A STUDY OF DIABETES IN CHILDREN, WITH SPECIAL EMPHASIS UPON CAMP SWEENEY, A SUMMER CAMP FOR DIABETIC BOYS AND GIRLS, GAINESVILLE, TEXAS

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By

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CHAPTER I

INTRODUCTION

Purpose of the Study

The purpose set forth for this study was that of making a critical investigation of the program of Camp Sweeney, a summer camp for diabetic children located in Cooke County, Texas, near Gainesville, in order to determine whether this camp is providing an effective and beneficial program for such children. In the light of the findings, it was proposed to make certain conclusions and recommendations regarding the facilities, administration, and program of Camp Sweeney, looking toward the improvement of its services in the interest of diabetic children.

The writer believed it to be necessary to have a rather detailed knowledge of the nature and treatment of diabetes in order to be able to evaluate the program of Camp Sweeney, and for this reason it was thought advisable to devote a major portion of the written report of this study to a somewhat comprehensive discussion of diabetes in general and also a briefer treatment of the occurrence of this disorder in children. The purpose of the research, then, was to make a study in

relation to the nature and treatment of diabetes and to evaluate Camp Sweeney as to its efficiency in meeting the needs of diabetic children.

Sources of Data

Data for this study were collected from a wide reading in published works relating to diabetes, from the records of individual campers at Camp Sweeney during 1950 and 1951, from correspondence files at the camp, and from personal knowledge and experience of the writer, who has served as the director of Camp Sweeney since its first session in the summer of 1950.

Limitations

This study was limited specifically to a consideration of Camp Sweeney, which is only one of a number of diabetic camps for children located in various sections of the United States, and one of the most recently organized. In that portion of the study dealing with diabetes, no attempt was made to present a technical discussion of this disease, but the information presented was collected for the purpose of giving the general reader a knowledge of the nature of the disease and its treatment without burdening him with certain scientific terminologies which are of interest and meaning only to the specialist in this field and to the individual who is a victim of diabetes. For this reason, all discussions of diet and of insulin therapy were kept on a non-technical

level, so far as possible, for the purpose of presenting a functional understanding of the disease, rather than a technical knowledge.

Procedure

Since a complete case record is kept at Camp Sweeney of every camper who attends, the writer consulted these records in order to collect data which were needed for this study to serve as the basis for certain tabulations to indicate the benefits which campers had derived from their camping experience. For the most part, the records of 1951 are those utilized, although those of 1950 were sometimes utilized for comparative purposes. Likewise, the files of correspondence conducted with other camps for diabetic children and with the parents of campers were consulted, as it was felt that unsolicited comments concerning the benefits derived from the camp by the parents of children who attended would be a significant factor in evaluating the camp program. Especially were the reactions of a number of parents and campers noted in an effort to evaluate the benefits derived from the camping program by those children who attended Camp Sweeney.

During the time when reading was being done in literature relating to diabetes, detailed notes were taken. After these had been completed and organized in logical manner, the next step was the actual writing of the report of the study, contained in these pages.

Organization

This introductory chapter has presented an outline of the purpose of the study, the sources of data, the limitations placed upon the study, and the procedure employed.

Chapter II presents a somewhat detailed discussion of the definitions, symptoms, incidence, and treatment of diabetes.

Chapter III deals specifically with the occurrence of diabetes among children.

Chapter IV contains a survey of the facilities and programs of some typical summer camps for diabetic children. It was thought that knowledge of what other and older camps are doing would serve as an index for evaluating the program of Camp Sweeney.

Chapter V is devoted to a consideration of the history, growth, present status, the facilities and program of Camp Sweeney. Tabulations are included in an effort to indicate the effectiveness of the program developed at the camp for caring for diabetic children, and a number of references are made to correspondence received from parents of campers in which an insight is offered into the benefits which apparently have resulted from the camping experience at this camp for individuals who are victims of diabetes. Correspondence from the campers themselves and from physicians is also cited.

Chapter VI lists certain conclusions relating to diabetes and to the program offered by Camp Sweeney. Also, recommendations are

included, pointing toward the improvement of this program in the future, so that Camp Sweeney may continue to become increasingly effective in providing wholesome and beneficial experiences for diabetic children.

CHAPTER II

DEFINITION, SYMPTOMS, INCIDENCE, AND TREATMENT OF DIABETES MELLITUS

History and Definition of Diabetes Mellitus

Diabetes mellitus, the technical name of the disease which is commonly referred to simply as "diabetes," was recognized as a physical disorder by the early Greeks, some of whom accurately described its symptoms and course in literature which is still in existence. In the seventeenth century the presence of sugar in the urine was suspected by taste, chemically demonstrated to be sugar a century later, and proved to be unassimilated glucose early in the nineteenth century.

The first real progress toward the modern conception of the fundamental pathological physiology of diabetes was made in 1889, when von Mehring and Minkowski found that surgical removal of the pancreas resulted in an experimental form of the disease in laboratory animals. In the dog, for instance, they found that the disease appeared within ten to fifteen hours after the removal of the pancreas, and tended to become more severe over a period of time until death

eventually occurred. Experimental animals exhibited the same symptoms as do human beings with diabetes—abnormal thirst, frequent urination, and excessive hunger. In addition to these traits, these experimenters found that the animals experienced progressive emaciation in spite of a superabundant diet. This symptom is also to be noted in most diabetic human beings before the disease is brought under control.

In 1901 Opie discovered that the excretion of sugar continued even when laboratory animals received no food. After a series of careful studies of the pancreas of both human beings and animals, he pointed out certain cellular differences which were common to diabetic individuals but never found in non-diabetics. He concluded that these structural abnormalities of the pancreas were responsible for the inadequate assimilation of sugar. This discovery led to the theory that the normal pancreas manufactures and sends into the bloodstream a hormone which is essential to the proper utilization of glucose in the animal or human organism, and that the differences in cell structure of the pancreas of diabetic individuals impair the production of this hormone which, a quarter of a century later, was isolated and named insulin.

After long experimentation on the part of many research specialists, Banting and Best of the University of Toronto succeeded in isolating the hormone produced by the pancreas and now known as

insulin. The discovery of insulin is recognized as one of the most important scientific advances in the first half of the twentieth century. Shortly after 1921, when Banting and Best made their momentous discovery, Collip developed a suitable method for the extraction of the hormone for commercial use from the pancreases of healthy slaughterhouse animals. Soon there followed methods of standardization on the part of both Canadian and American pharmaceutical companies, and before long the use of insulin in the therapy of diabetes became universal.

The foundation of expert and effective treatment of diabetes has always been the accurate adjustment of food intake, with or without the use of insulin. Of great importance have been many developments in the field of nutrition and the development of the quantitative diet for diabetic patients. Outstanding contributions during the past few decades have been made in this field by such students of diabetes as Lusk, Allen, Joslin, Woodyatt, Newburgh, and many others.

In 1936 Hagedorn and Jensen discovered how to precipitate insulin in the form of a relatively insoluble compound with one of the protamines. By chemically combining small amounts of zinc, they produced a suspension of insulin in a buffered solution in a slowly soluble form with sustained action. This formula is now the most widely used of all insulins, since its slow and fairly uniform reaction

eliminates the necessity of frequent injections for the control of diabetes. In many cases, one injection of protamine zinc insulin every twenty-four hours is sufficient for effective control, whereas several daily injections of earlier forms of insulin were required.[1]

Perhaps no other chronic disease makes such rapid inroads upon health, strength, and weight as does diabetes. The large amounts of sugar in the urine and the blood, the excessive thirst, frequent urination, and abnormal hunger are so commonly observed in most cases that many investigators have made detailed studies of metabolism.[2] This is a term referring to the process which deals with the conversion of food into various forms of energy. The human "engine" receives fuel in the form of food which, after a complicated series of chemical changes involving digestion and absorption, is converted into many forms of energy that make possible the vital processes of life.[3]

The three basic foodstuffs which provide fuel for the body are known as carbohydrates, proteins, and fats. These are complex substances derived either from animal or plant sources. Digestion is a

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[1]Arthur R. Colwell, Diabetes Mellitus in General Practice, pp. 17-21.

[2]Francis G. Benedict and Elliott P. Joslin, Metabolism in Diabetes Mellitus, p. 3.

[3]William S. Collens and Louis C. Boas, Helpful Hints to the Diabetic, p. 3.

complicated process which chemically disintegrates foods into their simplest constituents to enable them to pass through the membranes of the intestines into the blood. These fuels are then circulated to the cells of all the organs and tissues of the body, where they are converted into many forms of energy that keep the human engine alive and in automatic repair.

Most important of all foods as a source of heat and mechanical energy within the body are the carbohydrates. They are a class of foods, mainly of plant origin, which include all substances ranging from the most complex sugars (starches) to the simplest sugar (dextrose or glucose). Only in the latter simple form can the body utilize carbohydrates. When the starches are taken as food, chewed and swallowed, certain chemical digestive agents in the mouth, stomach, and small intestine, known as enzymes, promptly produce disintegration of the complex sugars which ultimately break down into the simplest form, glucose. The glucose then passes through the membrane of the intestine into the blood and is carried to the cells of the body to be consumed and converted into energy. Investigation has proved that insulin, the secretion produced by the pancreas, must be present to facilitate this process.

Diabetes is a disease in which the normal process of the utilization of glucose by the cells is impaired because of an inadequacy in the functioning of insulin. When the glucose is not used by the cells

at a normal rate, it accumulates in the blood in excessive amounts. One of the functions of the kidneys is to act as a dam to prevent sugar which normally circulates in the blood from entering into the urine. But when the blood is carrying an excessive load of sugar which the cells of the body are not using in a normal manner, all of this surplus cannot be handled by the kidneys and some of it "spills" over into the urine. Thus, in simple terms, may be explained the mechanism which brings about high quantities of sugar in both the blood and the urine, which is one of the most common manifestations of diabetes.

It is interesting that carbohydrates do not supply all of the energy needed by the body. Approximately 58 per cent of the protein substances and some 10 per cent of the fats taken into the body are eventually converted by digestive processes into glucose, which functions in exactly the same way as the glucose derived from starches (carbohydrates) in providing body energy.[4]

Fortunately, a number of definitions may be presented at this point to provide a better understanding of the nature and meaning of diabetes. They are all very similar in meaning, but each one makes its own contribution to an understanding of this disorder of the human body.

> Diabetes mellitus is a chronic disease of metabolism which develops as the result of an insufficient supply of endogenous insulin. It is readily controlled but rarely,

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[4] Ibid., pp. 3-5.

> if ever, cured. The greatest apparent disturbance caused by this disease is in the utilization of carbohydrate, though the metabolism of fat and of protein, and, indeed, the total food metabolism is affected. An insufficient secretion of insulin . . . will precipitate the clinical syndrome of diabetes mellitus. . . . In some instances it seems that the insulin insufficiency is relative and not absolute, that there actually may be a normal amount of insulin produced but that its effect is neutralized to a greater or lesser degree by some antagonist.[5]
>
> The distinctive characteristics of diabetes mellitus are those caused by deficient metabolism of glucose. Disorders of a vascular, infectious, endocrine or chemical nature commonly co-exist.
>
> Subnormal capacity for utilization of glucose is the most obvious feature of the disease. This results in persistent hyperglycemic glycosuria, deficient glycogen synthesis, and symptoms due to loss of glucose in the urine. The disease shows strong hereditary tendencies, is associated frequently with obesity at onset and with vascular degeneration in its course. It becomes more severe, as a rule, the longer it exists. It is usually of idiopathic origin and permanent, although exceptions may occur.
>
> The anomaly of glucose metabolism with ketosis is capable of control by diet and insulin, but the course of the disorder and the arteriosclerotic complications are not affected to any major degree.[6]
>
> Whatever may be the etiology of diabetes, the disease may be looked upon from the standpoint of practical management as a disorder in which the amount of endogenous insulin available is inadequate to meet the metabolic demands.[7]

Cecil has pointed out that diabetes mellitus is a disorder of carbohydrate metabolism characterized by excessive quantities of sugar

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[5]Garfield G. Duncan, Diseases of Metabolism, second edition, p. 698.

[6]Arthur R. Colwell, Types of Diabetes Mellitus and Their Treatment, p. 3.

[7]Russell L. Cecil, A Textbook of Medicine, seventh edition, p. 691.

in the blood and in the urine. This disorder appears to be the inevitable result of a disturbance within the normal insulin mechanism of the body. Linked with the serious derangement of the carbohydrate metabolism are abnormalities in protein and fat metabolism. The general condition may produce acidosis, coma, and death. It is generally believed that failure of the pancreas to function properly is the fundamental factor in explaining the cause of diabetes. At times, however, defects or abnormalities in cell structure may require excessive amounts of insulin—more than the pancreas can produce—for the effective utilization of sugar.[8]

> Diabetes is a condition in which the body has partially lost the power to "burn" the sugars obtained or absorbed from foods. As a result, the sugars which escape burning accumulate above the normal amount in the blood. This increased sugar content of the blood is greatest after meals and least during fasting.[9]

> . . . Diabetes, we can say, is an abnormality commonly dependent for the most part on an insufficient supply of insulin, whereby the storage of sugar in the liver is inhibited, the formation of sugar by the liver is accelerated, and the utilization of sugar by the tissues is depressed.[10]

> Diabetes mellitus is a metabolic disease characterized by a disturbance in the utilization and storage of the dextrose molecule by the body. This basic disorder is generally accompanied by a train of events which is responsible for the derangement of other metabolic processes in the organism. Among them may be included its direct effect upon

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[8]Ibid., pp. 685-686.

[9]Anthony M. Sindoni, Jr., The Diabetic's Handbook, p. 3.

[10]Russell M. Wilder, A Primer for Diabetic Patients, seventh edition, p. 4.

> water and salt metabolism, its very definite influence upon the nature of protein metabolism and its final effect upon the metabolism of fat.
>
> The cause of this derangement has been the subject of a long and lively series of controversial investigations and even today has not been clearly established.[11]

> . . . diabetes mellitus is considered to be a state of deficient glucose utilization . . .[12]

> Diabetes mellitus is an anomaly of glucose metabolism, usually of idiopathic origin and permanent. Its major characteristic is that of subnormal capacity for utilization of glucose, the signs of which are persistent hyperglycemic glycosuria, deficient glycogenesis and symptoms and signs of loss of glucose which normally would be utilized. It shows strong hereditary tendencies, is associated frequently with obesity at onset and with arteriosclerosis in its course and may lead to ketogenic acidosis. It is variable in severity in different subjects and in the same subject at different times, and it becomes more severe, on the average, the longer it exists. The anomaly of glucose metabolism with ketosis is subject to control by diet and insulin, but the course of the disorder and its arteriosclerotic complications are not influenced to any major degree.[13]

Scheinfeld calls diabetes the "sugar sickness," which he says is produced in most cases through the inheritance of genes which make one vulnerable to its attack. The disease results from a failure of the pancreas to secrete sufficient insulin, which is vitally essential for the conversion of sugar in the body processes. This is why excessive quantities of sugar accumulate in the blood and in the urine, producing

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[11] William S. Collens and Louis C. Boas, The Modern Treatment of Diabetes Mellitus, p. 3.

[12] Colwell, Diabetes Mellitus in General Practice, p. 32.

[13] Ibid., p. 17.

degeneration of the kidneys and also causing poisons that may bring death if neglected.[14]

> Diabetes mellitus is transmitted as a Mendelian recessive trait. According to the Mendelian hypothesis of heredity, the heterozygous or unlike traits of two mates do not fuse in their offspring. Instead, the predominant one leaves its mark and the recessive one tends to disappear or become latent until future mating revives it in another generation. In discussing the inheritance of diabetes, three types of individuals are involved. There is the homozygous nondiabetic who has not inherited the diabetic trait from either parent; there is the homozygous diabetic who has inherited the trait for diabetes from both parents; there is the heterozygous individual who represents a fusion of genes from one parent who carries the diabetic trait and one who does not, or two parents who do not have the disease but who both carry the trait, or one parent who has the disease and one parent who carries the trait. The heterozygous individual does not necessarily develop diabetes, but he carries the trait and may transmit it to his offspring. There are three types of mating which may produce diabetic offspring: first, if two carriers marry, 25 per cent of their offspring could develop diabetes; second, if a carrier and a diabetic marry, 50 per cent of their offspring could develop diabetes; third, if two diabetics marry, 100 per cent of their offspring could develop diabetes. From the last combination, which is indisputably the worst, only 44 per cent actually develop the disease, but as the life span continues to lengthen, this percentage should increase.[15]

> In summary, it may be said that diabetes mellitus is a disease affecting those processes of metabolism by which carbohydrate is both utilized and formed. As secondary consequences the metabolism of protein and fat is also disturbed as may be the electrolyte and water balance. Insulin deficiency, either relative or absolute, appears to play a central role in the continuation of the disease. The factors

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[14]Amram Scheinfeld, You and Heredity, p. 125.

[15]Mary E. Tangney, Diabetes and the Diabetic in the Community, pp. 13-14.

> which initiate the disturbance in carbohydrate metabolism are of a varied character and the mechanism of their action is often obscure. Among them are hereditary influences, alterations in the endocrine balance and long-continued use of diets the composition and quantity of which appear to render the organism decreasingly sensitive to insulin. There is also satisfying evidence that any agent that imposes a long-continued strain on the insulin-producing mechanism of the pancreas will result in its final insufficiency. Consequently, while the disease may begin through the operation of extra-pancreatic factors of a diverse character, it may ultimately be continued by the failure of the pancreas to produce insulin in sufficient quantity to support normal metabolism.[16]

Symptoms of Diabetes

The presence of certain well-known symptoms of diabetes may suggest a positive diagnosis of the disease, only to be refuted when a complete clinical examination of the patient is performed. On the other hand, diabetes is often discovered in laboratory examination in the absence of the usual symptoms. In the main, however, the presence of diabetes is usually indicated by a combination of symptoms which lead one to suspect its existence. The varied and numerous symptoms in a typical case of diabetes indicate the presence of a fundamental systemic disorder. Unfortunately, its cause is a matter of speculation, although the inadequate functioning of the pancreas or inability of body cells to utilize food energy adequately are known to be characteristic deficiencies which inevitably occur with diabetes, although the cause and cure of these deficiencies are as yet unknown.

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[16]Duncan, op. cit., p. 719.

General physical weakness; loss of weight; excessive appetite and thirst; the frequent passing of large quantities of urine, both day and night, without discomfort; persistent itching of the skin, especially in the area of the genitals; and chronic, more or less severe backache are the most common symptoms of uncontrolled and uncomplicated diabetes. Sexual impotence in the male is much less common than these other symptoms, but it occurs with far greater frequency than is commonly known. The fact that impotence or near-impotence occurs with much greater frequency among diabetic males than among non-diabetics indicates a positive relationship between the disease and loss of sexual powers.

In spite of these varied symptoms, several or all of which are usually present in the patient, it has been estimated from reliable courses that as high as 12 per cent of patients having a mild or moderate form of the disease have no symptoms of the disorder whatsoever, and their ailment can be discovered only by means of clinical analysis of their blood and urine.[17]

Tangney has pointed out that the most common characteristic indications of the presence of diabetes are the three "polys": (1) polydipsia (excessive thirst), (2) polyuria (frequent urination), and (3) polyphagia (excessive appetite).[18] Tangney makes the following

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[17] Ibid., p. 720.

[18] Tangney, op. cit., pp. 34-35.

comments in regard to these three principal evidences of the presence of the disease:

> This triad of symptoms forms a vicious circle. The higher the level of blood sugar, the more intense is the thirst. The more fluid the patient drinks, the more he voids. In this large volume of urine are lost potential calories and other nutriments; his hunger, therefore, is extreme. The hungrier he becomes, the more he eats, and the higher goes his blood sugar, and so the picture goes on. During this time, the patient loses weight and strength despite his enormous appetite.[19]

Loss of weight may be either gradual or rapid, and occurs with or without a condition of obesity. When one is overweight, of course, he needs to lose poundage, but the weight loss due to diabetes is not a normal loss and may proceed, if unchecked, to the point of emaciation. The patient wonders why he loses weight in spite of the enormous amounts of food he is eating. His skin often becomes flabby, dry, scaly, and loses its normal consistency and resistance. Various skin eruptions, such as boils, carbuncles, and eczema, may occur with abnormal frequency; and often there is a pronounced itching somewhere on the body, usually more prevalent in the genitals, where excessive sugar in the urine, coming into contact with the flesh, encourages the growth of itch-producing fungus. In many instances this persistent itching may be the first indication of diabetes. In advanced stages of the disease the normal functions of the bladder may lack control, to the embarrassment and inconvenience of the patient.

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[19] Ibid., p. 35.

Quite often, the patient's general make-up may change after the onset of diabetes. He may become irritable, depressed, listless, and desirous of being left alone. Inflammation of the nerves (neuritis) in the arms and legs, producing sharp pain, numbness, and tingling, is often an early indication of the presence of the disease. As the ailment advances, the symptoms may become more pronounced, producing muscular weakness, constipation, fatigue, shortness of breath, impairment of vision, and pain in the limbs which often becomes extremely severe during or immediately following physical exertion. Frequently, the patient may be aroused from his sleep by muscular cramps in his legs.

Even in the presence of some or all of these characteristic symptoms, however, the individual cannot be diagnosed as a diabetic until careful blood and urine tests have been made, for these symptoms can occur with other ailments as well as with diabetes. In mild cases of diabetes, an adjusted diet will eliminate the symptoms, whereas both diet and insulin may be required for more severe cases. With proper care, the symptoms need never recur, and the patient may live a normal active life which is in no way shortened by the presence of controlled diabetes.

In many instances no symptoms are present, and excessive sugar in the blood may be discovered by routine physical checkups or in tests required in applying for life-insurance policies. When the usual

symptoms are lacking, the presence of the disease may not be known until the patient is seized with coma. This is serious because it indicates that the disease is already firmly established.[20]

In their discussion of the symptoms of diabetes, Collens and Boas indicate that in addition to abnormal hunger, excessive thirst, and frequent urination—the most common and characteristic symptoms—there are also likely to be other indications of diabetes, including loss of weight when large amounts of sugar are excreted in the urine instead of providing calories for the maintenance of the body; weakness and chronic tiredness; severe nocturnal cramps, usually in the legs, which suddenly awaken the sleeper and which may be relieved by swinging the legs back and forth from the bed or by walking about the room; unusual and persistent taste sensations, such as salty, peppery, metallic, bitter, sweet, lemon, and sour tastes; burning of the tongue and prickly or leathery sensations in the mouth; and blurring of the vision. It is unusual for any one patient to have all of these symptoms, but several of them often occur in combination as an indication of a diabetic condition. The ones which are in evidence depend upon the severity of the case, its duration, and various physiological factors which fluctuate widely from individual to individual.[21]

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[20]Sindoni, op. cit., pp. 39-40.

