



PROTECTION OF LIFE

criteria for the determination of death

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Criteria for the
determination of death.

**Law Reform Commission
of Canada**

Working Paper 23

**CRITERIA
FOR THE
DETERMINATION
OF DEATH**

1979

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Notice

This Working Paper presents the views of the Commission at this time. The commission's final views will be presented later in its Report to the Minister of Justice and Parliament, when the Commission has taken into account comments received in the meantime from the public.

The Commission would be grateful, therefore, if all comments could be sent in writing to:

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Foreword

In 1976, the Law Reform Commission of Canada undertook an extensive research project on the protection of human life. The project has three principal objectives. First, to provide a critical evaluation of the present state of federal law, particularly in the area of criminal law, in the light of recent developments in medicine and biology. Secondly to promote a real dialogue on certain controversial issues between lawyers, scientists and the Canadian public. Lastly, following a period of consultation, to recommend to the Parliament of Canada any changes that it deems necessary in our present laws, or the adoption of a long-term policy for the future.

The Law Reform Commission is conscious it is venturing onto extremely controversial grounds, for the subjects that it deals with transcend mere scientific or legal opinion and reach down to strong and deep-rooted feelings and values — religious, moral, cultural and social — present in every human being. The very diversity of the stands taken on these issues is eloquent proof of this fact.

The Commission has no wish to engage in futile and sterile controversies. At the same time, it does not believe that the best policy in these matters is to refuse to confront reality, to deliberately avoid discussing it, in other words to play the ostrich. On the contrary, the Commission is convinced that the country has everything to gain from a critical examination and a frank and open debate on problems related to the protection of life. Itself independent of all professional, political and other ties, the Commission believes that it is eminently well placed to serve as a catalyst, as a moving force in the dialogue and as a neutral forum for the expression of varied opinions.

This study, the first Working Paper in a series dedicated to the protection of life, examines the difficult problem of death. It attempts to answer the question as to whether the time has come for Canadian law to follow the example of other legal systems and, in the light of modern developments in the techniques of determining death, to try to give specific legislative recognition to the criteria of death.

The Commission wishes to express its thanks to the Institute for Research on Contemporary Interpretations of Man of the University of Sudbury, which in 1975 prepared for the Commission a background paper on the subject. The Commission is largely indebted to this work in the present Working Paper.

Introduction

Death, as a wit once remarked, is the most important phenomenon of human life. It has been studied and analyzed from many points of view, whether religious, philosophical, sociological, literary, medical or legal.¹ It is the focal point of an abundant literature, of various forms of cultural expression, and of many social rituals varying from country to country, civilization to civilization, and age to age.

To appreciate human death in its totality, the phenomenon must be treated from all these points of view. The task is difficult, if not impossible. Yet, in the present document, it would be pointless to confine our analysis only to the strictly legal aspects of the problem. Death as a legal phenomenon only makes sense when studied against the background of the social context and its moral dimensions, and confronted with the realities of contemporary medical science.

Until the mid-1960's there existed, both in Canada and elsewhere in the world, a general correspondence between the medical reality of death and its popularly held socio-cultural conception. The cessation of cardiac and respiratory functions, long considered by medicine as the definitive sign of death, were also recognized as such by the public. In a society where medical and popular criteria coincided, there was little chance of legal controversy. The role of the law in these circumstances was simply in recognizing an undisputed state of fact. It was not called upon to resolve a controversy.

The advances of modern science disrupted this harmony. They taught the physician in some cases to look beyond the traditional signs of death and to base his diagnosis on less apparent indications, the presence of which could only be

detected through the use of advanced scientific apparatus. Contemporary medicine no longer considers the cessation of cardiac and respiratory functions as a certain and infallible sign of death in all cases. Science has made it possible to start a heart beating again after it has stopped, to defibrillate it and to regulate its function with the help of a pace-maker. It can bring back to consciousness patients who, but a few years ago, would have been considered lost. Cardiac arrest is no longer a certain sign of death, or even the first sign of certain death. It is moreover possible now with the help of technology, to stimulate respiratory functions artificially, or to replace them altogether and even in some cases to maintain them indefinitely. In these circumstances, medical science has naturally looked for other signs for the determination of death. It has done so notably by the observation of certain changes in the brain. The brain cells are incapable of regenerating themselves. Sufficient and irreversible neurological damage, once ascertained, can provide full assurance to the medical examiner in certain cases that the patient will never regain consciousness or is irreversibly deprived of spontaneous respiratory functions. Medicine was quick to adapt itself to these changes and to recognize the new dimensions of the problem.

Some members of the public, however, continue to regard the cessation of cardiac and respiratory functions as the only real signs of death, thus making it difficult for them to acknowledge that a person whose brain has totally stopped functioning but whose respiration and heartbeat are artificially maintained, could really be dead. This creates an apparent contradiction between appearance and reality. It seems that the one patently contradicts the other. How deep-seated these feelings are, is convincingly demonstrated by the somewhat sensational headlines one occasionally encounters in newspapers along the following lines: "Dead man revived", "Dead youth kept alive for 24 hours", "Clinically dead but still alive by some criteria", "Dead lightning victim survived", "Crash victim died twice", or "Doctors save woman after four hours death".

Our terminology mirrors the fundamental ambiguity. Thus, we learn about people "brought back to life", about persons "temporarily dead", "apparently dead", "really dead" and so on. From a medical perspective, cerebral signs have come to complement cardiac and respiratory signs to such an extent that they may occasionally outweigh them altogether in importance. By contrast, a certain number of people have not yet truly accepted the idea that death may be determined by the new criteria. It should be noted, however, that the conception of death is gradually evolving, and coming increasingly closer to the medical views. This greater willingness to accept brain death as a sign of death may also be due to a greater acknowledgment of the distinction between cessation of personal life and cessation of biological life. There now seems to exist a recognition of the idea that death is the termination of individual and relational life, and that therefore there is no point in prolonging a merely biological existence once personal life, as such, has been irretrievably lost.

The problem of the acceptance of the modern criteria of death has taken a particular turn with the development of techniques for transplanting human organs. The number of such transplant operations has considerably increased in the last ten years. The publicity surrounding some of these interventions, notably heart transplants, has compelled us to give the matter deeper thought. The viability of the organ to be transplanted is a critical factor for the success of the operations. It is therefore extremely important that the organ be nourished and oxygenated up to the moment of removal to prevent ischemia and the consequent degeneration of the tissue by cellular necrosis. The strict observance of this requirement has led physicians and surgeons to maintain "artificial" respiration and circulation within the body of a donor who has suffered an irreversible loss of brain functions right up to the moment of the removal of the organ to be transplanted.

Given that our traditional conception of death disposes us to regard the presence of cardiac and respiratory functions as sure and unmistakable signs of the continuation of life, there

has been some apprehension about this practice. The interruption of artificial techniques of cardiac and respiratory support was considered by some to coincide with the moment of death. In this sense, the vivid expression "disconnecting a patient" has often been confused in popular thought with "killing" the patient. Moreover, even though everyone acknowledges the human value and legitimacy of transplant operations, some have expressed fear that the new criteria of brain death have not been sufficiently perfected and that consequently there may be a danger that vital organs could be taken from unconscious, but still "living" patients.

This apparent opposition and competition between the criteria of death raises a series of difficult legal problems. Because of it, the law is no longer certain in its identification of the time of death. Is the patient dead at the moment when a physician has clinically determined that all brain functions have ceased? Or does he die only when, after this determination, the medical staff have terminated cardiac and respiratory support? Worse still, the determination of the cause of death is no longer certain in law. If an individual inflicts irreversible brain damage on another, is the legal cause of death the action of the assailant or the action of the medical professional who removes a vital organ or terminates the sustaining cardiovascular procedures?

The law sometimes has to choose between difficult alternatives: to follow the results of contemporary medical science or to continue endorsing the more traditional concept. Should law simply follow medical evolution? To what point can it do so? The rule of law being above all the expression of certain shared social values, can the law formally recognize a rule which may not yet be generally accepted? Should it recognize that determination of death is a purely medical matter, and thus leave to the physician the entire responsibility for defining and determining it? Would it, on the contrary, be useful and appropriate for the law to lay down the criteria of death by legislation? Should it be done through case law? These are all questions that those responsible for the law must address and to which answers, or at least tentative answers, must be found.

First of all there is a semantic problem. The abundant literature on death reveals the extreme difficulty of putting the real problems into proper perspective and of discussing them rationally, because of certain imprecisions reinforced by an often deficient terminology. Thus, one finds a host of somewhat contradictory terms used with death such as absolute or relative; apparent or real; clinical, molecular, biological, somatic, physical, psychic, functional, spiritual, social, metabolic, systematic, medical, legal and many more.²

Each of the foregoing expressions describes either a separate reality, or a different "instant" of the same reality, or again a distinct mode of perceiving the same phenomenon. Thus, a theologian might use the term "bodily death" and the physician the terms "cerebral", "clinical" or "biological death" to refer to the same reality or to some of its aspects. The repeated use of these terms, often interchangeably and with little attention to precision, has had the effect of making issues that are difficult at best even less accessible and more confusing than they already are. It is therefore of great importance that a precise and understandable terminology be used in discussing the problem.

There is a second difficulty at the conceptual level: a real or apparent opposition between those who consider death as an event and those who regard it as a process.³ In one sense, every human being "begins to die" from the earliest moments of life since he then enters upon the long process of biological transformation ending inevitably in death. Apart from this essentially biological fact there is medical proof that death of all the vital organs is not a simultaneous phenomenon. For example, when the brain is still functioning at the moment of the interruption of the cardiac and respiratory functions, it does not begin to die until several minutes after their cessation. Thus, an individual who has suffered a cardiac arrest is not necessarily "dead" at that instant even if all the most evident signs of the event are present. Moreover, cellular necrosis throughout the entire body takes some time to be complete. For example, certain cells (notably those of the nails and hair) continue to grow for several days after the total termination of cardio-vascular and cerebral functions. In this

sense, then, "death" is not only a final loss of consciousness but also a progressive deterioration of every organ, tissue and cell, leading irreversibly to the total ultimate decomposition of the human body.

Nevertheless, seen at a different level, death is also an event. There is an "instant" in the process of mortality when everyone, whether physician, jurist, theologian or other, can safely consider that the death of a human being has occurred. Generally, when there is no external maintenance of traditional vital signs, this instant coincides with the moment of total and irreversible loss of consciousness and spontaneous circulatory and respiratory functions. Thus, one does not wait for the complete decomposition of a body before burial or cremation. By the same token, the signing of the death certificate is not delayed until after burial. Yet, at the very moment that a body is cremated, for instance, total cellular function has not yet necessarily stopped entirely, even though the process towards the termination of these functions is already irreversible. The public, as well as the law are thus accustomed to viewing death as a "moment".

These two positions, however, are not contradictory, and the conflict is more apparent than real. In each case "death" is used and understood in a different sense. Those who regard death as a "moment" associate the phenomenon with a temporal and consequent act for some specific purpose such as the signing of the death certificate, the initiation of burial procedures, the beginning of the mourning ritual, the possibility of removing organs for transplantation, the stopping of medical treatment, the giving of last rites, and so forth. Those, on the other hand, who consider death as a process do not refer to any particular temporal and consequent act but see it rather as the last significant manifestation of the process of mortality, which also includes aging and the wearing-out or degeneration of vital functions. According to the first view, death is the fact of being no longer alive within a temporal context. Under the second, the term describes the process leading to the complete and ultimate extinction of all vital functions, seen in a dynamic perspective. In the first case, it is a matter of fixing an instant within the ongoing process; in the second, the whole process is viewed as a continuum.

One thing that this apparent conflict amply demonstrates, however, is the need to use concepts and terms with great caution. From the legal perspective the essential problem is the precise determination of the point along the continuum at which it is legally legitimate to fix the moment of an individual's death. Does the event occur simultaneously with the spontaneous arrest of cardiac and respiratory functions? Does it occur when the degradation of brain cells is such as to preclude any hope of the patient's recovery? Does it occur when cellular necrosis has become generalized? Or, last of all, does it occur when necrosis has run its full course?

