and Community Medicine at the University of Missouri warned that university departments of primary care are often too bogged down by clinical work and teaching to train and support principal investigators and to allow time and resources for research.

Nevertheless, primary care in America is rapidly becoming a leader rather than a follower, although its internal divisions could hold it back. Family medicine rightly claims to represent the core of American primary care, but its research structure has some catching up to do. The general internists and general paediatricians can claim to lead primary care research and evidence based practice (through bodies like the Society for General Internal Medicine), but they have lagged behind in education by continuing to offer hospital based training programmes. Those who practise primary care need to pool their individual strengths if they are to build a strong and united partnership.

TRISH GROVES
General practice editor

BMJ,
London WC1H 9JR

JOHN ROBERTS
Physician

York Health System Medical Group,
York, Pennsylvania 17403,
USA

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Diagnosing death

Getting it right is vital if opportunities for resuscitation are not to be missed

Britain's mortality statistics for 1990 report that 23% of all deaths occurred at home.[1] This percentage is likely to increase,[2] and it will be the local general practitioner who is usually summoned to certify death. Furthermore, in the case of sudden death the general practitioner will often arrive when the paramedics are still "on their way" and may have to make the diagnosis without the aid of high tech equipment. However, making a clinical diagnosis of death is rarely mentioned in modern textbooks, although much is written about pronouncing brain death. There is often considerable doubt about the actual moment of death, particularly for those witnessing the process of dying,[3 4] as the warmth of the body and the long unnerving intervals between respiratory gasps can be misleading.[4] Few reliable criteria exist by which the moment of death can be precisely identified.[5 6] Furthermore, attempts to define death depend on the subjective concepts of what constitutes biological life and personhood, and thus at what point the integration of functions of biological life constitute a living human being.

A body's organs and tissues do not die simultaneously, and only certain organs are regarded as crucial to the life of the "whole" person. Technological advances have led to the development of tests to determine the absence of integration between functions of respiration, circulation, and the nervous system. However, it is the sensorimotor potential rather than heartbeat and respiration that has become recognised as defining life, and this has led to a conceptual crisis in diagnosing death.[7] This blurring of the boundary between life and death has undermined the traditional clinical method,[6] even though this is the method on which most doctors must rely. For many practitioners, the diagnosis of death has largely "sunk into a commonplace formality"[8] and on occasions, fortunately rare, the diagnosis has been wrong.[9]

Evidently, definitions are complicated. For example, "somatic" or systemic death implies reversible death. Here respiration and cardiac output may have ceased, but a period of lingering vitality exists in which there may be potential for resuscitation. Hopefully, the distinction between somatic death and "molecular" or irreversible death, where the progressive disintegration of the body tissues has started, should be readily apparent to a doctor.[10]

Guidelines would help to ensure accurate diagnosis of death in the community. These would be the same whether death was expected or unexpected. First, a rapid assessment is needed, while taking a history from any attendants, to exclude the need for resuscitation. Initial observation should confirm a deathly pallor (pallor mortis), particularly of the face and lips, and relaxation of the facial muscles leading to drooping of the lower jaw and open staring eyes.

To confidently exclude somatic death, a complete physical examination should be conducted, preferably in private so that the presence of relatives does not inhibit its thoroughness. The examination should exclude central and peripheral circulation through the palpation of the carotid, radial, and femoral arteries. The absence of heart and lung sounds should be determined by auscultation continually for one minute and repeated intermittently over a period of not less than five minutes.[11] Caution is required as in very corpulent individuals, or conditions such as pericardial effusion, the normal heart sounds may be indistinct. Simultaneously, observations should be made for respiration. Inspection of the eyes is mandatory but not just for fixed and dilated pupils. There is a dry, often cloudy appearance to the cornea, an absence of corneal reflexes, and loss of eyeball tension.[10] Examination of the fundi may show segmentation of retinal blood columns, referred to by different authors as trucking, palisading, railroading, or boxcars. This is a definite sign of death, although nearly two thirds of dead people do not display this sign.[12]

Indisputable signs that occur some time after death are those of molecular death. These include purpuric death spots (postmortem staining) as a result of hypostasis, which may appear as soon as half an hour after death; the onset of increasing muscle stiffness after three hours and the beginnings of rigor mortis[10]; and decreasing body temperature, which may not be obvious until as long as eight hours from the time of death.[10]

Doctors in doubt about the diagnosis of death should be especially cautious in situations in which a person could seem dead.[9] Hypothermia, particularly in an elderly person, is perhaps the likeliest of such scenarios. Similarly, anything which causes coma can impair temperature regulation and so lead to hypothermia. Not only may hypothermia cause depres-

sion of the central nervous system, but it may lead to a profound reduction and therefore possible apparent absence of cardiac output and respiration. Conditions that can induce coma in which this may occur include drug overdose (particularly of tricyclic antidepressants,[13] barbiturates,[14] alcohol, and anaesthetic agents) and certain metabolic states including myxoedema coma, uraemia, hypoglycaemia,[9] hyperosmolar coma, and hepatic encephalopathy.[14]