[21]Collens and Boas, The Modern Treatment of Diabetes Mellitus, pp. 42-45.

The following explanation throws light on the nature of symptoms of diabetes:

> In the pancreas there are groups of special cells—probably a million of them. These may get out of kilter. You begin to have great thirst, you are troubled with frequent and excessive urination. Fatigue attacks you easily. Perhaps you notice that a small cut is slow to heal. And you are hungry most of the time; but, despite all you eat, you lose weight. For lack of insulin the body is unable to burn its food, and is drawing on its reserve fats for fuel. Actually you are in the process of starving.
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> If this process runs on unchecked, the diabetic one day collapses into a state of coma, from which nothing will revive him but insulin. Insulin today, more than 25 years after its discovery, is still, with diet, the only diabetic remedy. The American Diabetes Association is forcefully warning that any other medicine for diabetes is sheer quackery.[22]

The accumulation of sugar in the blood and in the urine means that this essential source of energy is being lost to the body to the extent that excessive amounts are present. Since a major portion of the food taken into the body is converted to sugar and is lost before it is utilized, the loss of this fuel in the urine produces a curious form of starvation within the body, even in the presence of big quantities of food consumed. This is one reason why loss of weight is a symptom of diabetes in spite of the excessive amounts of food consumed. In this condition resembling starvation, the body starves in the presence of plenty, for cells cannot utilize adequate quantities of the sugar which

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[22]C. Lester Walker, "A Million Unknown Diabetics," condensed from Harper's Magazine, January, 1949, Reader's Digest, LIV (May, 1949), 21-22.

is circulating through them. Thus, as the sugar is expelled in urine, the body slowly wastes from starvation. Consequently, the diabetic develops a voracious appetite and begins to eat abnormal amounts of food in an effort to satisfy the hunger of body cells for the food energy which is being denied them because of insulin deficiency.

Excessive sugar in the urine tends to irritate the kidneys, which in turn combat this threatened irritation by diluting the sugar with larger quantities of urine. In order to have sufficient water for this diluting process, the kidneys draw water from all overthe body, thus producing the process of dehydration of the cells and tissues, so often found in diabetics. In turn, the body cries out for more water and excessive thirst develops, but the major portion of the water drunk does not go to satisfy thirst but to dilute sugar in the urine to flush the kidneys. This total process accounts for the common symptoms of diabetes—excessive thirst and frequent urination.

Thus the body uses water to make more urine in order to dilute the sugar which it is losing. In turn, the increased and abnormal volume of urine which pours from the kidneys carries along with it certain minerals which are essential to the body. This contributes to the state of dehydration, which is a condition which causes the tissues of the body to become actually dry and shrunken from the loss of both water and salts. This is another important reason for the rapid

wasting and loss of weight that occur in the uncontrolled diabetic. Being a very sturdy organism and trying to protect its cells from destruction and death, the body attempts to combat what is occurring. Therefore, the marked drying sensation of the mouth which occurs as a symptom of diabetes represents nature's way of warning the body to consume more water to replenish the cells that are "drying up." Thus, "dry mouth" calls for more water.

Weakness is another outstanding indication of diabetes. In its milder forms it is responsible for easy fatigue, lassitude, drowsiness, or merely a feeling of "below par." In severe cases of uncontrolled diabetes, the loss of strength may become so pronounced that the patient finds difficulty in getting about. This weakness is brought about by inadequate assimilation of sugar, which produces the energy so essential to muscular activity and bodily functions.[23]

Onset and Incidence of Diabetes

In its onset, diabetes may be either gradual, sudden, or rapid. Usually, its appearance is gradual in middle-aged, overweight patients whose diagnoses are often accidental or incidental. Their symptoms are so mild that they may suffer no inconveniences until one or more diabetic complications appear. Younger patients are more likely to experience either sudden or rapid onset, in which symptoms may have

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[23]Collens and Boas, Helpful Hints to the Diabetic, pp. 6-8.

been present for hours, days, or a few weeks.[24] Hence, there is much variation.

The onset of diabetes, which definitely has a hereditary basis, is influenced by several known factors, including age, body weight, occupation, physical exercise, infections, and endocrine disturbances. Endocrine functions are known to be controlled by Mendelian genes, and they are therefore of utmost importance in determining whether an individual shall or shall not develop diabetes.[25] In instances in which diabetic inheritance is known or suspected, careful control of the diet, abstinence from over-eating, keeping down of excess weight, and frequent medical inspection may thwart the development of the disease or greatly impede its progress.[26]

Heredity is significant as a cause of diabetes, as it is known that the tendency to develop the disease is passed on from generation to generation. This does not mean that everybody who has a diabetic parent will develop diabetes, but it is an argument against the marriage of one diabetic with another, and it should influence two persons not to have children if both have a diabetic parentage. Hereditary aspects of the disease should cause all persons who are members of

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[24]Tangney, op. cit., p. 33.

[25]Duncan, op. cit., p. 716.

[26]Scheinfeld, op. cit., p. 399.

diabetic families to safeguard themselves against diabetes as much as possible. If gallstones are present, they should be removed, as they often appear to be related to the presence of diabetic tendencies. Obese persons, especially those with diabetes in their family heritage, should reduce, as obesity appears to be a provocation for diabetes. Over-indulgence in foods of all kinds, especially sweets, apparently encourages the onset of diabetes. Physical exercise is protection and nervous strain injurious. Diabetes occurs less frequently among those who engage in hard physical labor and more often in those within the higher income groups, and the death rate from it is much lower in the country than in the cities.[27]

The position of the average diabetic in the community should not change because of the onset of his disease. As an employee, he should prove to be more efficient than before, for his diabetic education causes him to realize that he must do a better-than-average job to overcome established prejudices on the part of employers. It is all-important, however, that the diabetic should understand that he must keep his diabetes controlled in order to achieve and maintain the maximum degree of good health.[28]

> One million Americans today have diabetes and are unaware of it. Another million know they have diabetes. And there is disturbing evidence that this disease, ninth

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[27]Wilder, op. cit., pp. 6-7.

[28]Tangney, op. cit., p. 244.

> on the list as a cause of death in the United States in 1940, is on the increase. Some doctors believe that, if all the figures were in, it would now place seventh on the "killer" list.
>
> "Today," declares Dr. Elliott P. Joslin of Boston, the country's leading authority on diabetes and no alarmist, "one fourth of our people carry a diabetic strain." Such is the over-all prospect that the U. S. Public Health Service has set up a special "Office of Diabetes" to spearhead an attack on the problem, and the American Diabetes Association has launched a campaign to take the facts to the people.[29]

Tangney substantiates the fact that diabetes mellitus ranked in 1947 as the seventh most frequent cause of death in the United States. She reiterates the fact that probably at least 25 per cent of the population actually carries the diabetic trait to a greater or lesser degree. The number of persons developing the disease is constantly on the increase and it likely will continue to increase at a greater rate than the population as a whole.

No age is immune to diabetes, although it is primarily a disease of later life. Only one fourth of all diabetics in the United States are under fifty years of age, whereas one half of all diabetics are sixty years of age or older. This latter figure is especially striking in the light of the fact that only one ninth of the entire population is sixty years of age or older.

American people are living longer than ever before. In 1900 the average age at death was 35.2 years; in 1937, 54.4 years; and in 1945, 64.8 years. This increased life span has had a direct effect on

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[29]Walker, op. cit., p. 21.

the mounting incidence of diabetes, because the longer the life span, the more possible it is for those individuals who are hereditarily predisposed to diabetes to develop the disease.[30]

One is amazed to note that in 1900 diabetes ranked as twenty-seventh as a cause of death, whereas in half a century it has advanced to seventh position as a cause of death in the United States. However, the actual increase is not so pronounced as it seems when one considers the great increase in life span that the twentieth century has brought about, together with vastly improved diagnostic facilities, better education of the public, great advances in medical treatment, and more efficient methods for determining causes of death.

About 35,000 deaths occur annually in the United States with diabetes named as the primary cause, and over 4,000 additional deaths in which diabetes is listed as a contributing cause. In many cases the actual cause of death is not easy to determine, and errors are likely to occur, thus making it difficult to attain a true picture. For example, if a diabetic dies as a result of trauma (wound or shock), the physician may not mention diabetes on the death certificate, since the actual cause of death seems to be unrelated to diabetes. Another doctor, in the same situation, may conclude that the patient was experiencing an insulin reaction and therefore list diabetes as the cause of death.

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[30] Tangney, op. cit., pp. 1-2.

Again, an unconscious patient may be hospitalized with a laboratory diagnosis of diabetic coma, whereas a post-mortem diagnosis may reveal cerebral hemorrhage. The difficulty of obtaining correct diagnosis becomes apparent in such cases.[31]

Up to age fifty, women are approximately twice as likely to develop diabetes as are men in the same age range. Under age fifty, over 4 per cent of the women and more than 2 per cent of the men now living will become diabetics during the course of their lives.[32]

The most recent and accurate data on a nation-wide basis were collected by means of the National Health Survey, conducted in 1935-1936 by the United States Public Health Service. This study disclosed that there were at least 500,000 diabetics in the United States—three fifths of whom were women and two fifths men. During the decade of the 1940's, diabetics in the population increased about twice as rapidly as the general population. Each year about 50,000 new cases are discovered, about half in persons below fifty-five years of age. The peak incidence of the disease occurs between ages sixty and seventy. Between ages forty and seventy, women diabetics outnumber men by a ratio of almost two to one. In urban communities of the United States, three or four persons in every 1,000 are diabetics. There is strong evidence that the actual prevalence of the disease is considerably greater

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[31] Ibid., pp. 5-6.

[32] Duncan, op. cit., p. 704.

than that disclosed by the surveys, because undoubtedly there are many undiagnosed, latent, or potential cases which are not discovered by such investigations.[33]

In 1940, Joslin, Root, White, and Marble wrote that the magnitude of the diabetic problem was just beginning to become apparent. At that time there were over 600,000 known diabetics in the United States. The number was continuing to increase because of the increased average age or life expectancy of the population, because alert doctors were discovering more cases, because patients were living longer, because people were becoming more medically conscious, and because the total population of the country was continually increasing. By 1950, these authors predicted, there were likely to be at least a million known diabetics in the United States.[34] That this prediction came to pass was indicated by Walker in his article written in January, 1949.[35]

The United States Public Health Service, in its 1946 annual report, estimated that there were at that time between 675,000 and 1,000,000 diabetics in this country, with at least 50,000 new cases being diagnosed every year. At the same time, the report stated that the actual number of diabetics in the nation probably should be at least

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[33]Colwell, Diabetes Mellitus in General Practice, pp. 22-23.

[34]Elliott P. Joslin, Howard F. Root, Priscilla White, and Alexander Marble, The Treatment of Diabetes Mellitus, seventh edition, p. 13.

[35]Walker, op. cit., p. 21.

twice the number estimated, and possibly three times that number, because of the many mild cases, or even those of a more severe nature, that were as yet undiagnosed.[36]

Figures concerning the number of diabetics in the United States vary widely, possibly because some of the numbers probably are based upon known cases, whereas others evidently attempt to estimate the extent of unknown cases as well. Cecil, for example, stated that in 1948 there were approximately 550,000 known cases of diabetes in the United States. Joslin, in the same year, estimated that between 2,000,000 and 2,500,000 persons then living in the United States and free from the disease would develop it before they die.[37]

According to an estimate based upon reliable sources, the number of diabetic patients increased by 18 per cent in the decade from 1940 to 1950, while the total population of the country increased by approximately 9 per cent. Careful students of the disease have estimated that the number of American diabetics in 1985 will be 74 per cent greater than in 1940, whereas the population as a whole will increase about 22 per cent in the same period of forty-five years.[38]

Before the discovery of insulin in usable form, diabetics had a markedly shorter life span than non-diabetics; but the difference in

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[36]Sindoni, op. cit., Introduction by Rufus S. Reeves, p. vii.

[37]Cecil, op. cit., p. 686.

[38]Duncan, op. cit., p. 703.

longevity of the two groups of persons has slowly diminished with the use of insulin. Even as recently as 1945, diabetics seeking to obtain life-insurance policies were denied that privilege because their life spans were only two thirds of the normal expectancy. In 1946, however, one of the largest life-insurance companies in the United States began to offer policies to diabetics, which fact alone proves the statement that the diabetic's life expectancy now approaches that of the non-diabetic.[39]

Statistics reveal that, in general, women live longer than men. For this reason, as the life span increases, the percentage of women in the total population will become larger. Thus it is not surprising to find that 61.5 per cent of all diabetics are females and 28.5 per cent are males. Diabetes, in its broadest sense, is considered to be a multiglandular endocrine disease, and its markedly high incidence in women after age forty is thought to be influenced by physical changes which occur in connection with the menopause.

Before age twenty-one, the occurrence of diabetes is approximately equal in both sexes. During the next decade, women have a 20 per cent preponderance. Between ages thirty-five and forty-four, the prevalence of diabetes in women is higher by almost 60 per cent. Between the ages of forty-five and sixty-four years, there are almost

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[39] Tangney, op. cit., p. 7.

twice as many women with diabetes as men. Statistically speaking, there are 4.53 cases of diabetes per 100,000 females of all ages in the United States, and only 2.73 cases in males per 100,000. At age sixty-five and over, one woman in every forty-five, and one man in every seventy has diabetes. Beginning at about age sixty-five, differences in sex ratios decrease until age eighty-five, when the occurrence of the disease is, as in youth, approximately the same for the two sexes.[40]

Melnitsky, writing early in 1949, stated that more than a million diabetics in the United States knew they had the disease and were keeping it controlled, knowing that if they study their disease and its treatment and co-operate intelligently with their physicians, they have an excellent chance of living as long and as successfuly with diabetes as they might reasonably expect to live without it. These are the lucky diabetics, this writer said, in contrast with the 800,000 to 1,000,000 or more unlucky ones who are not aware of their ailment and who are being needlessly destroyed by the disease or its complications—needlessly because diabetes can be successfully controlled, because its symptoms are obvious in most cases and its diagnosis almost foolproof, because with minimum care these persons could live normal vigorous lives, and because with proper treatment and diet they would

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[40] Ibid., pp. 2-3.

not have to develop the diabetic complications that are going to cost them their lives.[41]

In relation to diabetes as to all other physical ills, it is certainly a wholesome practice that,

> With increased education of the public, more persons are reporting routinely to physicians and clinics for physical examinations. Most industrial plants and business firms which offer retirement pensions to their employees require physical examinations yearly. Civil service appointments also are preceded by physical examinations. Although most public schools do not yet include urinalysis in the physical examinations given to students, many private schools and most colleges do. These factors alone have contributed to an increase, not in diabetes, but in diabetic case findings.
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> Statisticians and authorities agree, however, that many cases of diabetes still go unrecognized, particularly in rural areas where the ratio of physicians to patients is inadequate, and where diagnostic facilities are not readily available. Obviously, if every individual were to have a complete physical examination annually despite the absence of diabetic symptoms or known diabetic heredity, or if every patient who consulted a physician or dentist for treatment of any kind were to have his urine examined for sugar, the diabetic morbidity figures would show an even more marked increase. . . .[42]

At the present time, prevention of diabetes is not possible, but its incidence can probably be materially lowered by the prevention of obesity on the part of persons with a family heritage of the disease. A great decrease in the death rate from diabetes and its complications may be brought about by early diagnosis of the disease, by frequent

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[41]Benjamin Melnitsky, "Hidden Diabetes . . . A Threat to 800,000," Hygeia, XXVII (May, 1949), 320.

[42]Tangney, op. cit., pp. 3-4.

routine health examinations, and by prevention of complications through education of the patient and co-operation of the physician in treating even the slightest scratch or wound which can easily develop into an incurable infection when diabetes is present, especially if circulation is hindered by arteriosclerosis, as is so often the case.

The patient should be encouraged not to brood unnecessarily over his condition. He should be given every possible hope for a normal, happy, and long life if he gives his diabetes proper care. He should never forget that he is a diabetic, for laxness regarding diet, insulin injections, or urinalysis sooner or later brings about serious consequences. Moderate exercise is recommended, since it increases to some extent the body's ability to utilize carbohydrates. Thus, when exercise is taken, the taking of additional food or a small insulin injection may be necessary to maintain effective metabolism.[43]

Treatment of Diabetes

Aims of treatment.—It is desirable and highly advantageous to have the patient spend an initial period in the hospital following diagnosis of diabetes, such period to vary from a few days to two weeks. In this way a more thorough study of the patient and the requirements of his particular case of diabetes can be made. At the same time, treatment under controlled conditions inspires the patient

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[43]Cecil, op. cit., p. 709.

to develop a proper respect for his disorder. He is given adequate training in the preparation of his diet, the administration of insulin if it is required, testing his urine for sugar, and special hygienic practices which are essential for the diabetic. By means of hospitalization, the disease can be brought under control much more rapidly with far greater success than through a series of visits to a physician. One specialist in diabetes, Duncan, has written that he knows of nothing that makes such a lasting impression upon diabetic patients as the hospital routine and training, and that he has never known of a patient who regretted having had this valuable experience as excellent training for keeping the disorder under complete control. [44]

> There are few medical disorders in which the detail of treatment has so much to do with the maintenance of good health by the patient, the progress of the disease, and freedom from complications. Successful management of diabetes mellitus compels the physician and the patient to accept two fundamental principles: first, that treatment must be continuous because the disease, once established, is usually permanent; second, that such continuous treatment, if effective, will prevent all illness directly attributable to the disorder of sugar metabolism. Of course, certain complications, predominantly vascular, are not influenced to any great extent by treatment, but those due to the defect in glucose utilization are affected directly. [45]

Although it should be recognized that, for all practical purposes, diabetes is incurable, much benefit may be gained by proper and

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[44]Duncan, op. cit., p. 749.

[45]Colwell, Diabetes Mellitus in General Practice, p. 76.

continuous treatment under the supervision of a competent physician. Benefits resulting from such treatment are of three kinds, namely:

1. The severity of the disease may become much improved after a period of treatment, and it may revert permanently to a milder form if proper diet and treatment are continued without interruption.

2. The excessive thirst, frequency of urination, and abnormal hunger which are commonly associated with diabetes may show pronounced improvement and thus contribute to the comfort and well-being of the patient.

3. Complications which usually accompany diabetes, such as arteriosclerosis, coma produced by high bodily acidity, and a wide variety of non-healing infections and gangrenous conditions commonly referred to as "diabetic sores," are likely not to occur at all under proper care, or if they do appear, they will not be serious.[46]

In view of the incurability of diabetes, it is obvious that the most that can be expected from careful diet and insulin therapy is to bring about a measure of control so that the patient can metabolize carbohydrates in a manner resembling the normal. Thus far, no means of treatment have been devised which will cure diabetes, but the disorder can be kept under control to prevent its becoming worse and thus jeopardize life itself.[47]

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[46] Ibid., pp. 78-83.

[47] Collens and Boas, The Modern Treatment of Diabetes Mellitus, p. 35.

At present, the two major therapeutic weapons for the control of diabetes are diet and insulin. Through their use, the most important objectives of treatment are as follows:

1. Freedom from excessive amounts of sugar in the blood and in the urine.

2. Maintenance of a state of normal nutrition.

3. Maximum convenience and palatability of the diet and the general comfort and well-being of the patient.

4. Education of the patient in the essential techniques and habits which will lessen the severity of his disease and prolong his life.[48]

If the case is mild, diet and proper exercise often are sufficient to keep it under control. In more severe cases, insulin is required in amounts adequate to replace the insulin which the diabetic is unable to make for himself because of a deficiency in the functioning ofhhis pancreas. Commercial insulin is not a drug, but it is an extract from the pancreases of healthy slaughterhouse animals. No drugs known today have any effect upon diabetes, and insulin itself is ineffective if taken by mouth. It must be injected directly into the bloodstream, where it becomes effective within a very short period of time.[49]

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[48]Colwell, Diabetes Mellitus in General Practice, p. 84.

[49]Wilder, op. cit., p. 7.

When indicated by the particular case, insulin is indispensable for its control, since insulin is the specific hormone responsible for complete utilization of sugar in order to transform it into body energy. However, many patients who have diabetes, especially if in a mild form, can be treated effectively by proper regulation of the diet alone. Even when insulin is necessary, most authorities agree that adjustment of the diet is essential, since the beneficial effects of the insulin appear to be nullified to a considerable extent if the diet is not regulated to meet the needs of the particular patient.[50]

In the treatment of diabetes, whether insulin is necessary or not,

> . . . The aim is at the highest possible degree of vigor of mind and body, so that adults may pursue their usual occupations with customary energy and children may develop normally, attend their schools, and enjoy their play. Also, resistance to infection must be maintained at the highest possible level. To effect these objectives adequate food energy (calories), adequate protein and liberal amounts of the several indispensable vitamins and salts must be provided, while aggravation of the disease is prevented by using insulin when necessary, but always with due care to avoid overdoses and consequent reactions. Satisfactory results can be insured only by planning the diet with care and measuring the foods. When the intake varies too widely from day to day, accurate treatment with insulin is impossible.[51]

It should be emphasized that

> Appropriate treatment promises life to the diabetic child; it rescues the adult from the prospect of irreparable

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[50]Colwell, Diabetes Mellitus in General Practice, p. 97.

[51]Wilder, op. cit., p. iv.

