken daily? units.		
Time of administration		
Type— Plain units; Protamine zinc units; Globin units		
7. How much insulin was taken previously?		
A year ago	Two years ago	
8. Has the patient had any insulin reactions? When?		
9. Does the patient follow your advice consistently?		
10. Over a period of years has there been a gain or loss in tolerance?		
11. Is the fasting urine free of sugar?		
12. Fasting blood sugars. Give dates and estimations of recent tests.		
13. Are there any changes in the eye grounds?		
14. Is there any evidence of (now or in the past): Pulmonary tuberculosis? Heart disease? Any recurring or prolonged illness? Infections such as boils, infected teeth, tonsils, etc.? Any abnormality of palpable arteries?		
15. Is there a good pulsation in posterior tibial and dorsal pedal arteries?		
16. What is the highest blood pressure reading recorded?		
17. Has an electrocardiogram been taken? Date		
By whom	If cardiogram taken, submit copy. (This will be returned.)	
18. Was the electrocardiogram normal?		
19. Has an x-ray of the chest been taken? Date		
By whom		
20. Was the x-ray normal?		
21. Do you consider the patient a mild, moderate or severe diabetic?		
22. Further comments.		
Date	Signature of attending physician	

After obtaining satisfactory information from the diabetic, a similar questionnaire was sent to the attending physician (Figure 2) and arrangements for an examination made.

At first it was decided to grant only \$10,000 insurance to any one diabetic. Gradually, as more applicants have been accepted, the amount that can be given to each individual has been increased. We will now consider \$75,000 on any well-controlled diabetic.

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While we have been insuring diabetics for a period of somewhat over ten years, we still feel that sufficient time has not elapsed to permit adequate evaluation of the experience with this group. The majority of policies have been in force for less than seven years. Nevertheless, a summary of certain information about policies in force, death claims, and inquiries brings out interesting information.

A survey was made of the diabetics insured in our Company up to April 1, 1951. At that time it was found that we had placed 550 policies for a total risk of \$5,734,700. Of these, 76 per cent were placed in the United States, 20 per cent in Canada, and 4 per cent elsewhere.

In order to determine our experience with this group, our Actuary collected all cases insured from the beginning in 1940 up to 1949, and traced the status of each policyholder through the anniversary of each policy's issue as it fell in 1950. Only 13 deaths were found to have occurred in this group, a number too small to be considered conclusive. It should also be pointed out that the group was more heavily weighted with recent cases than is typical in our experience on other business.

Despite these two statistical abnormalities, it still is worth reporting that the mortality was between 50 per cent and 100 per cent higher than the Company average. Our basis of rating diabetics provided for 100 per cent higher than normal mortality, so that our experience to date is not seriously out of line with our original assumptions.

There may also be some value in a comparison of the number of policies actually issued with the number of inquiries received from diabetics. To arrive at this comparison, we collected all the inquiries received from diabetics from the beginning of 1950 through March 31, 1951. There were 255 in all, and they were disposed of as indicated in Table 1.

TABLE 1

Disposition of Case	Number	Per cent
Declined	106	42
Dropped	88	34
Insured:		
Ordinary extra	30	24
Additional extra	31	

The figure of 24 per cent may seem very low for the number of diabetics to whom we could offer a policy. The reasons for it are shown in Table 2.

It will be noted that the reasons for decline are essentially the same as the reasons for the charging of an

TABLE 2

Reason for Rejection	Declined*	Additional Extra*
Lack of supervision and control	60	8
Cardiovascular disease	42	8
Renal disease	42	8
Amount of insulin	13	1
Habits	11	3
Recent diagnosis	9	3
Weight	9	6
Eye changes	7	2
Age	6	1
Other	41	3

*Most cases showed more than one impairment, and many are listed twice in this table. For this reason the totals are greater than the actual number which were declined or which were insured with additional extra premium.

additional extra premium. This is to be expected, since the same factors exist in both groups. Those given insurance upon the payment of an additional extra premium were fortunate enough to be considered only mildly abnormal; those declined were thought to be poor risks because of their abnormality. The selection of cases therefore came down to a matter of degree of abnormality.

We originally started out with the premise that a diabetic could not qualify if he had an impairment other than diabetes. However, in our effort to insure as many as possible in this new category, we have selected some who probably would have been declined when we first started this type of insurance. We now accept some of these if they will pay an increase over the normal extra.