Determining the criteria of death or, as it is so often less exactly put, "defining" death, is a necessary task. There are a number of parties who have interests and concerns related to the legal determination of the moment of death. All of them would be served by more certainty and agreement in the matter.

First, there are the individuals themselves. As long as they are "alive" they are subject to law, assume a certain number of duties and possess at the same time a number of rights in regard to society and other individuals. Each individual is the centre of a complex network of rights and duties. Clearly the interests of the individual in question should be accorded primacy in any dispute or decision touching their health and lives.

Second, there are the concerns of the individual's family, parents and close associates who may sometimes be called upon to make decisions on the individual's behalf when the latter is unconscious or incapable of any manifestation of wishes. These decisions are often compounded because of the deep psychological and emotional ties involved. Physicians often consult them before administering certain types of treatment or discontinuing life-support procedures. It is evidently in their interest to have reliable and medically acceptable criteria upon which to base their decisions, if only to lighten a potential sense of guilt that may accompany their decisions.

Third, there are the concerns of the physician and other medical personnel. Physicians and nurses ought to be able to rely on certain precise elements recognized or acknowledged by law when making their decisions. They should be clear about the limits set out by law, both in terms of prevention of and defence against criminal or civil proceedings.

Fourth, there are the concerns of those involved in the legal process. Given the controversy surrounding the criteria of death and the various schools of thought on the subject, lawyers and judges have an interest in relying, if not on definitive criteria, at least on some reasonably specific guidelines to avoid debate and dispute in the courtroom about purely scientific controversies.

Finally there are the concerns of society in general. Society has a collective interest in achieving a conceptualization and determination of death that would be acceptable to most, if not all its members.

All these parties have an interest in the question. These interests and concerns are not necessarily identical. They may in some cases be contradictory, and criteria that may be acceptable to one party may not necessarily be acceptable to the other. However, they all point to the necessity of legally defining reasonable and widely acceptable criteria of death.

PART ONE

The Basic Facts

Before getting to the core of the subject, it is necessary at the outset to review certain basic facts and information about death. It would certainly have been possible to review systematically the theological, philosophical, moral, literary cultural and other aspects of death. Fortunately, however, excellent studies are already available on the subject. This Working Paper, primarily legal in its approach, could hardly have done more than offer an imperfect summary of them without doing them justice or fully developing the wealth of their implications. Since the crux of the problem is the important effects and consequences that the law attaches to the occasion of death, and since there are competing views as to the moment of death, it is useful to begin with a brief examination of death as a medical phenomenon before proceeding to analyze it from a legal point of view.

I. Death as a Medical Phenomenon⁴

The determination of death is of considerable importance to the physician. The event allows him to sign the death certificate, to terminate the care and treatment of the patient, to remove certain organs for transplantation, to proceed with a possible autopsy and so on.

In the vast majority of cases, the determination of death creates few difficulties for the physician. Usually clinical verification beyond all reasonable doubt is possible. Sometimes, however, this determination can raise some ethical and legal problems. Thus, a physician who interrupts the administration of so-called "extraordinary" patient care, or who orders that a heart-lung machine be disconnected may, technically speaking, expose himself to some difficulties. Similarly, the physician's decision to certify the death of a patient who is an eventual donor of organs has serious consequences. It is therefore not surprising that numerous medical professionals, faced with the risk of judicial or disciplinary sanctions, have repeatedly asked lawyers for clearer guidelines.

A. The signs of death

The lungs supply oxygen to the blood which the heart pumps throughout the body, including the brain. The brain functions are broadly speaking divided into the "higher" functions, controlling conscious activities and "lower" functions which include the operation of heart and lungs. There exists therefore an interdependence between the heart and lung operation and the "lower" brain activity, the latter being dependent on the former. Since the earliest stages of human history, the most common clinical sign of death has been the cessation of respiration and of heart movement. Subsequent to the appearance of these signs others, such as pallor, rigor mortis, or body discoloration have been used to confirm the diagnosis.

For some years now, medical science has realized that cardiac and respiratory arrest by themselves are by no means infallible signs of death. It is now possible to reactivate a heart that has stopped beating by mechanical or electrical stimulation, making heart failure, in some cases at least, a transitory condition. On the other hand, modern scientific equipment allows medicine to maintain normal respiratory functions where an individual is incapable of doing so spontaneously. The determination of death has consequently become, *in certain cases*, far more problematical.

Death, as has already been observed, is in one sense a *process*. The whole human body does not die at one and the same time. It fails gradually, some of its elements being more rapidly affected than others. No cell within the human body can survive for long under conditions of anoxia and ischemia. Yet the critical duration of oxygen deprivation that determines the onset of irreversible cellular damage varies from organ to organ and depends also on the previous condition of the organ. Heart tissues for example, can apparently survive anoxia lasting from one hour to ninety minutes. The corresponding period for kidneys is two and a half hours; 30 to 60 minutes for the lungs; 15 to 30 minutes for the liver.

Of all the human organs however, the brain is by far the most vulnerable. A blood circulation failure in the brain brings on loss of consciousness within ten seconds. During the following four minutes, reactivation is possible without the patient ordinarily suffering critical brain damage. Such reactivation is not unusual today in cases of heart failure. After this critical period, however, the brain begins to suffer permanent and irreversible damage. Unlike other cells in the human body (for example, those of the bone tissue), brain cells are incapable of self-regeneration. The brain cortex or cerebrum, which according to the present state of medical knowledge is believed to be the seat of consciousness and thus of relational life, is the first to be affected.

Necrosis of the cortex may of course be more or less severe, and the type of damage suffered depends on each individual case. However, beyond a certain time limit (reached somewhere between 8 and 10 minutes), the damage caused by anoxia and ischemia becomes such that it is then impossible for the patient to ever regain consciousness. The possibility of communication with the outside world is lost even though the cardiac and respiratory functions may still continue and a number of reflexes, such as response to pain stimuli, may still be observable. Necrosis of the cortex brings a state known as *cerebral death* (*syndrome appallique*) corresponding to a permanent loss of consciousness and loss of all manifestations of personality.

At this point if the brain stem remains unaffected, the heart and lungs will continue to function normally; arterial pressure and body temperature will still self-regulate without external help. In this state, therefore, the death of the whole brain and nervous system is only partial, though it is then certain that the individual will never recover from his coma and that his relational life is effectively at an end.

In the following 15 to 18 minutes necrosis sets in within the brain stem, the seat of automatic or vegetative functions. The functional destruction of this part of the nervous system brings with it the loss of spontaneous cardiac and respiratory activities. Unless supportive measures are then applied, the human body can no longer supply itself with oxygen. The cerebral reflexes cease; the individual no longer responds to pain stimuli. Although cardiac and respiratory functions can still be externally maintained, the condition is referred to as one of "*brain death*" or irreversible coma.⁵ In addition to the loss of relational functions (the characteristic sign of "*cerebral death*"), the patient now suffers also from a loss of automatic or vegetative nervous functions. In this state of deep coma, respiration may be maintained indefinitely by the use of the appropriate medical procedure. A medical description of irreversible coma can be found in the Report of the Harvard Medical School Committee, reproduced in Appendix II of this study.⁶

A number of pathological states however can produce the apparent symptoms of irreversible coma, and yet be no more than cases of *cerebral* death or even of mere loss of consciousness not involving serious damage to the cortex. Medical tests have established that a substantial number of so-called "medical miracles" fall into this category.⁷ All major medical studies are careful to point out the danger of misreading as signs of permanent and irreversible brain damage what may be only signs of temporary loss of consciousness brought on by one of two conditions: hypothermia (temperature below 32.2 C), or the presence of central nervous system depressants, such as barbiturates. Moreover, the medical tests for determining death such as those based on the Harvard Medical School criteria provide

for this possibility through, for instance, delayed and repeated administration of EEG tests.

The human brain thus dies by degrees and not at a single moment in time. This is probably what makes it so difficult to base the determination of death exclusively on the criteria of brain death since, with the exception of extreme cases, there exists a broad range of possibilities depending upon the exact extent of the brain damage. The change in the medical criteria of death and the emphasis placed on the diagnosis of irreversible coma demonstrate an interesting paradox. Only a few years ago, medical science considered as "dead" people who today would be classified without hesitation as "alive". In the interval of time between the cessation of heart functions and the onset of cerebral death, contemporary medicine considers the individual as "living", since, in many circumstances, he can be brought back to consciousness by appropriate medical procedures. On the other hand, while the medical profession generally tends to regard patients in irreversible coma as "dead" even though automatic or vegetative functions are externally maintained, in some cases, such patients are considered to be still "alive".

Technological progress has also had its influence on the development of the criteria of death. Angiograms can measure the blood flow to the brain and thereby serve as corroborative evidence of cerebral death.⁸ There is also a radio isotopic method.⁹ The electroencephalogram can register the electrical activity in certain parts of the brain, particularly in the cortex. Electrical silence is in general taken as *prima facie* evidence of irreversible coma. This technique has raised a good deal of controversy. Some maintain that the information it affords is reliable when expertly interpreted and confirmed by repeated administration of the test. Others are more circumspect. They are concerned with certain problems of interpretation and emphasize that the technique only yields information about superficial electrical brain activities, and not about its deeper ones. Still others stress the impossibility of universal application of the technique (there are, for example, serious difficulties in using the EEG on neonates). The medical literature on the subject is vast and controversies are far from resolved. It

is not our purpose to enter into a detailed assessment of the conflicting claims in this respect or to undertake an examination of the technical aspects of electroencephalography. We note that the EEG reading is not and should not be taken as the exclusive criterion for death but is considered rather as one of several criteria used in determining death.

B. Evolution of the medical position

It is largely to recent technical developments of organ transplantation that one may attribute the ever growing recourse of physicians to death criteria based on the cessation of brain activity. In many instances organ donors in a state of irreversible coma are placed on respirators while awaiting the transplant procedure. Criteria of brain death were initially debated in this context. This fact, however, has tended to obscure somewhat the discussion, for it may appear difficult to formulate an impartial and universal criterion of death in the sole context of organ transplants.

In 1968, only a few months after the first heart transplant, Harvard University set up a committee under the chairmanship of Dr. Henry K. Beecher. Its mandate was to evaluate the new criteria of irreversible coma.¹⁰ In its Report, the committee established a protocol for the determination of death based on the clinical signs of complete and irreversible brain death. The report, as we shall see, became the object of numerous commentaries and some criticisms. One should note, however, that the Committee really defined irreversible coma and not necessarily death.

The World Medical Association, at its congress held in Sydney in August 1968,¹¹ formally recognized that irreversible and certain brain destruction was one diagnosis of death. The congress stated moreover that the determination of the precise moment of death was to be left to the sole judgment of the attending physician.

In November of the same year, the Canadian Medical Association, which is opposed to legislative intervention, published a series of criteria for the determination of death

based on the criteria of irreversible coma and largely inspired by the Harvard Medical School Report.¹²

In 1973, 1974 and 1976, the American Medical Association clearly stated its opposition in principle to legislative intervention, adopting the stand that the determination of death should be left to the physician's clinical judgment alone. But the Association recognized that the permanent and irreversible cessation of brain functions could serve as a valid criterion.¹³ The American Electroencephalographic Society has issued a somewhat similar opinion.¹⁴

Since the end of the 1960's, a growing number of medical authorities have gone on record as approving brain death. Some American universities, for example, Duquette,¹⁵ Northwestern,¹⁶ and Baylor¹⁷, have published their own criteria based on the determination of irreversible coma.

Therefore, an ever-increasing proportion of medical authorities recognize as dead, those who suffer brain death. What difficulties remain, pertain not so much to the concept of brain death itself, as to the methods used to confirm it and the sufficiency of the technological means available for an authoritative appraisal.