> organic changes and creates a justified hope for a life of usefulness and service where the abyss of despair once prevailed. The object of the treatment should be to restore and maintain physiological blood sugar values, to correct and prevent glycosuria and acetonuria, to secure normal nutrition, and by virtue of these accomplishments, to restore the patient to a normal sense of well being with courage, ambition and ability to carry on a useful existence. Diabetes should be considered an incurable disease and in consequence treatment is lifelong.
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> Failure to secure treatment, no matter what the reason, be it through ignorance or neglect, promotes the development of incurable distressing complications and premature death. [52]

Treatment by diet.—Every diabetic patient relies to some extent upon restrictions in his diet in order to attain successful control of his ailment. Flexibility of the diet to meet individual needs and the particular degree of severity of the disease is essential. It will be a surprise to some persons to learn that diabetics require neither more nor less food than non-diabetics in order to perform the same work, provided the diabetes is under control. [53]

Unquestionably, diet is the most important single factor in the treatment of the disorder. For several years after the discovery of insulin, diet was often regarded as being subordinate to insulin, both by physicians and by patients. Time and experimentation, however, have proved the fallacy of this theory, for it is now recognized that the diabetic who survives twenty years by virtue of insulin is the

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[52] Duncan, op. cit., p. 749.

[53] Ibid., p. 750.

diabetic who suffers from the degenerative ravages of the disease—that is, if he depends upon insulin alone without careful regulation of his diet. On the other hand, the patient who has diabetes for twenty years or longer and keeps it under control by careful diet as well as by insulin seldom suffers any ill effects from his disorder, regardless of its long duration.[54]

In the treatment of diabetes, three basic types of diet are widely employed. Each of these diets may be used with or without insulin, as the particular case may require:

1. Desugarizing diet, used to reduce high sugar levels to normal in patients who are capable of responding without insulin.

2. Maintenance diet, used more or less permanently after desugarization has been satisfactorily achieved.

3. Reducing diet, used for weight reduction as well as for the control of diabetes.[55]

Obviously, the desugarizing and the reducing diets remain somewhat specialized in purpose and are therefore not so widely employed as is the maintenance diet, which is the standard method for managing most cases of diabetes. Even this diet, however, has wide variations to meet the needs and requirements of individual patients.

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[54]Tangney, op. cit., p. 103.

[55]Colwell, Diabetes Mellitus in General Practice, p. 97.

According to authorities, approximately half of all persons with diabetes mellitus can be treated with diet alone, thus producing satisfactory control of sugar in the blood and in the urine. Since diabetes ranges in severity from that which is so mild that it is barely recognizable to that which is so far advanced that life is impossible without insulin, it is reasonable to expect that a large proportion of the diabetic population can be treated satisfactorily without insulin and without nutritional penalties.

In the main, the shorter the duration of diabetes, the less severe it is. Many exceptions occur, especially in childhood and youth, but it is generally true that regulation of the diet alone is sufficient to control diabetes that is discovered early in its course. In general, the older the patient at the onset of diabetes, the better are the chances of satisfactory regulation of sugar metabolism without the use of insulin. Often, laboratory examination reveals cases of diabetes in whom the usual symptoms are either non-existent or so mild that they scarcely have been noticed. Diet usually will control such cases. Persons who are excessively overweight are usually mild diabetics. The fact that loss of weight has not occurred proves the mildness of the disease in these cases, who usually can be dealt with satisfactorily by diet restriction. Often, when weight is reduced, the diabetes in these persons improves, and if insulin was necessary to begin with, it may no longer be needed when the weight is reduced. The

only sure way of determining whether insulin is necessary is by chemical analysis of blood and urine, since insulin is prescribed on the basis of the percentage of sugar in the blood and urine.[56]

The only effective diet prescription is one which specifies which foods can be used and how much of each of them is allowed. The best means of accomplishing this is to weigh all foods by the metric system, especially when the diet is first begun. This plan is rather tedious, and soon it becomes possible to estimate food quantities, thus avoiding technical measurements and putting into practice a satisfactory compromise between accuracy and convenience.[57]

Until a few years ago, every phase of the diabetic diet had to be carefully weighed. The most modern diabetic diets, however, provide for such a high carbohydrate content that quantities may be carefully estimated by means of household measuring devices. The size of the portions should conform in all instances to the specific instructions of the attending physician, and quantities should not be varied under any circumstances unless the doctor advises such changes.[58]

In pre-insulin days, the diabetic's meals were a tasteless nightmare of high-fat, starchless, sugarless foods. Spinach eaten three

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[56]Colwell, Types of Diabetes Mellitus and Their Treatment, pp. 24-27.

[57]Ibid., p. 27.

[58]Collens and Boas, Helpful Hints to the Diabetic, p. 111.

times a day was not unusual. Today the diabetic still has to keep careful watch on what he eats, but he may include satisfying amounts of carbohydrates, fats, and even sugars provided he keeps his weight down and adjusts his insulin intake according to the foods that he eats.[59]

During the first World War (in pre-insulin days), the number of deaths caused by diabetes dropped markedly in those countries having food shortages, and rose again as normal food supplies became available after the war. Thus, when food was sufficient, persons who had diabetes were eating themselves to death, so to speak, as their intake of food was too great to be absorbed by their deficient insulin supply. In view of the accumulation of excessive sugar in the blood and urine, diabetic patients formerly were subjected to mild starvation, which was particularly dangerous for children who often were unable to survive because of a state of acute malnutrition. Since 1922, however, following the momentous discovery that insulin extracted from other animals can be artificially supplied to the human body, diabetics may lead virtually normal lives.[60]

If the doctor has a fair knowledge of the kinds, quantities, and nutritional values of the various foods, he can prescribe a palatable weighed diet for his diabetic patients. At the same time he must teach

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[59]Walker, op. cit., p. 22.

[60]Scheinfeld, op. cit., p. 125.

the patient to follow such a diet. Ordinarily, if a quantitative diet is skillfully prescribed, it will be followed by the intelligent patient, but an awkward, monotonous, or unpalatable diet will soon be abandoned and possible good results lost.

Another device which insures palatability and willing acceptance of the diet is the use of substitution food tables to provide variety in the diet. A rigid, monotonous diet usually will not be followed long. Since nutritive values of almost any food can be determined readily, exchanges of foods can be provided, thus increasing enjoyment of food through variety and taste appeal.[61]

> The quantity and quality of foods are of vital importance in controlling diabetes. Doctors allow the patient enough food to contain a definite amount of proteins, fats, and carbohydrates, in addition to vitamins and minerals, to satisfy his appetite. The absence of any of these food factors may aggravate diabetes and may make the patient susceptible to other ailments, such as skin, intestinal, or kidney disorders. It is necessary for the diabetic patient to include in his diet all important foods, but in controlled and definite amounts.[62]

Patients should receive careful instruction regarding not only the qualitative and quantitative restrictions of their diet but also concerning the component parts of diet and the functions of various foods. Instruction must be simple, positive, and within the knowledge and experience of each individual.[63]

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[61]Colwell, Diabetes Mellitus in General Practice, p. 89.

[62]Sindoni, op. cit., p. 21.

[63]Tangney, op. cit., p. 140.

Treatment by insulin.—Insulin, in partnership with the suitable regulation of the food supply, is the secret of successful control of diabetes mellitus. The more severe and complicated forms of diabetes require the steady use of insulin in addition to the quantitative prescription of food allowances.[64]

Insulin is an anti-diabetic hormone, a protein, which contains at least nine amino acids, and is produced by the islands of Langerhans cells in the pancreas. In mammals the pancreas, so far as is known, is the only organ which manufactures or stores insulin. When the insulin supply of the body is inadequate for maintaining proper metabolism, commercially prepared insulin obtained from the pancreases of slaughterhouse animals may be injected intravenously or subcutaneously to reduce the blood-sugar level, to restore the body's ability to utilize sugar in producing sufficient body energy, and thus to bring about the disappearance of sugar in the urine.[65]

Diabetes, as has already been pointed out, is primarily the result of the improperfunctioning of the pancreas, a small tongue-shaped organ just behind the stomach, whose function is to manufacture two secretions. One of these secretions is released into the intestinal canal, the other into the bloodstream. The one which enters the blood is called insulin.

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[64]Colwell, Types of Diabetes Mellitus and Their Treatment, p. 48.

[65]Duncan, op. cit., p. 759.

During the process of digestion, sugars, starches, and some fats and proteins are turned into glucose, a special kind of sugar that the body "burns" for fuel. Any unburned glucose is stored, as fat or glycogen, in the liver or the muscles of the body. But neither the burning process, which provides energy for the body, nor the storing away of glucose can occur without the assistance of that second secretion from the pancreas, insulin. No one knows exactly why this is true.[66]

Many people have the erroneous conception that insulin, once it is begun, can never thereafter be discontinued. They regard insulin as a habit-forming drug—an absolutely false idea. In the first place, insulin is not a drug; and in the second, it is not in any way habit-forming. When one begins using it, this does not necessarily mean that he must always use it. In mild cases of diabetes, the probability of being able to do without insulin later is greatly increased by taking insulin whenever sugar is present in the urine, because such procedure protects the pancreas against further injury. In severe cases patients may always require the injection of insulin, because in them the pancreas may never be able to produce enough insulin to sustain life. Before commercial insulin became available, severe diabetic cases soon experienced death.[67]

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[66]Walker, op. cit., p. 21.

[67]Wilder, op. cit., pp. 16-17.

> . . . with what is known today about the treatment of diabetes, deaths from it are needless. Ignorance and carelessness account for most of them. Insulin, properly used, not only saves lives; it also restores health by enabling the diabetic to eat the good, wholesome food he requires for satisfactory nutrition. Its self-administration with a hypodermic syringe and needle is no more burdensome and takes no more time than brushing the teeth, nor is it more painful if properly performed.[68]

Educational Program for the Diabetic

At the beginning of his treatment following the diagnosis of diabetes, each patient must be made to understand that his disorder is a lifetime disease and that his only hope for improvement and even for continued life itself is to follow a rigid schedule of diet and/or insulin injections demanded by his particular case. Some persons, especially parents of children with recently diagnosed diabetes, resent the doctor's insistence that the difficulty, in all probability, is for life, and they often make numerous futile attempts to locate a cure by unorthodox methods. Meanwhile, the disease, for lack of proper treatment, grows worse, and the patient may have to pay a lifelong penalty for refusal to accept the fact that his condition is a permanent one. Thus diabetes in its moderate or mild stage may lapse into a severe case, whereas immediate and proper care might have arrested it in its early stage and kept it there for the duration of life. Unless the diabetic and his family accept the fact that his disease is virtually incurable,

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[68] Ibid., p. 8.

carelessness and experimentation with diet and insulin inevitably follow the first improvement resulting from proper care, and irreparable damage which could have been prevented by better understanding often results. Therefore, it becomes the responsibility of the conscientious physician to convince the patient that established diabetes mellitus in its common form is likely to be permanent and that treatment must be continuous and uninterrupted.[69]

> After diabetes has made its appearance spontaneously in unmistakable form, it seldom disappears. The incurability of the disease is well known. Occasional instances of transient diabetes appear, and meticulous treatment of early cases sometimes results in such marked improvement that the patient eventually dies of some other condition before diabetes reappears. The diabetes which often accompanies other endocrine disorders, such as hyperthyroidism, acromegaly and tumors of the adrenal cortex, not uncommonly vanishes after correction of the primary endocrine disorder. Usually, however, it must be presumed that once spontaneous idiopathic diabetes arrives in any considerable degree of severity, it will always remain, although it may improve markedly with treatment.[70]

When diabetes has once made its appearance, it persists, with rare exceptions, for the balance of the patient's life. There is no known method of cure, although improvement and satisfactory control may be brought about with such success that the patient may lead a normal life. It is highly essential for all diabetics to understand the permanent nature of this disorder, for there is a great temptation for them to assume that excessive sugar in the urine (glycosuria) which

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[69]Colwell, Diabetes Mellitus in General Practice, p. 78.

[70]Ibid., pp. 77-78.

is discovered accidentally and which responds readily to diet regulation is transient, is due to diet indiscretions, and is of no lasting importance. Much diabetes which could easily be kept in a mild and harmless stage is permitted to become severe because of indifference toward the excessive sugar that occasionally is found in the urine. Especially is this true if the usual symptoms of the disorder are lacking or are so minor as to go unnoticed. Physicians rate more responsibility than patients in this matter of neglecting mild diabetes, for they often fail to emphasize to the patient whose mild diabetes is easy to adjust, that his ailment is permanent and that it must be properly managed without interruption if it is to continue in its initial harmless stage. All too frequently the disease is considered in a casual manner because no harm has yet come to the patient, and his excess sugar clears up with little or no effort. Doctors as well as patients must be made to realize the extreme danger of careless treatment of a mild case of diabetes. Possessing this realization, the doctor then has the responsibility of convincing the patient of the true nature of his disease and of the consequences of proper treatment and of the disastrous results of non-treatment.[71]

The thorough education of diabetic patients is essential to favorable progress and to the maintenance of life. However, the combination

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[71] Ibid., pp. 40-41.

of excellent prescription and admirable instruction cannot always cope with low intelligence or with a long-persistent and structural type of emotional instability which some individuals possess. In spite of these exceptional cases, though, education of the patient remains the most satisfactory and tangible approach to the prolongation of the lives of diabetic patients.[72]

Patients should understand the pattern assumed by diabetes at its various stages. This knowledge has been briefly stated as follows:

> 1. Diabetes is inherent and begins at birth.
> 2. Before it is recognized in clinical practice, it progresses through a stage, the magnitude of which is fully as great as that of the known diabetes which follows recognition.
> 3. The rate of its progress is indicated by the age at which it is recognized. The earlier it appears, the more rapidly it progresses. It is probably more nearly correct to say that the more rapidly it progresses through its unrecognized stage, the earlier in life it appears.
> 4. During the first few years after its recognition, it tends to improve temporarily, probably as a result of treatment.
> 5. For this reason it is important to recognize it early and to treat it meticulously. Temporary improvement could become permanent, as indicated by animal experimentation, if mild diabetes were taken as seriously as severe diabetes and if the idea of protection from permanent islet [pancreatic] damage were entertained.
> 6. After 10 years or more of known existence, there are indications that it may show progressive and permanent improvement.
> 7. These rules frequently appear to be violated in aged diabetics, probably because of chronic complications.[73]

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[72]Tangney, op. cit., p. 6.

[73]Colwell, Diabetes Mellitus in General Practice, pp. 47-48.

Whether treatment is received in a hospital, at home, or at a doctor's office, at the beginning there should be daily lessons of instruction concerning the nature of the disease and the manner of managing it to the best advantage. The patient is at school to learn how to save his life and how to live it to the fullest extent possible. The educational program can be carried out by means of classroom instruction when there are several diabetics ready at the same time to receive the needed information, by supervised study of books and pamphlets, by example through observation of other patients who have already mastered the necessary knowledge and techniques, or by all three methods combined; but education in one way or another the patient must have, and it must be of a sort suited to his comprehension. Time should be taken at the beginning of treatment to describe thoroughly to the patient the plan of procedure to follow in gaining control of his diabetes and the necessity of his being under close observation until the urine is sugar-free and until he understands how to keep it so. The diabetic patient should be made to realize that he has lessons to learn and that if he will learn them well, he need not worry about coma, reactions, gangrene, carbuncles, or the many types of infections which often accompany diabetes which is not adequately controlled.[74]

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[74]Joslin, Root, White, and Marble, op. cit., p. 290.

In discussing his specialized practice and experimentation with diabetes, together with the most modern methods of treatment developed by all specialists in the field, Colwell indicates that knowledge of a serious disorder such as diabetes develops so rapidly that much of present-day practice and experience may be subject to radical modification within a few years, especially in the therapeutic fields. He goes so far as to express the hope that the disease itself will, before long, become unimportant as a result of curative or preventive measures which are likely to be developed in the future and on which many specialists are now working in the hope of conquering this incurable disease.[75]

The educational program and equipment for the diabetic should contain the following items:

1. Nature of diabetes mellitus
   a) Probable hereditary origin
   b) Permanence of the disorder
   c) Mechanism of production of glycosuria and common symptoms
   d) General principles of control of sugar balance (Include pertinent points regarding normal nutrition)
2. Weighed diet
   a) Use of food scales and practice in weighing in grams
   b) Reading the diet requisition
   c) Use of food groups for selection of standard foods prescribed in diet requisition
   d) Use of substitution food tables for variety in diet
   e) Explanation of meaning of terms: carbohydrate, protein, fat, calories, glucose, acidosis

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[75]Colwell, Diabetes Mellitus in General Practice, p. 11.

f) Instruction in method of diet calculation (if intellectually able)
g) Use of saccharin and fruits canned without sugar
h) Use of supplementary vitamins

3. Urine testing methods
   a) For sugar (Benedict's or Haines's solution or Clinitest tablets)
   b) For diacetic acid (ferric chloride test)
   c) Keeping routine records of tests
4. Insulin technic (omit in cases managed by diet alone)
   a) Care of syringe, needles and insulin
   b) Sterilization of syringe and needles
   c) Filling of syringe and measurement of dosage
   d) Explanation of importance of correct type and strength of insulin at all times; instruction regarding mixing of insulins if mixtures are used
   e) Injection of insulin, including importance of rotation of areas of injection
   f) Cleaning and preservation of syringe, needles and insulin
5. Insulin shock or reactions (omit in cases not using insulin)
   a) Most common time of occurrence, according to type of insulin used
   b) Symptoms and accompanying sugar-free test of urine
   c) Methods of obtaining relief and prevention of future reactions
6. Care of skin and feet: instruction designed to prevent injury, infection, dryness, burns, friction and interference with circulation
7. Equipment
   a) Notebook containing diet requisitions, standard food groups, substitution food groups, recipes, written instructions for urine tests, and such other instruction as is published (including a primer if preferred)
   b) Food scales with table top and adjustable dial (Hansen or Chatillon 500 Gm. capacity preferred)
   c) Urine testing outfit
      Haines's or Benedict's solution or Clinitest outfit
      10 per cent ferric chloride in water
      Test tubes, medicine dropper, rack and holder
      Source of heat such as alcohol lamp or Sterno

d) Insulin injection outfit
Syringe: 1 cc. graduated into tenths preferred
Needles: no. 27, 3/4 in. for injecting and no. 25, 1/2 in. for filling preferred
Alcohol: isopropyl or 50 per cent ethyl preferred
Portable carrying case for insulin outfit
One vial of the insulin to be used[76]

Complications Resulting from Diabetes

At one time a diabetic's life expectancy was only five years—grim, hopeless, wasting-away years. Today his chances are excellent of living as long with diabetes, under proper treatment and diet, as he might have expected to live without it. Before insulin came into use, most deaths from diabetes were due to diabetic coma. Today, diabetic coma causes only 3 per cent of the deaths, since a shot of insulin is all that is needed to conquer coma. Arteriosclerosis is now responsible for 66 per cent of all diabetic deaths. Persons with diabetes are far more susceptible to arteriosclerosis than are non-diabetics because of a higher incidence of crystalline deposits in the arteries resulting from the high sugar content of the blood. Even early and proper treatment for diabetes is no guarantee against this hardening of the arteries, which may strike anywhere in the body, but more often in the heart, the brain, the kidneys, and the legs and feet.[77]

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[76] Ibid., pp. 92-94.

[77] Walker, op. cit., pp. 22-24.

Infections of the skin, the extremities, the urinary tract, and the respiratory organs are the most frequent infectious complications occurring in diabetes. No significant difference exists when compared with non-diabetics, however, except that infections occur much more readily when diabetes is out of control, and when blood circulation is hindered by arterial diseases which often accompany diabetes. Also, when infections appear in the diabetic, they are much more likely to spread and are very slow to heal—in fact, may never heal, especially if the disease is not properly controlled. Even minor scratches may become serious infections, even in extreme cases requiring amputation. Hence it is highly important for the diabetic to avoid scratching or injuring himself in any way, since the impaired circulation so often found in this disease may cause the slightest injury to become tragically serious.[78]

The great killer of American people from middle age onward is disease of the arteries, one form or another of arteriosclerosis, commonly called "hardening of the arteries." Its most prevalent form is that which thickens the inner layers of the coronary arteries which supply the heart muscles with blood and lead to their obstruction or blockage, thus making adequate circulation impossible. In uncontrolled diabetes, the progress of arteriosclerosis is much more rapid

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[78]Colwell, Diabetes Mellitus in General Practice, p. 217.

and severe than in non-diabetics or in those whose diabetes is well controlled. At the same time, the prevalence of heart disease in diabetics is alarming, probably due to heart injury in its efforts to circulate the blood in spite of arterial obstructions. On the other hand, when diabetes is well controlled by modern methods and proper treatment, heart disease and arteriosclerosis do not progress any more rapidly than in non-diabetics.[79]

One of the gravest complications of diabetes is that of acidosis or diabetic coma, in which the patient may lapse into complete unconsciousness when sugar accumulates to such an extent that the absorptive functions of the cells and tissues of the body are paralyzed. Before insulin, coma was almost always fatal, but now a shot of insulin will bring quick relief. The chief danger of coma occurs with young children who are not known to be diabetic. When they become unconscious, an insulin injection may be long delayed because of ignorance of the patient's condition. Excessive drinking of water, frequent urination, listlessness, excessive appetite, irritability, and breath that smells like ripe fruit are typical symptoms of acidosis.[80] Without insulin, the state of unconsciousness may continue for days, and in all probability will result in death.

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[79]Sindoni, op. cit., Foreword by Charles C. Wolferth, p. ix.

[80]Cecilia Healy Rohret, "The Diabetic Child," Hygeia, XXIII (October, 1945), 760.

> Diabetic coma presents one of the most fascinating, dramatic, yet thoroughly discouraging episodes in the panorama of medical emergencies. Known also as ketosis, acidosis, and acid poisoning, diabetic coma is fascinating because of the metabolic intrigue which it represents; dramatic because in a matter of hours the picture shifts from that of a patient who is critically ill and seemingly moribund with blood pressure and temperature at shock levels to one in which the patient is conscious and co-operative when therapy is timely and correct; discouraging because coma, which is entirely preventable in the known diabetic, represents a break in the continuity of an established treatment.[81]

Coma usually is induced by lapses in diet or by omissions of insulin.

