

GETTING THE BEST OF BOTH WORLDS – CLINICAL EXCELLENCE AT A PERIPHERAL UNIT

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Abstract

Audit of hospital practice in remote areas and military practice indicates that it is possible to provide a high degree of patient safety with the advantages of care close to home in a small hospital with less than 100 beds. However such an approach requires strict attention to training and retraining, good clinical networking, attention to quality control and a well defined system for identifying those patients who need to be transferred to a specialist centre.

Introduction

Following the NHS reforms of 1974, there has been a progressive move within the NHS to centralize medical care in large regional units. The earlier concept of lots of small hospitals (less than 100 beds), close to home, has been replaced by district general hospitals located in major centres of population and regional referral centres. Whilst this has facilitated the delivery of technologically-based services to a largely urban population, and has allocated overall resources more fairly in regard to need and with advantages of scale, the rural population has generally had to travel further to get to hospital. Within the NHS the distribution of the 60% of NHS resources that goes to hospital care has been left to Health Authorities. Most of this funding currently goes on big hospitals [1]. But paradoxically nearly all hospital-related health demand for hospital services could be met by polyclinics, day case treatment centres and small hospitals for those patients who, for social or for medical reasons, require a bed for a few days [2].

Thus a peculiar situation has arisen whereby the virtues of large hospitals have been taken mainly on trust whereas an examination of the Health Resource Group statistics shows that most illnesses, bronchitis and hernias being examples, do not require high technology centralized care in large units so much as simple medical or surgical measures combined with capable nursing and the opportunity to refer to a larger unit if necessary.

Meanwhile, the need for high quality medical, surgical and obstetric care in remote and rural areas remains. There are parallels with the needs of service personnel and their dependants on overseas postings. The problem of remote and rural health care delivery is thus shared by the military hospital abroad. One approach has been to transport patients, and dependents long distances to a suitable regional centre; but this has a number of drawbacks:

- The risks of travel to patients and staff may be considerable if, for example, the journey is made by helicopter at night in adverse weather condition and/or over unfamiliar terrain [3].
- The costs of transport and accommodation for the patient and their family for what may turn out to be a series of repeat visits.
- The disruption of work and family life and the secondary costs involved.

- The discomfort, loss of time and medical hazards of the journey [4].
- The tendency of rural areas to lose young families if obstetric services including caesarian section cannot be provided locally.
- The super-specialised care at the regional centre may in some ways be more fragmented and inferior to the more holistic approach available at a peripheral centre.

Smaller hospitals close to the community are not the answer to all these problems but they go a long way to supplying a need. There is little doubt, for example, that trauma care for major injuries is better at specialised facilities [5]. Likewise, it is becoming increasingly evident that early percutaneous coronary interventions are beneficial in many patients with acute coronary syndromes [6]. The small hospital can provide triage, resuscitation, diagnosis, stabilisation, admission if appropriate and transfer if necessary. The transfer may not happen immediately and a short period of admission may be required.

The clinical argument for the centralisation of hospital services is chiefly based on the observation that for some major conditions, outcome is better with larger throughput [7]. This relationship is not necessarily causal [8], and may be due to the multidisciplinary team (MDT) approach rather than to volume [9]. An MDT approach can now be achieved at a smaller unit by clinical networking with e-communication. For the majority of minor and intermediate level procedures undertaken at a small hospital the quality-volume relationship simply does not apply [10]. For more complex procedures the factors which lessen the effect are good training and mentoring, clinical experience and clinical networking [10-12].

Table 1 compares the advantages of small community-based hospitals and those of larger district general hospitals and regional referral centres. Of note is the inverse relationship between hospital size and infection rate [11, 13-15].

In remote areas and also in our military hospitals abroad, the alternative to the exclusive use of large regional and district hospitals, is to provide care close to the point of need using small hospitals/polyclinics, and to supplement this with an arrangement with a regional referral unit supplemented by a transport system for those patients who cannot be dealt with locally. This approach is suitable for remote and rural areas in the UK and for the military hospitals abroad. It works well in Australia, [11,12] and is the subject of recent interest in Scotland [10,16]. But it is only acceptable if it does not compromise the standard of care. How is this to be achieved?

