Misleading, unscientific, and unjust: the United Kingdom's research assessment exercise

Gareth Williams

Department of Medicine, University of Liverpool, Duncan Building, Liverpool L69 3GA
Gareth Williams, *professor of medicine*

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Keen observers of Britain will know of our obsession with regularly occurring phenomena that involve large sums of money, balls, and disappointment. Two obvious examples are test match cricket and the national lottery. Another, just as parochial but with lessons for the global scientific community, is the research assessment exercise (RAE) run every four years by the Higher Education Funding Councils. The aim of the exercise is to measure research activity in British academic institutions and thus determine how the councils' research budget will be distributed among the country's universities.

The importance of the exercise

In the 1996 research assessment exercise each "unit of assessment" in each university was graded from 1 (research of little consequence) to 5 (research of international renown) and 5* (outstanding).[1] In the "hospital based clinical medicine" unit of assessment (which includes all mainstream medical and surgical specialties) a grade 5* was awarded to two institutions, grade 5 to four, grade 4 to eight, grade 3a and 3b to eight and two respectively, and grade 2 to one institution. Units that did well will enjoy guaranteed funding from the Higher Education Funding Councils for the next four years, while poorly rated units are trying to limit the substantial damage of lost income from the councils. With the limited money available, it is logical for research funding to reflect research success; the need for research assessment is therefore incontrovertible.

Inevitably, the research assessment exercise has acquired enormous importance. It will determine who will receive the double blessing of money and prestige and whose research careers will wither on the vine. Given the seriousness of the consequences, the exercise should be accurate, just, and accountable. Unfortunately, it is none of these (see box). It gathers misleading data and assesses these unscientifically and unaccountably, using an inefficient procedure that is expensive and extremely wasteful of scientists' time and energy. Moreover, its limited focus is stifling other aspects of scholarship, notably teaching.

Academic units in Britain are already expending vast amounts of time and effort in preparing a strong submission for the next research assessment exercise, in the year 2001. This process is unlikely to advance knowledge and will involve much window dressing and the discarding of groups and individuals that do not meet the assessment exercise's criteria of success. The assessment exercise must be completely rebuilt if it is to have any credibility as an indicator of research performance or funding.

Summary points

The aim of the research assessment exercise is to evaluate research success and determine central funding for academic units in the United Kingdom

The assessment criteria used are restrictive, flawed, and unscientific and produce a distorted picture of research activity that can threaten the survival of active and productive research units

The assessment exercise is also unaccountable, inefficient, time consuming, and expensive

The assessment exercise should be made objective, by basing it solely on each unit's total published output during the survey period; each publication would be scored for quality (using agreed criteria) and the unit's share of the work done

With a computerised spreadsheet, data could be collected easily and each unit's submission for assessment continually updated. The assessment scores could determine the national ranking of groups in each specialty, as well as the distribution of central funds to each unit

Operation and flaws of current research assessment exercise

At present, each academic unit declares those members of staff funded by the Higher Education Funding Councils who will be in post on the date of the assessment exercise and whose research it considers worth while. These individuals each cite their four best papers published in peer reviewed journals and all external grants and PhD studentships obtained since the previous assessment. Individuals' contributions are submitted together with the unit's assessment of its own research, highlighting its star groups and themes. All submissions for each unit of assessment (for example, "hospital based clinical subjects") are reviewed by a panel of British scientists selected by the funding

Major flaws in the research assessment exercise

Restrictive survey criteria
- Researchers not funded by Higher Education Funding Councils are excluded
- Total research output is not considered
- Only peer reviewed papers are considered

Dubious research performance indicators
- Best four papers of each council funded researcher
- Number of PhD studentships
- Grant income (amount and source)
- Unit's assessment of its own performance

Loopholes and abuse
- Selective submissions to enhance research image
- A researcher's publications at one unit are transferred with the researcher to a new post
- Using staff funded by councils to submit publications from ineligible researchers

Inefficiency and expense
- Time wasted by units in preparing submissions for assessment
- Time wasted by assessment panels
- Delay of several months before results are announced
- Four year cycle between assessments is too long

Process is subjective and unaccountable
- Subjective assessment by panel of units' submissions
- Selection of panel members is covert
- No audit or peer review

Bias
- Restrictions favour established groups with existing support from funding councils

Process is uninformative
- No information about individual groups in each unit
- No information about national ranking of groups in each specialty

Damage to other aspects of scholarship
- Teaching and teachers neglected
- Other ineligible academic activities neglected:
    Writing reviews and books
    Reviewing papers and grants

councils, which decides a lumped score for each institution. Groups considered to be at least two ranks higher than the institution's overall score (such as a grade 5 group in a 3a unit) are "flagged."

This assessment of research activity is distorted and obscures the true productivity of many groups, mainly because of its idiosyncratic measures of research success.