It will be noted that supervision is considered an important factor in both groups. By supervision we mean the teamwork which should exist between the applicant and his doctor. Both are important players. The physician must give the patient expert advice on diet, work, exercise and general way of life. In return, the patient must not only follow his doctor's orders about his way of life, but must report at frequent stated intervals for rechecks. If either one falls down, the supervision falls down also. This teamwork involves a combined effort through which a new way of living is established for the diabetic. It influences his medical fitness, his ability to work, how he fits in with his confreres, and also his habits.

It may be that the applicant has been set on the proper path by his physician, but has decided that he can follow the rest of the way himself without further help. We do not usually insure such people, since they are in all likelihood quite unaware of their actual diabetic status. It is true that an occasional self-controlled diabetic may, by careful dieting and daily checking of the urine, remain in a well-controlled state. Indeed, many diabetics do become very proficient in looking after themselves. Even so, they are the exceptions.

In general, we want our diabetics to report for blood sugar determinations at suitable intervals, and to be in constant touch with their physicians. Actually, insufficient supervision is a matter of degree. A person who seems well-controlled may see his doctor only once a year. This is not entirely satisfactory, but it is enough—other things being equal—for us to offer him insurance at an added extra premium over what the well-controlled diabetic who sees his physician regularly is paying.

Although we feel that supervision is the most important single criterion in the selection of this group, we also recognize that if we are to offer insurance to diabetics we must be as practical and reasonable as possible. We no longer believe that it is desirable to defer a newly-diagnosed diabetic for three years before insuring him, in order to make certain that supervision is well established and that the applicant is stabilized. We have therefore reduced our waiting period for the new diabetic to one year.

Usually, applicants were either declined or offered insurance at an additional extra premium when they exhibited a *combination* of impairments. Overweight alone, however, was the major factor in a number of declinations; underweight was important in only one case. Most cardiovascular abnormalities which caused refusal to insure involved increased blood pressure. Today we accept 140/90 as the top limit of normal. Aortic calcification, electrocardiographic changes and so on played a relatively infrequent role in those given insurance with an additional extra. The overweight diabetic becomes a problem if he is 35 pounds over normal. He probably will be declined if he is 50 pounds over normal.

The persons included in the group labeled "recent diagnosis" present us with two types of problems. Certain people present new evidence which shows that they are real diabetics. We feel that these persons should wait a year before being allowed to buy insurance, so that we can make sure that they have stabilized themselves in their new way of living.

The other group included under "recent diagnosis" is composed of doubtful diabetics—people who exhibit merely a lag in the fall of the blood sugar at two hours after the beginning of the glucose tolerance test. We consider such individuals to be potential diabetics, but we are willing to insure them at once with an extra premium since, according to Joslin, only about 17 per cent become true diabetics. Furthermore, we are willing to reconsider this latter group for insurance at regular rates after a year or two.

Retinitis presents a problem. Originally we declined

everyone showing changes in the retina. Currently we are being told by some that these abnormalities are not necessarily important. We are skeptical about this new viewpoint, but we sometimes do offer insurance with an additional extra premium to people with a history of retinal changes, provided that there has been no recent progression.

Renal changes are most commonly shown by albumin in the urine, which may be the first sign of degeneration. Our problem is, should we decline risks that show only a small amount of a albumin? It is, of course, essential to check these people very thoroughly for other evidence of aging; however, we do accept some if the amount of albumin is very small.

Habits alone often are decisive elements against insuring persons who otherwise are in fine physical condition. For example, we prefer diabetics who do not drink alcohol. Very light drinkers, for example, might be accepted if they definitely take only one drink. We do accept a few people who drink enough to put them just over our "normal" line; these we charge extra.

We believe that the daily dose of insulin usually gives some indication of the severity of the diabetes, though of course this will not be so with patients who are deliberately given a large caloric intake. In any event, we have felt it wise to set an upper limit to the amount of insulin a diabetic could take and still be eligible for insurance. This has currently been set at 75 units a day instead of the original 50.

At first we accepted diabetics only when they were between the ages of 30 and 60, but now we are accepting them as young as 20 years of age. It is still our feeling that the mild, recently-diagnosed diabetic who is about 45 years old will do better than one who is under 20.

It was also thought that a study of the death claims among our diabetic policyholders might teach us something, and therefore we had them analyzed. To the date of preparing this review, we have had a total of 20 claims.* The causes of death for these cases are presented in Table 3.

TABLE 3.