The acceptance of brain death has a series of important consequences that are liable to affect the professional conduct of physicians and hospital personnel. First of all, a patient can be declared dead as soon as medical authorities have ascertained by appropriate examinations, that he is in a state of irreversible coma. In practice this means that a person may be pronounced dead even though his cardiac and respiratory functions may still be operative through external support procedures. Death does not occur when such procedures are stopped but at some previous point in time. Consequently, the withdrawal of external support from the patient becomes medically justifiable. It is indeed no longer a question of "treatment" of the patient — or, put another way, of interrupting "treatment". Finally, all other conditions imposed by law and medical ethics being met, nothing prevents the continuation of procedures to "maintain" the dead body so as

to make the subsequent removal of organs for transplantation possible.

II. Death as a Legal Phenomenon

Significant consequences have always been attached in law to the occurrence of death. Until recent times, in the absence of any real controversy on the subject, the law was content to recognize what amounted to a consensus of public and medical views. Changing medical criteria has resulted in a need to re-examine the legal view of death. To confront at least in some cases the significance of new scientific developments and to consider ways in which to eliminate, or at least to minimize, the effect of the uncertainty that has come to surround the question.

A. Importance of the phenomenon

The interest of the law in death is apparent at two levels: one of time (when did death occur?), the other of causation (what event caused death?). At the time level, a series of important legal consequences flow from the determination of the moment of death for both civil and criminal considerations. An individual is subject to the law up to the time of his death. When that event occurs, the totality of his or her estate, property, rights and obligations with some exceptions, pass to heirs and legatees. It is therefore important to know when death has occurred in order to determine the order of succession, to establish the termination of certain obligations contracted by the deceased (for example, those resulting from agency contracts), to freeze bank accounts and safety deposit boxes and to determine the distribution of life insurance benefits. In the overwhelming majority of cases it is obviously not necessary to fix the time of death to the second or minute. Sometimes, however, such a determination becomes useful, if not indispensable, as, for example, in the case of persons who die in the same accident. When two persons have willed in each other's favour and die, say, in the same automobile accident, it becomes imperative to determine which of the two

died first since the property of the first to die will pass, however briefly, to the other and will then have to be distributed to the heirs of the survivor. Case law contains many examples of this situation. Some jurisprudential solutions, while undoubtedly practical, are also somewhat artificial. In one American case for instance, the jury, on the evidence, found that one of the spouses had survived the other by 1/500,000th of a second!¹⁸. Some jurisdictions have even gone so far as to legislate specifically on the question, creating legal presumptions of survivorship.

The determination of the "moment" of death is also important for criminal law. Death is, in effect, the fundamental element of several crimes. Murder and manslaughter are two examples. Moreover, the law makes a distinction between the illegal act that causes death and that which merely causes injury. Thus, one who injures another may be prosecuted for assault and battery or criminal negligence but not for murder or homicide. In this regard, section 210 of the *Criminal Code* states that, for culpable homicide to exist, the victim must die within a year and a day of the last event causally connected with the death. On the other hand if the victim can be said to be already dead, what would otherwise constitute an "assault" may become an offence of indignity to a dead human body.

Determination of death is also of particular importance to law from the point of view of causation. Identification of the exact cause of death may make the difference between a prosecution for murder or manslaughter and no prosecution at all. The law, moreover, permits certain acts to be performed on a dead body and not on a living person. A surgeon removing a vital organ for transplantation purposes must be quite sure that the person from whom the organ is taken will be considered dead by law, otherwise both the surgeon and the medical team could be exposed to criminal and civil sanctions. The problem is far from academic. Several physicians are confronted with it each year in Canadian hospitals. Given that cardiac and respiratory activities can be maintained in certain situations, it is indeed important to formulate a clear legal policy with respect to whether termination of external

means for maintaining these functions could ever be considered in law as the cause of death, and if so under what circumstances.

B. Practical illustrations

There are a number of recorded instances of legal difficulties raised by the problem of determining the time or cause of death. We shall confine ourselves here to a few characteristic examples and refer for more cases and precedents to the abundant literature on the subject.

In 1950, in Kentucky, Mr. and Mrs. Gugel died in a railway level-crossing accident.¹⁹ The problem facing the court was to determine, for purposes of inheritance, which of the two spouses had survived the other. A witness to the accident testified that he had found Mrs. Gugel decapitated by the side of the railway track with an abundant blood flow surging from the headless trunk. Mr. Gugel's body, by contrast, appeared not to have bled at all. The Court upheld the opinion of medical experts to the effect that Mrs. Gugel had survived her husband by a few seconds. The fact that blood was still gushing from her body was accepted as proof of the continued functioning of the heart. The court ruled that, although decapitated, Mrs. Gugel was still "alive"²⁰ at the moment of her husband's death.

In 1936, in Ontario, a husband and wife drowned following an automobile accident.²¹ The problem, once again, was to determine who had survived the other. The Supreme Court of Ontario, basing its decision on expert medical testimony and accepting the fact that death occurs when heartbeat and respiration cease, based its decision on the difference between the quantities of water found in the lungs of each victim and concluded that the husband had survived his wife.

By contrast, in 1967, a court adjudicating the Pyke case came to a different conclusion, thereby implicitly giving the concept of brain death legal recognition.²² Mr. Pyke, whose

wife was stricken with terminal cancer, fired five revolver shots into her head before turning the weapon upon himself. Medical testimony was to the effect that Mrs. Pyke had bled profusely, whereas no evidence of bleeding was noted in the case of her husband. The Court, however, accepted medical testimony that the severe neurological damage suffered by Mrs. Pyke had been such as to bring about an immediate and irreversible end to vital functions, even though automatic or vegetative functions might have continued for a few seconds. The Court ruled that Mrs. Pyke had died before her husband.

The first heart transplants contributed to the debate. In May 1968, in the United States, a man named Bruce Tucker²³ fell and suffered serious cranial injuries. On his arrival in hospital a craniotomy was performed to reduce the brain hemorrhage and edema. His condition improved slightly, but only for a short time. To relieve respiratory difficulties, a tracheotomy was performed. This procured little benefit. He was then placed on a respirator. The electroencephalogram trace showed a total absence of neo-cortical electrical activity. The physicians then tried without success to get authorization from his next of kin to remove the patient's heart. After a final clinical check, the respirator was stopped. Tucker was pronounced dead, and his heart was removed and used in the seventeenth such operation ever performed in the world.

Tucker's brother sued the four attending physicians and surgeons. He argued that his brother was alive at the time of the removal since the classic and fundamental signs of life (heartbeat and respiration) were still present. The case attracted considerable attention. At the outset, the judge instructed the jury to follow the classic definition of death given in *Black's Law Dictionary*,²⁴ that is, the cessation of respiration and blood circulation. Later however, in his final charge, the judge changed his mind and told the jury that it was free to choose between the classical symptoms given in the law dictionary or the new neurological criteria argued by the defendants. The jury acquitted the physicians and found that Tucker had died several hours before the surgical removal of his heart. This decision, considered by some as a legal recognition of brain death, was the object of numerous comments, most of them favouring the decision.

These precedents notwithstanding, it would be inaccurate to say that the concept of brain death always met with universal case law acceptance. For example, in 1958 a Mr. and Mrs. Smith were killed in an automobile accident.²⁵ The wife was placed on a respirator which was stopped 17 days later. The lawyer representing Mrs. Smith's heirs claimed that the husband and wife should be considered as having died at the same time since both had suffered brain death simultaneously. The claim was rejected by the court which found that Mrs. Smith had indeed survived her husband by 17 days.

Canadian law, for its part, also contains a few examples of this type of situation. A man by the name of Garriock, of Winnipeg, suffered serious skull injuries during a fight. Taken to hospital, he stopped breathing and was placed on a respirator. His condition showed no improvement. The electroencephalogram traces were flat and he was incapable of spontaneous breathing. Four days later he was pronounced dead and both his kidneys were removed. The autopsy showed that his brain was in a state of advanced liquefaction, and the pathologist testified that, neurologically speaking, he had been dead some three or four days before the removal of his kidneys. The man who had attacked him and was tried for murder pleaded that the medical treatment constituted an intervening act so that death had to be considered as having been caused by the surgical procedure and not by him. The jury rejected the argument and found the accused guilty of manslaughter.²⁶

In 1976, also in Manitoba, a drunken man was violently ejected from a bar by two employees of the establishment. He hit the pavement and fractured his skull. Upon arrival in hospital, the victim's breathing had stopped and he had no perceptible pulse. Emergency medical procedures restored his cardiac and respiratory functions. The victim's death certificate having been signed, physicians proceeded to remove his kidneys. Here again, the assailant pleaded that the kidney removal had been the sole cause of death thus raising the defence of "*novus actus interveniens*". The Manitoba Court of Appeal decided, on the merits of the case, to uphold the verdict of guilty against the accused, thereby granting at least

some implicit recognition of the brain death concept.²⁷ There are numerous similar examples, but it seems hardly necessary to list them in order to demonstrate the reality of the problem and the legal difficulties to which it has given rise.

C. Present state of the law in Canada

No Canadian court has ever made an explicit declaration on the criteria that constitute the legal meaning of death. It is therefore impossible to find a legal consensus on a shared judicial "definition" of death, or even of a tendency to lean in the direction of one particular conception or of a specific set of criteria.

However, judging at least from the two Manitoba cases, present Canadian jurisprudence does not exclude neurological criteria of death and does not limit itself to the classic criteria of cardiac and respiratory arrest.

Federal statutory law is likewise silent on the question. Yet, numerous federal statutes refer to death as a legal fact and as the occasion for the creation of a series of rights and duties.

The situation is different at the provincial level. The Manitoba Law Reform Commission released in 1974 a report entitled *A Statutory Definition of Death*.²⁸ After thorough medico-legal research, the Commission proposed, and the provincial legislature adopted, a definition of death based on the irreversible cessation of all brain functions.²⁹ Manitoba is at present the only province in Canada to have provided a legislative solution to the problem.

A certain number of other provinces have taken steps to adapt the rule of law to contemporary medicine and science. The province of Quebec has amended the *Civil Code* to include a series of general provisions regulating gifts, removals and transplantations of human organs from dead donors.³⁰ Ontario enacted in 1971 the *Human Tissue Gift Act*,³¹ regulating organ transplants and their legal consequences.

However none of these statutes specifies in any way how death shall be determined, even though they both make frequent reference to it and use it as a basis for a series of legal rights and duties.

A brief survey of legal and medical literature in Canada shows that the problem has been frequently discussed.³² As in most other countries where determination of death has been considered, the debate in Canada has been marked by opposition between the partisans of legislative intervention and those who maintain either that the problem should remain a purely medical concern with which the law should not or need not meddle, or that the solution is better left to case law.

PART TWO

Possible Solutions

The problem set out in the preceding pages is not purely theoretical. On the contrary, it is of real and practical importance, no less to the public and to society at large than to the lawyer and the medical and health professionals who frequently must confront it in their professional lives.

Whatever solution is proposed ought to meet certain specific requirements. First, it should be flexible, allowing for adaptation to new developments in law and medicine. Secondly, it should try to reflect the consensus of a large segment of public and professional viewpoints, even though the prospect of a unanimously acceptable solution can be discounted as unlikely.

Three types of approaches are possible:

- (1) Treating the time and criteria of death as a purely medical problem, and leaving their determination to the exclusive jurisdiction of the medical profession.
- (2) Leaving to the case law the task of gradually developing coherent criteria as to time and determination of death.
- (3) Proceeding directly by way of legislation to define the criteria of death, and apply them in the adjudication of individual cases.

The first and second approaches are in fact similar and are not always clearly distinguishable.

I. The Proposed Approaches

A. Determination by a purely medical decision

Those who favour this solution argue that death is essentially a medical phenomenon, at least in terms of observing and determining its occurrence. Physicians alone, it is argued, are in the best position to establish and to apply scientific criteria of death with a reasonable degree of certainty, to decide whether a given individual can be considered dead in the specific circumstances and to certify this fact. Physicians are in continuing contact with factual situations, no two of which are exactly identical, and particular circumstances play an important part in making a decision. Any attempt to legislate or judicially define death (it is argued) would only succeed in fixing or crystallizing what is essentially a dynamic and changing situation.