Researchers considered

The assessment exercise recognises only those individuals funded by the Higher Education Funding Councils in post on the assessment date, and so excludes researchers supported by short term external grants. These people form the backbone of many research groups in Britain, yet cannot be considered in their own right no matter how productive they might be. However, members of the group who are funded by the councils can put their own names on these papers and claim them among their four publications, which introduces a bias in favour of units with relatively more council funded staff.

Inexplicably, a researcher's publications since the previous assessment are regarded as the property of the unit where he or she is based at the time of the present assessment. This "transfer" rule is both unjust and illogical as a unit has no intellectual or moral claim on any work which was devised, funded, executed, and written up elsewhere. The assessment exercise in 1996 was preceded by a flurry of job advertisements, apparently to attract productive scientists and effectively buy their publications. The absurdity of this practice has been exposed by Bird's analogy with the football league, which would collapse if players transferring to a new team took their previous goals with them.[2]

Like many others, my own group has fallen foul of these anomalies. For the 1996 assessment, we could cite only four of the 30 peer reviewed papers published between 1992 and 1996 because I was the only worker eligible for assessment out of the 13 members of the group who were first named authors. One of these other members was a postdoctoral scientist who had moved to another unit, which, even though it does no animal based research, promptly claimed his papers on neuropeptides in the rat hypothalamus.

The existing rules are readily manipulated, notably by not declaring individuals funded by the Higher Education Funding Councils who will not enhance a unit's overall research profile. In the 1996 assessment exercise one university contrived to gain a grade 5 in hospital based clinical subjects by reincarnating three individuals as 1.5 full time equivalent researchers. The next research assessment exercise may penalise institutions that conceal too many underperforming staff who are council funded, but this will do nothing to tackle the system's fundamental and obvious flaws.

Dubious performance indicators

None of the assessment exercise's main indices of research success—eligible workers' four best papers, numbers of PhD students, and external grant income and the unit's self assessment—stands up to scrutiny.

Publications are generally the only sign of research activity visible internationally and its only enduring legacy. What else will be remembered in 10 years' time? A group's publication record must therefore be the core index of its research performance, but assessing only four papers of each council funded member is misleading and prejudicial. Surely the only valid measure of what a group has achieved is its total published output during the assessment period, regardless of how its members were funded or where they now work?

Grant income impresses assessment panels, especially funding obtained from the Medical Research Council, the Wellcome Trust, and major medical charities. Research obviously costs money, but grant income is no guarantee that the project will be successfully conducted or reach any worthwhile conclusions. There is no evidence that a project's measurable outcome (such as publications or the improved management of a disease) is related to the size of the grant that supported it. The source of grant income is an even weaker performance criterion: can it really be argued that a published paper would be more or less valuable if someone else had paid for the work?

Self assessment would be superfluous if the entire exercise was objective and thorough: the world class stature of a group should be self evident without others in the unit having to draw this to the panel's attention.

The assessment exercise is cumbersome, inefficient, and expensive

The preparation and assessment of submissions must waste thousands of hours of scientists' time. The true costs of this lost productivity and its contribution to the continuing decline of British science are incalculable, but there is no doubt that the time could be better spent.

The machinery of the assessment exercise also grinds unacceptably slowly: publication of the results of the 1996 assessment took about 20% of the time before the next assessment, and the four year cycle of the assessment exercise assumes that British science stands still during this time. Rationally, research performance should be assessed more frequently, but the slowness and expense of the current exercise clearly make this impossible.

The assessment exercise is unaccountable

The power and influence of the assessment exercise demands transparency and accountability. Unfortunately, the transformation of an institution's submission into its assessment grade is cloaked in a mystical opacity of which politicians could be proud. We simply do not know how different panels value the various performance criteria (grant income, publications) or how they assess subjective questions such as the stature of individuals (who may be working in specialties unfamiliar to panel members). At present, it is impossible to counter the reflex criticism of those disadvantaged by the assessment exercise—namely, that the panel's judgment was flawed or biased, or both.

The assessment exercise is biased

The restrictions regarding who and what can be included in submissions favour established groups with staff funded by the Higher Education Funding Councils. However, such staff include those with long standing appointments, who do not necessarily fulfil present criteria of research excellence. Unless this bias is removed, there is a real risk that council funding will be progressively concentrated on a dwindling number of privileged units. New groups, especially those in units with low assessment grades, may never be able to clamber aboard this self perpetuating merry-go-round.

The assessment exercise is uninformative

The composite score for a unit of assessment may be distilled from the submissions of over 100 individuals and can conceal a wide scatter of quality. For example, a cardiology group in a grade 5 unit may not merit that grade itself; conversely, a good group can be embedded in a mediocre department without being flagged.

The assessment exercise damages scholarship

The growing obsession with the need to succeed in the research assessment exercise is damaging other crucial academic activities. There is an increasing tendency to abandon forms of scientific writing that are not included in submissions (reviews, editorials, and books) as well as the refereeing of manuscripts and grant proposals, teaching, and administration.