Causes of Death	Number
Coronary disease	11
Diabetic coma	2
Cerebral hemorrhage	2
Diverticulitis	1
Sarcoma	1
Cardiovascular renal	2
Myelogenous leukemia	1

*Including deaths occurring in the period of nearly two years following the analysis of 13 cases previously described.

Some interesting facts were uncovered during our study of these 20 claims. Diabetes varied in duration from 2 to 27 years. The ages of the deceased varied from 23 to 66. The man who was 66 had been a diabetic since he was 50. He developed diverticulitis with perforation of the sigmoid; an abscess formed; and he died of ileus.

Of the two who died of coma, one was a man of 52 who was said to have had regular blood sugar estimations. He was on a trip with his wife when he began feeling unwell and went to a hospital. The diagnosis was diabetic coma, acidosis, and general debility. This man did not take insulin, and was no doubt not well supervised. Coma should not be the cause of death in a well-controlled diabetic.

The other case of coma was that of a young man of 28. He had been a diabetic for 15 years, and took 36 units of insulin daily. He was on a fishing trip when he was found dead near a river. Some question regarding the cause of his death still remains.

Of the 11 coronary cases, satisfactory electrocardiograms existed for 7 and none for the other 4. They had the usual coronary history. One was sick only a few hours; another died during his second attack; still another was said to have had coronary sclerosis for 10 years.

One instructive case concerned a man who was 39 years old and had been a diabetic for 27 years. He was first accepted for insurance in 1945 on a high-premium plan because of the amount of insulin he had to take—70 units. The examination was quite satisfactory. The blood pressure was 128/80, the urine was negative, and the electrocardiogram and x-ray film were both normal. In 1946 he applied again. The blood pressure was the same, but there was a faint trace of albumin (less than 20 mg.) and occasional red and white blood cells in the urine. We issued a second policy, although supervision was not impressive. In 1948 this man applied again. This time his urine showed 100 mg. of albumin, the blood pressure was 156/96, there was a fast pulse rate, and low T waves in Leads I and II of the electrocardiogram were noted. We declined to insure. He died in 1950 of coronary artery disease.

One of our recent claims was that of a young man of 23 whose diagnosis had first been made when he was 14. He presented a history of coma in the past, but had had a clear history for the previous seven years. We did not have an electrocardiogram or an x-ray film of the chest. He was a very intelligent person, and we felt he was capable of good supervision. When he was examined, two specimens of urine

showed 30 mg. of albumin, and the blood pressure was normal. He died five years later, when he was 28. Claim papers showed that he had developed hypertension 17 months before death, and that he died of cardiovascular disease.

Another recent claim was that of a man of 52. He was a diabetic of 2 years' standing, and was taking 50 units of insulin, although he had never had a blood sugar estimation made. He was said to have sugar-free urine. We felt that supervision could not be good, and issued a policy with a higher extra premium. The electrocardiogram and the x-ray film of the chest were both satisfactory. He died of coronary occlusion.

Our most recent death was that of a young man of 43 who died in 1951 of myelogenous leukemia. This man had been diagnosed a diabetic in 1947, and was considered a mild case. He took 12 units of insulin daily. All examinations, including an electrocardiogram and an x-ray film of the chest, were normal.

It obviously is necessary to maintain good supervision of our diabetics if we are to keep the mortality low. It is also necessary to take cognizance of all factors that indicate changes in the cardiovascular renal system. Zeal to insure diabetics must not be permitted to interfere with good judgment. Many of these people still die prematurely of cardiovascular renal disease. Consequently it seems sensible to check the cardiovascular system as carefully as possible. With this in mind we examine the applicant thoroughly, and obtain an electrocardiogram and a six-foot x-ray film of the chest if his age is 45 or over, if \$10,000 or more insurance is requested, or if he has been a diabetic for 10 or more years. Similarly, as will be noted on the questionnaires, we ask both the doctor and the applicant questions concerning blood pressure, eye grounds and peripheral circulation.

In the insurance business it should in theory be possible to issue anyone a policy. (This is not true practically, because some applicants show so many signs of aging that we are unable to evaluate the risk.) Similarly, all diabetics should be insurable at a price. Yet every day we decline to offer insurance to some people in this group, because we cannot fairly measure the risk. This is, of course, unfortunate. But it should be remembered that before 1940 diabetics were unable to obtain insurance at any price. Now, of course, many companies in the United States and Canada are willing to give selected diabetics insurance. Many, of course, are unable to qualify.