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SMALL HOSPITAL	REGIONAL CENTRE
Easy access for relatives and patients.	Access more difficult.
More personal care.	Care may be fragmented and impersonal.
Basics of healing tend to be better – better food, quieter accommodation, personal responsibility for patients.	Basics may be poorer with an emphasis on technology and team responsibility for patients.
More holistic approach to care.	Wards generally devoted to one specialty.
Reduced transport costs.	Substantial transport costs for patient and accompanying relatives when visiting from remote areas, both for the individual and the NHS.
Cannot justify high capital investment equipment (but much modern monitoring, ventilating and diagnostic equipment now relatively cheap and visiting NMR, lithopaxy etc. and specialists can be provided).	Can provide high capital investment equipment (e.g. radiotherapy) on site.
Usually no ITU, but usually and HDU or ability to develop one when needed.	Has ITU, HDU.
Low volume throughput may result in higher complication rate for complex procedures.	High volume throughput. Volume-quality relationship results in lower complication rate (but see text).
Limited specialist care (specialists may visit). Disproportionate salary bill for emergency obstetrics, paediatrics.	Specialist care on site.
Little pressure on beds.	Pressure on beds necessitating early discharge – not always in the interests of a patient from a long way away.
No need to travel.	Long exhausting journey for patient and relatives; problems with radiotherapy and chemotherapy.
Easy communication within hospital. Clinicians can talk to radiologists etc. directly.	Communications potentially more fragmented. No multidisciplinary teams/meetings.
Patients have to be referred or managed clinical network utilized.	Large specialized teams; easy to formalize cancer care, better training opportunities.
Lower incidence of hospital-acquired infections.	Higher incidence of nosocomial infections.
Continuity of care easy.	Continuity care difficult – emergency cases scattered in non-specialist wards.
Usually zero, or minimal, waiting list.	Usually longer waiting lists.

Table 1. Small and large hospitals compared.

The following paper argues that it is possible for patients to enjoy the best of both worlds so long as certain precautions are observed. The best of the world of the smaller hospital – with care close to home, friendly faces, fresh food and community support around the corner – can be combined with the technical expertise and specialist support services of the regional unit. The strategy for achieving this at a peripheral unit rests on three precepts:

- *Stratification of patient care.* A systematic method of identifying those patients who can and cannot be safely dealt with locally. Identification of core services to be provided locally.
- *Measures to reduce the effect of the volume-quality relationship.* The use of state-of the art monitoring and anaesthetic equipment; clinical care algorithms derived from best national and international guidelines adapted to local circumstances; use of managed clinical networks including e-mail groups and telemedicine; visiting specialists and services.
- *Specific arrangements for validation and training.* The establishment of a formalised relationship with a designated regional unit for training purposes.

These aspects of strategy will now be examined in detail.

Stratification of patient care

Introduction

It is not always possible to provide the same standard of care in a remote area as it is in a large regional centre. People who work

and live in remote and rural areas enjoy many advantages, such as better schooling, better leisure facilities and a lower crime rate. But with these advantages come certain disadvantages, and easy access to specialized health service provision is one of them. This is something which must be recognized by both the patient and their employer. Local health care providers should be transparent about what can and what cannot be reasonably expected. It is important that patients with pre-existent complex medical conditions who chose to live and work in such areas are correctly advised about the medical implications, and should check what facilities are available.