Individuals who devote much time to teaching may find themselves jettisoned from departments obsessed with the research assessment exercise and that hack back "dead wood" in favour of those active in research. This would be catastrophic for the next generation of medical students and for the new, problem based, undergraduate curricula. So far, there have been few attempts to integrate the conflicting yet complementary demands of the research assessment exercise and its teaching counterpart, the teaching quality assessment (TQA), which will take place later this year.

Can the assessment exercise be made to work?

The following suggestions are intended to stimulate debate rather than to provide a quick fix for the research assessment exercise's many ills. To fulfil its essential roles, the exercise must be

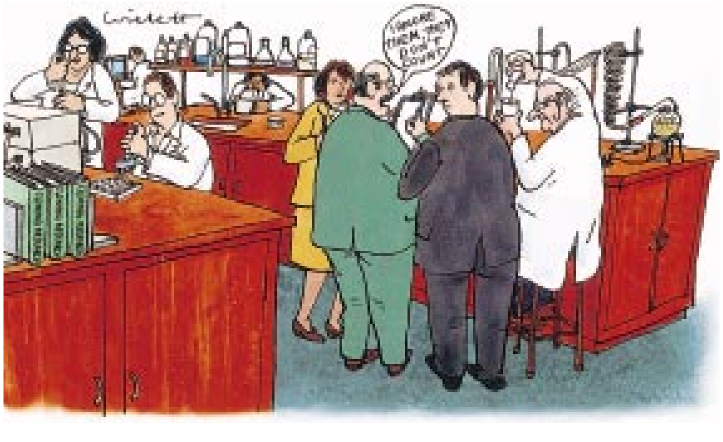
- Based on accurate, complete, and valid measures of research success
- Fair, transparent, and fully accountable
- Informative
- Quick, efficient, and cheap to operate

Evaluation of research success

Publications are the only universally accepted currency of research success; other measures, including grant income, have no proved value and should be scrapped. A group's submission should comprise its total published output since the previous assessment, irrespective of who funded its members or where they now work. This would correct the unjust exclusion criteria and the daft transfer rule, and would also avoid the need for more mathematical fudge factors to discourage abuse of the system.

A group's output should include all its substantive publications—including reviews, editorials, books, and chapters (perhaps with different mathematical weightings)—as well as peer reviewed papers. The output score must accurately reflect the quantity and quality of the group's work. The group's share of each publication could be quantified by an "attribution factor," which would be 1.0 for work performed entirely within the group and appropriately smaller for collaborative efforts.

Quality is harder to assess objectively, especially soon after publication, and it is probably reasonable to gauge a paper's stature from that of the journal in which it is published. However, the commonly used impact factor is mathematically dubious (see box).[3] Instead, general and specialist journals relevant to each subject could be assigned to categories (perhaps 1 to 5), decided by the assessment panel for each specialty in consultation with researchers in the subject. The categories could be published before each research assessment exercise to democratise the scoring



Why journals' impact factors should not be used to measure quality of publications*

- Impact factors can conceal large differences in citation rates for different articles in the same journal
- Impact factors are determined by an arbitrary mathematical exercise that is unrelated to the scientific quality of individual papers
- Impact factors of specialist journals depend on the specialty itself and on the proportions of basic research *v* clinical research in the subject

*Modified from Seglen[3]

process. This would also redress the imbalance between specialties whose journals have particularly high impact factors (such as cardiology) and those with low impact factors (such as public health).

A group's assessment score would simply be the sum of its publication scores (that is, the product of journal category and attribution factor for each publication). With computerised spreadsheets, a unit's submission for assessment could be continuously updated and the final submission easily checked and transmitted by email within a few hours.

New roles for the assessment panels

Assessment panels would need only to decide the categorisation of journals, audit randomly chosen submissions, and respond to any challenges about the outcome. Panel members could be selected at random from a pool of active researchers nominated by all relevant institutions in the United Kingdom, while panel chairs should be scientists of international standing from outside the country.

Information provided by assessment exercise

The proposed assessment exercise would readily yield two valuable measures of research success. Firstly, all groups in a given specialty (such as cardiology) throughout the country could be ranked into a national pecking order, information that is currently lacking. Secondly, each institution's total output within each unit of assessment would be a reasonable template for the distribution of funding by the Higher Education Funding Councils.

Conclusions

The research assessment exercise is a dysfunctional juggernaut, lumbering on under its own momentum and threatening to crush research creativity, careers, and scientific integrity. Its credibility survives only because it is administered by members of the scientific establishment. It must now be replaced with a structure that is scientifically and morally beyond reproach.

Academic medicine should have nothing to fear from the radical changes that will be needed; the truly excellent will welcome the opportunity to prove that they can remain at the top whatever criteria are used.

