



Workplace Safety and Insurance  
Appeals Tribunal

Tribunal d'appel de la sécurité professionnelle  
et de l'assurance contre les accidents du travail

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# Diabetes Mellitus

Discussion paper prepared for

The Workplace Safety and Insurance Appeals Tribunal

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Addendum added March 2013 by:

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Dr. Forbath graduated from the University of Budapest, Hungary in 1953. He did post-graduate research in Diabetes from 1954 to 1956 in Hungary, from 1957 to 1958 at the C. H. Best institute in Toronto, and later served as a research associate at the University of Toronto and Toronto General Hospital from 1962 to 1963. He did further post-graduate training at the University of Toronto and was granted his fellowship in Internal Medicine in 1962. He joined the faculty at the University of Toronto in 1966 and held the rank of Associate Professor in the Department of Medicine, retiring in 1992. His clinical and research interests were in Endocrine and Metabolic Disorders, and he published in that area. He served as a consultant in the Department of Medicine at the Toronto General Hospital from 1963, and then an honorary consultant in Internal Medicine from 1992 until his retirement. Dr. Forbath was an assessor for the Tribunal for a number of years until September 2007.

Dr. Weinberg was educated in England at the University of Durham Medical School graduating in 1965. Obtained Membership of the Royal College of Physicians (London) in 1968 and elected Fellow of the College in 1993. Immigrated to Canada in 1976 and became a Fellow of the Canadian College in 1979. He became a Fellow of the American College of Physicians in 2008.

He began teaching at the University of Ottawa Faculty of medicine in 1979 and was appointed to Full Professor in 1997.

He has received numerous teaching awards in Canada including election to the Alpha Omega Alpha Honours Society in 1983. He was nominated three times for the PAIRO award for Clinical Teaching (1987, 1988 and 1992) and received the award in 1988. In 2004 he was the first recipient of the Andre Peloquin award for Excellence in Clinical Education and in 2012 the Deans Award for Postgraduate Teaching.

His administrative experience included a prolonged spell as Division Chief and University Chair of Internal Medicine at the Ottawa Hospital as well as involvement in many hospital committees. He was also a Medical Assessor for WSIAT for a number of years before appointment as Counsellor in 1998.

He is currently semi-retired and working part-time in the Vaccines Division of Health Canada, analysing and evaluating scientific data.

WSIAT literature search reviewed by Dr. A. Weinberg in 2010, who is of the opinion that this paper still provides a balanced overview of the medical knowledge in this area.

This medical discussion paper will be useful to those seeking general information about the medical issue involved. It is intended to provide a broad and general overview of a medical topic that is frequently considered in Tribunal appeals.

Each medical discussion paper is written by a recognized expert in the field, who has been recommended by the Tribunal's medical counsellors. Each author is asked to present a balanced view of the current medical knowledge on the topic. Discussion papers are not peer reviewed. They are written to be understood by lay individuals.

Discussion papers do not necessarily represent the views of the Tribunal. A vice-chair or panel may consider and rely on the medical information provided in the discussion paper, but the Tribunal is not bound by an opinion expressed in a discussion paper in any particular case. Every Tribunal decision must be based on the facts of the particular appeal. Tribunal adjudicators recognize that it is always open to the parties to an appeal to rely on or to distinguish a medical discussion paper, and to challenge it with alternative evidence. See *Kamara v. Ontario (Workplace Safety and Insurance Appeals Tribunal)* [2009] O.J. No. 2080 (Ont Div Court).

## DIABETES MELLITUS

### 1. Definition of Diabetes:

Diabetes Mellitus is a metabolic disorder characterized by a fasting plasma glucose greater than 7 mmol/L, or a 2 hr post-meal plasma glucose level greater than 11.1 mmol/L; these numbers greatly differentiate people at high and low risk for subsequent diabetic retinopathy (eye disease) and nephropathy (kidney disease).