This opinion is shared by a certain number of physicians as well as by some medical groups and associations. It is also apparently the position taken by a number of English lawyers. A declaration of Pope Pius XII on the morality of artificial means of resuscitation and life support is often quoted in support of this position. Pope Pius XII declared:

It is the province of the physician, and particularly of the anaesthesiologist, to provide a clear and precise definition of the fact and the time of death of a patient who dies in a state of unconsciousness.³³

This sentence however, as some have remarked, must not be read in isolation. The context gives it a quite different meaning and the Pope's statement cannot be taken as an unconditional endorsement of absolute medical control over death.³⁴

The main arguments for the medical solution are the following. First, it is argued, it is dangerous to seek to define the criteria of death by legislation or case law. Medical science is in a state of permanent evolution. Crystallizing in a

legal norm a potentially evolving situation, creates a risk of impeding the progress of medical science and of giving positive legal sanction to obsolete solutions.

Second, there is fear that the legislator, reasoning from abstract and general principles, will propose unnecessarily strict norms without enough flexibility. Yet flexibility is crucial since the physician needs a degree of freedom to evaluate and adapt to new, critical or unforeseeable situations.

Third, there is at present, no unanimous view among physicians either on criteria of death or on techniques of diagnosis. Doctors are too divided over the issue to exercise a choice, for example, between the classic criterion of cardiac and respiratory arrest and the new criteria of brain death. In the event of legislative intervention, the law would thus have to take sides in what is essentially a scientific controversy. This would take the law beyond its role. The legal rule should, as far as possible, reflect a consensus or at least the predominant position of the medical profession. Legislative intervention would neither promote the professional freedom of physicians nor contribute to the improvement of health care; instead, it would risk subjecting physicians to unnecessary restraints in their practice and therefore impede the progress of medicine.

Finally, there is not only one method of determining death. It would therefore be futile to seek uniformity at all costs where none can really exist. Thus, it would be foolish to subject an accidentally decapitated patient to an electroencephalogram before pronouncing him dead. By the same token, it is materially impossible to administer this test to individuals who have died elsewhere than in hospital. By contrast, this procedure would probably be required in the case of a hospitalized patient in a state of irreversible coma before discontinuance of life support procedures or removal of a vital organ for transplant. The criteria of death, as well as the scientific means used to determine it, vary according to circumstances. It would thus be impractical to impose a uniform rule. Legally prescribed criteria have a good chance of being either too complex or too general. Only the physician

is in the position of exercising a true scientific judgment concerning his patient. He should therefore be the only one qualified to do so.

All these arguments have one element in common. They express a well-known and understandable concern on the part of certain physicians that legislative intervention could only impede or complicate their practice of medicine. It is nevertheless difficult to subscribe without reservation to these arguments, even though the concern of part of the medical profession is real and understandable to a certain degree.

First of all, it is unrealistic to believe that the public, despite its basic trust in the medical profession, is willing or should be willing to give it complete *carte blanche* — especially when what is at stake is ultimately not just the scientific criteria for determining death but the very conception of death itself. No profession, despite its internal control and discipline over its own members, is completely exempt from or immune to abuses. Would not any insistence by physicians that the public unquestioningly accept their criteria of death, merely fan the latter's anxieties? The role of courts in our society is to prevent and sanction abuses, to protect the weak and helpless, to redress certain wrongs and to defend individual rights. It is hard to imagine that society and its courts would accept medical opinion without reserving the right of critical examination and review. The maintenance of some form of external control mechanism over any profession remains indispensable.

It is moreover impossible to completely dissociate the concept of death itself from the criteria used in its determination. The use of one criterion rather than another will often reflect a conception, perhaps even unconscious, of life, death, and ultimately, of the human person. Thus to accept whole brain death as death of the individual is to subscribe to a particular philosophical concept of human life. To recognize that an individual has died when his brain has sustained irreversible and irreparable damage is to acknowledge conceptually the normative value of relational and conscious life. It is to affirm that the individual, though some of his functions may

still be artificially operative, is nevertheless dead because he has no hope of returning to consciousness or to spontaneous breathing. Other conceptions or perceptions of human life could be argued. One could maintain, for example, that life does not cease with the irreversible loss of brain functions. This suggests that the acceptance of brain death is not only a medical phenomenon in its assumptions and implications.

The dangers of legal "interference" are also somewhat exaggerated. Legal intervention in this perspective is sometimes looked upon as inflexible, totally abstract, rigid and fixed once and for all. Legislative and jurisprudential experience clearly prove to the contrary that legal rules can be made flexible enough to avoid these pitfalls and can remain adaptable to changing realities.

Finally, a very important distinction must be made. No one seriously doubts the fact that the practical tests and scientific procedures for diagnosing death in a particular case are medical matters. The law should certainly not impose on a physician one procedure in preference to another. By contrast, however, the *concept* of death itself is by no means the exclusive concern of the medical profession. Death, as well as life, is not only a scientific fact; it is a far more complex reality, incorporating elements of ethics, philosophy and sociology. In other words, as most physicians recognize, medicine has no monopoly in determining the normative concept of death and thereby relevant policy. On the contrary this is a privilege and duty shared by medicine and society as a whole, requiring public input and debate.³⁵ To hold the opposite view could have disastrous consequences and contribute to the creation of an unbridgeable gulf between the medical profession and the rest of society.

There can be no real consensus on the problem of death unless the views of the medical profession correspond more or less closely to those of the great majority in society generally. The definition of the concept of death must be shared. Society, as well as medical science, has the right to evolve, to change its mind, to challenge existing concepts. Of course medicine necessarily retains a leadership role in these matters,

for it would indeed be foolish not to take into account the experience and knowledge of medical science.

Some important conclusions can be drawn from the analysis of this first possible approach. First, if a legislated definition of death should be advisable, this definition should not list the technical medical procedures for diagnosing death. To include them would only prove the critics of such legislation to be right. It would in fact cause the law to enter into controversial and technical medical questions which it is not competent to resolve and thus law would ultimately hamper the progress of medical science.

Second, the final solution must accept the principle that the criteria of death must be defined with the direct help and support of medicine.

Third, even if the choice of a concept and standards of death itself must be the result of a multi-disciplinary approach involving lawyers, physicians, ethicists, theologians, sociologists and members of the public in general, its determination and diagnosis must remain the exclusive responsibility and task of the physician.

B. Determination by judicial precedent

The second possible option is to trust the natural evolution of case law and let courts decide the criteria and the fixing of the time of death within the context of individual cases. Because of the nature of the judicial process, such determinations are necessarily made *a posteriori*. The accumulation of individual cases, it is argued, would eventually allow for a general rule to be formulated and give birth to a legal rule having authority through the process of *stare decisis*.

The creation of law by consecutive judicial decisions is well known. It is frequently used in common law countries, in Canadian and Provincial legal systems with the possible exception of Quebec. Its application to the criteria for determination of death has, however, few supporters in

contemporary literature, either among jurists or among physicians. The main reason for this lack of support has been summed up in the following way. *"I don't think it makes sense at all. It's like letting speed laws be established by lawsuits resulting from crashes"*.³⁶

The main argument in support of the case-by-case approach is that the progressive evolution of a legal norm through judicial decisions allows it to keep a much desired flexibility in individual cases. Courts can adapt to changing circumstances and thus better take into account new medical discoveries and progress. Creation by judicial precedent is thus virtually immune to possible arbitrariness and inflexibility. It would then be preferable to legislative enactment, by avoiding the risk of freezing too quickly the content of the rule of law. It would allow for a long maturation of ideas, eliminate the danger of inflexible norms, and impose the need to refer to past experiences before coming to a final decision in each circumstance.

This argument, at least on a general level, has some merit. The successful creative experience of the common law system seems to confirm its value. The jurisprudential approach appears to protect the law against taking a too definitive and authoritarian stand by deciding controversial medical questions once and for all. Each court, in fact, would decide in the light of the particular circumstances of each case the criteria applicable to it, without foreclosing evolution consecutive to future scientific data.

While no one, at least in Canada, seriously questions the value of the process of jurisprudential creation, its usefulness in determining the criteria of death is open to doubt.

First of all, the common law process of establishing a jurisprudential rule in this case would be exceedingly slow and highly controversial. It is, for example, impossible at the present time to draw any general rule from the numerous decisions of the American courts on the problem of determination of death. The uncertainty that still surrounds the issue after years of legal testing in the courts is of little help to

physicians who frequently face the problem and urgently need knowledge and reaffirmation of the exact limits of their duties in view of possible civil or criminal actions. Moreover, the uncertainty could be greater in this case, since a criminal proceeding involving the question of the definition of death would probably be heard before a jury. The jury's *ad hoc* verdict in such a case would probably have little authority for the future.

Furthermore, to treat the problem of what constitutes death as a simple question of fact raises difficulties at two levels. First, is the determination of death really a question of fact? Given its extreme importance, does it not constitute a question of law as well? If it is held to be a question of fact alone, is not the jury then already entrusted with deciding a question of the highest importance in terms of public policy? Is this its role? Second, is there not a serious risk of the multiplication of *ad hoc* decisions before a real consensus, with a certain degree of wide applicability, can be attained? The possible danger would be the emergence of different criteria established for different purposes: one for settlement of estates, another for criminal liability, another still for administrative purposes.

An additional difficulty arises from problems of evidence. The trier of fact in an adversary system is called upon to decide the issues in the light of two presentations of evidence by the parties. The evidence presented is usually partial and conflicting. The court has neither the authority nor the means to undertake its own research or to commission independent research to guarantee impartial scientific evidence. On an important issue there is no guarantee that presentation of conflicting evidence will necessarily lead to the best verdict or judgment on a more generally applicable definition of death. It may also happen in a particular case that the parties will agree to present the same scientific evidence. The court would then have little choice but to accept it, with no opportunity for a real search for scientific truth.

The creative jurisprudential process is not well adapted to the resolution of problems requiring multidisciplinary actions

or broad public input — and therefore to the problem of defining a concept of death. Why should a physician be dragged into court on a test case in order that society might get an answer that could have been obtained otherwise? Why should he be obliged to submit to the trauma of a criminal or civil trial to learn retrospectively whether the scientific theory that he has applied is the correct one? Why should we foster an atmosphere of uncertainty for the medical profession? Why try to resolve such an important issue in the emotional climate of the courtroom? It seems unfair to oblige physicians, or members of the family of a patient to appear in court, to undergo the unpleasantness of unwanted publicity for the sole purpose of contributing to the definition of a legal doctrine which could have been defined otherwise. Why rely on or wait for extreme cases? The disadvantages of the jurisprudential solution at the human, economic and social levels appear too great a price to pay. As one American author has put it:

Aside from the issue of uncertainty, no physician or institution should have to undergo the time, expense and psychological trauma of litigation (civil or criminal) for a retrospective determination of rights and duties concerning such a fundamental problem as the definition of death (and life).³⁷

C. Determination by legislation

A third possible approach is the enactment of legislation by Parliament. Such legislation could take various forms. It could be conceived in very general terms addressing the question of death at a conceptual level, and defining it for instance in terms of cardio-vascular death or of brain death. On the other hand, it could be more specific and recommend the use of a certain number of procedures to determine death. Lastly, it could go further and, taking the Report of the Harvard Medical School Committee on irreversible coma as a model, contain a full description of both the signs of death and medical procedures to determine it.

The legislative approach met with some opposition from physicians and lawyers at the end of the 1960's and the beginning of the 1970's, though many supported it from the

start. In recent years there has been a progressive change of professional opinion in its favour. This is apparently so for several reasons: weariness on the part of those waiting for a yet to come case law solution, a growing concern in the face of the continuing legal ambiguity of the present situation, and the positive experience of numerous countries that have already legislated in the matter.

The legislative approach has however been criticized. One may distinguish two types of criticisms: those that take issue with a particular statute such as those from Kansas or from California or the criteria of the Harvard Committee, and those that oppose legislation as a matter of principle, regardless of its content and formulation. We shall examine the first type of objection later on in this paper within the context of the discussion of these statutes, and restrict our analysis here to those who object to the principle of legislative intervention itself.

The first criticism has already been dealt with above. It argues that death is strictly a medical phenomenon whose conceptualization as well as determination should accordingly be left entirely in the hands of the medical profession.