In the research assessment exercise of 1996, the hospital based clinical subjects in Liverpool were graded 3b overall, with a flag for my group. The preclinical sciences (anatomy, physiology, and pharmacology) in Liverpool had the highest density of grades 5 and 5* in the United Kingdom.[4]

The views expressed here are my own. I am grateful to the many colleagues who read and commented on this article.

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1 *The 1996 research assessment exercise.* Bristol: Higher Education Funding Councils, 1996.
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Cambodia—after the killing fields

Vivienne Nathanson

BMA, London
WC1H 9JP
Vivienne Nathanson,
head, professional resources and research group

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The BMA has campaigned in Britain and internationally through the Commonwealth and World Medical Associations for a worldwide ban on landmines for more than three years. As part of this campaign the British Red Cross invited me to visit Cambodia in January.

Political snapshot

- 1860-1954 Cambodia under French control
- 1970 United States and South Vietnamese forces invade
- 1969-75 A US supported regime holds power
- 1975-8 Pol Pot in power and between one and three million people killed
- 1978 Vietnam invade, Pol Pot toppled, and US and Thailand support Khmer Rouge rebels against Vietnamese backed government
- 1990 United Nations peace keeping forces move in until the 1993 election
- 1998 Next general election due in July when Cambodian People's party expected to win a majority

Arrival: Bomb craters and cigarette hoardings

Bomb craters and cigarette hoardings are the most obvious influences from the developed world. I noticed the many small round ponds in the fields as I flew into Phnom Penh. The water filled bomb craters stand out from the irrigation ponds and are a stark reminder of the frequent fighting around Cambodia's capital over the past 50 years.

I was reminded of France: wide boulevards lined with mature trees; grand decorative houses and civic buildings set back behind ornate cast ironworks. But many are scarred with shell marks and others are decaying. There are many small motorbikes, but few cars, most of which carry the logos of non-governmental organisations or aid agencies.

Day 1: New injuries occur every day

My first working day began with a visit to the prosthetics factory run by the International Committee of the Red Cross (ICRC), where the components, except the rubber feet, are made for all the prosthetic workshops in Cambodia. The local workshops, run by the ICRC and other care providers such as Handicap International, buy centrally and then fit and customise the prostheses for individual patients. Many patients live a long way from the centres and have little access to transport or money, and the limbs have to withstand enormous wear and tear, including walking on unmade roads and in fields.

As many limbs as possible are made to fit without straps, as these and the feet are the first to fail. The feet can be replaced in five minutes. Despite this many patients do not return for a new foot until long after the original one has disintegrated, using, as I saw, considerable ingenuity to make their own temporary replacements. The workshop is beginning to make components for orthotics. The number of people with disabilities caused by polio, cerebral palsy, and other conditions is unknown but could be as high as 2% of the population.

At a briefing from the head of the ICRC's delegation to Cambodia the scale and nature of the problems that the aid agencies face became clear. New injuries occur every day—especially in the north and west of the country, where fighting between the government and rebel forces is still taking place and where new mines are still being laid. In many of these areas relief agencies have little access because of political and military instability.

Unexploded ordinance as well as landmines causes severe damage. Much of this is the remnant of bombing by the United States. This type of unexploded ordinance is a particular problem east of the Mekong. And throughout the country unexploded ordinance from the various wars—international and civil—litters the countryside. Bombs as large as 500 lbs are found; more often they are the size of cricket balls and are exploded by children.

Day 2: No one talks of danger

The demining site at Skun is a two and a half hour drive from the capital. The road is still being rebuilt with Japanese money. The site is on a hillside around a Buddhist temple; the land is rough, with dense foliage. The teams work in pairs, clearing to a depth of 10 cm. One of the pair probes the ground and clears the undergrowth. The second approaches and checks for metal with a detector. It is a slow and steady approach, tested and effective in all terrains.

No one talks of danger, except from snakebites, but the risks are real. I learn later that the Cambodian mines clearance group—the government agency—had one deminer critically injured every month in 1997. Furthermore, it is risky walking along one metre wide paths on the side of a steep slope, on loose sand, where the earth is shifting and has been cleared to only a depth of 10 cm.

The "Japanese" road has recently been the site of attacks on road users. Some seem to be carried out by police or militia—extracting a "toll" from road users. In common with many government employees, including doctors and teachers, the police and soldiers are paid about \$10-\$15 (£6.25-£9.30) a month. But the government is bankrupt and many people have not been paid for months.

