the intensive care unit[16] and of deaths after discharge.[17] Comorbidity, physiological instability, tachypnoea, hypotension, and impaired mentation have all been identified as predictors of critical illness and cardiorespiratory arrest. If such features could be incorporated into an index of prior risk for use in ordinary wards it might provide the opportunity for earlier intervention with better outcomes at lower cost. It might also facilitate discussions with individual patients about how much treatment they would want[18] and encourage the use of advance directives. Junior doctors and nurses should also receive better training in basic intensive care and preventing critical illness.

Risk management will not succeed unless it is accompanied by more resources for high dependency care. Earlier intervention means more detailed monitoring with particular attention to tissue oxygenation. Monitoring response to fluid resuscitation and inotropic drugs in patients at risk[19 20] cannot be provided safely in ordinary wards. High dependency care units allow preventive care to be delivered with nurse staffing levels that are half those of intensive care units[21] and are also less intimidating than intensive care units, which may facilitate earlier referral of patients by junior medical staff. The introduction of a high dependency unit has been shown to reduce cardiac arrests in hospital and overall mortality,[22] and the fact that only 15% of British hospitals have identifiable high dependency units should concern both purchasers and providers of health care.[11]

Britain is uniquely placed to examine these issues because constraints on resources may provide a natural experiment from which to assess how much benefit accrues from different levels of treatment. Although regionalisation of intensive care, better transport, and improved medical staffing are urgently needed in Britain, the internal market inhibits sharing of costs and services between trusts and makes these developments unlikely. Rationing and triage are inevitable and should be open to public debate informed by scientific research. There should be no place for secrecy and guesswork in the rationing of critical care when evidence suggests that the limitations placed on funding are resulting in inefficiencies and avoidable illness and deaths.

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Pulling the plug on futility

Futility is not the ethical trump card that some would like it to be

If the fashionableness of a new idea can be measured by the number of publications it generates these are piping times for the idea of "medical futility." As it has been developed in the medical literature futility provides a basis for doctors to refuse demands for treatment from patients and families. According to the results of a Medline search, articles on futility have undergone a small scale population explosion: two articles in 1987, five in 1990, and 23 in 1993. As with any new intellectual tack, after the initial intoxication has begun to wear off we must ask soberly: "Are we any further ahead?"

The idea of futility is admittedly seductive. Over the past few years the familiar "right to die" issue has been turned on its head. Rather than refusing life sustaining treatment in the face of intransigent doctors, patients (and their surrogates) have begun to demand treatment that doctors are reluctant to provide, either because its efficacy is questionable or, more problematically, because it serves goals that the doctors are reluctant to endorse. The most contentious of these cases have been those in which families have asked for aggressive life sustaining treatment for anencephalic children[1] or patients in a persistent vegetative state.

The concept of medical futility has emerged as a popular rejoinder to these demands mainly, we suspect, for two reasons. Firstly, futility can be used as an ethical trump card to deny demands for treatment made under the authority of patient autonomy. As Schneiderman and his colleagues put it: "Futility is a professional judgment that takes precedence over patient autonomy and permits physicians to withhold or withdraw care deemed to be inappropriate without subjecting such a decision to patient approval."[2] Thus in a case such as that of Helga Wanglie, an 86 year old woman in a persistent vegetative state,[3 4] the concept of futility permits doctors to order the withdrawal of life support despite the family's desire for the treatment to continue.

Secondly, at a time when doctors feel the need both to do what is best for patients and to avoid treatment that is extravagantly expensive, futility offers the comforting advantage of pushing financial considerations to the side. If futility is the issue, doctors can now say that the fact that keeping an irreversibly comatose patient alive costs an exorbitant amount of money is neither here nor there. The treatment will not work so doctors are not obliged to provide it.