> Insulin is frequently omitted inadvertently even by conscientious patients when they experience nausea, vomiting, or anorexia. The rationale of their decision sounds logical on first consideration, because insulin helps to digest food; when they are unable to eat or retain food, they then conclude that there is no need to take insulin. Experience reveals that the omission of insulin during such an interval is now the commonest cause of coma. Efforts should be doubled to teach all patients that even when they do not eat food, they still require insulin because the body consumes its own tissues. Thus, since insulin is essential to the metabolism of food, whether the food comes from the diet eaten or from the body stores, insulin should never be omitted as an emergency procedure. The dose of insulin may be reduced, but it should never be omitted without careful and painstaking study and observation.[82]

Since diabetic coma represents an acute deficiency of insulin in the body, the successful treatment of this condition depends largely upon the prompt administration of what are termed "courageous"

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[81] Tangney, op. cit., p. 145.

[82] Ibid., p. 151.

amounts of insulin. Three hundred units of insulin given within the first three hours of treatment are of more value in saving the patient's life than the same dosage would be if administered over a twenty-four-hour period, as the rapid intake of large amounts begins at once to correct the excessive acid condition of the body.

In certain specialized cases, when the body has lost too much chlorides or when blood sugar is at a low level, solutions of sodium chloride and/or glucose may be injected intravenously or subcutaneously as a relief measure to cure coma, in addition to large dosages of insulin, which is always essential in combatting diabetic coma.[83]

The principal complications, then, which may be expected when diabetes is not properly controlled, are infections that are slow to heal and which may eventually become gangrenous; arteriosclerosis, which prevents the free circulation of the blood and thus fosters gangrene and non-healing of infections; and diabetic coma, which results when the diet is not observed carefully or when insulin injections have been omitted. There are many other complications, as well, but these three are the most prevalent and are more or less the basic ones out of which others may develop.

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[83] Ibid., pp. 153-154.

CHAPTER III

DIABETES IN CHILDHOOD AND YOUTH

Fortunately, diabetes in childhood is relatively rare. However, it may occur at any age and has been diagnosed even at birth, and it is found among children with sufficient frequency to render it a major problem for doctors, pediatricians, parents, and the patient himself, who is faced with a lifetime of rigid diet control and regular insulin injections if he is to live his normal life span with efficiency and comfort.[1]

Tangney has pointed out that approximately one in every 8,000, or a total of some 25,000 children develop diabetes annually before the age of fifteen years. In 1947 it was estimated that there were some 40,800 diabetic children in the United States.[2] White made a similar analysis in which she concluded that, out of every 8,000 children in the United States, one becomes diabetic each year. In 1922, the end of the pre-insulin era, an average of 1,080 children under fifteen years of age were dying each year of diabetes. This number has now

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[1] William S. Collens and Louis C. Boas, The Modern Treatment of Diabetes Mellitus, p. 222.

[2] Mary E. Tangney, Diabetes and the Diabetic in the Community, p. 200.

declined almost to the vanishing point due to the use of insulin in the control of juvenile diabetes. There are approximately as many children who have diabetes before age ten as there are men and women who have the onset of the disease after age seventy. Unlike adults, in which many more women than men have diabetes, there are approximately the same number of cases of the disease in each sex of children.[3]

Symptoms and Onset of Juvenile Diabetes

In about 65 per cent of the cases, diabetic patients who are children or young people experience an abrupt onset of the disorder or one which can be dated definitely within a two-month period. In contrast, among middle-aged and older patients, the beginning of diabetes is usually so gradual that it cannot be definitely established. Among these persons, the disease is usually discovered only by means of routine urinalysis, because, if symptoms do exist, they are usually so mild that the patient does not seek medical advice concerning them. In other patients above forty years of age the doctor is consulted only when some common diabetic complication arises, such as an infection or a sore that will not heal, thus indicating that the disease has been present but unrecognized for years. Children are often brought to

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[3]Priscilla White, Diabetes in Childhood and Adolescence, pp. 60-61.

the doctor by parents who are concerned because the children are failing to gain weight or strength or may even be losing weight in spite of a great "improvement" in appetite.[4]

Joslin, White, and other specialists have classified the types of onset of diabetes in children as follows:

1. Indefinite, when no close relationships of symptoms can be found.

2. Gradual, if the symptoms have developed in the course of a two-month period.

3. Rapid, if in the course of seven days.

4. Sudden, if on a particular day.[5]

This metabolic disorder in children is diagnosed by the same means as in adults—by excessive sugar in the blood and in the urine. Other symptoms, too, are the same: excessive thirst, frequency of urination, great hunger, and loss of weight. One or more of these symptoms is almost invariably present in the youthful diabetic, and often several of them are found in combination.[6]

> Examination of the child diabetic does not usually reveal any abnormal physical signs except those of wasting and dehydration in varying degrees. If uncompensated acidosis has developed, he will show signs of dehydration, hyperpnea, hypothermia and a sluggish mental

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[4]Russell L. Cecil, A Textbook of Medicine, seventh edition, p. 697.

[5]White, op. cit., p. 64.

[6]Tangney, op. cit., pp. 200-201.

> behavior. One may occasionally find that the liver is enlarged and firm due to fatty infiltration. The laboratory examination of both the blood and urine will reveal the characteristic findings of a severe form of diabetes. This is the picture of the newly discovered juvenile diabetic.[7]

The child who suddenly develops the habit of bed-wetting after having overcome this infantile trait earlier in life should be suspected of being diabetic. This habit is a characteristic juvenile manifestation of the common symptom of frequent urination which occurs in all diabetics regardless of age. In addition, the diabetic child may experience abnormal thirst and excessive hunger, along with weakness and loss of weight. If the child is lethargic and does not enter freely into play activities, this trait is sometimes an indication of diabetes. Thus, the symptoms for children are the same as those for adults.[8]

Another authority in this field has pointed out that, although symptoms of diabetes are similar in children to those in adults, they usually are more pronounced, have a more rapid course, and are more definite in character. Diabetic children are not always overweight, but are actually prone to be taller and thinner than average. The youthful diabetic may, almost over-night, become emaciated from loss of weight, have increased appetite and thirst, and frequent urination. Occasionally there is a sudden loss of appetite, and loss of weight

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[7]Collens and Boas, The Modern Treatment of Diabetes Mellitus, p. 222.

[8]Ibid.

may amount to as much as five to eight pounds or more each month. Thirst may be so extreme that several pints of water are consumed every day. Bed-wetting is common, and often is the first symptom. In children, as in grownups, diabetes may develop slowly without symptoms and be discovered only by chance examination of the urine. On the other hand, it may make itself known suddenly by means of coma.[9]

Diabetes in children is always of a rather severe type, since the fact that it develops early in life indicates something of its severity in view of the fact that most diabetics are middle-aged or elderly before their disease becomes apparent. Among children, excessive sugar in the urine is bound to be present, together with a similar condition in the blood. Other symptoms include skin infections, boils, impairment of vision, pains in the muscles of arms and legs, drastic changes in personality, and apparent lack of capacity for school work. Along with these there is usually a history of loss of appetite or of excessive appetite, nausea, vomiting, shortness of breath, and possibly loss of consciousness. It should be borne in mind that, as with adults, these symptoms do not necessarily mean that diabetes is present; only laboratory examination of the blood and urine can settle that question once and for all. As with adults, also, the usual symptoms

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[9]Anthony M. Sindoni, Jr., The Diabetic's Handbook, pp. 72-73.

may be lacking, and the first intimation of diabetes may occur when the child lapses into a state of coma.[10]

Coma occurs among diabetic children with far greater frequency than among diabetic adults, primarily because of (1) more frequent lapses in dietary control, (2) more errors or omissions in the administration of insulin, and (3) greater susceptibility to minor infections. It should be recognized that this condition of semi-consciousness or of total unconsciousness is a serious one which requires emergency treatment, since it is true that

> . . . untreated diabetic coma still plays the major role in the mortality of the unvenile diabetic. This remains true although it is evident that the prognosis for recovery from coma in the young patient is good and the fatalities result largely from the failure of those who care for the child to realize that an emergency may arise in diabetes, fundamentally a chronic disease. The child who has diabetic coma is as much an emergency patient as one who has an acute appendix or diphtheria, and his recovery, as with these other patients, depends upon the promptness with which treatment is instituted.[11]

Treatment and Control of Diabetes in Children

Unlike that of adults, the onset of diabetes in children is characterized by acuteness and severity. The growing body of the child breaks down quickly when severe dehydration occurs and when essential

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[10]Garfield G. Duncan, Diseases of Metabolism, second edition, p. 868.

[11]White, op. cit., p. 150.

nutriments are lost in the urine, as they are in untreated diabetes. Blood-sugar levels in diabetic children, even when they are receiving good treatment, experience wide variations during brief periods of time. Since the child is physically smaller than the adult, and at the same time more active, he is not always able to store enough glycogen in his lifer to take care of his varying physical activities. Therefore, his blood sugar may fall to abnormally low levels three or four hours after he has eaten a meal unless he has small carbohydrate lunches between meals. Even though the diabetic child experiences excessive lowering of blood sugar before meals, his blood sugar often rises to excessive heights immediately after meals. Such wide variations in blood-sugar levels rarely occur in so short a period in adult diabetics.

The diabetic child, even before he develops known diabetes, is frequently precocious in physical and mental development. He usually walks and talks sooner than his non-diabetic sisters and brothers, and his mental age is likely to be above normal for his chronological age. Precociousness and mental superiority should not be accepted, however, as an indication of diabetes or of diabetic tendencies. The simple fact is that most diabetic children are to be found within the superior group, although many others within this group will never have the disease.[12]

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[12]Tangney, op. cit., pp. 201-202.

As in adulthood, the treatment of diabetes in childhood consists of insulin, diet, and education. When the patient is a child, his parents receive most of the education since the young child, though he may learn quickly, does not possess the wisdom required in order to apply the facts over a long period of time.[13]

Hospitalization of the juvenile diabetic patient is highly beneficial for initial instruction and treatment following diagnosis of the disease. In all cases where possible, the period of hospitalization should be reduced to as short a time as is feasible—perhaps a week, on an average—in order that diet, insulin, and urinalysis techniques have been mastered either by the child or his parents, preferably by both, and that the patient and his parents are sufficiently well informed to recognize the seriousness of the disorder and the necessity for following a careful schedule of diet and insulin administration. Partially because of economic reasons, the stay in the hospital should be as brief as possible; but the fact that the hospital is lacking in opportunity for the young patient's normal exercise is a real handicap in the treatment of a disease in which it is generally known that diet, insulin, and exercise constitute a trio in which each is essential and supports the others. As soon as possible, then, the child should be allowed to resume his normal physical activities, supported now by insulin and planned diet.[14]

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[13] Ibid., p. 202.

[14] White, op. cit., p. 128.

Unfortunately, there are as yet no standardized procedures for the treatment of juvenile diabetics, since there are several schools of thought regarding the matter, ranging with respect to diet from low-carbohydrate under-nutrition diets to totally unrestricted diets. The ideal aim of treatment should be to re-establish as normal a metabolic state as possible. The patient should be given help in utilizing a mixed diet in a normal manner so as to provide him with his requirements for energy and growth and to supply him with materials to replace those lost in the wear and tear of tissues. In other words, all efforts to provide effective treatment consist in supplying the patient with quantities of carbohydrates, proteins, and fats equal to those required by the normal child and to use insulin in such a way as to make it possible for him to derive full benefit fromthese food components. Treatment is considered satisfactory if the patient is protected from the toxic effects of insulin overdosage, the urine is kept as free from sugar as possible, and blood sugar is maintained close to the normal level. Any diabetic diet should be sufficient to satisfy the normal appetite for carbohydrates, therefore removing the temptation for the child to pilfer food and to break his diet in a dangerous manner.[15]

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[15]Collens and Boas, The Modern Treatment of Diabetes Mellitus, pp. 223-224.

Diabetic children must be saved from coma and early death, and every effort must be made to prevent infections. Although each case is an individual one, in most instances initial treatment can be accomplished best by a period of hospitalization, thus making available special facilities, laboratories, skilled workers and technicians, dietitians with scientific knowledge of foods and of the proper portions of various food materials, and experienced general care in hygiene and diabetic education.

While in the hospital the child is not being considered "sick" or as a "bed patient" except for prescribed periods of rest and sleep. Otherwise, it is best to keep the child active, like non-diabetic children, in so far as the facilities of the hospital will permit. After a careful examination is made, including complete physical and laboratory studies, the child is placed on a diet of known quantity and composition based upon his age, height, weight, and physical responses. Insulin is almost invariably prescribed for juvenile cases.

Some authorities recommend the testing of all urine passed during the day while the child is hospitalized following diagnosis. Others say that it is sufficient to test from four to six specimens of urine passed from early morning until bedtime. Regardless of the frequency of urinalysis, a careful record of each testing must be kept, and both diet and insulin may be varied from day to day in accordance

with the quantities of sugar appearing in the urine, until the treatment is standardized; that is, until the diet and insulin are able to maintain normal blood and urine sugar levels.

After a certain period, usually a week or ten days of experimentation with diet and insulin, the child is found by clinical testing to be "adjusted" or "stabilized." This means that the blood and urine sugars are normal, since the amount of insulin being injected is exactly enough to derive proper energy from the quantities of food being eaten. After this state of stability has been attained, the diabetic child may return home, but extreme care must be taken that the right amounts of insulin are used when prescribed, and that quantities of food for each meal do not vary to any appreciable degree. When daily urine tests reveal the presence of excessive sugar again when the patient has been carefully following his diet, the doctor should be consulted for an adjustment in either diet or insulin, or both.[16]

Before 1922, a diabetic child was an object of sympathy and sorrow, for his life was extremely limited. Now, however, with insulin and modern diet therapy, the juvenile diabetic can live a normal life. As one specialist in the treatment of the disease has written: "I really think that a child who has diabetes is often healthier than a child who does not have it, because he must follow a sensible diet

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[16]Sindoni, op. cit., pp. 73-74.

and lead a well-regulated life."[17] When these factors are considered, it becomes apparent that the diabetic child may even be benefitted by the presence of his ailment.

Use of Insulin with Juvenile Diabetics

After insulin was made generally available in 1921-1922, all diabetic children had a chance to live, in spite of their diabetes. Before that time, young diabetics lingered only a year or two and then wasted away, usually dying in coma. Protamine zinc insulin, developed in 1936, permits a child to live, work, and play without any sign or symptom of diabetes. Under normal conditions, all that is needed is careful attention to diet and a daily injection of insulin.[18]

The junior patient should be treated with unmodified (ordinary) insulin for a period of from ten days to two weeks after the beginning of treatment. By this time it will be known whether he is experiencing any allergic reactions to insulin. If such reactions are noted, suitable therapy should begin at once. All indications of allergic reactions should disappear before the patient is given protamine zinc insulin.

By the end of the initial try-out period with unmodified insulin, if diabetes is showing improvement and if no allergic tendencies have

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[17]Cecilia Healy Rohret, "The Diabetic Child," Hygeia, XXIII (October, 1945), 761.

[18]Lewis J. Burch and Isabella C. Miller, "Diabetes in Childhood," Hygeia, XXVII (November, 1949), 760.

appeared, a shift may be made to protamine zinc insulin, which is ideal for the management of the juvenile diabetic. If the young patient at this stage requires less than twenty units of insulin per day, the entire dose may be given each morning before breakfast. If daily requirements are more than twenty units, the greatest insulin efficiency may be obtained by giving both unmodified and protamine zinc insulin in separate injections before breakfast.[19]

All diabetic children, with very rare exceptions, require insulin, which should be started on the very day of positive diagnosis. Insulin for diabetic children is imperative, since their diet should not be reduced to one of low caloric content because such children are usually underweight and overheight, in contrast to the diabetic adult, who has a tendency to be obese. The use of low caloric diets in order to avoid the necessity for insulin will increase children's state of malnutrition and actually be a threat to their lives.

At the beginning of treatment, the insulin requirement for the diabetic child is relatively small, but it usually rises rapidly during the first three years. Ordinarily, for some time after the beginning of insulin therapy, most children could get along nicely with protamine zinc insulin alone, but eventually they would require both protamine and crystalline insulin. Frequently physicians prescribe both insulins

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[19]Collens and Boss, The Modern Treatment of Diabetes Mellitus, p. 230.

from the beginning, either mixed or in separate injections, thus avoiding the disappointment of the patient and his parents when crystalline insulin is added later. It is easy to understand that if a child starts on one injection and then at a later date begins to require two injections, he and his parents may lose morale by erroneously concluding, even in the face of reassurances from the doctor, that the disease is becoming worse, when actually it is only following a pattern characteristic of juvenile diabetes.[20] Of course, the physician can help to prepare the patient and his family for this additional requirement of insulin by reminding them frequently that it will later be necessary, and by telling them why it will be essential.

After parents have been carefully instructed in regard to the theory and practice of insulin administration, they should then apply their knowledge by giving each other a dose of insulin. After this experience, both parents are better prepared to give insulin to their child. When doing this they should not reveal their emotional reactions, since any indication of squeamishness or abhorrence on their part will make the child feel that he is undesirable or repulsive. The two parents should alternate week by week in giving the insulin, because such a plan will keep both parents in practice and thus insure safety for the child in case one parent becomes ill or is away from

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[20] Tangney, op. cit., pp. 202-203.

home. If only one parent administers all the insulin, the relationship of the other parent to his child will become emotionally and psychologically abnormal, since the child is likely to interpret the situation as meaning that one parent loves him more or less than the other.

Many authorities stress the need for teaching the diabetic child how to administer his own insulin. This, of course, is an admirable goal toward which to work, but giving the child this responsibility must be viewed with grave concern by both parents and physicians. Usually it is not advisable to allow the child to manage his own insulin program until he is at least fourteen years of age. Opinions vary, however, as to the appropriate time when the child may be trusted with his own insulin therapy; and the situation will logically vary with individuals as well.

Often both parents and the diabetic child believe that the juvenile patient is doing nicely under his self-administration of insulin until he suddenly develops coma from having missed his insulin one morning. For many reasons the child may neglect to take his insulin if he is not carefully and constantly supervised. He may frankly forget to administer it; he may think of it but decide to skip it as an experiment, in order to see what will happen; he may not think of it until he is on his way to school and, knowing that he will be tardy if he returns home for it, he proceeds to school; or the child may have

used all his insulin on the preceding day and forgot to let that fact be known in time to obtain another supply.[21]

> Insulin has proven a boon to the juvenile diabetic. There is no question in the mind of anyone experienced in the treatment of diabetes, that the juvenile diabetic should under no circumstances be treated by diet alone. Insulin must be given daily without interruption. The following are the questions which may arise when insulin therapy is started:
>
> 1. What should be the total daily dose?
> 2. How should the dose be divided?
> 3. What kind of insulin should be employed?
>
> The answers to these questions depend upon the clinical picture found in the individual under observation. If the diabetes has just been discovered and the child not yet treated, the physician may find him in a state of uncompensated acidosis.
>
> After the acidosis has been brought under control, the patient is then ready for his diet. At this time he is still to be regarded as a severe diabetic. His insulin requirements should be established on the basis of his being able to utilize at this stage, approximately 3 grams of available glucose for every unit of insulin administered. . . . The available glucose may be roughly calculated as follows: all of the carbohydrate, plus 60 per cent of the protein plus 10 per cent of the fat. This total is then divided by 3 (glucose-insulin equivalent) to obtain the figure for the total 24 hour insulin requirement. Thus, a nine year old child would receive a formula consisting of 250 grams of carbohydrate, 75 grams of protein and 70 grams of fat, which contains 300 grams of available glucose. This would therefore establish the total daily insulin dose at 100 units.
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> We have found from practical experience that it is undesirable to employ protamine zinc insulin at this stage, for two reasons: first, because the tolerance of the juvenile diabetic changes quickly and improves rapidly from day to day at the onset of treatment, necessitating prompt reductions in insulin dosage. It is better to keep pace with these quick changing shifts in tolerance by the use of short-acting, unmodified insulin. Giving protamine zinc insulin early creates a greater tendency to the production of hypoglycemic reactions. Secondly, manifestations of allergic reactions to

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[21] Ibid., pp. 206-208.

> insulin do not appear until about the eighth or ninth day of insulin treatment. It is more desirable to contend with this problem while the patient is receiving unmodified insulin since one may consider transferring the patient to "special insulin." . . .
>
> The administration of 100 units of insulin per day is best given in 4 doses as follows:
>
> 40 units before breakfast
> 20 units before lunch
> 30 units before dinner
> 10 units at 11 p. m.[22]

In contrast to the previous suggestion that children should not be entrusted with their own insulin program until they are at least fourteen years of age, Duncan states that those over ten years of age should be taught to give their own insulin, and should be made aware of the dangers inherent in neglect or inaccuracy in insulin administration. He does caution, however, that parents must be alert to see that the insulin is given at the required times and in the necessary amounts.[23]

Fortunately, with proper insulin treatment, the death rate from diabetes in childhood has fallen to the vanishing point, normal growth in height and weight are to be expected, and the serious diabetic complications are rarely found in the juvenile diabetic whose disease is under adequate control.[24]

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[22]Collens and Boas, The Modern Treatment of Diabetes Mellitus, pp. 225-266.

[23]Duncan, op. cit., p. 879.

[24]White, op. cit., p. 139.

Diet of the Diabetic Child

The diet of the diabetic child is an individualized one, depending largely upon the age of the patient, and therefore requiring frequent changes with the passage of time. A general rule for determining the caloric requirements of diabetic children is simple to use and specific for the requirements of childhood. This rule, subject to modification in individual cases, allows 1,000 calories for the first year and an additional 100 calories for each added year of age. Ten per cent of the total number thus obtained gives the figure for the number of grams of carbohydrate; the fat prescription is approximately half that of the carbohydrate; and the protein is five to ten grams less than the fat.[25]

It is highly important that the diet of a diabetic child must be readjusted at least once each year. Naturally, food requirements increase with age, and emaciation or lack of growth may result if diets are not adjusted as needed to the child's requirements for proper nourishment. Children who are undersized for their age should be given 20 per cent more protein (meat) than those of normal size. In winter months diabetic children should receive three teaspoonfuls of cod-liver oil or its equivalent each day.[26]

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[25]Tangney, op. cit., p. 204.

[26]Russell M. Wilder, A Primer for Diabetic Patients, seventh edition, pp. 80-81.