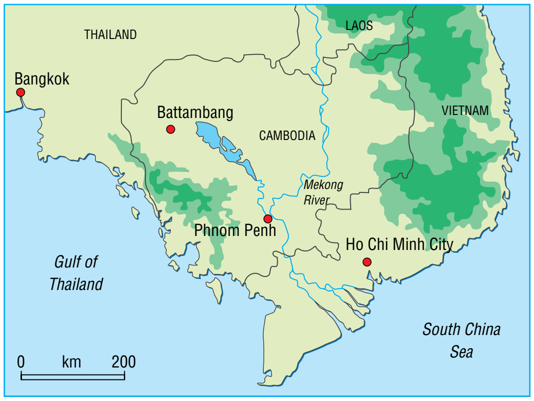
Day 3: Contrasting centres

A visit to the prosthetics centre at Kompong Spoue, which is supported by the American Red Cross, is delayed by a visit to a Jesuit run training centre for mine injury survivors. The school teaches practical and marketable skills—weaving, tailoring, carpentry, sculpture, and television and video repair. The workshops also make the wheelchairs used by the ICRC prosthetic centres. As metal frames collapse from rust and wear and tear very quickly, local woods are used instead. And wheelchairs are attachable to a bicycle for those who travel longer distances. When ready for dispatch they are flat packed in sacks. The prosthetic centre drivers deliver them to villages and then put them together.

The training centre's workshop provides prosthetics to mine injured people south west of Phnom Penh. It has a village outreach programme to bring in patients from remote villages, including those in areas still controlled by the Khmer Rouge. A new orthotics programme is about to start. The workshop shares a site with a state hospital into which some \$2m has been sunk over the past few years. Our visit confirms that it has sunk without trace—the conditions are primitive. Patients with malaria lie on beds without nets. Relatives provide food; the floors are covered with raw and cooked foodstuffs and leftovers.

The operating room is filthy. The hospital has an unreliable power source. A patient lies on a trolley outside the theatre. He fell out of a palm tree earlier in the day—a common cause of serious injury—and an *x* ray film shows that his right tibia and fibula are in several pieces. He also has a fractured right hip and pelvis. The patient—who has had no analgesics— lies disturbingly quiet on the trolley under the blazing sun. The surgeon shrugs when asked about internal injuries; another surgeon will operate "at some stage."

In contrast the prosthetics centre shows how well donor money has been spent. A shining new



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dormitory for patients undergoing fitting, physiotherapy, and mobilisation cost only $35 000. The equipment is old but well maintained, but there is energy and enthusiasm.

Later that day an expatriate who teaches at the Cambodian school for prosthetics and orthotics tells me that what Cambodia really needs is ethics: health workers have no sense of the importance of the patient, or care and commitment to the patient above themselves. This may be a Western judgment and inappropriate in Cambodian cultural terms.

The fourth day was a rest day spent visiting the archaeological site of Angkor—a series of temples built between the seventh and 13th centuries. The next day we travelled to Battambang, the second largest city, close to the Thai border and the current centres of fighting.

Day 6: More surgical skills are needed

The ICRC workshop in Battambang treats three times as many patients as the one in Kompong Spoue. Last year the numbers treated in the first quarter of the year were double the normal level because for the first time patients came from villages in a Khmer Rouge held area. They now trust the workshop and know that they will not be arrested.

Some of the patients clearly needed new prostheses—the soft lining to the below knee prostheses was loose and worn, the outer shell cracking from age and wear. But they would not stay, preferring patchwork repairs which allowed them to return to working their fields.

About 10-15% of the patients cannot be fitted with prostheses because of poor coverage of the bone or other stump problems. Although the quality of amputations is generally acceptable, some patients, particularly those treated in war zones, had less than optimal surgery. There is a clearly a need for orthopaedic skills to perform revision surgery and to teach that skill to local surgeons. A new hospital funded for two years by an Italian agency will open soon and this should provide the necessary skills.

The workshop staff are paid the standard rate of $15 a month by the state; the Red Cross makes this up by between $65 and $150. But the workers show little initiative and the supervisors and teachers are clearly frustrated. Patients, however, cope remarkably well—playing volleyball and walking apparently effortlessly on unmade roads.

The most disheartening and depressing visit was to the military hospital. This has recently moved into newer accommodation, but is desperately short of everything. Patients lie on metal beds, with springs covered by rush mats. There are no sheets, blankets, or pillows, let alone mosquito nets. There are very few nurses; care is provided by family and friends.

In small five or six bedded rooms patients lie with fresh amputation stumps leaking through old dressings. One man, admitted the day before with shrapnel wounds to his chest, neck, face, and arm from a fragmentation mine, had not been operated on. A clearly distressed surgeon told me that he could not operate as he had no dressings, not even sheets to tear into dressings. The squalor of the hospital was indescribable—the despair of patients and doctors was frightening.

The hospital receives little or no aid and as the doctors had not been paid they could not buy any dressings. The staff seem to rely on patients' families to go to the market to buy supplies. There is no access to a blood bank, and although there is a generator there is no reliable supply of diesel to power it. Drugs are in

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short supply. And this is the hospital which has to deal with large numbers of young soldiers from an active war zone. Ninety per cent of the surgical cases are mine injuries; medical cases are falciparum malaria and tuberculosis.

It was at this hospital that a surgeon asked why donors do not seem to care for the injured soldier, who is also a victim. The next day he appealed to the Red Cross, who provided the needed dressings.