The second criticism takes issue on the grounds that legislation tends to impede or inhibit the evolution of medical science. It is argued that to determine statutory norms at present would be premature since the facts at issue are still in a state of flux. In these circumstances, legislation would merely hinder the progress of medicine and compel the legislator to choose between alternative theories or concepts of death at a time when the controversy is still far from settled among physicians and scientists.³⁸

There are many possible replies to these arguments. First, to legislate is not necessarily to inhibit scientific development. Such a consequence could however result from an attempted exhaustive legislative enactment containing a highly detailed enumeration of procedures and techniques to be used in the determination of death. The objection would probably apply for instance to a statute that would not only prescribe the use

of electroencephalography but also would fix the frequency of its use and the intervals of time between its application. Any statute giving that rigid and detailed a formulation would of course run the risk of obsolescence after a short period of time. Worse still, it could slow down medical advance until the legislation was amended to recognize further medical developments. The case need not however be stated in such an extreme way. A statute recognizing a legal concept of death, but leaving to medicine the role and obligation of applying clinical criteria and procedures for its determination, would surely run no such risk. No one can reasonably claim for instance, that the statutory definition enacted by Manitoba is an obstacle to scientific development.

Second, there are good reasons for believing that carefully drafted legislation would eliminate, or at least partially dispel the uncertainty presently surrounding the issue of the irreversibly comatose. It would allow medical personnel to know at last what they may and may not legally do, and to adopt a more precise line of conduct. It would remove the sword of Damocles suspended above their head.

Legislation would, moreover, encourage the public to review its own conceptualization of death, reassure it, if necessary, and give it a better protection from possible abuses. A statutory definition of the criteria of death would not however exclude or eliminate the role of judicial decisions. Courts would still have to interpret the statute and to apply it to particular fact situations. However, the fundamental parameters of the question would at least be determined with a higher degree of certainty. In this respect, the legislative option appears more complete and less contingent.

Finally, one further argument (made for instance by the Manitoba Law Reform Commission) has been invoked in favour of taking into account recent developments in medical science and adopting criteria of neurological damage. A number of Canadian physicians today hesitate before interrupting so-called "extraordinary" procedures administered to irreversibly comatose patients for fear of possible legal consequences. This fact may have a significant impact on

hospital administrators who must see to the equitable and efficient use and allocation of hospital resources. It is also a contributing factor to the painful and agonizing problems that face both the patient's family and friends and the medical and hospital personnel. The Karen Quinlan case in the United States should serve as a concrete example of the practical problems. Legislation, by determining a more precise boundary-line between life and death, would go a long way towards remedying the situation.

Briefly, these are the three main attitudes to the problem and the three possible approaches that might be adopted. Before taking a stand on the question, it appears necessary to review briefly comparative law elements and to examine the legal experience of jurisdictions that have followed one or the other of these solutions.

II. The Lessons of Experience

The legal problems occasioned by the determination of criteria of death have been considered in many countries. A brief survey of the subject reveals a considerable variety of positions taken on its medical, legal, ethical and philosophical aspects. In some instances, these positions have been articulated in statutes or regulations.

A review of the experience of other jurisdictions allows a critical appraisal of both attitudes, policies and legislative models. There are many available models. The most typical and significant examples will be considered here.

The Harvard Medical School criteria shall be examined first for two reasons. First of all though these criteria are essentially of a medical and scientific nature and do not constitute an attempt at legislative drafting, they do demonstrate that there are in fact medical tests available which can accurately determine brain death. Secondly they have been an important source of background reference and assistance in a number of legislative projects.

A. The Harvard Report

In 1968, the “*Harvard Ad Hoc Committee to Examine the Definition of Brain Death*” submitted a report that has been recognized as one of the seminal works in the field.³⁹ Implicitly equating the notion of death with that of irreversible coma, the Committee concluded that a person could be pronounced dead when a number of situations tending to demonstrate the functional destruction of the brain have taken place:

(1) Unreceptivity and unresponsivity — no response even to intensely painful stimuli.

(2) No movement of spontaneous respiration for three minutes off the respirator.

(3) No reflexes: fixed, dilated, and unresponsive pupils; no ocular movement with head turning and irrigation of ears with ice water, no blinking; no postural activity; no corneal or pharyngeal reflexes; no swallowing, yawning, or vocalization; no biceps, triceps, pronator, quadriceps, or gastrocnemius reflexes, and no response to plantar or noxious stimulation.

(4) Flat EEG for at least ten minutes as a confirmation of irreversible coma.

(5) All of the above tests repeated at least 24 hours later with no change.

(6) No evidence of hypothermia or central nervous system depressants.

With respect to death occurring when irreversible coma is recognized, the Committee recommended that the person be pronounced dead *before* the interruption of extraordinary life-support procedures such as the use of the respirator. The purpose of this recommendation is to prevent possible legal disputes and to underline the fact that death has occurred and can be pronounced despite the existence of signs (such as non-spontaneous respiration) which, under other circumstances, would be evidence of life.

The criteria of the Harvard Medical School Committee have been successfully tested several times. One of these tests has shown that all 128 patients with all the enumerated

symptoms had indeed suffered irreparable and irreversible destruction of brain functions.⁴⁰ A second study based on 2642 comatose patients showed that all but three never regained consciousness.⁴¹ Significantly enough, these three individuals had all lost consciousness following the absorption of depressants of the central nervous system, a fact which, *ipso facto*, excluded them from being considered irreversibly comatose according to the criteria of the Harvard Report.

Medical literature as a whole appears to endorse the Harvard criteria. Some difference of opinion has however been expressed on specific technical points notably the length and intervals of electroencephalographic testing.

The Harvard criteria have had considerable impact on subsequent legislation, particularly in Europe. It has generally been recognized that their realistic comprehensive perspective has eliminated controversies regarding the legality of organ transplantation and the withdrawal of extraordinary medical treatment. The only criticism of the report has come essentially from some members of the non-medical milieu.⁴²

The first criticism refers to the highly technical nature of the criteria.⁴³ Despite the Committee's evident wish to make the "definition" accessible to all, it is obvious that the criteria remain highly technical and outside the reach of non-experts. Yet it must be remembered that the Committee never did attempt to draft a statute on death but simply a *medical* protocol for the diagnosis of irreversible coma. The technical character of the criteria is easily explained by the fact that they were written for physicians.

The second objection is that the proposed criteria are said to be unrealistic. On the one hand, the sophisticated technical equipment and methods of clinical diagnosis that they require make them inapplicable in a majority of cases. In practical terms, the criteria are useful only for hospitalized cases of irreversible coma and are of little use with neonates. On the other hand, despite the search for simplicity (some have viewed the omission of angiography as an expression of it), the lengthy enumeration of diagnostic techniques make any

direct transposition of the report into legislation unrealistic. Indeed, a statutory definition using the Harvard criteria as a model would run the risk of being quickly superseded by medical and scientific development. These criticisms are not to the point. As was pointed out above, the Committee had no legislative view in mind. Moreover nothing in the report prevents attempts to determine death by other criteria and tests in circumstances other than that of irreversible coma, or when sophisticated technical equipment is not available.

In the third place (it is argued), the Harvard criteria lack precision in determining the exact time of death. Nowhere in fact does the report indicate the precise moment when death can be said to have occurred. In our opinion, however, it may be assumed that the time of death coincides with the moment at which all conditions are found to be present for the first time.

Finally, some have commented that the problem of organ transplant has coloured the choice of these criteria and by implication, the conception of death which underlies the Committee's choice of criteria. The report, it has been argued, is closely tied to a particular interest facilitating the removal of organs and not oriented toward a search for an objective and universal "definition" of death. However this last criticism loses its sting in the light of another recommendation of the report which requires a complete separation in cases of transplantation, between the medical team determining death and the medical team doing the transplant.

B. Manitoba

In 1975, the Manitoba Legislature adopted a proposal for legislative amendment recommended by the Law Reform Commission of that province.⁴⁴

The first draft of the proposal submitted by the Commission was as follows:

For all purposes within the legislative competence of the Legislature of Manitoba, the death of a person takes place at the time at

which irreversible cessation of all that person's brain function occurs, and when it appears that withdrawal, if already instituted, of any artificial support of that person's vital functions causes or will cause the immediate onset of tissue disintegration throughout that person's body.

After further reconsideration, however, the Commission deemed it preferable to drop the last part of the sentence (*italicized above*), in the belief that it really added nothing to the first part of the text.

The Manitoba statute remains faithful to the guidelines that the Commission had set for itself: a basic simplicity that would avoid giving rise to absurd ramifications; listing no reference to the scientific instruments or techniques to be used in the determination of death; and lastly, a certain universality of application to all questions within provincial jurisdiction.

The Manitoba solution gave rise to two criticisms: first, the very general character of the definition afforded little perception of the detailed, rigorous and systematic analysis that had gone into its drafting. This generality, it was objected, might encourage interpretations that would not necessarily reflect the spirit and intent of the drafters and legislators.

It is a fact that the Manitoba definition of death is drafted in general terms and explicitly recognizes only brain death. However, the general character of its drafting does not exclude the possibility that death might be determined on other grounds or by other criteria than that of brain death, namely, the prolonged cessation of all cardiac and respiratory activity. Therefore though it might risk being narrowly interpreted by not explicitly referring as well to the traditional criteria of death, that first criticism of the Manitoba formulation is not justified.

Secondly, the wording of the phrase, "*... irreversible cessation of all that person's brain function ...*" — was also the object of some criticism. The words "*... all ... brain ... function ...*" refer to a state of complete neurological death. Some have argued that as long as there exists any sign, however feeble or slight, of any brain function whatsoever,

the person in question falls outside the definition. It is medical fact that even after the irreversible destruction of the cortex, which is taken to be the centre of consciousness and of the respiratory and cardio-vascular control centres, there may still exist certain electrical signs of neurological reflex activity in the spinal cord for instance.⁴⁵

It was argued that taken at face value and interpreted widely, which was obviously not the intention either of the Commission or of the Manitoba Legislature, the statute could possibly prevent a patient being declared dead even after the complete cessation of respiration and circulation and the necrosis of the neo-cortex and the cortex, only because some spinal reflex activity continued.⁴⁶ But it is important to note that medical authorities, and the Harvard Committee Report in particular, are of the opinion that these activities have no real significance, are compatible with whole brain death and would not prevent the determination that there is an "irreversible cessation of brain functions".

This second criticism is therefore a weak one. Also worthy of note in this regard is that the Manitoba statute refers to "brain function", rather than "cerebral function". In other words, it does not consider legally dead a person in a state of mere "cerebral death". To fall within the meaning of the statute the individual must be in a state of irreversible coma which (as stated above) includes the total absence of spontaneous breathing.

C. The United States

In the United States, legislative action on the criteria of death appears to fall within state jurisdiction. Some states have not yet acted in this regard; others have legislated using various formulations. In addition to these "definitions" of death, it is useful to consider also a number of suggestions made by individuals, or medical or interdisciplinary groups and committees. Although they, of course, have no legal force, the direct and normative influence that some of them have had is sufficient to justify their scrutiny. Both the

legislative and unofficial texts are numerous and to some degree repetitive: thus, the Kansas statute bears a high degree of resemblance to that enacted by several other states, such as Maryland. We shall restrict our examination to the best known and most characteristic among them.

(1) *Kansas*

Kansas enacted a statute in 1971⁴⁷ which was to serve as a model for a number of other American states.⁴⁸ The text is reproduced in Appendix II of this paper. The statute recognizes brain death but does not impose particular medical tests or techniques for its determination. In this regard it refers simply to the ordinary and standard procedures of medical practice. On the other hand, the statute proposes a two pronged "definition" of death, recognizing both the conventional signs of death (a cessation of spontaneous cardiac and respiratory activity) and the neurological signs (lack of spontaneous brain function established by the ordinary procedures of standard medical practice) as sufficient to establish death.