Diet among juvenile diabetics presents many more problems than the administration of insulin. During the first year of his disease the child usually co-operates remarkably well: he thrives on the praise of his elders and begins to feel superior at his ability to refuse candy and other sweet foods which are offered to him. Usually, however, this period of willing submission is of short duration, for such behavior is not typical of children. Those foods which are denied the diabetic child should not be kept in the house where he can find them and certainly should not be eaten by other members of the family in his presence.

Box lunches for school taken from home are preferable to cafeteria lunches, since the latter do not conform to diabetic diet patterns. Even when lunches are prepared at home, extreme care and considerable effort must be exercised that the child's allowance of carbohydrate is not exceeded. For instance, most children cannot have two sandwiches in their lunch unless the bread is sliced very thin or the crusts removed.[27]

There is no guaranteed, common solution to the problem of diet breaking among diabetic children, but there are several considerations which parents should recognize. The child should not be asked whether he has broken his diet, as this question puts him on the defensive and encourages him to falsify the facts. Parents should

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[27]Tangney, op. cit., pp. 208-210.

discourage tale-telling by other children in the family or neighborhood, as the acceptance of such information causes the diabetic child to feel that he is being constantly "spied" upon. If someone catches him in the act of pocketing a forbidden item of food and scolds him for it, the child is thereby encouraged to lie, for the diabetic child is likely to retort immediately that he was taking it for someone else. Since the accuser cannot prove what the child's original intentions were, he may find himself in an embarrassing position when the child emphasizes his innocence by delivering the food to the person whom he named!

> When the child first breaks diet, only to find that no infirmity resulted, he is not quite so convinced that he ought to be living on a diet. Showing sugar in his urine does not bother him personally; it merely upsets his parents. His next step, that of diluting the urine with water, is obvious and logical. To him, such a procedure offers a happy solution for he now eats the food he wishes, and his tests do not upset his parents. Again, such seemingly strange behavior reveals a perfectly normal trait, the desire to please. Parents should be instructed that thirst and frequency of urination in the presence of a sugar-free test may mean that the urine is being diluted.[28]

Dietary indiscretions must not be occasions for punishment. They happen with adults as well as with children. All a child should be required to do is to report them so that the necessary insulin can be administered to counteract the surplus sugar which otherwise would accumulate in the blood and urine. The specialist in diabetes, Elliott

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[28] Ibid., pp. 215-216.

P. Joslin, M. D., has said: "Never ask a child if he has broken his diet, any more than you would ask a friend if he has been dishonest." The child, however, should be impressed with the importance of observing his diet as carefully as possible, and of making insulin adjustments to care for any carelessness in diet that may have occurred.[29]

Many diabetic children, in order to prevent insulin reaction, require small amounts of carbohydrates between meals, especially in the mornings about two hours after the insulin injection. A small apple or pear or about twenty raisins are often prescribed for between-meal eating. If the child is sensitive about eating in class or if problems arise with other children because of his little mid-morning lunch, the teacher should be willing to excuse him from the room each day to enable him to have his necessary carbohydrates in private. In any case, a note from the physician should be given to both the principal and the teacher, acquainting them with the real necessity of the child's having his small lunch each day at a given time. They in turn should make this possible with the least embarrassment to the child and with a minimum of disruption in class procedure.[30]

The question is often asked, "Should the diabetic child be permitted candies and other sweets?" In answer to this query there is the argument that if the carbohydrate value of candy, ice cream, and

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[29] Burch and Miller, op. cit., p. 761.

[30] Collens and Boas, The Modern Treatment of Diabetes Mellitus, pp. 234-235.

cake were taken into consideration, they could be used as substitutes for other foods in planning the child's menu. This, of course, would make the child very happy. On first thought there appears to be little objection to including confections in the diet of the diabetic child, in spite of the fact that refined sugars are so rapidly absorbed. However, such liberality in diet tends to give the child so much freedom that he will be inclined to indulge in the eating of sweets to such a degree that his diabetic condition will become worse and more difficult to control. Thus, for safety's sake, most young diabetics should be denied confections unless they are made with saccharin or other reputable synthetic sugars.[31]

Here it should be pointed out that "regular exercise is just as important diet and insulin in the routine treatment of diabetic children."[32] The exercise to be participated in, however, should be carefully prescribed for the individual child. Experience has proved it to be practical to prohibit the diabetic child from participating in any form of calisthenics or active competitive athletics at any time before lunch, as he is most likely to have insulin reactions during the morning. It is much safer to permit physical exercise in the afternoon. During the time of physical activity, diabetic children who play hard, as at tennis, bicycle riding, football, basketball, baseball,

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[31] Ibid., pp. 235-236.

[32] Elliott P. Joslin, A Diabetic Manual, seventh edition, p. 193.

and so on, should be allowed additional carbohydrates beyond what are already prescribed in the diet. A practical procedure is for the child to have four ounces of orange juice at the beginning of the exercise, and four ounces again an hour later. If the child exercises strenuously for longer than an hour, this amount of carbohydrates may be taken every hour during the period of physical activity. Instead of orange juice, the child may be permitted sixty grams of ice cream or a bottle of Coca-Cola.[33]

Education and Responsibility of the Diabetic Child and His Parents

Embarrassment and sensitivity because of their disease is a problem often present among young diabetics and frequently in older patients as well. Adolescents especially are prone to exert every effort to keep others from knowing about their affliction. Unjustly, many young diabetics feel a sense of shame because of their disease. At the same time they are living in the period when popularity and social approval are so much desired. Thus they are handicapped bluntly by limitations upon their social life. Groups of children returning home from school often seek refreshment at stores and ice-cream establishments, and the diabetic child who does not wish his friends to know about his ailment finds it necessary to avoid them on

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[33]Collens and Boas, The Modern Treatment of Diabetes Mellitus, p. 235.

the way home from school. When sweets are served at parties, the diabetic child is often confused and embarrassed. Sometimes parents wish to conceal the fact that they have a diabetic child, and thus they are guilty of adding to the child's sense of being "different." Satisfactory dietary adjustments can often be made to permit the child to have fruits, cookies, and occasionally specific quantities of ice cream, provided these foods are carefully planned for between-meal refreshment. Thus the child can be made to feel that he is not living in a world apart, segregated from his friends.

In most instances, frankness concerning diabetes is the best policy, and juvenile patients should be encouraged to face their problem squarely and to tell their friends why they persist in not partaking of certain types of refreshments. True friends will understand and be co-operative if the diabetic child is frank about his ailment, and he will thus be accepted into groups much more readily than if he remained silent about his "queer" habits.

Young diabetics who are having "dates" should always be frank with their friends of the opposite sex concerning their condition. Friendship should never be allowed to flower into romance without a free admission on the part of the diabetic involved. Thereby courtship and marriage can be entered into with a full understanding and with no future shocks in store for an uninformed partner.[34]

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[34] Ibid., pp. 236-238.

Highly important as is the instruction of the juvenile diabetic patient himself as to how his disease can best be managed, of equal significance is the knowledge which his parents should acquire along similar lines. Since the diabetic child often is negligent or forgetful about properly caring for himself, it may become the responsibility of the parents to see that he keeps his diabetes under adequate control. Certainly, whether the child is dependable or not, his parents owe it to themselves and to him to know the nature of his ailment and the methods for controlling it. However,

> Instruction of the parents of diabetic children cannot be clearly outlined since personality, economic position, and educational factors vary from family to family. The instruction concerning recognition, treatment, and prevention of insulin reactions and acidosis may be written, . . . but most of the real problems are best approached by conferences at which are discussed those factors which will enable the parents to anticipate, recognize, understand, and help solve the physical and psychological problems of their diabetic child so that normal parent-child relationships are maintained.[35]

During the first week or two after a case of juvenile diabetes has been diagnosed, the parents—especially the mother, since she will have the major responsibility for the child's care—are given a thorough diabetic education to enable them to give the child proper care at home. This training includes the following:

1. Methods of selecting, measuring, and preparing the diet.

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[35]Tangney, op. cit., p. 206.

2. Giving injections of insulin.

3. Examining the urine for sugar and acetone.

4. Detection of the onset of insulin shock, acidosis, and coma.

5. Directions concerning what to do if these conditions occur.

At the same time, the mother must be taught what types of exercise and physical activity are to be undertaken by the child, what to do about insulin injections and diet during or after mild or strenuous exercise, and the effect of exercise on the diabetic.[36]

Above all, parents should do everything in their power to prevent the child from becoming melancholy and embittered because of his disease. The child should be carefully educated as to the nature and treatment of his disorder, and if he is capable, he should be taught the method of injecting his own insulin and of eating a known quantity of food. If possible, he should be given the responsibility of measuring or estimating his own diet and examining his urine for sugar. He should constantly be reminded that his welfare depends primarily upon himself and to the care that he gives to his ailment.[37]

Parents should guard against diabetic children's becoming self-centered and conceited as a result of overindulgence or sentimentality on the part of adult members of their families. Sincere encouragement

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[36]Sindoni, op. cit., p. 74.

[37]Ibid., p. 76.

is far better emotional food than is pity. The child should be educated as rapidly as possible in the nature and treatment of his disease and learn the two rules that are to govern the remainder of his life: the daily injection of insulin and strict adherence to a prescribed diet. This means that at the earliest possible age he should be given the responsibility for his own welfare, with, of course, the supervision and helpfulness of other members of the family, particularly his parents. Any child of sufficient age and of adequate intelligence can be taught to make his own daily urine examination, take his injection of insulin, keep the daily records, learn the requirements of personal cleanliness, and choose the proper items of diet.[38]

Through actual experimentation, White learned that at five years of age the child can acquire some dietary knowledge and can do the Benedict test for sugar in the urine; and at six years most children can administer insulin with success, but at this early age they should have constant adult supervision. She recommends that children should begin their own injections of insulin as soon as they can be trusted with the responsibility. This age will vary greatly with different individuals, and that is one reason why very young children should be given an opportunity to practice injections so that it can be determined when they are ready to assume responsibility for the task. In support of

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[38]Burch and Miller, op. cit., p. 761.

this contention, White cites the unusual example of a little girl of two years and eleven months of age who was highly efficient at the job of giving herself insulin.[39]

In the experience of a young man who is a diabetic and who has had the disease since early childhood, the education of both parents and the juvenile diabetic himself is of the utmost importance if the disease is to be adequately controlled and the child to enjoy a normal life. This youthful diabetic has written:

> The most important thing in a diabetic child's life is the attitude and intelligence with which his parents approach the problem of living with this affliction. Let the child take his own injections, but retain the skill yourself, just in case something unexpected occurs. Discuss with your doctor —a specialist, remember—the question of sweets. Never make your child fear them. Explain to him that he must tell you what he has eaten away from home, so that you and the doctor can make the proper adjustments in his insulin and diet.[40]

Future Prospects for Diabetic Children

Since insulin has become readily available, the diabetic death rate for the early decades of life has sharply declined until now there are very few deaths from diabetes in the years before middle age. Diabetic children and young people who formerly died at an early age

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[39]White, op. cit., p. 203.

[40]Julian Ginsberg, "What You Should Know About Diabetes," Parents' Magazine, XXIII (November, 1948), 175.

now live to become victims of heart disease, arteriosclerosis, and other ailments of old age.[41] In cases of controlled diabetes these ailments are no more serious, nor is their incidence any greater among diabetics than non-diabetics.

Those persons who develop diabetes in middle or later life, after their occupational patterns are already established, experience little or no change in their work habits. But youthful diabetics must often struggle for an opportunity to demonstrate their ability as capable and reliable workers. Most industrial positions and civil-service appointments exclude diabetics, and many large business firms will not employ them knowingly. Therefore, diabetics who develop the disease in childhood or youth, before they have attained economic independence, tend to prepare themselves for creative and unique positions in which individual talents and personal interests and aptitudes are essential, and in which, because of the absence of marked rivalry, the prejudices of employers are of less significance. For this reason, the social and economic future of the young diabetic seems assured.[42]

There is no reason why diabetics may not marry and enjoy normal family life. They should, however, select with care the one who is to be their marriage partner. Heredity is such a pronounced factor

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[41] Cecil, op. cit., p. 686.

[42] Tangney, op. cit., p. 242.

in diabetes that marriage should not be entered into lightly. Young diabetic adults contemplating marriage are concerned with how their affliction may influence sexual intercourse and child-bearing and with the question of heredity in relation to the disease.

Sexual intercourse is not in any way influenced, one way or another, by the presence of diabetes. Long before any thought of marriage is entertained, however, both the patient and his parents should be informed that the patient should marry one in whom there is no family history of diabetes. Careful study has proved that children will almost certainly develop diabetes if both their father and mother either have diabetes or possess diabetic tendencies inherited from their parents. At the same time, if one parent has diabetes, the child may develop the disease at some time in his life if the other parent is non-diabetic but is a member of a diabetic family. It follows that diabetes seldom occurs in offspring of parents who are non-diabetics and who have no diabetic tendencies through inheritance. Thus, by a process of careful mating, diabetes might be greatly reduced or virtually eliminated in the course of a few generations.

Diabetics contemplating marriage should be informed that a diabetic mother whose disease is properly controlled will experience no greater difficulties in child-bearing and in childbirth than is true of the non-diabetic mother. If her disease is not under satisfactory

control during pregnancy, however, she may develop complications which will be harmful or even fatal to herself and/or to her offspring.[43]

In 1941 Joslin wrote:

> Thirty years ago when I began treating diabetic children, I counted the days they lived. It is hard to believe, but it is true, that now I measure their lives in decades of years and see for myself that thus far there is no limit to their living.[44]

This finding is of utmost importance to all juvenile diabetics, for it holds out to them the expectation of living a normal, active, happy life, in no way shortened by their disease. The secret of this attainment on the part of the diabetic child lies in the mastery of the simple rules for controlling his disorder. If he neglects to practice adequate measures of control, he will pay the penalty in suffering, in the many severe complications that may result from diabetes, and in a substantially shortened life span. If, on the other hand, he is careful to keep his disease under proper control by the prescribed measures of diet and insulin, neither his physical comfort nor his life is in any way jeopardized.

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[43]Collens and Boas, The Modern Treatment of Diabetes Mellitus, p. 238.

[44]Joslin, A Diabetic Manual, p. 196.

CHAPTER IV

A SURVEY OF SOME TYPICAL SUMMER CAMPS FOR DIABETIC CHILDREN

Within recent years a number of summer camps for diabetic children have been established in various parts of the country. All of these camps have the dual purpose of giving assistance and guidance in the control and improvement of the diabetic condition of boys and girls and of enabling campers to enjoy the experience of happy camp life, with all of its fun and adventures, while at the same time receiving constructive help with the care of their physical ailment.

While plans were under way for the organization of Camp Sweeney at Gainesville, Texas, Madge Miller, secretary of the Sweeney Diabetic Foundation, corresponded with the founders and directors of a number of these camps, requesting information in regard to the facilities, program, and plan of operation of these camps. A few of the directors were kind enough to respond with detailed letters describing the operation of their respective camps, whereas numbers of others sent booklets, mimeographed materials, and forms related to their camps. Information derived from these sources served to some extent as a guide for the development of Camp Sweeney and its program.

It is believed that a survey of a few of these typical camps for diabetic children will serve a useful purpose at this point in providing a general knowledge of facilities, programs, and plans of operation of such camps. At the same time, such knowledge may be utilized as criteria in terms of which Camp Sweeney may be evaluated.

Material for the present chapter was compiled from letters and camp publications selected from the correspondence file in the office at Camp Sweeney.

Clara Barton Birthplace Camp

One of the earliest camps established specifically for diabetic children is the Clara Barton Birthplace Camp, located near North Oxford, Massachusetts, on property on which is located the birthplace of Clara Barton, founder of the American Red Cross.[1] This camp offers unusual facilities for diabetic girls from five to eighteen years of age, and enables them to receive complete medical examination and supervision while enjoying the benefits of wholesome camping. The camp is under the personal direction of two of the nation's outstanding authorities on diabetes, Elliott P. Joslin, M. D., and Priscilla White, M. D.

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[1] Information concrrning this camp was taken from two pamphlets, Clara Barton Birthplace Camp, Seventeenth Season, and Clara Barton Birthplace Camp, Eighteenth Season, and from a letter from Mrs. Edward W. Sherman, Jr., director of the camp, addressed to Madge Miller, secretary of the Sweeney Diabetic Foundation, and dated September 14, 1949.

The property of the camp consists of sixty-four acres of land on a country hillside, situated ten miles from Worcester. This beautiful location offers ideal conditions for camping, with adequate buildings, small sleeping cabins, modern sanitary facilities, and up-to-date laboratory and infirmary provisions.

The camp staff is carefully chosen on the basis of leadership qualities, training, personality, and knowledge of girls. One competent resident physician is on duty at all times, and two others serve as consultants with scheduled visits to the camp. Three graduate nurses with training and experience in the care of diabetics are in constant attendance, and two skilled technicians furnish efficient laboratory service. Trained persons are in charge of all housekeeping arrangements, and the preparation and weighing of food is under the supervision of graduate dietitians. The counsellor staff is composed of persons prepared in their specialty, experienced in dealing with girls, and particularly interested in working with diabetic girls. A small counsellor-in-training group is made up of campers sixteen years of age and older who are interested in helping with cabin, laboratory, and dining-room routines. Campers share in the routine responsibilities by doing their cabin clean-up every day and keeping the campus ready at all times for an inspection by a staff member.

Included in the program of activities at the Clara Barton Birthplace Camp are softball, volleyball, dodge ball, archery, badminton,

numerous other outdoor games, swimming, boating, singing, folk and social dancing, hikes and nature walks, dramatics, handcrafts, outdoor cooking, and fire building. Opportunities are also provided for frequent overnight sleep-outs and for hiking trips out of camp.

Accommodating fifty-six campers at a time, the camp has the following buildings, all of which are constantly in use: an infirmary with doctors' and nurses' quarters and a four-bed ward; an administration building with kitchen, dining room, staff room, office, and four rooms for the executive staff; a large barn converted into space for various recreational activities, with a craft shop and a laboratory enclosed; and nine cabins, seven of which house six campers and two counselors each, one five campers and two counselors, and one eight campers, two counselors, and one nurse. The cabins are located in close proximity, thus permitting constant supervision of all campers at all times. The administration building is so placed that it separates the sleeping area from the areas of activity and enables the staff to know the whereabouts of the campers at all times.

Twenty-seven staff members are employed, including the director, an assistant director, a business manager, a resident physician and three nurses, three laboratory technicians, a cook, an assistant cook, a handy man, and eighteen camp counselors.

The actual cost of operating the Clara Barton Birthplace Camp amounts to $35.00 per camper per week. Parents of campers pay as much of this amount as they can, friends and civic and welfare groups make contributions, and the Diabetic Fund of the Joslin Clinic, together with the Clara Barton Birthplace Camp Committee of the Association of Universalist Women of America take care of the balance required for operation.

Because of a long waiting list of applicants, the camp has, in recent years, been operating two weeks longer each summer in order to take care of some especially needy cases who could not be enrolled in the regular eight-week period. Also, during this extended period, older working girls are permitted to attend the camp to have their diabetes regulated. This special program is proving to be most successful.

Elliott P. Joslin Camp

The Elliott P. Joslin Camp, located near Charlton, Massachusetts, had its first season in 1948. The camp was established for the purpose of enabling diabetic boys from five to sixteen years of age to enjoy the benefits of wholesome camping and at the same time to receive complete medical and diabetic care. The desire of the founders is to make this a model camp in which diabetic boys may learn to care for themselves and to live happily with others. The same groups which

contribute to the financial support of the Clara Barton Birthplace Camp for girls likewise underwrite the work of this camp for boys.

The camp is located in beautiful hills country. It contains an area of approximately sixty-five acres of rolling land, on which is situated a twenty-acre pond for water sports. Camp buildings are new, adequate, and modern in every respect, with a rustic attractiveness which appeals to boys who enjoy "roughing it" in the country. The camp site was selected with the approval of doctors, health officers, and camping experts, and the lay-out was planned by an architect along approved lines.

The camp staff is carefully chosen according to leadership abilities, training, personality, and knowledge of boys. Alexander Marble, M. D., an associate of Joslin, is in charge of diabetic care and the general health of campers. In addition, there is always a resident physician to provide continuous supervision of medical needs. Graduate nurses with training and experience in the care of diabetics are in constant attendance, while technicians carry out efficient laboratory services. Trained persons are in charge of all housekeeping arrangements, and the preparation and weighing of food are under the direction of specially qualified personnel.

Operating cost per camper at the Joslin Camp is approximately $45.00 per week, which includes the cost of the necessary insulin.

In fairness to all, parents are asked to contribute as much toward this cost as they feel they can. To meet the expenses of the camp which are not cared for by payments of the campers, various organizations and individuals contribute to the program. It is the hope of Joslin that parents will apply for these funds in order that no boy needing this experience will ever be deprived of attending the camp for lack of the attendance fee.

The activity program at the camp is designed to meet individual and age interests and needs under the supervision of trained men who are specialists in their respective fields. Boys are always urged to sample the program as a whole in order to broaden their experiences, but are, at the same time, permitted and encouraged to specialize in activities which have particular interest for them. Naturally, campers are responsible for their share of daily cabin and camp maintenance.

Daily activities at the Joslin Camp include the following:

1. Aquatics: swimming, diving, boating.

2. Land sports: archery, baseball, basketball, badminton, volleyball, track, and games.

3. Woodcraft and nature: camping in the woods, cooking out, fire-building, trail making, and flower, tree, bird, and animal hikes.

4. Handcrafts: woodworking, metal and leather work.

5. Dramatics and singing.

6. Singing and story-telling around the campfire.[2]

Camps in the Seattle Region

In 1938, the first summer camp for diabetic children in the Pacific Northwest was operated near Seattle, with twelve boys in attendance. A few years later a similar opportunity was provided for diabetic girls in this area. Since then, Camp Banting for Diabetic Boys and Priscille White Camp for Diabetic Girls have grown and become well known until now forty to fifty boys and the same number of girls attend these camps each year. The cost of maintenance averages about five dollars per day per child. About 20 per cent of the cost has been borne through the years by parents of the children who attend, the balance being met by the Diabetic Trust Fund and the Virginia Mason Hospital of Seattle. Authorities in charge of these camps have felt that it is not best to segregate children with diabetes into camps attended solely by children who are similarly afflicted. Consequently, arrangements have been made with the Seattle Area Boy Scouts of America and with the Seattle Camp Fire Girls to conduct the summer camps for diabetic children in conjunction with the regular camping season for boy and girl scouts. Thus the diabetic children mingle with non-diabetics in the activities of camp life, the only difference being that

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[2]Information pertaining to the Joslin Camp has been obtained from Second Season of the Elliott P. Joslin Camp, a folder issued by the camp prior to its second season in 1949.

they must attend to their insulin routine and eat in a separate mess hall where their diets are taken into consideration. This plan has proved to be quite wholesome, and tends to build up the diabetic's confidence that he can readily hold his own with non-diabetics in the many activities of normal camp life.