Day 7: Returning the land

The British non-governmental organisation, Mines Advisory Group, runs a tight ship—a well disciplined team of deminers. These include women and amputees, who wear specially made metal free legs while working. The deminers work in pairs, but cease work when visitors are on site and within 30 m of them. They clear in the same manner as the Cambodian mines clearance group but to a depth of 15 cm. The safety record is impressive—four accidents in five years, and in each case a deminer had ignored procedure and training.

The site in Tapon shows the problems that deminers face: relatively level land, with some hidden streams, an old banana plantation, and an ancient crumbling pagoda, all hidden by dense jungle.

As land is cleared people move back. A 75 hectare site becomes home and farm land for 75 families. In some areas families move back into the minefield with deminers working around and even under their houses. The Mines Advisory Group takes a hard line and refuses to clear land "owned" by local militia or police chiefs. But the Cambodian mines clearance agency is not able to withstand pressures, and some generals now control land that should also have provided homes and a livelihood for many families. Donors must start to insist that the local agencies take the same principled stand and monitor land use for at least a year after it is handed over to ensure that it is kept by local families.

It takes about five months to train the deminers. They can enter a site only after it has been "surveyed" and initial access paths cleared with preparatory demining. And teams need four wheel drive vehicles to reach the sites. Large tents would help make remote areas more accessible. Clearing the dense foliage requires a lot of shears and secateurs, which rapidly wear out. So any donor needs to recognise that demining is a medium to long term investment, and that the return of land takes time to achieve.

The most commonly seen simple mines will cause injuries up to 30 m away, but the similarly common "claymore" type of fragmentation mine with trip wire will injure everyone within 100 m. The explosive ordinance teams sent out into the countryside to explode exposed mines and ordinance have set limits: blowing up a 500 lb unexploded ordinance will cause fragment or blast injuries to everyone within a 1 kilometre radius. More explosive ordinance teams are essential but no funding has yet been secured.

The civilian hospital in Battambang was a relief after the military hospital. A general hospital, it deals with a wide range of infectious and other diseases. The mortality rate from epidemics of dengue fever is 5%. Malnourishment and other diseases of poverty including diarrhoeal diseases are commonest in children of a mine injured father. But malnutrition has increased in the past couple of years as more farmers are forced off their land by renewed fighting between government and rebel (royalist) forces.


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Even in this hospital, with its aid connections and support from Médecins Sans Frontières, Handicap International, and Unicef, there are urgent needs—especially for training materials for doctors. A plea for books and journals, especially field surgery texts, preferably in French, clearly came from the heart.

My translator said that the patients seemed much less distressed than at the military hospital; they were less afraid, less shocked. But the injuries were the same. And many of the patients were young soldiers brought in within the past 24 hours with devastating mine injuries. The environment, the speed of treatment, and its quality were clearly decisive factors.

Day 8: Everyone has guns

On the way to the airport we followed a small motor bike. On the young man's lap, loosely wrapped in sacking, were a dozen or more guns. As my translator said: "The trouble in Cambodia is we have no laws about guns and everyone has them."

What can it mean to children who grow up in the knowledge that they cannot play in the fields or near


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their home? In eight days I rarely saw children at play—the exception was around a cluster of houses newly built on a 75 hectare site cleared by the Mines Advisory Group. Children were playing in the water from an irrigation pipe—a common sight in other countries, an exception in Cambodia.

We have to educate donors that the 100 countries riddled with land mines and unexploded ordinance will need a long term commitment to demining and rehabilitation. Demining can take place only where there is access to the land, and where it is not going to be seized by the military and remined immediately. Patients and their access to care need to be protected and the security of deminers and aid workers assured. In recent years the ICRC has seen its staff work in increasingly dangerous conditions—and there must be a limit to how much their safety should be jeopardised. Social and political stability are equally essential. And there are other factors—including, sadly, interagency rivalry—which militate against successful schemes.

Cambodia is not a hopeless case, but its future is dependent on complex factors. It has a glorious past; we can help to shape its future.

Coping with loss

Surgery and loss of body parts

Peter Maguire, Colin Murray Parkes

This is the fourth in a series of 10 articles dealing with the different types of loss that doctors will meet in their practice

CRC Psychological Medicine Group, Christie Hospital, Manchester M20 9BX

Peter Maguire, *director*

St Christopher's Hospice, Sydenham, London SE26 6DZ

Colin Murray Parkes, *consultant psychiatrist*

Correspondence to: Dr Maguire

Series editors: Colin Murray Parkes and Andrew Markus

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The loss of body parts can have distinct but overlapping psychological consequences. These can be bodily changes—alterations in the way patients, their families, and others perceive their bodies—or changes of function—alterations in the activities and roles that they are able to carry out. Some types of surgery affect one more than the other. Thus a unilateral mastectomy may have little influence on a woman's functional ability, but the effect on her body image will usually be profound. Most types of surgery, however, affect both form and function. Losing a limb is a clear example of this.