The concept of core services

Common diseases commonly occur. The common simple things can generally be safely dealt with at a peripheral unit. Hernias and varicose veins do not need a large hospital. The bulk of surgical need and demand is for elective and day case surgery. These are the core services; they may be seen as the central (green) area in the Venn diagram in Fig. 1. What exactly constitutes the core services of a rural general hospital is currently being debated within the Remote and Rural Steering Group in Scotland. Around this is a grey area, representing a range of conditions that may be dealt with locally to an adequate standard if certain conditions regarding patient selection, staff training and equipment are fulfilled. Work in the grey area is subject to a formal clinical governance process which examines health need, team competences and demonstrated outcomes. Within the grey area the yellow ellipse represent the areas of activity covered by

certain generalists with a developed interest (i.e. the core services plus the more complex procedures relating to the special interest), and the square area represent that area covered by a visiting specialist, or contracted out to a regional centre. Each generalist covers the central green core and his own particular section of the grey area. To achieve this safely he will need input from a regional centre. This may include case discussion, training, mentoring and visits from specialists. Outside the grey area is a red no-go zone representing those patients whose condition or age is such that they cannot be treated at a peripheral unit. Conditions for which the quality-volume relationship has been clearly established, such as surgery for oesophageal or pancreatic cancer [6] fall into this category. It is essential to the safe operation of a peripheral unit that these patients are identified correctly.

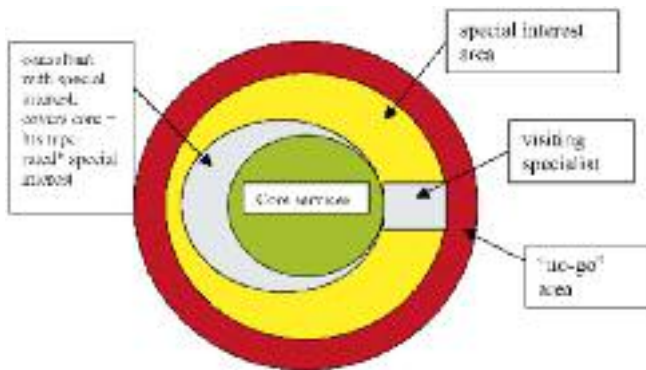


Figure 1. Core services in a small hospital. The green area represents what can and should be done. The grey area represents what may be done safely and advantageously so long as certain conditions with regard to training, recency, revalidation, equipment, staffing and the health status of the patient are fulfilled. The red area represents uncommon but serious conditions which need to be dealt with in a large regional unit, and which must be referred.

*The concept of “rating” is borrowed from aviation whereby a pilot is rated to fly a particular type of aircraft – type rating – or in particular conditions – e.g. instrument rating – and maintains that rating by a process of either annual testing or by logbook – certified currency plus frequency of experience. In the medical world this might be dealt with by revalidation and appraisal within the context of a robust clinical governance system.

Demand and supply

Both clinical safety and economic factors should be considered when determining what should be done in a small hospital. Figure 2 illustrates the theoretical relationship between cost and complexity of surgical procedures/severity of disease which can be dealt with in such a unit. Very simple surgical procedures have a relatively high unit cost because these could be contracted out to an office surgery facility or polyclinic, which does not suffer the fixed costs of a 24 hour-staffed hospital facility. Complex procedures and major illnesses carry a high unit cost because of the staffing, equipment, training and support infrastructure needed which favour the advantages of scale of a large regional referral unit. However over 95% of health demand can be met by primary care supplemented by a small hospital [2]. The graph illustrates the point that a peripheral hospital unit is at its most cost effective dealing with common simple or moderately complex procedures. There is a maximum-efficiency range for the small hospital, and it also covers the bulk of health demand.

Who should be referred? Sift-sort criteria.

In 2001, the author undertook an audit of two year’s surgical work in a remote Scottish hospital to identify what cases could safely be done there and which cases should be referred. The audit looked at process and outcome, the criteria for process being derived from the Scottish Health Department’s SIGN documents. The audit was then used to derive a triage system, which would identify those cases which should be referred to

larger centres. The criteria were validated by testing them retrospectively against the following year’s data to see if their application would indeed have avoided the actual or potential complications that had been identified [16].