During the full term of the camping period there is a carefully planned program appropriate for each age group. Sufficient hours of sleep each night are required, and each child has a one-hour rest period each afternoon following the noon meal. Graduate nurses supervise insulin administration and laboratory examinations, and graduate dietitians supervise diets according to individual prescriptions. A regular camp physician is in attendance daily, and a member of the medical staff of the diabetes division of the camp visits the camp on alternate days.

A new administration building at the Priscilla White Camp provides, in addition to adequate office space, an assembly hall, quarters for the nurses and dietitians, a well-equipped laboratory, first-aid room, and lavatories with showers, plus an adjacent dormitory unit accommodating twenty girls.

Swimming is taught under the supervision of Red Cross Life Guard personnel at both camps, and special attention is devoted to beginners so that every child may learn to swim. Experienced leaders well versed in nature lore conduct hikes along the beach and in the

woods. Overnight trips are planned for qualified campers. There are evening campfires with stories, songs, and stunts enjoyed by everyone. Handcraft instruction is given by skilled teachers. Strict supervision to promote good habit-forming activities for the promotion of fun, health, and safety is an important phase of life at both camps.[3]

Seale Harris Camp

The Seale Harris Camp for diabetic children is operated on a small scale by the Mobile Optimist Club and the Mobile Diabetic Clinic of Mobile, Alabama. It was established a few years ago to enable children from eight to fourteen years of age to enjoy the benefits of wholesome camping and at the same time to receive complete medical and diabetic care. The objective is to teach diabetic children properly to care for themselves and to live happily with others.

Located in the hills west of Mobile, the camp is beautifully situated on rolling, wooded country that overlooks a twenty-five-acre lake for water sports, including fishing. Cabins are constructed in such a way as to allow for maximum light and air, they are electrically illuminated, and each accommodates eight campers. Electric refrigeration and cooking facilities assure safe food, and the water supply is regularly analyzed for purity. The dining hall is spacious,

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[3]Information concerning these camps was taken from a folder entitled Priscilla White Camp for Diabetic Girls—Camp Banting for Diabetic Boys.

and another large hall provides for indoor recreation on rainy days and for instruction in handcrafts.

The staff is selected to provide leadership and training. A counselor is available for each cabin unit of campers. Children's diets are under the supervision of a trained dietitian, who not only supervised the daily food intake but also gives instruction to the children to enable them to develop a greater appreciation and understanding of their requirements in diet and insulin. Diebetic care and general health supervision are under the direction of a physician, assisted by a medical resident and a graduate nurse.

Among the activities available at Seale Harris Camp are baseball, softball, basketball, archery, badminton, horseshoes, ping-pong, swimming, volleyball, paddle tennis, riflery, track events, hiking, quiet games, nature study, fishing, and boating.

The cost of operating this camp averages $40.00 per child for the camping period of two weeks. Each child is expected to bring enough insulin to last him for the entire two weeks, together with a syringe and needles.[4]

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[4]Information about this camp was obtained from a folder entitled The Seale Harris Camp for Diabtic Children, Mobile, Alabama, and from a personal letter written by the executive secretary of the camp, Jeanette Overstreet, to Madge Miller, secretary of the Sweeney Diabetic Foundation.

Sunset Camp

In 1949 the Chicago Diabetes Association sponsored its first summer camp for diabetic children. The Association leased Sunset Camp, located thirty-five miles from Chicago, near Bartlett, which had been in operation for several years as a summer camp for cardiac children. When the camping season for cardiac children was completed in 1949, diabetic children moved in for a two-week camping experience. The regular camp staff remained for the additional period, but a full-time doctor, a full-time nurse, and two dietitians were added to the staff in order to afford better care for the diabetics.

The campers' cabins have a lovely setting facing Lake Michigan. In addition to living quarters for campers, the camp includes a craft shop, a recreation lodge, a counselor's cabin, an infirmary, and a dining hall. Each cottage accommodates twelve campers and two counselors. An excellent area for swimming and boating is marked off in the lake for the use of the campers.

The staff includes the camp director, the head counselor, the program director, a resident doctor, a resident nurse, a dietitian, and counselors for each cabin of campers. All counselors have a genuine enthusiasm for outdoor living and have a wide variety of interests and skills to help in planning and executing an interesting and beneficial program for all of the campers.

Camp activities are planned and carried out co-operatively by the counselors and the campers. Most of the program centers around informal outdoor living. Campers enjoy hiking, nature study, boating, swimming, crafts, music, and other camp activities. Sunday vespers are held at the camp, and campers are permitted to attend Protestand and Catholic services in Bartlett if they so desire.

Campers are expected to bring enough insulin to last them three weeks. Although the camp session extends over a two-week period, they are asked to bring additional insulin in case of breakage or loss. Also, they should bring syringes, needles, sterile cotton, their diet list, isopropyl alcohol, and a container for the syringe. Urine testing apparatus is furnished by the camp.

Most of the members of the Chicago Diabetes Association are physicians. Each year they recommend, from among their patients, children who are physically able to attend camp and those who would be likely to receive the optimum benefit from the camping experience. However, the group desires to include some children who would not be financially able to afford the camp fee, and for this purpose all of the clinics and a number of social-service centers in Chicago are asked to recommend children who should attend the camp. The physicians, agencies, and clinics are provided with detailed application blanks, which are carefully studied by members of the Camp Committee.

Fortunately, funds permit the Association to disregard the payment of assessed camping fees as a requisite for admittance to the camp. Acceptances of applications are based wholly upon the child's physical and mental record, provided he is within the proper age bracket. Very few applications have been rejected, and they have all occurred in cases of such severe mental retardation that it was feared that the applicants would not make congenial campers. By following the plan of having doctors, clinics, and social-service agencies recommend diabetic children as campers, the camp does not have a waiting list such as exists in most other camps for diabetics which do not practice a similar plan of recommendation and referral.

Before the camping season opens, the dietitian contacts the parents of each child who is to attend the camp and requests a personal interview for the purpose of discussing the child's diet and food preferences. Such a procedure has proved very helpful in purchasing groceries and in planning the camp meals. Also, prior to the camp period, the director has telephoned the parents of each child to ascertain whether they would bring the child to camp by car, or whether he would come by train from the Chicago Union Station. Counselors meet all children at the station who are going to camp by train and accompany them, as a group, to Sunset Camp.

The fee for the two-week period at camp is $100.00 per child. Less than half of the total amount needed for the operation of the camp

is collected, on the average, each year. Thus far, no solicitation of contributions for the operation of the camp has been conducted, but through wide publicity of the work being done, from $2,500 to $3,000 is collected each year from interested persons through almost no effort. This sum has always been adequate to take care of any financial deficiency existing at the conclusion of the camping season.

Many of the physicians who are members of the Chicago Diabetes Association are extremely interested in knowing of any benefits experienced by the children as a result of their attendance at camp, and for this purpose a rather elaborate series of forms has been developed for recording complete physical, medical, and health data about each camper at the beginning and end of his camping experience. Duplicates of these data are sent to the child's family physician and have proved to be of considerable worth in developing sound and beneficial programs for the continued care and progress of these diabetic boys and girls.[5]

Illahee Lodge

In 1946 the Kinsmen Clubs of Toronto, Ontario, Canada, began the sponsorship of Illahee Lodge near Cobourg, Ontario, located on a fine old estate in the country which was deeded to the clubs by the

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[5]Information about this camp was obtained from a pamphlet entitled Sunset Camp, August 18 to September 1, 1949, and from a detailed letter from Louise D. Pennock, administrative secretary of the camp, to Madge Miller, secretary of the Sweeney Diabetic Foundation, August 25, 1949.

owner as her contribution to the welfare of handicapped children. The lodge was established for the purpose of giving health and holiday care to children suffering from heart diseases, chest complications, and diabetes. Several new buildings were constructed in addition to those already on the estate, and much specialized equipment was required for this unique camp. Theoretically, both boys and girls from eight to fourteen years of age are accepted for the camp, but actually many below and above these age limits have been allowed to attend when facilities have permitted. One hundred and fifty or more children attend the camp each summer, the camping season for each lasting for three weeks.

The handicaps of the children require careful and expert medical, nursing, and dietetic supervision, as well as the recreational and sports leadership required by any summer camp. The staff is adequate to consider each camper as an individual whose needs are carefully studied and met, both as to medical care, recreational activities, rest periods, and diet. Many of the children with heart ailments, of course, must have restricted programs of activity.

Illahee Lodge is beautifully situated on the shores of Lake Ontario. The boys', girls', and medical cottages are all well-equipped, furnished, and colorfully decorated. The spacious, well-kept lawns, which extend in front of the lodge all the way down to the beach, are

where the children spend many happy hours participating in the various camp activities.

Golf, croquet, ping-pong, volleyball, archery, and baseball are some of the more popular games. When the water is warm enough, swimming is a great delight to many children. The beach itself is a source of much pleasure and endless interest to most of the children. Music is emphasized in the camp program, both at morning worship and at various other times during the day and around the beach campfire at night. Various types of craft work appeal to many of the children.

In the main, the campers are permitted to do what they want to do when they want to do it. Overnight hikes and fishing expeditions are particularly enjoyed. When exploring the woods in the neighborhood of the camp, they listen with delight to the songs of the birds.

Pirate parties are a thrilling experience to most of the children; and once during each three-week camping season a big birthday party is given for all children whose birthdays occur during the camp period. Perhaps the most fun of all for many of the children is the unique experience of having a big "Christmas" party in the middle of the summer. The purpose of having this unseasonal celebration is to develop the attitude within the children that Christmas is really a state of mind and not a date on the calendar, and therefore can be celebrated at

any time. The children enter happily into the fun of singing Christmas carols, having the Christmas tree, exchanging gifts, and enjoying the traditional Christmas dinner. During each camping period there are also many picnics, cookouts, beach parties, overnight trips, and so on.

Food is, of course, important to everyone, but especially so to diabetic children whose food has to be carefully chosen and weighed. Increased physical activity while at camp makes it possible to allow larger quantities of food to the diabetic children, much to their satisfaction and enjoyment. The emphasis at Illahee Lodge is on fruits and vegetables, eggs, butter, milk, meat, and bread. Gains in weight made by most campers are most encouraging. The dining room at Illahee, with its large screened windows bordered with gay drapes, its freshly painted tables and benches, and the pastel-colored walls, contributes to give a perfect atmosphere to encourage children to eat. Staff members eat with the children, distributed so that there is one staff member for each table of children.

During each summer, Illahee Lodge conducts three camping periods of three weeks each, beginning in the middle of June. The schedules are arranged so that the staff has a two-holiday between the camping periods. The cost per child for the three-week period is approximately $90.00. As is true of other camps, parents who can do

so are encouraged to pay this fee for their children; but children are never denied camp experience for lack of money, as trust funds and contributions from various sources make it possible for the camp to admit those who are unable to pay their own way.

Expert medical and dietetic services are available for the diabetic children who attend Illahee Lodge. They are given help with their insulin injections and those who come to camp unable to give their own "shots" soon become masters of the technique under the patient guidance of nurses. Great improvement has been noted in many diabetic children as a result of their experiences and training at the camp.[6]

Summary

The seven summer camps for diabetic children discussed briefly in the preceding pages of this chapter represent only a sampling of the numerous camps now in operation in various sections of the country, but they are typical of all. Among the provisions made in all of these camps are the following:

1. Expert medical care.

2. Assistance in the administration of insulin by doctors or trained nurses.

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[6]Information about this camp was obtained from three booklets, Illahee Lodge Report, for 1946, 1947, and 1948, and from a personal letter from M. Collver, camp director, to Madge Miller, secretary of the Sweeney Diabetic Foundation, October 7, 1949.

3. Guidance in the adjustment of insulin to the individual child's requirements.

4. Careful planning of diet under the supervision of trained dietitians.

5. Programs of education and training of diabetic children to give them a better understanding of their disease, and to train them to administer their own insulin and to make their own urine analyses.

6. Programs of vigorous recreational activities and craft work designed to meet the interests of all children and to encourage them to participate wholeheartedly in spite of their handicap, for they learn in camp that they can be as active as normal children if they have the proper diet and insulin routine.

7. Camp facilities available to the poor as well as to those able to pay their own way.

CHAPTER V

A STUDY OF CAMP SWEENEY, A SUMMER CAMP FOR DIABETIC BOYS AND GIRLS, GAINESVILLE, TEXAS

Values of Summer Camps for Diabetic Children

From their study of young diabetic patients, doctors many years ago began to realize that some special type of training and group living was needed by these children. Charles Bolduan, M. D., then Director of Health Education for New York City, asked the question: "How about removing the child from temptation, and helping him through rest, fresh air, and exercise to grow strong enough to resist temptation and build a new foundation toward adjusting to life as he must live it?" Henry John, Elliott P. Joslin, and Priscilla White —all doctors of medicine—and all pioneers in camp work with diabetic children and recognized authorities in the treatment of diabetes, were asking similar questions; and all came out with the answer that summer camps designed especially for diabetic children would be one valuable means of providing a solution to the problem. Ordinary youth camps would not do, for they would lack the trained medical personnel, the

laboratory facilities, and the dietetic supervision essential for every diabetic camp.[1]

Camping for diabetic children began in an informal way in 1925, when a nurse, Mrs. Elizabeth Devine, took a diabetic child from Boston to spend the summer with her in her country home in Maine. The striking results obtained in this case were so outstanding that Joslin, to whom Mrs. Devine reported the outcome of her experiment, sent five children to her the following summer. Soon Mrs. Devine had erected a building on the property, containing a large dormitory, lavatories and showers, a dining room, a living room, a kitchen, and a laboratory. By 1930, the camp was filled to its capacity of thirty children, who stayed for a period of two weeks each, thus enabling 150 children to have the advantages of the camp during a single summer.[2]

In 1930 the Clara Barton Birthplace Camp for Diabetic Girls was established at North Oxford, Massachusetts, under the sponsorship of Joslin and his associates. It was the first official summer camp for diabetic children on record, and is still in operation.[3]

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[1]Isabella C. Miller and Lewis J. Burch, "Summer Camps for Diabetic Children," Today's Health, XXVII (April, 1950), 28-29.

[2]Priscilla White, Diabetes in Childhood and Adolescence, pp. 222-223.

[3]Miller and Burch, op. cit., pp. 29-30.

Since that time a number of other camps for diabetic children have been established in various sections of the country, and all have been outstandingly successful in bringing about improvement in the children who attend them and in building up their morale and self-confidence. What does the summer camp for diabetic children seek to accomplish? For the child the results are both physiological and psychological. Just to keep a child alive with insulin and proper diet is not enough: he must also have a chance to grow and develop normally, and his life must be given the opportunity to parallel that of normal children in all possible aspects. Henry John, M. D., an authority on diabetes and a pioneer in camping for diabetic children, has written:

> A diabetic child needs the advantage of a healthful vacation even more than a normal child, for his daily routine is an onerous thing. More than other children he is apt to be introspective and inclined to be a psychologic problem. The very nature of his disease is the cause for this, as well as doting parents or unintelligent handling. By communal living with other children, diabetic like himself, he can realize for the first time that he is not alone with his problems. He has the advantage of seeing how others face theirs and solve them in healthy, normal ways.
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> Also, . . . by providing a place of vacation for the diabetic child, the mother is relieved of her arduous task for a brief period in which she, too, can gain some rest and renewed strength to face the burden of the child's care when he returns home.[4]

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[4] Ibid., pp. 29, 54.

Collens and Boas have indicated a similar statement of reasons for the encouragement of summer camps for diabetic children. Such camps, they say, should be greatly increased in number because:

1. Summer camp life gives a growing child an opportunity to spend his time out-of-doors with properly supervised exercises and recreation.

2. It gives the child an opportunity to enjoy nature and to develop his agrarian instincts.

3. It fosters a certain degree of self-reliance.

4. It aids in overcoming any psychological inferiority or repressions due to his diabetes when he mingles with other children similarly afflicted and notes that they are happy and adjusted in their environment, in spite of their disease.

5. It gives the mother a rest from constant care of a diabetic child—an important consideration which should not be overlooked. [5]

The new plan of operating summer camps for diabetic children is an excellent idea. Besides allowing the mother a chance to rest by relieving her of the burden of taking care of the child, it affords the child an opportunity to meet and associate with other diabetic children, thus boosting his morale by causing him to feel that he is not alone in his condition. While at camp, the child experiences

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[5]William S. Collens and Louis C. Boas, The Modern Treatment of Diabetes Mellitus, p. 236.

definite routines, regular periods for exercise, eating, resting, and acquires broader diabetic knowledge, in addition to the benefits of fresh air and sunshine.[6]

One of the chief values of camps for diabetic children is the fact that the program of activities is the same as that found in camps for normal children. This fact within itself is a tremendous morale builder for the diabetic child, whose activities are often drastically curtailed by over-solicitous parents who do not understand that their child is as capable of physical activity as any other child if he has proper diet and correct insulin routine. When the child at camp discovers that he can engage in the activities of normal children, he is thrilled and happy to know that there is no need for his being denied such pleasure. At camps for diabetic children, as at any other summer camps, swimming, tennis, baseball, archery, badminton, crafts, painting, sculpture, woodcraft, nature study, hiking, cookouts, dancing, dramatics, stunts, singing, hayrides, carnivals, puppetry, and the publication of camp newspapers are among the most common activities. Also, in diabetic camps, there are special training classes, instruction in insulin injection and urinalysis for those who have not yet mastered these techniques, and such aids as lectures, films, and charts to enable the child to gain a better knowledge of his condition

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[6]Anthony M. Sindoni, Jr., The Diabetic's Handbook, p. 76.

and of how to care for himself in order to live a normal, active, happy life in spite of his diabetes. For example, at camp, he receives instruction in food values of meals, and he learns about substitutions in the diet that make the meals at camp, and later those at home, more interesting and wholesome.[7]

Most children fortunate enough to attend diabetic camps for the two- to four-week sessions are from underprivileged homes, since such children are often especially sought out for the camps, as it is believed that they usually need camp experience to a greater degree than those from homes in a higher economic status. Underprivileged children pay no fee, or only a small one, but for those who can afford it the rates may be graduated according to ability to pay, up to $150 per month. The fee is usually just sufficient to meet actual expenses, as all of the diabetic camps are non-profit organizations. In camps with a capacity of fifty children, operating expenses may run as high as $4,000 a month.

Most of the camps are financed primarily by organizations or clubs, rather than by campers' fees, although fees are collected when families are able to pay them. Contributions or endowments from individuals are also an important source of income. Often groups or persons build cottages or furnish equipment at these camps, sometimes

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[7]Miller and Burch, op. cit., p. 54.

as memorials to deceased relatives or friends, thus providing remembrances that are permanent, functional, and beneficial in contributing to the health and happiness of diabetic children.

In every state, many more organizations are needed to provide camps for diabetic children. For those groups interested, the American Diabetes Association will provide complete suggestions for the construction, equipment, and maintenance of a diabetic camp.[8]

The life-saving magic of insulin is not all that is needed for insuring that the young diabetic will grow into a healthy, normal adult. In addition, he needs proper diet, outdoor exercise, and emotional adjustment to his condition. Doctors have discovered that many diabetic children who get along splendidly in the winter often do not do so well in the summertime. When their friends buy ice cream and candy at the corner store, it is difficult for them to resist the natural desire to be one of the gang. Yet, their health is seriously endangered if they do not fight temptation.

In the summertime the acceleration of activity for all children is greater than in other seasons, but for the diabetic child these sudden and strenuous expenditures of energy can create serious problems. At the same time, however, the diabetic child needs exercise to assist his metabolic processes. Therefore, if he is to enter into the activities

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[8]Ibid., p. 29.

of his fellows, as he very much yearns to do, he must make compensating adjustments in insulin and food intake.

Diabetic children often become too conscious of their disease and develop too deep a sense of being "different." Such an attitude may bring about inferiority complexes or neurotic tendencies. These children may have fears that life cannot bring them the same promises of success and normal living that non-diabetic children take for granted. Many appear to be listless, lethargic, and lacking in energy and initiative merely because of fear that they will have insulin reactions if they over-exert themselves.[9] The camping experience helps greatly in overcoming these fears.

One young man, a diabetic, after spending a season at a summer camp for diabetics, was certain that his experience had been invaluable to him. His confidence was restored, and he learned how to live a normal life in spite of his disease. Concerning his experience at camp, he wrote, in part:

> . . . I met and lived with other diabetics when I spent a summer at a camp run by the New York Diabetes Association. Taking insulin, eating, sleeping, and playing with diabetics of all ages, religions, colors and income brackets, I was pleased to know that I was not alone with my problems. We were different and yet all of us were perfectly normal as soon as we had taken our insulin. We ate hearty meals and followed a strenuous schedule of play. I knew I could exercise to my heart's content, so long as I worked out a

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[9] Ibid., pp. 28-29.

> balance with either smaller doses of insulin or more food. Since I had to take some insulin regardless, I naturally chose the former.[10]

Camps for diabetic children offer many advantages. Until the child attends camp, he may never have seen a diabetic contemporary. The old adage about there being "strength in numbers" seems to relieve the oddity of his situation. A camp which is well organized offers the diabetic child not only a vacation of entertainment and fun, but also an annual diabetic checkup which is preferable to hospitalization since it is based upon normal physical activity. Parents also need a rest from the responsibility of caring for a diabetic child who, for obvious reasons, can seldom visit relatives or friends for a vacation. The sending of diabetic children to camp should be one of the principal functions of a diabetic fund, since the camping experience helps to round out the physical and psychological needs of the youthful diabetic and his family.[11]

Joslin has said that "summer camps for diabetic children are splendid. . . . Diabetic camps should be encouraged. Children are far more easily and naturally treated in them than in hospitals, and at less expense."[12] Such camps lessen the need for hospitalization,

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[10]Julian Ginsberg, "What You Should Know about Diabetes," Parents' Magazine, XXIII (November, 1948), 32, 174.