Amputation of a limb

The similarity between grief at loss of body part and grief caused by the death of a loved person has been clearly shown in comparative studies of the reaction to amputation of a limb and of widowhood.[1] People with either of these losses were preoccupied with feelings of loss: bereaved people were missing the lost person and the amputees were missing the loss of physical attractiveness (loss of body image) or the occupational and other physical functions that could no longer be carried out (loss of function), or both of these.

Both groups said that they had difficulty in believing in the fact of the loss and tended to avoid reminders. Both groups reported having clear visual memories of the lost person or part, and many had a strong sense of their persisting presence. This was most pronounced in the amputees as the "phantom limb." As time passed, both the phantom limb and the phantom spouse tended to dwindle in significance. In the case of the amputee, the phantom limb seemed to merge with the prosthesis. In both groups, returning to work was associated with improvement in emotional symptoms, but only a third of amputees were able to work full time, often because of persisting arterial disease in the unamputated limb.

Both before and after amputation, impairment of mobility often gave rise to depression, which in turn delayed rehabilitation. Like the widows, those amputees who had a longstanding tendency to anxiety or depression (described as "sensitisers" by Horowitz[2]) coped less well and suffered more than others. So, paradoxically, did a group of amputees, mostly men, who showed little evidence of distress at the time of the amputation. Rigid and compulsively self reliant people, they seemed to be coping well at first, but 13 months later they were significantly more likely to have persistent pain in their phantom limb than other amputees.[3] These compare with the "identification symptoms" reported by some bereaved people who show little grief at the time of a loss (Horowitz's "avoiders") but subsequently develop pains and other symptoms that often resemble those of the person who died. This suggests that the persistence of pain in a phantom limb may sometimes result from the repression or avoidance of grief at the loss.

Summary points

The loss of body parts can give rise to grief for loss of body image or function, or both

Anxiety, depression, and sexual problems are related to the magnitude and type of loss as well as the personal vulnerability of the patient

Both avoidance of and obsessive preoccupation with the loss can be problematic

Members of the caring professions can help to prepare people for the losses that are to come; reassure them of the normality of fear, grief, and their physiological consequences; introduce them to support groups; recognise and monitor any problems that may arise; and ensure that specialist help is given when needed

Cancer and cancer surgery

Cancer commonly causes loss of bodily functions, damage to the body image, and threat to life itself. Fear and grief are likely consequences, and the surgical and medical treatments for cancer are often drastic and may give rise to further losses. In a psychological sense cancer invades families, for many lives are likely to be affected by this illness.

People vary greatly in the degree of confidence and flexibility with which they cope with threatening situations. Several studies show that the intensity of distress following the onset of cancer is determined by such factors and by the degree to which people feel that the losses caused by the illness have made them different from others. This, in turn, can give rise to depression, problems of sexual adjustment, and other psychological difficulties.[4–6]

One indicator of adjustment, sexual functioning, gives an idea of the magnitude of the problem. Comparative studies are few, but the effect on sexuality is surprisingly similar in cancers as varied as Hodgkin's disease and cancers of the testis[7] and those of lung and prostate.[8] In both of these studies, between a quarter and a third of respondents in each diagnostic group felt that they had become lastingly less attractive to their partners, and a similar proportion found that their sex drive was diminished.

Similar difficulties have been reported in women after mastectomy.[9–11] Many women are dissatisfied with any prosthesis that they are offered, and they may attempt to avoid facing the painful reality of their loss by refusing to look at their chest wall or allowing their partners to do so. Some go to the lengths of covering mirrors, dressing and undressing in the dark, and minimising the time that they spend bathing. These activities reflect an avoidant style of coping. It is hardly surprising that these women tend to have lasting depression and loss of interest in sexuality.

Although the psychological consequences of surgical mutilation can be severe, they need to be set against the anxiety that patients may feel if they fear that their cancer has not been completely removed. Lumpectomy has often been advocated on the grounds that it is less psychologically traumatic than mastectomy, yet in one study it was associated with a slightly higher incidence of anxiety states and depression than mastectomy.[10] Similarly, surgical treatment for carcinoma of the cervix has been shown to give rise to rather less reduction in sexual enjoyment and activity than treatment with radiotherapy.[12] On the other hand, between a quarter and a third of men who undergo surgical castration for cancer of the testis think that the operation has made them less attractive and less able to achieve sexual satisfaction,[12] whereas chemical castration for carcinoma of the prostate is associated with substantial improvement in psychological state.[6]

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Whether or not patients with cancer have surgical treatment, they will usually have chemotherapy and radiotherapy, with loss of hair and other physical consequences. These are a further cause for loss of self esteem, grief, and depression.

Cardiac surgery

Since cardiac surgery has little effect on the body image and most patients are likely to experience restoration of function rather than impairment, we might think that the psychological impact would be relatively slight and might be positive rather than negative. Yet in one study as many as 51% of elderly patients who underwent cardiac surgery had an adjustment disorder.[13] Why should this be?