The Kansas statute received a mixed reception. Some commentators said it was "*. . . bold and innovative . . .*"⁴⁹; others did not hesitate to attack it.⁵⁰ The most common criticism has been that it attempts through a simple "definition" to solve at once too many problems that should have been considered separately. Indeed, the statute is concerned with three distinct questions:

- When can a person be considered dead?
- When is it appropriate and legal to interrupt artificial life support procedures? and
- When can an individual be permitted to die in peace?

A statute concerned with the determination of the time of death should not raise other issues or attempt to solve them at the same time. This attempt to be all-inclusive leads, unfortunately, to an unduly complex text. It also leaves a distinct

impression that the statute may have been conceived with a view to facilitating organ transplantation. All of this obliges the drafters to take refuge behind such terminology as, "... ordinary standards of medical practice . . .", to give the text enough flexibility and adaptability for future use.

Second, the definition is given in the form of two alternatives. It thus gives the impression at least that there are two types, two distinct sorts of death, and that an individual could be considered dead under one definition and still alive under the other. This aspect was considered by many as at least a sin against public psychology in that it contributes to the propagation of the inaccurate notion that there are different kinds of death for different purposes. The layman may get the impression that there is one type of death for organ transplantation purposes, another for homicide, and so forth. Consequently, the statute could exacerbate and foster public concern instead of providing a much needed sense of certainty. This general impression is reinforced by the presence of the second "definition" of death which appears to have been inserted to facilitate organ removals. This criticism is not justified. The Kansas legislators have pointed out that they did not want to sanction different kinds of death but only to separate two series of circumstances where death could be determined by different sets of criteria.

(2) *California*

In 1974 California adopted a legislative amendment to the *Health and Safety Code* reproduced in Appendix II of this paper.⁵¹ The approach taken differs substantially from that of the legislation previously examined and has been inspired by the Capron and Kass proposal examined later in this paper.

The first paragraph of Section 7180 of the Act states that a person shall be pronounced dead upon medical determination made by one physician, and confirmed by another, of the total and irreversible cessation of brain functions. The second paragraph specifies that a physician may, however, base his determination of death exclusively upon other, more usual and customary procedures. Section 7181 in turn prescribes for

purposes of organ removal for transplantation, confirmation of brain death by an independent physician. Neither the diagnosing nor the confirming physician may participate in the procedures for removing or transplanting the organ. This follows on both points the Harvard Committee Report's suggestions.

The California legislation has several interesting features. First, the use of the imperative form in the first paragraph makes brain death the norm for the determination of death, while the second paragraph leaves open the possibility of a diagnosis based on other criteria. Second, the text does not discriminate between patients subject to life sustaining procedures and others. Finally, taking into account the possible danger of an error of judgment, it requires for transplant purposes that the diagnosis of irreversible coma be confirmed by a second independent physician, as does the Harvard Committee Report.

The principal objective of the California statute as reflected by its philosophy and formulation, was to give legal recognition to brain death as equivalent to the death of an individual. It is unfortunate however that the second section too clearly shows the motive to be closely connected with organ transplants. The statute has the unquestionable merit of eliminating the ambiguities inherent in the Kansas formulation and of avoiding the specification of diagnosis procedures.

A number of other American states have also opted for a legislative approach to the problem and have followed either the Harvard or Kansas models. In one way or another, they all recognize brain death. Such is the case with the legislation of Alaska, Georgia, Idaho, Iowa, Illinois, Maryland, Montana, Louisiana, Michigan, New Mexico, North Carolina, Oregon, Oklahoma, Tennessee, Virginia and West Virginia.⁵²

(3) The Capron and Kass Proposal

Particular attention should be paid to the Capron and Kass proposal. It is a major contribution because of its

originality, its influence on subsequent statutes, and because of the interesting discussion it has raised. Furthermore, the Michigan statute repeats almost word for word the "definition" proposed by Capron and Kass.

The proposal is as follows:

A person will be considered dead if in the announced opinion of a physician, based on ordinary standards of medical practice, he has experienced an irreversible cessation of spontaneous respiratory and circulatory functions. In the event that artificial means of support preclude a determination that these functions have ceased, a person will be considered dead if in the announced opinion of a physician, based on ordinary standards of medical practice, he has experienced an irreversible cessation of spontaneous brain functions. Death will have occurred at the time when the relevant functions ceased.

In 1972, A. Capron and L. Kass, a lawyer and a doctor respectively, who had worked together in a research group on death, published an article entitled "*A Statutory Definition of the Standards for Determining Human Death: An Appraisal and a Proposal*".⁵³ After a review of the then existing "definitions", the authors examined the various possible options. Having concluded that a legislative definition is necessary and that the public should be directly involved in the drawing up of such a definition, they propose a text which attempts to solve the three main problems raised by the new medical dimensions of death. The text recognizes that a person may be pronounced dead when an irreversible cessation of the cardiac and respiratory functions has occurred. The text also specifies that if artificial support procedures have been used, death can be determined through the irreversible loss of spontaneous brain functions. Finally, it adds that the time of death is the precise moment when these functions cease to exist.

This proposal differs from all others especially in that it recognizes two different ways of declaring death but clearly

excludes any suggestion that there are "different deaths". Under normal circumstances, cardiac and respiratory arrest is the test. In cases where absence of spontaneous cardiac and respiratory functions cannot be determined, the test will be cessation of brain functions. It determines the exact moment of death and, unlike the Harvard and Kansas definitions, does not insist on the obligation to declare death before stopping artificial means of support, though it does not exclude this possibility.

The Capron and Kass text was generally well received in legal and medical circles except by those who, like Roger Dworkin, oppose any attempt at legislative intervention.⁵⁴ However, the proposal did meet with some criticism. The main one is that, as in the case of Kansas, Capron and Kass seem to endorse two alternative notions of death: death resulting from the arrest of cardiac and respiratory functions and death resulting from the arrest of brain functions. The criticism however is not really justified. In fact, despite the "alternatives" proposed, there is only one concept of death, because the irreversible cessation of cardiac and respiratory functions leads, in the next few minutes, to the irreversible end of brain functions. The alternatives are not related to the *concept* of death but rather to the *method* of determining it. The apparent dichotomy is justified by the still apparent signs of life when external support procedures are used.

D. *Europe*

The majority of European countries recognize brain death either directly through legislation or regulations, or indirectly through official medical texts establishing diagnostic procedures very similar to those of the Harvard Medical School.

In France, a document published by the Ministry of Health on April 24, 1968,⁵⁵ endorsed criteria closely resembling those of the Harvard school. The same can be said of the Canton of Zurich in Switzerland, the Académie Suisse des Sciences Médicales,⁵⁶ and Holland. As for Denmark, Sweden⁵⁷ and Belgium⁵⁸, the concept of brain death seems to be

generally accepted although not formally recognized. The Federal Republic of Germany takes the same stand, while adding the requirement of cerebral angiography.⁵⁹

Great Britain, on the other hand stands as a special case. Lawyers and doctors have generally opposed any attempt at legislative intervention,⁶⁰ judging it futile and dangerous because it might lead to a restriction of medical progress. However, a certain number of cases have forced the British courts to come to grips with the problem. A remarkable example was the Potter case, which unfortunately has not been reported.⁶¹ Potter, suffering from a skull fracture owing to a fall, was taken to a hospital. When his spontaneous breathing stopped, he was placed on a respirator. Twenty-four hours later with his wife's consent, one of his kidneys was removed and transplanted. The respirator was then shut off. The surgeon, accused of murder, appeared before the same coroner who had authorized the removal of the kidney under the "*Human Tissue Act*". The problem was to determine the moment and cause of death. The jury decided that the kidney removal was not the cause of death. The case raised considerable discussion among those who, while admitting the practical validity of the given solution, were concerned about its possible consequences.

For some time, however, the opponents of legislative intervention have been losing ground in Great Britain. In 1976 the English author Skegg⁶² remarked that many of the classic objections were unfounded. Moreover, the *Conference of Medical Royal Colleges* recently recognized the concept of brain death and approved a series of criteria similar to those of the Harvard school.⁶³

E. Australia

The Law Reform Commission of Australia published in 1977 a Report on Transplantation.⁶⁴ In this context, the Commission examined the problem of determination of death. Noting the medical profession's general acceptance of brain death as well as its fears concerning the uncertainty of existing

legal solutions, the Commission concluded that legislative intervention was necessary. Prior to this report, the Commission had issued a working paper. The definition proposed stated that a person could be considered dead in the case of total and irreversible cessation of all vital brain functions. Death had to be certified by two doctors, one of whom was to be a neurologist. It could also be determined on the basis of the arrest of spontaneous respiratory and cardiac functions. The working paper was discussed at a conference of representatives of the medical profession.

This proposed definition met with some criticism and was consequently re-examined in the Commission's report. Unfortunately, details regarding these criticisms are not available. According to the new proposal, death can be determined not only by the total and irreversible cessation of all functions of the brain but also by the irreversible cessation of circulatory functions. The second part of the proposal concerns the determination of death when the individual's vital functions are artificially maintained; in this case, the report suggests that death must be certified by two doctors. The Commission's report substantially differs from the recommendations of the working paper by putting the two alternatives on the same level and allowing either standard to be used depending on the circumstances.

This brief comparative review reveals that the legislative or regulatory solution seems to have met with approval even in jurisdictions like the United States and Australia, or Manitoba, where the common law tradition might have favoured a case-by-case approach. Moreover the opposition to legislative intervention, in most cases, has been directed not against the principle itself but against its particular formulations. In other words, the discussion has now centered more around the content of the legislation than around the question of whether or not legislation is required.

Without returning to a detailed discussion of the respective merits of the three possible types of solution, we suggest that a carefully drafted legislative intervention, designed to meet specific and clearly-defined objectives, is probably the

best alternative. Its psychological and legal effects would be to dissipate fears shared by doctors, other medical personnel and the public. It would also eliminate the tensions between the insights of tradition and the imperatives of contemporary medicine.

However, one cannot opt for just any type of legislative intervention with an unspecified content. The parameters of the solution must be carefully set out according to the objectives and the general philosophy of the reform.

PART THREE

The Proposed Solution

To legislate on the subject of death can be risky because of controversies in the medical field and the diversity of the possible objectives. For this question perhaps more than for any other, it is absolutely necessary to clearly state the objectives of the proposed law, the fundamental principles it should endorse and the practical problems it must resolve.

I. The Necessary Objectives

(1) The proposed legislation must avoid arbitrariness and give greater guidance to doctors, lawyers and the public, while remaining flexible enough to adapt to medical changes.

As already noted, in the present state of affairs there could exist in Canada a degree of uncertainty which may have serious consequences. First, it may lead to the belief that there exist several kinds of death, and consequently that a person could be pronounced dead under certain circumstances, while according to a different medical theory or in another time and place, the same person might be considered to be alive. People would rightly have difficulty accepting the co-existence of different conceptions of death

and the influence that might have on the making of medical decisions. Any legislative action must therefore attempt to solve this problem and to offer greater certainty in this area.

Second, doctors should be able to know precisely when they may legally pronounce a person dead. This fact has important consequences on their practice, and affects the legality of some of their actions and consequently their ability to carry them out. Doctors and nurses must not be used as hostages in a legal dispute. On the contrary, they must be able to coordinate the practice of their profession with what society allows and prohibits. The standards set by society should be clearly determined to eliminate arbitrariness and to give more reliable terms of reference.

Given the numerous practical legal consequences attached to the determination of the moment of death, lawyers, as we have seen, also need to have a line drawn as clearly as possible between the living and the dead.

Greater certainty does not, however, necessarily mean a lack of flexibility. Legislation should not be rigid, especially regarding the determination of death. Legislation must not stifle the court's flexibility, which permits the adaptation of legal norms to the changing circumstances of individual cases. Moreover, legislation must have the capability of adapting not only to new and different case circumstances, but also to changes, improvements and discoveries in the fields of science, medicine and biology. To conclude otherwise would be to create a hidebound law, an obstacle to progress and to the adaptation of legal standards to social reality.

(2) The proposed legislation must not attempt to solve all the problems created by death, but only the problem of establishing criteria for its determination.