[11]Mary E. Tangney, Diabetes and the Diabetic in the Community, pp. 224-225.

[12]Elliott P. Joslin, A Diabetic Manual, seventh edition, p. 194.

since, if children can attend camp immediately after their disorder is diagnosed, they can receive at camp the same careful attention that hospitalization would provide, and they may thus learn about their disease and about effective means for its control under circumstances that are far more pleasant and happy than those provided by any hospital.[13]

Priscilla White, an authority on diabetes and in the field of summer camping for diabetic children, has written:

> For the solution of dietetic problems diabetic camps are, of course, superior. For the adjustment of mental problems the non-diabetic camp has its advantages, and the two can be effectively employed together. The advantages of camp life for the diabetic child are regular routine, regular exercise, regular rest, and increase in the knowledge of the disease, because one child must help another. Diabetes becomes submerged and normal activities replace introspection. The relief which the camp affords the mother of the diabetic child from a tiring incessant routine, and the resultant new lease of life given to her quite as much as to her child cannot be underestimated. The great achievement, however, is not the establishment of the isolated camp or group of camps, but the fact that the diabetic child of today is alive, and therefore capable of going to any camp.[14]

In 1941 Joslin wrote that there were at least eighteen camps for diabetic children in the United States and that the number was gradually but steadily increasing.[15] There are perhaps twenty-five or thirty

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[13]Elliott P. Joslin, Howard F. Root, Priscilla White, and Alexander Marble, The Treatment of Diabetes Mellitus, seventh edition, p. 20.

[14]White, op. cit., pp. 223-224.

[15]Joslin, A Diabetic Manual, p. 195.

such camps in existence at the present time, but they are still all too few in number, for there are thousands of diabetic children who badly need the help that such camps can give them, but who will never have a chance at this valuable experience unless the number of camps is greatly increased. Joslin has called these special camps "islands of safety" for diabetic children, and this name is an appropriate one.[16]

One such "island of safety" is Camp Sweeney, a new camp for diabetic boys and girls, located near Gainesville, Texas.

History of Camp Sweeney

The inspiration and guiding spirit for Camp Sweeney is the man whose name it bears, J. Shirley Sweeney, M. D. The camp is operated by the Sweeney Diabetic Foundation, Inc., of Gainesville, Texas, which is the outgrowth of the doctor's long-dreamed plan to provide in his native Texas a camp for diabetic children of the South, together with research facilities for the study of the disease, the treatment, the determination of its causes, and the possible cure of diabetes and allied metabolic disorders. As a young man Sweeney left Gainesville to enter Texas Christian University, where he worked his way through school, earning his bachelor's and master's degrees. Because of his scholastic record he was made an instructor in biology in Vanderbilt University and later won a Rockefeller Fellowship which enabled him

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[16]Miller and Burch, op. cit., pp. 28-29.

to earn the degree of Doctor of Science at Johns Hopkins University. Returning to Texas, he entered medical school at Baylor University and began active medical practice in 1925. While engaged in the practice of medicine, he served as a professor of clinical medicine in the Baylor medical school and later in the Southwestern Foundation School of Medicine in Dallas.

During the Second World War, after volunteering for the medical branch of the Army, he made original studies in the use of penicillin at Bushnell General Hospital in Utah, that 5,000-bed hospital being the only Army hospital at that time with a supply of that new medicine. His studies paved the way for the general use of the "wonder drug" in the armed forces and among the civilian population.

After returning to civilian life in Dallas, Sweeney was asked by the Veterans Administration to organize the proposed veterans' hospital in Fort Logan, Colorado. During its first year of operation this hospital became known as one of the best such institutions in the nation. With the hospital functioning efficiently, Sweeney returned to his medical practice in Dallas.

Soon, intimate friends of the doctor were appealing to him to return to Gainesville and lend his abilities and knowledge to the organization and operation of a diabetic foundation, in which they knew he had

long been interested.[17] Sweeney's idea for a diabetic foundation and for a summer camp for diabetic children originated some twenty years ago, when he talked with the mother of a diabetic child, who was desperately eager to have her attend a summer camp, but had not been able to find any camp which would admit her as a camper because she had to have insulin three times each day and her diet had to be carefully regulated. Sweeney made contacts with several other camps, but was unable to persuade any camp to take her. The mother was financially able to send a doctor, a nurse, and a dietitian to camp with the child, and offered to do so, but even this arrangement was not acceptable. Needless to say, it would not have been a wholesome situation for the child to have had so much attention. This experience with the unfortunate diabetic child who could not attend summer camp caused Sweeney to give serious thought to a summer camp for diabetic children. Through the years he discussed this idea with many people, particularly with his many friends in Gainesville, where he had lived as a youth. One day a group of interested business men of Gainesville went to Dallas to confer with Sweeney concerning his hope of establishing a diabetic foundation and summer camp. This conference occurred before the outbreak of the Second World War, which interrupted all plans. Following the war, however, these men were still

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[17] Camp Sweeney, a Summer Camp for Diabetic Boys and Girls, a brochure issued in 1951 by the Sweeney Diabetic Foundation, Inc., Gainesville, Texas, p. 7.

enthusiastic about the project and conferred several times with Sweeney about the matter. They assured him that if he would only move to Gainesville, they would make his dream into a reality.

After much thought and consideration, Sweeney moved to Gainesville in the fall of 1947. Then the group of citizens began work in earnest. In 1949, a systematic campaign was launched for the raising of funds in Gainesville and in surrounding areas. Before long, enough money was in hand for the purchase of a campsite of 403 acres situated nine miles northeast of Gainesville in the rolling hills near Red River. George Dahl of Dallas, who has planned many camps, was engaged as the architect, and plans were drawn while the campaign for funds continued. During 1949 and the early part of 1950 the original camp was constructed, consisting of two barracks, one for boys and one for girls, and a main lodge. Each barracks accommodated twenty-four persons, including counselors. They were equipped with double-decked beds and contained an infirmary room and a laboratory. The laboratory was equipped with an electric refrigerator, ample drugs, and a sterilizer, syringes, needles, and necessary equipment for first aid and simple treatment, as well as for urinalysis. Each barracks had four showers, four toilets, four wash basins, and hot and cold running water.

Having one large room, which served as a dining room and a play room, the main lodge also contained a kitchen with a restaurant

range, two huge refrigerators, a large store room, offices for the dietitian, medical director, and camp director, and toilets for both men and women, as well as showers.

Down the slope toward the south, not far from the camp buildings, is Lake Dealey, named for E. M. (Ted) Dealey, president of The Dallas Morning News, who raised funds outside of Gainesville for its construction. The lake covers nearly twenty-five acres and is fed by natural springs, which, over a period of a hundred years have never been known to run dry. The lake fills by the discharge of the springs alone. Waters are impounded by a large dam and spillway, and the lake is equipped with boathouses and docks for fishing and swimming. The lake is abundantly stocked with game fish. There are many aluminum boats, with aluminum oars, which are non-sinkable; and motors can be attached for the older children.

Along with the original three buildings were constructed a large concrete tennis court, a baseball diamond, an archery range, a rifle range, a craft shop, and bridle paths.

On June 5, 1950, Camp Sweeney was opened for its first season and dedication ceremonies were held. The camp was dedicated by the cutting of apron strings by the original campers, symbolizing the camp's purpose of building independence in the diabetic child. During the first summer the camp was in operation for two six-week semesters,

with approximately seventy children in attendance, ranging from six to fifteen years of age. (After the first year, the age limit was raised to eighteen years.) The children attending the camp during the first season came from six different states. The camp staff consisted of the camp director, an assistant camp director, and eight non-professional counselors, all of whom were university graduates and teachers in their respective fields of sports and physical education. At all times three graduate nurses and one resident physician were on duty. On the staff were two graduate dietitians, a chief cook and two assistant cooks, and two keepers of the grounds.[18]

Whereas seventy diabetic children attended Camp Sweeney during the first year, 1950, in 1951 186 campers were registered, including sixty-eight children who were back for their second season. Before the beginning of camp in June, 1951, two additional dormitories had been built, thus doubling the camp's capacity and increasing the number of dormitories to four, each with a capacity of twenty-four campers. Thus it was possible to have a total of ninety-six campers in attendance at any one time, or a total of 288 for the three four-week sessions. For the second year a caretaker's cottage had been erected on the grounds, and twenty-three horses and saddles had been bought to add to the children's pleasure in horseback riding.

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[18] J. Shirley Sweeney, "The South's First Full Summer Camp for Diabetic Children," unpublished typewritten manuscript, pp. 1-3.

The policy of Camp Sweeney, as of other summer camps for diabetic children, is that the parents of campers pay their fees, or any part thereof, if they are financially able to do so; but no child has ever been turned away from the camp because of inability to pay. In fact, 83 per cent of the children who attended the camp during the first two seasons were admitted free or on partial payment of the fee. No distinction is made between those children who pay the fees and those who do not; in fact, neither the counselors nor the children know who has paid and who has not.

Nine states were represented among the campers for 1951. An additional resident physician, a woman, was added to the staff for that year, thus making two doctors on duty at all times, in addition to Sweeney, who divides his time during the camping season between his hospital in Gainesville and the camp. His work at the camp is, at his own request, wholly without remuneration except that of the satisfaction he derives from serving the needs of diabetic children. Many diabetics are included in the personnel of Camp Sweeney; in 1951, approximately 40 per cent of the staff membess were diabetics.[19]

By the first of June, 1952, applications approved indicated that the total number of campers in attendance during the three four-week periods would be at least 241 individuals, coming from fifteen states

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[19]J. Shirley Sweeney, "Another New Camp for Diabetic Children and Experience with NPH Insulin," unpublished typewritten manuscript, pp. 2-3.

and from Alaska and Canada. All of the original campers who attended in 1950 have returned for the two succeeding sessions except two who married.

All campers who attend Camp Sweeney, together with all staff members, wear white sport shirts with the words "Camp Sweeney" sewn in a sweeping arc across the front, with the letters "P F C" below. "P" stands for proteins and perseverance, "F" for fats and faith, and "C" for carbohydrates and courage. The campers, however, have added other meanings such as "private first class" and "personal friend of the cook."

Campers are divided into three separate and distinct divisions: juniors, from six to eight years of age; intermediates, from nine through twelve years of age; and seniors, from thirteen through eighteen years of age. They are housed according to age group, and activities and the total program of the camp are planned for each group according to age level.

While the operation of a summer camp for diabetic children is the first project undertaken by the Sweeney Diabetic Foundation, it by no means represents the end of Sweeney's dreams. For instance, he and the Foundation plan to make the facilities of the camp available, as soon as possible, not only during the summer but also on a year-round basis. When it becomes possible to place it in operation on a twelve-month schedule, it is planned that adult diabetics may come and spend

a few weeks or longer at the camp during the fall, winter, and spring, where they may enjoy fishing, hunting, and other sports, while at the same time receiving help in the care of their diabetes which will make them more efficient members of society. Also, it is planned that mothers of small diabetic children who are too young to attend regular summer camp, may come and bring their small ones and learn the proper methods of caring for them, plus the enjoyment of a respite from their constant care, together with opportunities for wholesome rest and recreation. It is further planned that older people who have diabetes or some other metabolic disorder may come and stay a few weeks or longer at the camp, enjoying its beauty while relaxing and improving their health.

Another future project of the Foundation is the construction, equipping, and staffing of research laboratories to be built on the 403 acres of land near Gainesville, which will provide for the South its first facilities for studies in the field of metabolic disorders. In these laboratories studies will be made on the various glandular disorders, high blood pressure, arteriosclerosis, and allied problems. Although arterial degeneration is the usual killer in the diabetic, little is known about this common complication. Research will be conducted in an effort to find solutions to these and other problems of the diabetic. Sweeney dreams of the day when the Foundation's research program will cause the medical profession throughout the world to look upon

the camp and the Foundation as a center for metabolic research. When important contributions to scientific and medical knowledge have been verified, they will be distributed to the medical profession through the national and international medical journals. Some of the best trained scientists and research workers will staff the research laboratories.

A third proposed project of the Foundation is that of the construction of a Metabolic Pavilion, which will be, in a sense, a hospital to provide beds and treatment for those ill with metabolic disorders. This, too, will be built on the wooded tract of land on which the camp is already situated. Persons suffering from metabolic diseases who are in need of the help of specialists in this field will come to the Pavilion for treatment, study, observation, and experimentation. They will provide actual human cases of metabolic disorders on which specialists in the laboratories will be working. It is hoped that the Foundation's research specialists may find ways of curing such persons, or at least discover effective methods of control for these metabolic disorders. Such care will be given without cost to the patient, if possible, or at as small a cost as possible.

The final project envisioned by the Foundation, at present, is that of carrying out an educational program in conjunction with its other undertakings to be developed in the future. Knowledge is to be distributed to the public regarding the proper care of metabolic

disorders, the real truth about them, and to enable the layman to be better informed on the subject which may now or later concern him or members of his family. The educational program is to be designed to make the public aware, in a common-sense sort of way, of various troubles that may be encountered, and of the most effective methods for their control or cure. Such information will be derived from experiments in the laboratories and from actual case results in the Metabolic Pavilion.[20]

Program of Activities

Every boy and girl who attends Camp Sweeney is placed with his or her own age and development group, with its own counselors. Thus, when engaged in an activity, each boy and girl will compete with children of similar physical ability. Each camper, under the supervision of a counselor, selects the activities in which he or she wishes to participate, such as craft work, music, art, square and folk dancing, horseback riding, and so on. Afternoons are devoted to team play and the development of group spirit by means of such activities as baseball games, swimming, boat races, track meets, hikes, etc. Evenings are devoted primarily to the development of camp and group spirit, and to entertainment.

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[20] J. Shirley Sweeney, "What the 'Dream Harvest' Holds in Store for the Future," Camp Sweeney, a Summer Camp for Diabetic Boys and Girls, a brochure issued in 1951 by the Sweeney Diabetic Foundation, Inc., Gainesville, Texas, pp. 12-13.

Swimming and life saving are popular phases of the program at Camp Sweeney. All water-front activities are under the supervision of Red-Cross trained, water safety instructors. Beginning, intermediate, and advanced swimmers are kept with their respective groups for the sake of safety and instructional methods. A Red Cross life-saving course is offered to boys and girls past twelve years of age. The camp now has at its disposal a beautiful modern $100,000 swimming pool, which was completed in 1950. Boating and surf-boarding are taught on the camp lake.

Boxing and wrestling are offered to those campers who desire them. These two sports provide muscle and skill development as well as a foundation in the art of self-defense.

A trained instructor and an excellent stable of gentle horses make horseback riding a popular and indispensable activity at Camp Sweeney. Western style riding is stressed, although instruction in English riding is available for those who desire it.

Baseball diamonds, badminton courts, volleyball courts, basketball courts, football fields, and professional instructors in all these athletic activities, make these phases of the program enjoyable as well as adding a definite plan for improving skills for their carry-over value.

Camp Sweeney's own Lake Dealey is well stocked with game fish and is the site of much fishing, especially on the part of boys. In

addition, Lake Texoma, located within a few miles of the camp, provides unlimited opportunities for fishing, and many fishing trips are made to that lake. Both bait casting and fly fishing are taught, and the making of plugs and the tying of flies are added crafts taught in connection with this popular activity.

A mature and skilled instructor with a complete course of crafts forms the basis of fascinating hobbies that will endure for a lifetime, in many cases. Tooled leather work, painting, bead work, metal crafts, and airplane crafts are a few of the many forms of expression offered.

A safe and modern rifle range provides each camper with the facilities to progress through the various skills of marksmanship, and safety, above all else, is stressed on the rifle range.

Square dancing and folk dancing, under competent instruction, furnish enjoyable recreation for the entire camp. In addition, archery, photography, golf, and tennis furnish diversified interests which should prove attractive to individual tastes.

Regular schedules of activities are followed each day, with the individual camper being given the privilege of deciding which activities he will engage in during the various periods. He is encouraged to sample all activities afforded in order to broaden his interests and skills before specializing in certain ones which have particular appeal to him.

Program of Health

The campers' health and safety while at Camp Sweeney are of most vital concern. Three registered nurses and two college-trained dietitians reside at the camp and devote their full time to the children's health. The camp medical director, J. Shirley Sweeney, M. D., makes daily visits to the camp and is on call at any time he may be needed; in addition, two resident physicians are on duty at all times. A complete health chart is kept for each child and is filed in either the boys' or girls' infirmary. Each camper is weighed and examined daily. All insulins are given by or under the supervision of a graduate nurse. Any illness or accident that requires hospitalization will be at the expense of the parents. Camp Sweeney assumes no responsibility for injuries, illness, or emergencies beyond its control, but every precaution is taken to prevent their occurrence.

Camp Sweeney's water supply is filtered in a plant that meets all requirements of the State Department of Health. Sanitary sewage disposal plants care for the modern bathroom facilities located in the dormitories. A health certificate is required of all food handlers, and immunization against typhoid is required of all campers.[21]

Of course, special attention must be given to the health of the campers when they are diabetics. Sweeney has recently written as

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[21] Camp Sweeney, a Summer Camp for Diabetic Boys and Girls, a brochure issued in 1951 by the Sweeney Diabetic Foundation, Gainesville, Texas, p. 15.

follows concerning the camp's program for the improvement of the health of the diabetic child:

> While the major purpose of the camp is to give the children a happy vacation, a continuous effort is made to teach them about their disorder and what it means to them. Methods of treatment and the various types of insulin are described, and those children who do not already know are taught to give themselves their own insulin injections and test their own urine. The older ones are taught how to figure their own diets, too.
>
> In short, a continuing effort is made to create within each camper a desire to be a good diabetic. The camper is given an understanding of diabetes and a philosophy about it that helps to make him independent and unafraid. The whole camp idea is to remove all signs of self-consciousness and of an inferiority complex from the boys and girls, and to return them to their parents proud and self-reliant youngsters.[22]

Each child, when he comes to the camp, continues for a day or two on the diet and insulin schedule he utilizes at home, as directed by the family physician. Experience at Camp Sweeney has made it clear, however, that these schedules, in most instances, are inadequate for the unusual degree of activity indulged in by the children while at camp. It becomes necessary, therefore, to alter the diets and insulin intake according to weight and in terms of the individual child's camp program. Insulin is taken each morning shortly after arising, and before the camping period of one month is concluded, every child, even the six-year-olds, is giving his own insulin. This self-administration of insulin is not forced upon the children, but they

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[22] J. Shirley Sweeney, "The Story of Camp Sweeney," ADA Forecast, V (January, 1952), 18.

are encouraged to want to give their own injections by watching others give them and by being shown constantly how easy it is to do. Also, the more indifferent cases are approached from the point of view of their being able to relieve their parents of the responsibility of giving them insulin, because "big boys and girls can give it to themselves" and thus give their parents more time for other activities.

All foods are weighed, and separate trays are served as the children pass in line at the serving window. They are grouped at tables with their counselors, in order that their eating habits may be observed. A different child is requested to return thanks for the food at each meal.

The schedules and activities of the children are closely watched, so that the medical group know rather well when to expect or anticipate possible insulin reactions. Oranges are available at all times. When trips are made to Lake Texoma or to other points away from the camp, adequate nourishment is always taken along for interval feedings when they become necessary.

Each child performs his own urine test in the morning. Usually two tests are run if the first one contains sugar. If more than two plus sugar is present, tests are made for acid bodies, and the child follows throughout the day with subsequent tests, using Clinitest materials provided by the Ames Company of Elkhart, Indiana. Two

bedtime tests are made by each child, and when negative tests are present, bedtime feedings are provided. These vary from raw carrots and apples to milk and graham crackers. The night nurse makes rounds each hour, inspecting each child's bunk, checking for any restlessness, sweating, and so on. The bed wetters are gotten up at scheduled hours. Weights are checked daily before breakfast. Each night, every child's record is checked as to the outcomes of urine tests, insulin reactions, or any other irregularities; and their schedules, food intake, and insulin may be varied accordingly.

Whereas the ages of the campers at Camp Sweeney range from six to eighteen years, the average age of the boys in 1951 was 12.8 years and that of the girls, 12.3 years, as indicated in Table 1. The duration of diabetes among the boys ranged from one week to fifteen years—an average of 5.3 years. Among the girls the duration of diabetes ranged from two months to fourteen years—an average of 3.8 years. Further examination of Table 1 indicates that the average insulin dosage for the boys was 42.2 units per day on admission to the camp and 47.7 units upon leaving camp; for the girls, an average of 42.0 units on arriving and 44.7 units on departure. At first glance this increased intake of insulin appears to indicate that the values of the camping experience might be questioned. However, for most of the campers, their diets had to be increased considerably from what they had been accustomed to at home because of the much more strenuous

TABLE 1

AVERAGE AGE OF CAMPERS IN 1951, AVERAGE DURATION OF DIABETES IN YEARS, AVERAGE INSULIN DOSAGE ON ARRIVAL AND AT DEPARTURE FROM CAMP SWEENEY, AND AVERAGE GAIN IN WEIGHT OF BOYS AND GIRLS

Item	Boys	Girls
Average age of campers . . .	12.8	12.3
Average duration of diabetes in years	5.3	3.8
Average insulin dosage at time of admission at Camp Sweeney .	42.2	42.0
Average insulin dosage at time of departure from Camp Sweeney .	47.7	44.8
Average gain in weight	1.3	2.8

program of activities engaged in at the camp. Consequently, the intake of insulin had to be increased in proportion to the larger quantities of food consumed, and this fact accounts for the slightly larger average dosages of insulin being administered at the time of departure from the camp. In spite of their larger diets, many of the children were able to decrease their insulin because of better regulation at the camp than at home, and two boys and two girls were able to discontinue insulin altogether before the end of their camping period.

These children did not require any insulin for several months after their camp experience, and then only small doses.