If only things were that simple. The problem with medical futility is that it cannot come anywhere close to doing the

ethical work that its supporters claim. Firstly, judgments of futility make sense only in relation to a specified goal: an intervention may be futile if the aim is to cure an underlying disease but effective if the aim is to keep the patient alive. Yet in the most controversial cases in which futility is invoked the disagreement between doctors and families is not about the probability that an intervention will work but about the goals that it will serve.

For Helga Wanglie and her husband, human life—even unconscious life—was valuable above and beyond considerations of its quality. In a context like this, calling treatments that preserve permanently unconscious life "qualitatively futile"[2 5 6] sounds suspiciously like trying to redefine a debate about conflicting values into a debate about medical probabilities. And as doctors are generally the sole arbiters of medical probability this amounts to saying to families, "Your values don't count."

Even in its customary sense, as a judgment about medical probabilities, futility cannot bear too much weight. Beyond the obvious sorts of cases, which can be resolved by scientific evidence (antibiotics for a viral infection, for example), the definition of when a treatment is futile has proved elusive. Schneiderman *et al* have suggested that a treatment is futile "when physicians conclude (either through personal experience, experiences shared with colleagues, or consideration of reported empirical data) that in the last 100 cases, a medical treatment has been useless."[2]

But even a criterion as apparently straightforward as this has obvious problems. Firstly, problems will arise with any criterion that allows doctors to rely solely on their own experience. Their recollections are biased towards cases with a poor outcome.[7] Moreover, doctors' judgments about individual cases are not accurate enough to allow them to claim reliably that a given person has (for instance) less than a 1% chance of responding to treatment.[8] While the agreement of several colleagues about a prognosis may improve the judgment's reliability, support from the literature may be lacking. Even if empirical data exist on a particular intervention, the vast majority of "negative" clinical trials have a sample size that is too small to provide strong enough evidence to rule out a small treatment effect.[9]

We do not contend that doctors are obliged to provide any treatment that patients demand. Patients do not have a right to treatment that falls outside the bounds of standard medical practice.[10] Such treatments need neither be offered to patients nor be provided if demanded by them. But the concept of medical futility is a tarbaby. It cannot do what it is asked to do, and trying to force the issue won't produce a solution; it will produce a mess. When patients or families demand treatment that is unlikely to produce a good outcome doctors ought to disclose carefully the treatment options, the likely outcomes, and the probabilities of attaining those outcomes. Clearly, both the doctor's judgment and that of the patient (or family) are essential to the decision making process. As highlighted by the case of Tony Bland, the objective of this process is a decision supported by all parties.[11] This can be achieved only by an open and frank dialogue. Invoking futility ensures, if anything, that this will not occur.

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Metered dose inhalers free of chlorofluorocarbons

Doctors can ease their introduction

The metered dose inhaler, which is used by patients with asthma and chronic obstructive pulmonary disease, is about to undergo some substantial changes. Health professionals need to know why and how these changes are occurring so that they can ease their patients' transition from old to new.

The reason for the changes lies in the thinning of the ozone layer in the stratosphere. The possibility that chlorofluorocarbons, which are widely used as aerosol propellants and refrigerants, might deplete stratospheric ozone was first suggested 20 years ago.[1] This caused concern because reduction of the ozone layer would permit increased exposure to ultraviolet B radiation, with the possibility of increased rates of skin cancer and cataracts and other less obvious effects on the immune system, vegetation, and plant and animal growth.[2 3] Such postulated thinning had been confirmed over Antarctica by 1986. Government action had, however, predated this proof, and initial negotiations by the United Nations culminated in 1987 in the signing of the Montreal Protocol. This outlined a series of measures to eliminate the manufacture of substances that deplete ozone (including chlorofluorocarbons). The initial deadlines were subsequently brought forward so most developed countries have agreed to cease production of chlorofluorocarbons by next January; members of the European Union did so last January.

Other propellants could easily be substituted for the non-medical uses of chlorofluorocarbons, but the development of new propellants for use in metered dose inhalers has been a substantial challenge for the pharmaceutical industry. Fortunately, metered dose inhalers are exempt under the "essential use" provisions of the Montreal Protocol, and