The answer seems to lie in the special significance of the heart as the symbol and source of life, an internal clock that ticks our life away until it stops, dead. Cardiac surgery brings home to patients the seriousness of their illness and causes fear. The incidence of preoperative distress correlates with the incidence after operation. In addition, open heart surgery may cause cognitive impairment, particularly in elderly people, making it harder for patients to cope with the emotional demands of the operation.

It is no surprise, therefore, to find that many cardiac patients remain fearful of exerting themselves and are apprehensive even when good cardiac function has been restored by surgery. This is most obvious in the sexual area and explains the occurrence of erectile dysfunction and loss of desire in these patients.[14]

Preventing problems

Counselling, in the form of information and advice given before surgery, emotional support, and the opportunity to discuss problems that are anticipated, reduces the prevalence of psychological problems after mastectomy[15 16] and cardiac surgery.[17]

If an operation is planned the patient will need to be prepared for both the operation and its short term and long term consequences. Those about to undergo an amputation should be warned that a phantom limb, which may be painful, might persist for a while, and they should be invited to share any doubts or fears they have. This enables the carer to reassure them when fears are needless and to support them in grieving for the losses that are inevitable. It also increases the probability that the patient will agree to undergo the surgery. Such support has been shown to increase the probability that the patient will cope effectively with the loss.[18]

Recognising problems after surgery

Despite the prevalence of sexual and other problems, they are detected and treated in only a small minority of patients. In one study of women undergoing mastectomy, not one had been asked a direct question about how she felt about the impact of surgery.[19]

Any person who has undergone surgery or other treatment that has led to the loss of a body part or function should be asked how they feel about the loss (“How have you felt about losing your breast?”). Patients should be asked about the effects on mood, day to day life, relationships, and sexuality (“Can you look at the scar?”; “Is it having any effect on your physical relationship?”). If there is evidence of mood disturbance it is important to establish whether this amounts to an affective disorder.

It is also important to discover how well the family is coping (“How does your partner feel about the effects of your operation?”; “Can you talk to your family about their feelings?”). A man who has lost a testis or a woman who has lost a breast needs to know that their partner still finds them attractive. When surgery is carried out in childhood it is particularly important to involve parents in the support system since overprotective behaviour can undermine rehabilitation.

Management of problems

Despite some research which throws doubt on the lasting benefits of routine use of professional counsellors for stoma patients,[20] the kind of emotional support and information that can be given by a doctor or nurse is undoubtedly valuable to patients about to undergo major surgery. Other members of the patient’s family, particularly spouses, will also need support.

“Avoiders” may need opportunities to talk through the implications of their loss and reassurance of the normality of grief and of its physical and emotional consequences. “Sensitisers” are more likely to benefit from meeting other patients who have undergone similar surgery and can help to reassure them that it is possible to live with disabilities.

Anything that increases mobility and enhances the patient’s confidence and self esteem will facilitate the necessary physical and psychological transitions.[21] Well conducted postoperative exercise programmes will restore patients’ confidence in their bodies; this is particularly important after cardiac surgery when spouses, and even doctors and nurses, commonly aggravate patients’ fears by treating them as if they were extremely fragile.[22] Organisations such as Cancer Link and Ostomy Clubs (for people with stomas) give neophytes opportunities to learn from veterans how to live with their disabilities.

People with damaged bodies may have longed for the day when they will again feel strong and safe. They approach surgery with a mixture of hope and dread. All too often their fear creates the very situation they dread. The physical manifestations of fear (which include the effects of both hyperventilation and autonomic disturbance) are easily misinterpreted as symptoms of bodily damage. It is important for medical attendants to provide positive reassurance and explanation for all such symptoms and to avoid unnecessary investigations (which only serve to convince patients that their doctors are as worried as they are). Anxiety management includes techniques for muscular relaxation and imaging (envisaging relaxing scenes and situations). Anxious patients may also benefit from anxiolytic drugs at times of particular stress.

The fact that someone who is clinically depressed has lost a limb or a breast does not mean that they will not respond to antidepressant medication, and there is no evidence that these drugs interfere with the process of grieving. When there are clinical indications for their use they should be given in full dosage and for at least four months.

Clinical psychologists have much to offer. Cognitive behaviour therapies challenge patients’ misperceptions of themselves and can be helpful when body image problems persist. They are of particular value for disturbance of mood and sexuality associated with problems of body image.[23] Surgical correction of disfigurement can also have a positive influence on body image, and operations such as breast reconstruction and the re-siting or modification of stomas can have profound benefits. Patients should have realistic expectations and be properly prepared.

Although many sexual problems respond to appropriate education, reassurance, and support, those that do not may be helped by conjoint sexual therapy for both patient and partner. Sometimes a recent loss may uncover sexual and other problems that go back a long way. In all of these situations the general practitioner, who is likely to be the only person in a position to give long term support, is a key figure.

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