If death is one side of the coin, the other, obviously, is life. Some people will maintain that the two issues must be discussed together and cannot be separated. It will doubtless be argued that it is difficult to take a position on death and not

at least implicitly to take it on life. This argument is philosophically well-founded. However, within the framework of this particular study and for legal purposes only, the two (though related) can and must be treated separately. In our view therefore, there can be legislation authorizing a doctor to declare a person dead that will not (at least in the same piece of legislation) make any statement on the right to refuse treatment or on the right to die, or on the human or non-human status of a foetus. Refusal of treatment and euthanasia are indeed the subjects of separate studies by the Commission though there is full agreement in all three studies as to the underlying assumptions and principles. The problem that the present document attempts to solve is limited to the following question: from what moment and by what criteria can a human person, for legal purposes, be considered dead?

(3) The one proposed piece of legislation must apply equally in all circumstances where a determination of death is at issue.

It would be difficult to accept a multiple teleological legislative approach for the legal norm. For example, the law should not have a definition of death for fiscal purposes and another for the purposes of criminal law. Neither should a difference be made on the basis of legal status or age (for instance a concept of death for children, another one for adults). To do so would risk three negative effects. It would foster existing public concerns already discussed. It would also create different social "categories" of people and inequalities with respect to a phenomenon which is conceived of and accepted as identical and universal. Finally, the proliferation of "definitions" of death would doubtless lead to even more uncertainty and confusion than we have today.

On this point, the federal and provincial governments should agree to adopt, each within the limits of its own jurisdiction, either an identical text or at least a text reflecting the same conception and having the same effect. It would be rather absurd to have to speak of "federal death" and "provincial death"!

In the United States, the National Conference of Commissioners on Uniform State Laws has recently recommended the adoption of a uniform text by all the states and the federal government.

(4) The proposed legislation must recognize only the standards and criteria of death; it must not define the medical procedure to be used, nor the instruments or procedures by which death is to be determined.

This condition is extremely important. Comparative approaches reveal two different models. Some, such as the Harvard Committee, are medical models and attempt to give a detailed list of the scientific and medical tests and technology to be used in the determination of death. Others, for example the Manitoba statute, are legal models and avoiding specificity merely express a general standard, allowing medical science to adapt methods of diagnosis and techniques to each individual case.

For legal purposes the Manitoba model is, in our opinion, preferable to that of the Harvard Committee. The proposed legislation must reflect a degree of conceptualization of death without encroaching upon what must remain within exclusive medical jurisdiction: the field of diagnosis. It is not the legislator's role to dictate diagnostic methods to the medical profession. His role is simply to recognize ethically, philosophically and socially acceptable standards and let doctors determine, at the clinical and practical level, the most appropriate way of translating those standards and criteria.

Any legislative attempt to set down scientific procedures and medical methods of diagnosis would be open to three dangers. In the first place, practically speaking it is impossible to find complete consensus about them in the medical profession. One clear example is the ongoing controversy over the validity of the electroencephalogram, and over the length and frequency of its use. In the second place, if one lists these procedures and methods in the legislation they become immediately fixed and unresponsive to changes that are

sometimes very rapid. Fixing them in legislation would create the need for periodic revision to prevent a quickly outmoded legislative text.

Finally the description of diagnostic procedures in legislation would obviously have to be as complete and detailed as possible to attain a high level of certainty. Such a description could have the effect of imposing these procedures in all cases. Death would therefore become a phenomenon that could only or ideally be determined in a hospital setting. Yet, in the vast majority of cases the administration of these procedures will not be necessary to determine death with certainty. It would for instance be ridiculous to administer an EEG to someone who has been decapitated in an accident or to a body discovered several days after death. It would be equally ridiculous to require that each person who dies in his own home be taken to a hospital so that death may be ascertained through sophisticated medical apparatus.

(5) The proposed legislation must recognize standards and criteria generally accepted by the Canadian public.

Legislation must not be seen by the public as substituting, through legal authority, a new concept of death to the existing one. Legislation must not create a "new death" but simply provide a new general and accepted method of determining the same reality. Law is there to reflect a change not in the nature of death, but only in the criteria for determining, recognizing and appraising it. In that respect, it would be both futile and illusive to ignore the popular consensus or at least the concept generally accepted by the public.

(6) To remain faithful to the popular concept, the proposed legislation must recognize that death is the death of an individual person, not of an organ or cells.

The proposed legislation must reflect a unitary concept of death. As we have seen, one view of death is that of a process of progressive deterioration of all vital functions. Nevertheless, what is important for the public is not cellular death or

the death of an organ, but that of a *person*, of a *human being*. Obviously, a human being cannot be considered dead just because his kidney or appendix was removed and the organ is dead. On the other hand one should not have to wait until a corpse has totally decomposed before declaring that person dead, nor should one consider as alive a person who is buried, just because his kidneys transplanted into another individual are still functioning.

(7) The proposed legislation must not in practice lead to wrong or unacceptable situations.

Even if the law remains very general, it must not lead to wrong conclusions in its practical applications. For example, any proposed legislation would be totally unacceptable if, according to its terms, persons incapable of spontaneous breathing whether conscious (*e.g.* a quadraplegic, or a victim of acute poliomyelitis) or temporarily unconscious were to be considered "dead". By the same token it would be wrong to treat as dead a severely mentally handicapped person who has suffered the irreversible loss of certain cerebral functions but remains conscious.

Legislation must not create categories of "semi-living" and "semi-dead" persons, or treat certain people "as if" they were dead. There is no need to elaborate on the dangers of this hypothesis in regard to human rights, or to convey the unreality of such a concept.

Finally, the legislation must recognize deaths whether or not they occur in the presence of a doctor. The proposed statute must not for legal purposes impose medical acknowledgment of death in each and every case. It must not therefore confine itself to the definition of clinical death.

(8) The proposed legislation must not determine the criteria of death by reference only or mainly to the practice of organ transplantation.

The reasons behind this proposition are easily understood. Organs and tissue must be removed as quickly as possible for a successful transplantation. Any "definition" of death based solely or mainly on this requirement would risk catering to the interests of one group (legitimate as these interests may be) at the expense of others. There is a danger that the law would be biased in favour of the receiver, or at least tend to favour his interests, where in doubt. This would engender suspicion, mistrust and fear in the public, with possibly disastrous results for the medical profession. The proposed "definition" must not be conceived with a view to aiding transplantation; neither should it hinder them. It must be neutral on that issue.

II. The Proposed Reform

The contemporary and shared conception of death is not as far removed from medical reality as is sometimes believed. Death is considered to be both the permanent and irreversible cessation of conscious and relational life of which the medical term is "irreversible coma". Whole brain death is its sign. The difficulty in a certain number of cases stems from an apparent conflict between this state of fact and a visual perception of it. For instance, an irreversibly comatose patient, according to the Harvard test, can be considered dead even if still on a respirator and thus showing signs of respiration which under other circumstances would be tangible signs of human life. Yet these signs or movements are misleading for they indicate only an "appearance" of life.

The cessation of conscious and relational life must be permanent and irreversible, corresponding from a medical point of view, to a loss of consciousness and the absolute inability to regain consciousness. A patient under anaesthetic or with the symptoms of mere cerebral death, for instance, would not fall into that category. In the former case the patient has the capacity to regain consciousness.

In the latter case despite symptoms of apparent "brain death" such persons will continue to be capable of spontaneous cardio-respiratory functions until the centre controlling

them (the brain stem), is or becomes irreversibly damaged. It would be wrong to consider them dead, even when it is certain that they will never regain consciousness. The ambiguity here comes from a misuse of terminology and of the terms "cerebral death" and "brain death". "Brain death" is not only the irreversible loss of conscious and relational abilities and functions, but *also* the permanent cessation of spontaneous breathing and heart beat.

However, the simple fact that residuary electrical activities are still maintained in the spinal cord has never been considered by medicine as an obstacle to the declaration of brain death. These spinal reflexes are not included, as medical science readily accepts, within the meaning of "brain death" as we understand that term in the recommendation below.

The legislation must deal with concrete problems. The most frequent one is that of irreversibly comatose patients showing no signs of brain life or of spontaneous respiratory and cardiac functions but where the latter are assisted by modern technology. We believe that legislation should address itself to that specific problem. The case is one of *whole* brain death which cannot be ascertained by the usual method, that is, the cessation of cardiac and respiratory functions.

Finally, as we have already discussed before, the legislation should not contain the description of the medical procedures or techniques for determining death. At most, it can include reference to the norms generally accepted by contemporary medical practice.

Taking these factors into account, the Commission makes the following recommendations:

(1) *That the Parliament of Canada adopt the following text:*

A person is dead when an irreversible cessation of all that person's brain functions has occurred.

The cessation of brain functions can be determined by the prolonged absence of spontaneous cardiac and respiratory functions.

When the determination of the absence of cardiac and respiratory functions is made impossible by the use of artificial means of support, the cessation of the brain functions may be determined by any means recognized by the ordinary standards of current medical practice.

(2) That the Government of Canada enter into agreements with the Provincial Governments to insure the adoption of this text or a similar one throughout the country for all legal purposes in order to achieve suitable uniformity.

Endnotes

1. See, the brief bibliography given in Appendix I.
2. It was not unusual a few years ago to even speak of "civil death" to designate the legal status of individuals in certain situations (for example, criminals condemned to death or to life imprisonment) with reference to the exercise of their civil rights.
3. See the now classic debate on the subject between Morison and Kass. Robert S. Morison "Death: Process or Event?", and Leon R. Kass, "Death as an Event: A Commentary on Robert Morison", in 173 *Science* 694 ff. (1971).
4. For the medical analysis of death, see (as well as the large number of specialized works in existence), an unpublished study undertaken for the Commission by the Institute for Research on Contemporary Interpretations of Man of the University of Sudbury, entitled *Definition of Death and Euthanasia* (March 1975), 746 pp. We are largely indebted to this work in our own analysis.
5. For the very important distinction between "cerebral death" and "brain death", see Olinger, "Medical Death", 27 *Baylor Law Review* 22 (1975), p. 24.
6. "A Definition of Irreversible Coma: Report of the Ad Hoc Committee of the Harvard Medical School to Examine the Definition of Brain Death", 205 *J.A.M.A.* 337 (1968).
7. This fact is emphatically pointed out in the Harvard Medical School Report.
8. See Bergquist, J., and Bergstrom, W., "Angiography in Cerebral Death", 12 *Acta Radial* 283 (1972).
9. Lamoureux, Chartrand, Copti, Guimond, Bisson, Doyal "Le diagnostic de la mort cérébrale par une méthode radioisotopique simple et rapide" 107 *Union médicale du Canada* 61 (1978).
10. "A Definition of Irreversible Coma: Report of the Ad Hoc Committee of the Harvard Medical School to Examine the Definition of Brain Death", 205 *J.A.M.A.* 337 (1968).
11. 15 *World Medical Journal* 133 (1968).