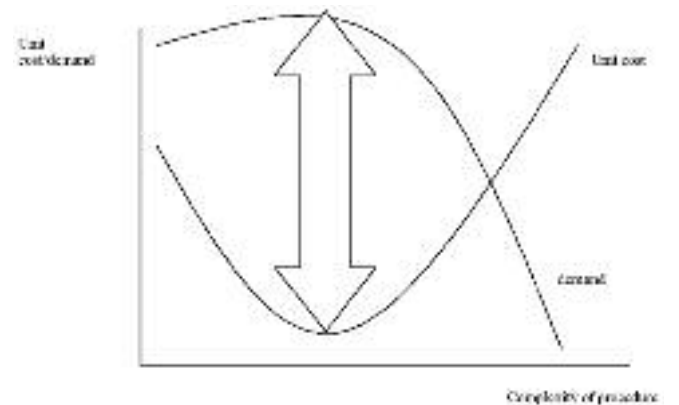


Figure 2. Unit cost and demand in relation to complexity of surgical procedure. Small hospitals work most efficiently in the area depicted by the arrow, doing intermediate level procedures where there is a high demand but the costs are low.

Findings

The audit found that a core business of simple common procedures supplemented by developed special interests including appendicectomy, hernia repair, cholecystectomy, vasectomy, varicose veins, and internal fixation of common fractures could be identified. This core business not only represented the majority of the operating to be done, but it was accomplished with a high degree of safety and patient satisfaction.

In contrast a small proportion of major or complex cases could be identified in which it was evident there were definable defects in both process and outcome.

In between these two extremes a range of intermediate procedures could be identified which might be performed safely so long as the clinical team was competent and the patient relatively fit. The demand for more complex procedures represented a fairly small component of the overall workload, and no great social penalty would accrue from referring this “grey area” of work elsewhere, were local provision impractical.

It was then observed that if the patient’s health status was classified according to American Association of Anaesthesia criteria (Table 2) and the operations were graded according to OPCS4 BUPA criteria (Table 3) the two could be combined to formulate a triage method which, when applied to the following year’s cases, effectively excluded all the cases where defects in process were identified.

Figure 3 represents the results of this analysis, where the colours have the same significance as at figure 1. The triage criteria obtained from this analysis identify those patients who should be referred on to a larger unit. This system seems simple and robust and can easily be applied in any peripheral unit or small military hospital.

ASA category	Description
1	Healthy. No disease.
2	Mild systemic co-morbidity such as controlled Type 2 diabetes, controlled epilepsy, pregnancy or mild asthma.
3	Severe compensated systemic disease.
4	Severe systemic disease, constant threat to life.
5	Moribund, not expected to live >24hrs.

Table 2. American Association of Anesthetists classification.

Category of procedure	Example
Minor	Excision of lipoma
Intermediate	Hernia repair
Major	Cholecystectomy
Major plus	Right hemicolectomy
Complex major	Aortic aneurysm repair

Table 3. OPCS4 BUPA grading of surgical procedures.

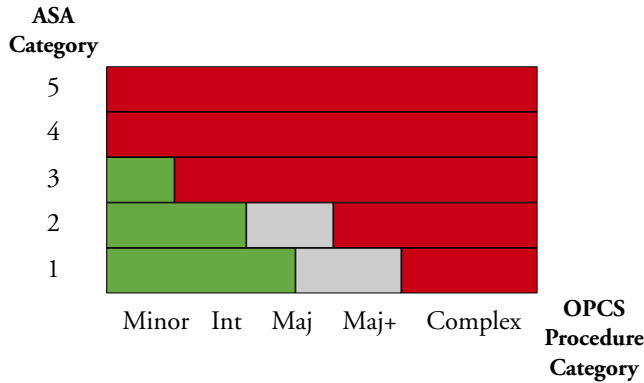


Fig. 3 represents graphically what is safe to undertake in a well-equipped and appropriately staffed small hospital in the under-70s. The red, grey and green areas have the same significance as at Fig.1, the red representing the no-go area and green the core business. For example, the conditions to be fulfilled for a patient to undergo a cholecystectomy (Major to Major +) in a small hospital are that they are ASA Cat 1 or 2 and that the surgeon has a special interest in and is current and "type rated" for the procedure.