The diabetic who cannot qualify for insurance very often has only himself to blame. Some diabetics, it is true, have not been diagnosed until they are in a condition which we consider uninsurable. Others, however, could be insured if they would adopt the practice of visiting their doctors at regular intervals and of following closely and continuously the advice given them.

Great strides are being made at present in the care and detection of the diabetic. Taken early, most are insurable. Physicians can do a great deal of good if they keep their patients on the proper path by insisting on constant supervision. For here is one place where supervision really pays off. The careful diabetic who knows his limitations and follows his doctor's advice will reap the benefit of the most satisfactory rate the companies

can offer. The diabetic who does not bother to see his doctor, who goes off diet, who is careless regarding his insulin, will in all likelihood be penalized by having to pay a much higher premium—if he can obtain an insurance policy at all. Thus it would appear that the diabetic who obeys instructions will not only live longer and enjoy life more, but will have his insurance responsibility to his family covered, and at a cheaper rate than otherwise would be the case.

As a Company, we are interested ourselves in insuring as many diabetics as possible, but we must take only those who show the likelihood of achieving a reasonable life span. To do otherwise is to court disaster for us; it might eventually eliminate us from the business of insuring the diabetic.

CONCLUSION

1. We have insured diabetics since 1940 on an empirical basis. This seems to have been a satisfactory experience, since our mortality to date is within the limit of our estimates.
2. Our claims show that the diabetic dies primarily from cardiovascular disease.
3. The number of diabetics refused insurance is still too high.
4. We should endeavor to get all diabetics to follow consistently their physicians' advice concerning supervision and treatment.

ABSTRACTS

BARR, DAVID P. (*New York Hosp., New York City*): The relationship of endocrine factors to the development of diabetes mellitus. *Smith, Kline & French Laboratories: The Clinical Problems of Advancing Years. Second Symposium*, pp. 26-27, 1951.

The clinical state of diabetes mellitus is a complicated situation in which at any particular time a multitude of factors are in evidence. Many of these can be only partially evaluated, and the true nature of the disease is still in doubt. At present, diabetes appears to be due to an absolute or relative lack of insulin, which results in inhibition or diminished activation of enzymatic intracellular reactions necessary for normal carbohydrate metabolism. Excess of pituitary, adrenal, and thyroid activity may produce a state in which even a normal supply of insulin is insufficient to prevent the manifestations of diabetes mellitus.

BARR, DAVID P.; RUSS, ELLA M.; AND EDER, HOWARD A. (*Dept. of Med. of the N. Y. Hosp., Cornell Med. Center, New York City*): Protein lipid relationships in human plasma. II. In atherosclerosis and related conditions. *Am. J. Med.* 11:480-93, October 1951.

The authors report the results of their studies, using the Cohn protein microfractionation method No. 10 for the separation of protein, on the plasma of 33 patients who were known or thought to be suffering from complications of atherosclerosis, 2 who exhibited advanced lesions of familial xanthoma tendinosum with hypercholesterolemia, 35 diabetics, and 12 nephrotics. Protein, cholesterol, and phospholipids were determined on the original plasma and on each of the fractions. The in-

vestigation was undertaken to determine whether there are significant abnormalities of lipid distribution in the plasma of patients with atherosclerosis or with conditions that are known to predispose to its development.

The authors conclude from their findings that patients who have survived coronary occlusion or present otherwise unequivocal evidence of the complications of atherosclerosis frequently exhibit several abnormalities in the distribution of proteins and lipids in the plasma. These include a tendency toward reduction of albumin and alpha lipoprotein, as well as other components of Cohn's Fractions I and III. These changes may be apparent without hypercholesterolemia or recognizably significant elevation of the cholesterol-phospholipid ratio of the unfractionated plasma. Like normal individuals, patients in the atherosclerotic group were found to exhibit, in the fraction containing alpha lipoproteins, cholesterol-phospholipid ratios which averaged around 0.50, and in the fraction containing beta lipoproteins, ratios which ranged about 1.40.

Similar changes in protein and cholesterol distribution were seen in conditions which are known to predispose to early and extensive atherosclerosis. The authors state that in many diabetics they are apparent before any vascular complications of the disease are clinically recognizable. They were seen in 2 cases of familial xanthoma tendinosum. They were noted to an extreme degree in patients with the nephrotic syndrome. The authors suggest that future attempts to relate lipids of the plasma to the deposition of lipids in tissue must take account of their combinations with protein; also, that further exploration of protein-lipid relationships may be rewarding both in clarifying the pathogenesis of atherosclerosis and in aiding in its early recognition.