12. Canadian Medical Association 1968 *C.M.A.J.* 99: 1266 (1968) and General Council 1974, 1975; Resolution of the College of Physicians and Surgeons of the Province of Québec: (1969) *Bulletin du Collège des médecins et chirurgiens de la province de Québec*, p. 78.
13. American Medical Association *Judicial Council Opinions and Reports*. Chicago A.M.A. Press 1977, p. 23 ff.
14. Silverman, D., Saunders, N. G., Schwab, R. S. *et al.*, "Cerebral death and the electroencephalogram: Report of the Ad Hoc Committee of the American Electroencephalographic Society on EEG criteria for determination of cerebral death", 209 *J.A.M.A.* 1505-1510, (1969).
15. "Life or Death by EEG", 190 *J.A.M.A.* 112 (1964).
16. *Medical World News* 271 (1975).
17. Quoted in S. Olinger, "Medical Death", 27 *Baylor Law Review* 22 (1975), p. 25.
18. *Estate of Rowley*, 257 Cal. App. 2d. 324; 65 Cal. Rep. 139 (1968).
19. *Gugel's Administrator v. Orth's Executors*, 236 S.W. 2nd 460 (1950).
20. See also for similar circumstances: *Evans v. Halterman* 165 N.E. 86 (1928); *Waegemast v. Hess* 280 N.W. 641 (1938); *Sauers v. Stolz* 218 p. — 2nd 741 (1950); *Re: Davenport Estate* 323 P. 2nd 611 (1958).
21. *Re: Warwicker, McLeod et al. v. Toronto General Trust Co.* (1936) 3 D.L.R. 368 (Ontario Sup. Court).
22. *United Trust Co. v. Pyke* 427 P. 2d. 67 (1967). See also: *People v. Lyons* 15 Crim. L. Rep. 2240 (1974); *People v. Flores*, reported in *Medical World News* 1974, 14; *New York City Health and Hospital Co. v. Sulsona* 367 N.Y.S. (2d) 686 (1975).
23. *Tucker v. Lower* — Richmond, Va. no. 2831, May 1972. Viz., Converse, R. "But When Did He Die?: *Tucker v. Lower* and the Brain Death Concept", 12 *San Diego Law Review* 424 (1975). Also Veatch "Brain Death", *Hastings Center Report* No. 11 (1972) p. 10; *State v. Brown* 8 Oreg. App. 72 (1971).
24. *Black's Law Dictionary*, 4th ed. 1968 — 488.
25. *Smith v. Smith* 229 Ark. 579; 317 S.W. 2d. 275 (1958). See also: *Douglas v. South Western Life Insurance Co.* 374 S.W. 2d. 788 (1964).
26. *R. v. Page* not reported. Cited in "Report on Statutory Definition of Death", Manitoba Law Reform Commission 1974, p. 17; see also: "Medical Causation: The Defendant's Act a Pre-existing and Intervening Factor: a Case History Report", in 14 *Trauma* 1 (1972).
27. *R. v. Kitchling and Adams* (1976) 6 W.W.R. 697 (Manitoba Court of Appeal).

28. Manitoba Law Reform Commission "Report on a Statutory Definition of Death", Winnipeg 1974.
29. *Vital Statistics Act*, R.S.M., ch. V-60.
30. Sects. 18-23 *Québec Civil Code*.
31. *Human Tissue Gift Act*, 1971. S.O. 1971, ch. 83.
32. See among other texts *Definition of Death and Euthanasia* op. cit. (*supra*, note 4).
33. Pius XII "The prolongation of life" (1958), *Pope Speaks* Vol. 4, No. 4, p. 393.
34. This excerpt has often been misquoted, and has given rise to numerous ambiguities and distortions of the original thought of it's author. See on this topic, Van Till-d'Aulnis de Bourouill, H. A. H., "How Dead Can You Be?", 15 *Medicine, Science and the Law* 133 (1975), p. 138.
35. This argument is forcefully developed by A. Capron and L. Kass in "A Statutory Definition of the Standards for Determining Human Death: An Appraisal and a Proposal" 121 *U. of Pen. Law Rev.* 87 (1972) p. 92 ff.
36. Curran, W., quoted by Hendin in *Death As a Fact of Life*, New York Norton, 1973, p. 41.
37. Mills, D., "The Kansas Statute: Bold and Innovative" 285 *New Eng. J. of Med.* 968 (1971) p. 968.
38. One of the best critiques of the legislative solution along these lines is that of I. Kennedy, "The Kansas Statute on Death: An Appraisal" 285 *New Eng. J. of Med.* 946 (1971). See also: Horsey, *Dead or Alive — Continuing Educational Course for Coroners*, Toronto, 1974.
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APPENDIX I

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APPENDIX II

Selected Definitions of Death

AUSTRALIA:

- (1) A person has died when there has occurred:
 - (a) irreversible cessation of all functions of the brain of the person; or
 - (b) irreversible cessation of circulation of blood in the body of the person.
- (2)
 - (a) Where the respiration and the circulation of the blood of a person are being maintained by artificial means, tissue shall not be removed from the body of the person for the purpose of the transplantation of the tissue to the body of a living person or for use for other therapeutic purposes or for medical or scientific purposes unless two registered medical practitioners (each of whom has carried out a clinical examination of the person, each of whom has been, for a period of not less than five years, a registered medical practitioner and one of whom is a specialist neurologist or neurosurgeon or has such other qualifications as are prescribed) have declared that irreversible cessation of all function of the brain of the person has occurred.
 - (b) For the purposes of subsection (a), any period during which a person who is a medical practitioner practised as a medical practitioner, however described, under the law in force in a country outside Australia shall be taken into account in calculating the period of five years referred to in the subsection.

(Australian Law Reform Commission — "Report on Human Tissue Transplants" (1977).)

CALIFORNIA:

7180. A person shall be pronounced dead if it is determined by a physician that the person has suffered a total and irreversible cessation of brain function. There shall be independent confirmation of the death by another physician.

Nothing in this chapter shall prohibit a physician from using other usual and customary procedures for determining death as the exclusive basis for pronouncing a person dead.

7181. When a part of the donor is used for direct transplantation pursuant to the *Uniform Anatomical Gift Act* (Chapter 3.5 commencing with Section 7150) and the death of the donor is determined by determining that the person has suffered a total and irreversible cessation of brain function, there shall be independent confirmation of the death by another physician.

Neither the physician making the determination of death under Section 7155.5 nor the physician making the independent confirmation shall participate in the procedures for removing or transplanting a part.

(California Health and Safety Code 7180-81 (West Supp. 1975).)

CAPRON AND KASS:

"A person will be considered dead if in the announced opinion of a physician, based on ordinary standards of medical practice, he has experienced an irreversible cessation of spontaneous respiratory and circulatory functions. In the event that artificial means of support preclude a determination that these functions have ceased, a person will be considered dead if in the announced opinion of a physician, based on ordinary standards of medical practice, he has experienced an irreversible cessation of spontaneous brain functions. Death will have occurred at the time when the relevant functions ceased."

(Capron and Kass, A Statutory Definition of the Standards for Determining Human Death, 121 U. PA. L. Rev. 87 (1972) (a).)

HARVARD MEDICAL SCHOOL:

Criteria for Irreversible Coma of Harvard Ad Hoc Committee —

- (1) Unreceptivity and unresponsivity — no response even to intensely painful stimuli.
- (2) No movement or spontaneous respiration for three minutes off the respirator.
- (3) No reflexes: fixed, dilated, and unresponsive pupils; no ocular movement with head turning and irrigation of ears with ice water, no blinking; no postural activity; no corneal or pharyngeal reflexes; no swallowing, yawning, or vocalization; no biceps, triceps, pronator, quadriceps, or gastrocnemius reflexes, and no response to plantar or noxious stimulation.
- (4) Flat EEG for at least ten minutes as a confirmation of irreversible coma.

- (5) All of the above tests shall be repeated at least 24 hours later with no change.
- (6) There must be no evidence of hypothermia or central nervous system depressants.

(Report of the Ad Hoc Committee of the Harvard Medical School to Examine the Definition of Brain Death, 205 J.A.M.A., 337 (1968).)

KANSAS:

- (1) A person will be considered medically and legally dead if, in the opinion of a physician, based on ordinary standards of medical practice, there is the absence of spontaneous respiratory and cardiac function and, because of the disease or condition which caused, directly or indirectly, these functions to cease, or because of the passage of time since these functions ceased, attempts at resuscitation are considered hopeless; and, in this event, death will have occurred at the time these functions ceased; or
- (2) A person will be considered medically and legally dead if, in the opinion of a physician, based on ordinary standards of medical practice, there is the absence of spontaneous brain function; and if based on ordinary standards of medical practice, during reasonable attempts to either maintain or restore spontaneous circulatory or respiratory function in the absence of aforesaid brain function, it appears that further attempts at resuscitation or supportive maintenance will not succeed, death will have occurred at the time when these conditions first coincide. Death is to be pronounced before artificial means of supporting respiratory and circulatory function are terminated and before any vital organ is removed for purposes of transplantation.

(Kan. Stat. Ann. 77-202 (Supp. 1974).)

MANITOBA:

For all purposes within the legislative competence of the Legislature of Manitoba, the death of a person takes place at the time at which irreversible cessation of all that person's brain function occurs.

(S.M. 1975, ch. 5, Sect. 1.)

MARYLAND:

A person will be considered medically and legally dead if, based on ordinary standards of medical practice, there is the absence of spontaneous respiratory and cardiac function and, because of the

disease or condition which caused, directly or indirectly, these functions to cease, or because of the passage of time since these functions ceased, attempts at resuscitation are considered hopeless; and, in this event, death will have occurred at the time these functions ceased; or

A person will be considered medically and legally dead if, in the opinion of a physician, based on ordinary standards of medical practice and because of a known disease or condition, there is the absence of spontaneous brain function; and if based on ordinary standards of medical practice, during reasonable attempts to either maintain or restore spontaneous circulatory or respiratory function in the absence of spontaneous brain function, it appears that further attempts at resuscitation or supportive maintenance will not succeed, death will have occurred at the time when these conditions first coincide. Death is to be pronounced before artificial means of supporting respiratory and circulatory function are terminated and before any vital organ is removed for purposes of transplantation.

(Md. Ann. Code, Art. 43, Sect. 54F (Supp. 1975).)

MICHIGAN:

- (1) A person will be considered dead if in the announced opinion of a physician, based on ordinary standards of medical practice in the community, there is the irreversible cessation of spontaneous respiratory and circulatory functions. If artificial means of support preclude a determination that these functions have ceased, a person will be considered dead if in the announced opinion of a physician, based on ordinary standards of medical practice in the community, there is the irreversible cessation of spontaneous brain functions. Death will have occurred at the time when the relevant functions ceased.
- (2) The means of determining death in subsection (1) shall be used for all purposes in this state, including the trials of civil and criminal cases.

(Mich. St. Ann. S-14-228(2) (Supp. 1977).)

NATIONAL CONFERENCE OF COMMISSIONERS ON UNIFORM STATE LAW (U.S.):

- (1) For legal and medical purposes, an individual with irreversible cessation of all functioning of the brain, including the brain stem, is dead.
- (2) Determination under this Act shall be made in accordance with reasonable medical standards.

VIRGINIA:

When a person is deemed medically and legally dead

A person shall be medically and legally dead if

(a) in the opinion of a physician duly authorized to practice medicine in this State, based on the ordinary standards of medical practice, there is the absence of spontaneous respiratory and spontaneous cardiac functions, and because of the disease or condition which directly or indirectly caused these functions to cease, or because of the passage of time since these functions ceased, attempts at resuscitation would not, in the opinion of such physician, be successful in restoring spontaneous life-sustaining functions, and, in such event, death shall be deemed to have occurred at the time these functions ceased; or

(b) in the opinion of a consulting physician, who shall be duly licensed and a specialist in the field of neurology, neurosurgery, or electroencephalography, when based on the ordinary standards of medical practice, there is the absence of spontaneous brain functions and spontaneous respiratory functions and, in the opinion of the attending physician and such consulting physician, based on the ordinary standards of medical practice and considering the absence of the aforesaid spontaneous brain functions and spontaneous respiratory functions and the patient's medical record, further attempts at resuscitation or continued supportive maintenance would not be successful in restoring such spontaneous functions, and, in such event, death shall be deemed to have occurred at the time when these conditions first coincide.

Death, as defined in subsection (b) hereof, shall be pronounced by the attending physician and recorded in the patient's medical record and attested by the aforesaid consulting physician.

(VA. Code Ann. 32-364.3:1 (Cum. Supp. 1975).)

APPENDIX III

Short Glossary of Medical Terms

ANGIOGRAPHY: A radiography of blood vessels following an injection of an X-ray opaque liquid.

ANOXIA: A decrease in the quantity of oxygen distributed to the tissues by the blood.

BULB: The upper enlargement of the spinal cord.

COMA: An extended loss of consciousness.

CORTEX: The outer layer of the brain and cerebellum.

ELECTROENCEPHALOGRAPHY: A medical technique which records the electrical activities of the brain.

FIBRILLATION: The violent and erratic contraction of the cardiac muscles.

HYPOTHERMIA: An abnormal lowering of the temperature of the body.

ISCHEMIA: The cessation or decrease of the blood flow in a tissue or an organ.

NECROSIS: A deterioration of a tissue following the death of its cells.