If hypothermia is suspected and resuscitation instituted it should be remembered that, although complete cessation of circulation to the normothermic adult brain for more than 10 minutes is incompatible with survival of brain tissue,[14] hypothermia affords protection from hypoxic neurological damage.[13] Resuscitation attempts should not be discontinued until near normal core temperature has been restored.[14] Furthermore, the brains of children under 5 years old are more resistant to damage.[14]

Additionally, certain situations equate with sudden somatic death but if caught in time may allow for resuscitation. For example, death should not be certified after drowning until attempts at resuscitation have been exhausted after water has been expelled from the lungs using the Heimlich manoeuvre, particularly as there is likely to be coexistent hypothermia. Other events that fall into this category include airway obstruction, electric shock, and lightning strike.

The Harvard criteria of 1968 and the memorandum by Britain's medical royal colleges in 1979[3] stated that death should be declared when brain death is diagnosed, not at the later time when the heart stops. However, for general practitioners in patients' homes, this is rarely a practical option. The criteria include eliciting unresponsiveness at body temperatures over 35°C; absence of depressant drugs; no spontaneous movements; apnoea; absence of reflexes, including corneal, gag, and vestibulo-ocular reflexes (although spinal reflexes may persist); fixed dilated pupils; and an isoelectric electroencephalogram.

For a hospital doctor, the finding of no electrical activity from the heart and brain should preferably be the indisputable sign of death. However, even these measurements are not completely reliable indicators of death. The electrocardiograph invariably becomes a flat line at the time of death, but not always,[15] and "electrocerebral silence" on an electroencephalogram is not always consistent with death. Thus, it seems that death is not an event but a process,[3] and so the point at which actual death begins and somatic death progresses to molecular death may be difficult to determine.

The diagnosis of death is made by excluding all possible signs of life. Thus, to avoid apparent death being mistaken for actual death and to ensure that opportunities for resuscitation are not missed, corners should never be cut in making this ultimate diagnosis.

RODGER CHARLTON
Senior lecturer

Centre for Primary Health Care,
School of Postgraduate Medicine,
Keele University,
Stoke-on-Trent ST4 7QB

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"Is my practice evidence-based?"

Should be answered in qualitative, as well as quantitative terms

The growing interest in evidence based medicine among practising clinicians[1] has prompted doctors in every specialty to ask themselves, "to what extent is the care of my patients evidence based?" The search is on for a means of answering this question that is achievable, affordable, valid, reliable, and responsive to change.

Evaluating one's own performance is the final step in the five stage process of traditional evidence based practice. The first four steps are: to formulate for each chosen clinical problem an answerable question, to search the medical literature and other sources for information pertaining to that question, to assess the validity (closeness to the truth) and usefulness (relevance to the problem) of the evidence identified, and to manage the patient accordingly.[2]

Several papers have been published[3-5] and many more are being written whose stated objective is "to assess whether my/our clinical practice is evidence based." Most describe prospective surveys of a consecutive series of doctor-patient encounters in a particular specialty, in which the primary intervention for each patient was classified by the doctors (and in some cases verified by an independent observer) according to whether it was based on evidence from randomised controlled trials, convincing non-experimental evidence, or inadequate evidence.

Such surveys have generated the widely quoted figures that 82% of interventions in general medicine,[3] 81% of interventions in general practice,[4] and 62% of interventions in psychiatry[5] are evidence based. Questionnaire surveys of what doctors say they do in particular circumstances are starting to add to this literature.[6] The public may soon be offered a "league table" of specialties ranked according to how evidence based they have shown themselves to be.

Figures produced in the early 1980s suggested that only about 15% of medical practice was based on sound scientific evidence.[7] Is the spate of new studies, therefore, grounds for reassurance that medical practice has become dramatically more evidence based in the past 15 years? Probably not. The earlier estimates were derived by assessing all diagnostic and therapeutic procedures currently in use, so that each procedure, however obscure, carried equal weight in the final figure. A more recent evaluation using this method classified 21% of health technologies as evidence based.[8] The latest surveys, which looked at interventions chosen for real patients, were designed with the laudable objective of assessing the technologies which were actually used rather than simply those that are on the market.

But the impressive percentages obtained in these series should be interpreted cautiously. As the protagonists of evidence based medicine themselves have taught us, a survey of any aspect of medical care should, in order to be generalisable beyond the particular sample studied, meet criteria for representativeness (are