Changes in weight were of importance. Among the boys there was an average gain of 1.3 pounds during the camp experience, while the girls showed an average gain of 2.8 pounds. Four girls gained ten pounds or more, one gaining twenty-three pounds. One boy gained fifteen pounds. As might be expected with diabetics, most of the children did not have a favorable nutritional status when they were admitted to the camp.

Diets of the campers varied according to age and nutritional status. A few children who were overweight were given reduction diets, while many children were underweight and came to camp with inadequate diet formulas. Such adjustments were made in diet and insulin as appeared to be required for the best benefits from the camping experience. Active older children received each day from 100 to 150 grams of protein, 100 grams of fat, and 200, 250, or 300 grams of carbohydrates, depending upon age, weight, and nutritional status. Bedtime feedings were given if bedtime urine tests indicated their desirability. Those who had blue urine tests received milk and crackers, those with two to three plus tests received an orange, an apple, or a carrot, while those with a four plus test received a tomato. The youngsters worked hard to attain blue tests at bedtime, as is indicated in the campers' song:

I'm in love with you, Camp Sweeney,
For your deeds so true;
Perseverance, faith, and courage
Help our tests stay blue![23]

There were supplementary feedings of orange juice when indicated for minor insulin reactions. These varied as to the time of day, but usually were given before the evening meal. Apparently, this need for supplementary nourishment was the result of the more vigorous exercises taken during the afternoons, when the campers engaged in various group sports and swimming. Such activities naturally require special attention in diet and insulin if urine tests are to stay blue. Incidentally, the Time reporter who heard seventy-nine youngsters, aged six to eighteen, singing the above song in the summer of 1951 stated that they put as much enthusiasm into it as if they had been singing the praises of a victorious football team. They were justifiably enthusiastic, for every one of them knew that when their urinalysis results in blue, it means no excess sugar in their urine, whereas a red color is bad.[24]

In Table 2 are presented the urinary findings during the 1951 camping season at Camp Sweeney. Overnight specimens were tested. Children whose tests were positive were checked again just before breakfast. If a child showed two plus at any time, a test for acetone

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[23]"Where the Blue Begins," Time, LVIII (July 23, 1951), 32.

[24]Ibid.

TABLE 2

SUMMARY OF URINE TESTS

Sex	Per Cent of Negative Urine Tests		Per Cent of Positive Acetone Tests	
	Overnight	Bedtime	Overnight	Bedtime
Boys	66	69	2.5	1.4
Girls	57	49	3.0	2.0
Average	61	60	2.8	1.7

was performed. Additional urine tests were made frequently throughout the day until satisfactory results were obtained, and diet and insulin were regulated accordingly. If a child had positive acetone, extemporaneous unmodified insulin in doses of from six to ten units was given. Extemporaneous insulin was given in 3 per cent of the girls and 2.5 per cent of the boys in the mornings and 2 per cent of the girls in the evenings, along with 1.4 per cent of the boys. This is but another way of expressing the percentage of campers who had positive acetone reactions.

Approximately 60 per cent of the children showed negative overnight and bedtime urines, with the boys having a slightly better record

than the girls. Sixty-six per cent of the overnight urine specimens were negative among the boys as compared to 57 per cent among the girls, whereas 69 per cent of the bedtime tests were negative among the boys, compared to 49 per cent among the girls.

Next in interest are the insulin reactions observed. About half of the children exhibited at one time or another varying degrees of insulin reactions. Since NPH insulin was used exclusively in 1951, and for approximately half of the summer of 1950, the following comparisons were made. For example, of all the reactions of moderate to severe degree occurring during the 1950 session, 67 per cent of them were nocturnal. In 1951 only 5 per cent occurred during the night. Six per cent of all insulin reactions were convulsive during the summer of 1950, while only 2 per cent were of this degree in 1951, as indicated in Table 3.

During the summer of 1950, 94 per cent of all reactions were mild to moderate, and only 6 per cent were severe. In 1951, however, 97 per cent of all reactions were included in the category of mild to moderate, while 3 per cent were severe. In 1951 the girls had a slightly better record in connection with insulin reactions than did the boys. Among the girls 98 per cent of the reactions were mild to moderate and 2 per cent were severe, while comparable figures for the boys were 94 per cent mild to moderate and 6 per cent severe.

TABLE 3

SUMMARY OF INSULIN REACTIONS FOR BOYS AND GIRLS AND FOR THE TOTAL NUMBER OF CAMPERS, 1950 AND 1951

Type of Reaction	Total Group, 1950	Total Group, 1951	Boys, 1950	Girls, 1951
Per cent of mild to moderate reactions . .	94	97	94	98
Per cent of severe insulin reactions . .	6	3	6	2
Per cent of convulsive reactions . .	6	2	1	1

Severe reactions usually occurred in children who were proved to be highly sensitive to insulin.

All but two of the campers who attended the first session of Camp Sweeney in 1950 were again registered as campers in 1951. This group of repeaters was surveyed as to progress made during the intervening year. All of the children had gained weight, and most of them appeared to be self-confident and self-reliant. Undoubtedly, they made the best campers of 1951, for they had already had the advantage of one year's experience at the camp.

In Table 4 the repeaters are studied as to insulin dosage received upon leaving camp in 1950 and the dosage they were taking when they were admitted to camp again in 1951. Sixty-five per cent of the repeaters returned to Camp Sweeney in 1951 taking the same dosage (28 per cent) or a decreased dosage (37 per cent). Thirty-five per cent

TABLE 4

COMPARISON OF INSULIN DOSAGE OF REPEATERS AT THE TIME THEY LEFT CAMP SWEENEY IN 1950 WITH DOSAGE AT THE TIME THEY ARRIVED AT CAMP IN 1951

Insulin Dosage	Boys	Girls	Total
Per cent of campers on increased insulin dosage in 1951	13	22	35
Per cent of campers on same insulin dosage in 1951	9	19	28
Per cent of campers on decreased insulin dosage in 1951	28	9	37

returned to camp the second year taking an increased dosage of insulin. Sixty per cent of this group, however, had to have reductions in insulin dosage after a few days of engaging in the activities of the camp and of benefitting from the careful supervision of diet and physical exertion.

Evaluation of Camp Sweeney

J. Shirley Sweeney, M. D., founder and medical director of Camp Sweeney, has stated that, in over a quarter of a century during which he has been engaged in the practice of medicine, he has never found anything which provides such a stabilizing effect on both the diabetic child and his parents as the group psychology and mutual understanding and helpfulness which are to be found in camp life. He feels that a minimum camping period of four weeks is necessary to orient a diabetic child, to allow adjustment of his disorder, and to develop a wholesome independence and an ability for self-care. Sweeney believes that there is no better place than the summer camp for the investigation, study, and care of diabetes; nor is there a more effective place for the careful instruction of the diabetic in proper methods of managing his disorder.

That the work of the Sweeney Diabetic Foundation is gaining recognition and approval from laymen is evidenced by the fact that the Texas Junior Chamber of Commerce adopted as its number-one project for 1951 the raising of funds in every city where it has a member club, to be devoted to sending indigent children to Camp Sweeney from their respective communities or to help pay tuition of unfortunate diabetics from elsewhere.[25]

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[25]Untitled press release from Sweeney Diabetic Foundation, Gainesville, Texas, dated May 27, 1951 (mimeographed), p. 2.

That medical authorities and experts in the treatment of diabetes approve of the summer camp for diabetic children has already been indicated in earlier pages of this thesis. However, the best testimony to the effectiveness of the work being done by Camp Sweeney is the improvement in the health of the campers who are privileged to attend. Gains in weight, decreased use of insulin, decrease in number and frequency of severe insulin reactions, and lessening of the sugar content of the urine provide ample evidence that the program of the camp is accomplishing the major purpose of any plan for the care of diabetics —the improvement of the general condition of their health. In addition to this, the development of self-confidence in the diabetic child, the realization that he can participate in the same activities as those engaged in by normal boys and girls, and the development of skill and precision in the administration of his own insulin and in performing his own urinalyses, all add much to the benefits to be noted from a camping season spent at Camp Sweeney.

Perhaps the most eloquent evidence, however, comes from the parents of diabetic children who recognize the great improvement that Camp Sweeney had produced in their sons and daughters, from these children themselves who know that they have benefitted, and from their family physicians who can detect the improvement made in their youthful diabetic patients after a season at camp. For this reason, a number

of quotations will be taken at this point from letters in the correspondence files of the Sweeney Diabetic Foundation received from these three groups of individuals—parents, children, and physicians. These letters have been selected at random and are only a sampling of many more that could be cited. All attest to the worth of the program which is made available at Camp Sweeney, and all indicate that this camp is performing a great work. To avoid possible embarrassment, no names will be mentioned.

The mother of a little boy of eight wrote to state that her son

> . . . gave a talk in school one day about the camp, and all he learned while there. He also had a host of admirers because of his swimming medal. It is the first time he has ever felt important, and as fortunate as other children. And, I might add that we are not a little proud of his self-confidence. His camp training was the best thing he ever had, and he is looking forward to next year.

Another parent wrote while her son was attending camp:

> I cannot resist the impulse to express our deep appreciation to all of the wonderful personnel at Camp Sweeney. Our son writes frequently and we can tell from his letters and reading between the lines, just how happy he is and how he gets along. I can visualize the wonderful improvement in his acceptance of his ailment, also the improvement in his independence. Until this camp trip, he was so completely dependent on his father and me that he could not bear to leave us, or permit us to leave without him.

Still another parent wrote enthusiastically as follows:

> Our son is taking his insulin (as directed) and has gained ten pounds since coming home from such a wonderful stay at Camp Sweeney. He longs each and every day for the time to come that he can return to camp. Just last

night he got his camp pictures out and showed them. Thanks to every one for making his stay at camp so complete, and may God bless each of you for your wonderful work with these children.

The father and mother of another camper wrote that "he enjoyed his entire stay at camp, and we are convinced that he has been helped a great deal. We want to make application now for the first term of next summer."

The parents of a girl camper wrote as follows:

> Words can't express the gratitude we feel for what camp life did for _____.
>
> To be able to give her injections has given her independence she, of course, has never known in four years. And at her age it is wonderful.
>
> I feel like a great load has been lifted from my shoulders since there was no one with whom I could share that responsibility.

The following excerpt is eloquent testimony of the heart-felt gratitude of a mother for what Camp Sweeney did for her daughter:

> The change in _____ is almost unbelievable—she runs her tests religiously, and is now telling me what to do instead of me telling her. She has gained so much in poise and dignity, and I am delighted with her improved posture and grace, as well as her ability to assume a large part of the responsibility in keeping herself well and fit. She is assiduously avoiding foods which she knows she shouldn't have, and I am trying to back her up a hundred percent on not putting temptation in her way. There has been no increase in her insulin intake, as yet, and she tells me her tests have been showing approximately the same percentage as they did while she was at camp.
>
> There just aren't any words to express my heart-felt gratitude, so I can only say thank you, to you, Mrs. Sweeney, all the fine personnel at the camp, and all the people who made possible this opportunity of a lifetime for _____ and the other children like her.

Wrote another parent:

> _____ has been doing fine all the year. In fact, better than he has been in 3 years. And I contribute plenty of it to Camp Sweeney. He has been very interested in Boy Scout work—and has gone on several week end camping trips.
> _____ is very anxious to go to Camp Sweeney again and of course wants to go the first session, but if it is full, he will take his turn.

Prior to the opening of the 1952 camping season, the director of Camp Sweeney received the following letter from a mother who realized the values that her daughter had received and wanted her to attend for the third consecutive year, but was reluctant to have her attend since the family could not bear the total expense of her camping experience:

> We think all of you have worked so hard developing Camp Sweeney and are accomplishing a wonderful and worthwhile objective in giving diabetic children an opportunity to go to camp, to mix with others like themselves and to learn to be independent and take care of themselves.
> We could see a startling improvement in _____ in health and independence after her first summer at camp, and last year was similarly beneficial. We have enrolled her for the first period in camp again this year because we know she needs to go.
> Each year, upon enrolling her, you have offered kindly to reduce her attendance fee if we could not meet it. We have felt that, though it was an expensive experience, as long as we could strain our budget to do so, we would pay the fee because it was for a worthwhile cause. Each year the amount has loomed bigger and this year we feel it is bigger than we can handle entirely.
> We have talked to _____, and she hopes, that since she has been to camp two summers and is acquainted with the routine, rules and regulations, that maybe in some way she may be able to help at camp to earn part of her expenses so that she may go. Could she?

We regret that it has come about so that it is necessary for us to write this letter, but our interest in _____ and her welfare overcomes our reluctance.

A father wrote expressing "our heart-felt thanks for your generosity in helping us get our son started on the proper outlook towards what may be always a life-time condition with him."

The campers themselves are deeply appreciative of the benefits and happiness which they experience at Camp Sweeney, as is evidenced by the following letters or excerpts selected at random from the files of the Sweeney Diabetic Foundation:

> You were like a Mama to me, being so good. You never spoke a harsh word to any of the girls the six weeks I was there. I had a wonderful time and am looking forward to coming again next year and the years after that. I was homesick for the camp after a few days at home. Please write to me, and tell all of the Counselors "hello."
>
> I am writing to thank each and every one of you for the wonderful time I had while I was at Camp Sweeney. I loved every one I met and no one could have been any nicer. I think Camp Sweeney is the most wonderful place in the world and no more wonderful staff could have been picked. I learned a lot at camp and am hoping I can stay the whole six weeks next year.
>
> Since I have been home, I realize even more what a wonderful time I had at Camp Sweeney. I really do miss it, and am looking forward with eagerness to next summer. I know I will never forget what wonderful times we had together. I have been following the diet as suggested.
>
> Yesterday, at our swimming pool, we had a contest. I won a first place medal. I am real proud of myself and of camp too, because that is where I learned to swim so well. I am beginning to wonder whether I was smart in coming home. There is plenty to do but it is nothing like camp and not nearly so much fun.

> I can't tell you how much I enjoyed my stay at Camp Sweeney. I have always wanted to attend a summer camp, but have not been able to because of my condition. So, Camp Sweeney is really a dream come true for me. Tell every one hello for me and that I hope to see them at camp next summer.
>
> I really have been feeling swell, thanks to the very nice and considerate counselors, dietitians, nurses, et al. at Camp Sweeney. Now I realize that the campers didn't show their appreciation and thanks as much as they wanted to. I know I was so sad over leaving the last day that I couldn't say very much. I want all of you to know that I appreciate how much you helped me. Mother is very happy over my getting along so well and I have taught her several of the things Doctor Sweeney and Doctor Autry talked to us about. I'm almost sure to be back next year and can hardly wait.

The enthusiasm of the campers themselves, who realize how attending Camp Sweeney has helped them, is ample evidence of the value of the program which is offered by the camp. The fact that almost one hundred per cent of the seventy original campers in 1950 have returned for both succeeding sessions indicate the enthusiasm of the children for Camp Sweeney, not only because of the fun they have there, but also because they know they receive real benefits in the care and improvement of their diabetic condition.

Physicians themselves are enthusiastic over the results noted in their young patients after spending a camping session at Camp Sweeney. A doctor in Corpus Christi wrote as follows:

> Thank you very much for your letter concerning _____. I saw her last week and she looked remarkably well and has made an excellent adjustment to her new diet and the self

injection of her insulin. Permit me to compliment you on the excellent care which she received. Such an attitude of cooperation with attending physicians is indeed quite admirable. The whole purpose of the foundation fills a long required need. Up until the present time it was assumed all over the country that such a place could only be found in Massachusetts under the supervision of Dr. Joslin.

We are watching _____ with her new NPH insulin and I will forward to you progress notes from time to time. I hope that she will have the opportunity to return again next summer.

One of the staff physicians of Parkland Hospital, Dallas, wrote the following letter of appreciation for what the camp had done for three boys whom he had been instrumental in enrolling in the camp:

I want to express my gratitude to you for all your camp has done for the boys who have come there from Parkland. _____, _____, and _____ have been followed in our diabetic clinic for several years and all have enjoyed their stay at camp, and I believe have benefited thereby.

They seem to be more self-sufficient since last summer, and _____ and _____ particularly are more conscientious about keeping on their diet, apparently because of their increased knowledge of the disorder and an increased awareness of the complications which may occur after prolonged periods of poor control.

They are looking forward to spending another summer with you. _____ told me he hopes to stay for all three semesters.

From Lubbock came the following letter of appreciation from a practicing physician:

This letter is to express my grateful appreciation for Camp Sweeney and the help it is giving diabetic children. We have long had a need for such a camp in this part of the country, and it is a source of comfort and satisfaction to me to know that I can now refer my child diabetic

> patients to your camp and rest assured that you will further the work I have tried to do in teaching them how to care for themselves.
>
> I have been amazed at the change that a month of camp life has wrought in the children I have referred to you. You know the ones of whom I speak. I am sure you remember how shy and dependent they were when they first came to you and how they came away with so much self-confidence and independence that they hardly even needed any help from their parents or me.
>
> You are to be commended for the excellent way you are handling these children, and it is my sincere wish that your camp will continue to grow and prosper.

Thus it is evident that those who are best able to recognize and appreciate improvements in diabetic children have nothing but praise for the work being done at Camp Sweeney. Parents of these children notice great improvement after a season spent at camp, the children themselves realize that they have had a wonderful experience and have received much benefit and valuable information concerning how to live most effectively with their disorder, and their physicians verify that Camp Sweeney makes valuable contributions to the general welfare of diabetic children.

CHAPTER VI

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

On the basis of the information collected and discussed in the course of this study, the following general conclusions appear to be warranted:

1. Diabetes is a disease brought about by the inadequate functioning of the body's metabolic processes.

2. Although it is primarily a disease of old age, it occurs with considerable frequency, also, among children and young people, in whom it is likely to be more severe than in older persons.

3. Diabetes appears to result when the pancreas functions inadequately and therefore fails to produce enough insulin to promote the proper absorption of food values into the bloodstream and cells and organs of the human body.

4. No cure has yet been found for diabetes, but it can be controlled effectively by careful diet and by the proper injection of insulin obtained from the pancreas glands of such animals as cattle and horses and sheep.

5. At present, diabetes is a lifelong ailment which will continue to grow worse rapidly and to shorten life drastically unless it is controlled by insulin and diet.

6. Until the discovery of insulin in 1921, diabetes was equivalent to a death sentence, and life continued only for a few months or, at most, for five or six years after the diagnosis of diabetes. In those days, great suffering accompanied the disorder, for many painful and often fatal complications arose which can now be prevented by the proper use of insulin.

7. Diabetics today can lead normal, happy lives, and their life expectancy is almost equivalent to that of non-diabetics.

8. Many cases of diabetes in its milder forms can be treated effectively by the mere regulation of diet, but in more severe cases the use of insulin is necessary also for adequate control.

9. Children who have diabetes must learn at the beginning that the most important thing they can do is to watch their diet and to administer proper quantities of insulin in order to keep their urine sugar-free.

10. An occasional break-over in diet is not a serious offense and often does not have any serious results, but the danger lies in the fact that it is so much easier to make a second break-over after the first one is made. And habitual violations of diet can readily be fatal.

11. Insulin should be administered with exceeding care, as too much can be as serious as too little. Most important of all, insulin must be given strictly according to prescription as to kind and quantity, and it should be varied only in accordance with the physician's instructions, based upon the results of urinalysis and upon tests for blood sugar.

12. Children with diabetes are likely to develop attitudes of inferiority, abnormality, and aloofness; they feel "different" from other children and are often ashamed of the fact that they have diabetes. They may strive desperately, from a sense of self-consciousness, to keep their friends from knowing about their disorder, and in doing so they may overstep the limitations of their diet and produce danger to their own health.

13. One of the chief values of summer camps for diabetic children is that such camps prove to diabetics that they can engage in vigorous activities just as normal boys and girls can, and the only difference is that they must regulate diet and insulin intake in accordance with physical exertion.

14. At summer camps diabetic children learn that they are not so "different," after all, and they are thereby helped in the development of such attitudes as self-confidence, independence, self-reliance, happiness, and pleasure in living.

15. While engaging in the same activities and experiences and enjoying all the fun that normal children have at camp, the diabetic children at the same time learn many valuable facts concerning their ailment and its effective care. For instance, if they do not already know the techniques, they learn how to administer their own insulin, how to judge the amount needed on the basis of urinalysis, and how to make sugar tests of their urine. Also, they learn significant facts about their diet and why they must eat certain things and not eat others; and the older ones are given training in the accurate calculation of quantity in their diet. They take pride in learning these vital facts, and at camp they form wholesome habits of diet, insulin usage, urinalysis, rest, relaxation, and physical activity that will continue to be of value to them throughout their lives.

16. Camp Sweeney met and continues to meet the criteria for a good summer camp for diabetic children. It affords them wholesome recreation, provides them with proper diet and instruction in the use and calculation of insulin dosages, enables them to make their own urine tests, and promotes their self-confidence and self-reliance.

17. Camp Sweeney provides such an effective program for diabetic children that many of them are able to reduce their intake of insulin as a result of their camp experiences. Most campers, under the influence of proper diet and wholesome activities, together with

planned insulin administration, gain weight while at camp and show marked improvement in their general physical condition.

18. Camp Sweeney, therefore, is performing a valuable service to diabetic children by fostering wholesome influences that improve their health and by providing them with adequate knowledge as to the nature of their disorder, while at the same time encouraging them to engage in normal activities.

Recommendations

In the light of the data considered in this study, the following recommendations are offered for serious consideration:

1. Since Camp Sweeney has been shown to be a valuable asset to those diabetic children who are privileged to attend its sessions, its program should be broadened and encouraged in every possible way in order that larger numbers of children suffering from diabetes may come under its wholesome influence.

2. Individuals, organizations, and philanthropic groups seeking ways of performing public service should give serious consideration to the program of Camp Sweeney. Additional funds are needed in order to expand the services of the camp for providing year-round operation, research laboratories for metabolic disorders, hospital facilities, and a constructive educational program. If desired, arrangements can be made whereby buildings, equipment, or endowment funds may be designated as memorials to deceased persons.

3. Medical and educational groups throughout the country should emphasize to the public the values that are to be experienced by diabetic children who attend summer camps, and thus arouse public interest and participation in the establishment of many more such camps in all sections of the country. These camps offer one of the best means of teaching the diabetic child to care properly for himself and of making him realize that he can lead a normal, happy life in spite of his diabetic condition.

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