Diabetes is a disease of unknown cause. It can present in different ways and its course is variable. According to current classification, most cases of diabetes can be classified as type 1 and type 2.

Type 1 diabetes is an autoimmune disease. The immediate cause of the disease is the destruction of the insulin-producing beta cells in the pancreas, a large gland located behind the stomach. Insulin is the most important blood sugar lowering hormone. It acts primarily on the muscle, fat tissue and liver. The loss of insulin production causes a rise in blood sugar and the appearance of sugar in the urine and an increase in urine output and fluid depletion which in turn increases thirst.

Type 2 diabetes: the initial defect is insulin resistance. Insulin resistance is compensated for by increased insulin production. In a later stage, the pancreas fails and insulin deficiency develops. At this stage of the disease insulin is needed to keep the blood sugar normal.

### 2. The causation of type 1 and type 2 diabetes:

- a. The cause of type 1 diabetes is unknown. It is believed that the insulin-producing beta cells are destroyed by an autoimmune process. The immune system protects the body against infections caused by microbes and viruses. Rarely, the same cells that attack the invading microbes turn against the cells of the body. The diseases caused by these mechanisms are called autoimmune. Type 1 diabetes is an autoimmune disease. There is evidence that heredity plays an important role in the development of type 1 diabetes.
- b. The cause of type 2 diabetes is unknown. Heredity predominates. Very important contributing factors are obesity and lack of exercise. The major modifiable risk factor in the development of type 2 diabetes is obesity.

### 3. The complications of diabetes:

- a. Diseases of the small blood vessels damaging the eyes and kidneys can cause blindness and kidney failure.
- b. Diseases of the large blood vessels causing narrowing and ultimately occlusion of the arteries in the heart, brain and legs resulting in heart attack, stroke and gangrene. The complications of diabetes can be to a large extent prevented or delayed by keeping the blood sugar as close to normal as possible and treating high blood pressure and high cholesterol. Smoking is absolutely contraindicated in both types of diabetes.

### 4. Stress and Diabetes:

Stress is an ill-defined but widely used and abused concept. It can be physical, i.e. an injury, an illness, e.g. infection, psychosocial e.g. death in the family or economic hardship. All of the above elicit a physiological response including the release of excessive amounts of so-called “stress hormones”, i.e. adrenalin and cortisol. These cause temporary elevation of blood sugars in all individuals.

Stress can influence **all** chronic diseases including diabetes. Therefore, statements that an injury adversely influenced a disease process is possible, unprovable, but also irrefutable. One of the common problems for the Appeals Tribunal is to deal with the effect of an injury, be it major e.g. multiple fractures or minor e.g. lumbar strain without evidence of fracture or dislocation on a pre-existing chronic illness such as diabetes or high blood pressure. The injury and the associated pain are stresses that aggravate chronic diseases **temporarily**. Their long-term effect is unknown and there is no evidence that chronic stress alters the course of many of the common chronic diseases including diabetes. There is no acceptable scientific literature on this issue that I know of, and it is not surprising. Scientific studies require controls. The “after this, therefore because of this” reasoning is not acceptable.

Dr. Nicholas Forbath, MD, FRCPC

**Diabetes and the Metabolic Syndrome:  
by Dr. Anthony Weinberg**

The metabolic syndrome describes a condition that predisposes to type 2 diabetes, coronary artery disease and stroke. It is characterised by a number of clinical features including truncal /central obesity and insulin resistance. It is associated with increasing age, inheritance, hormone change and lack of exercise. It also features excessive blood clotting and increased blood levels of markers of inflammation.

Diagnosis is established by the presence of 3 or more of the following:

BP >130/85, Fasting blood glucose  $\geq$  5.6 mmol., waist measurement  $\geq$ 102 cm in men,  $\geq$ 88 cm in women, HDL cholesterol < 1.0 mmol (men), 1.3 mmol (women) and Triglycerides  $\geq$ 1.7 mmol (in either sex).