Clearly these proposed rules must be interpreted in the light of the local situation. The fact that a patient does not fulfill the criteria for referral should not be taken as indicating that that patient must be operated upon locally. On the other hand an emergency may arise such as a ruptured aortic aneurysm, incompressible haemorrhage, a compartment syndrome or a rapidly expanding intracranial haematoma when in the judgment of the clinician it is clearly right to do the operation on the spot and accept the risks rather than let the patient die. This position requires robust defence, and it is the role of those involved in this work to provide such a defence should such action subsequently be challenged in the courts.

Specific measures to address the effects of the quality-volume relationship at a peripheral unit

Locally-formulated guidelines.

The concept of evidence-based medicine derives from an empirical trial-based approach to medical treatment [17]. Data from multiple studies are then analysed and reviewed by an expert committee who come up with a set of agreed guidelines. A number of organisations are now producing these guidelines including the National Institute for Health and Clinical Excellence (NICE) and the Scottish Intercollegiate Guidelines Network (SIGN).

Such guidelines may be seen as a distillation of best current best practice, and generally remote area practice should try to conform to them. However they may not always take account of the special circumstances of a small remote hospital. For example NICE and SIGN guidelines for the management of breast cancer indicate that the patient should be seen at a breast unit where a breast surgeon, radiologist and cytopathologist are available on site. This is not practical in a remote area, but an adaptation of the guidelines to local circumstances as part of a clinical governance process may produce a system of care which is not inferior and may in some ways be superior to that

available at a regional centre.

Contracting-out care.

Military hospitals abroad are staffed to UK standards, and if aspects of care are to be contracted out there needs to be some mechanism to insure that these standards are maintained by the provider, which can be a challenge. This is not a problem shared by the remote areas hospitals in Scotland. At The Princess Mary's Hospital at RAF Akrotiri, Cyprus (TPMH) we have outsourced the breast imaging service to a local provider who is subject to our quality control and who is supported by our own UK-trained radiographer with secondary reporting from our own radiologists. The result is a high-quality, friendly, inexpensive local service where clinical examination at one site is quickly followed by imaging services at another; probably preferable to a longer wait to be seen in a "one stop shop" breast clinic. The key steps in this process were:

- Evaluation of a local facility to the purchaser's standards.
- A diplomatic culturally-sensitive approach to local providers offering assistance and help with providing the requested service.
- A sensitive supervision of the locally-provided service with helpful suggestions for improvement where appropriate.
- Quality control (secondary reporting etc.)

Contracting-out is not a good option where local services are of an uncertain standard or where the purchaser does not have a contractual relationship to enable clinical access and supervision.

On mainland sites with adequate road access, mobile imaging and lithotripsy services arriving on a rotational basis also enable regional centre-type care to be delivered at a peripheral unit, Such services are suitable only for non-emergency cases, and in the case of lithotripsy need back up by a skilled urology team.

Visiting specialists and mobile units.

Visiting specialists based on the regional referral centre can provide care for elective cases and can give refresher training to locally based staff during the visit. If the specialists are based at the same regional referral centre used for training and tertiary referral of patients, this reinforces the relationship. A clinical nurse specialist working to protocols can pre-assess patients, set up clinics and operating lists and maximize the use of the resources during the visit. This system results in a standard of care comparable to that achieved in the regional centre [12].

Clinical care algorithms and check lists.

Clinical care algorithms dealing with common clinical problems, adapted for the local circumstances, may be constructed from existing current guidelines. Such algorithms provide a robust and evaluable tool whereby best current practice can be delivered at a peripheral unit. It is important that the authority or authorities upon which the algorithm is derived is stated and that it is regularly updated. Care algorithms provide a standard process against which the actual delivery of care can be audited. Using nationally agreed evidence-based and regularly-reviewed protocols agreed with the MDT of the regional referral centre, the patient can be assured that differences from best practice will not occur, whichever the hospital undertakes primary treatment.

When complex actions are performed relatively rarely, as for example when undertaking an emergency vascular procedure, checklists may be used to ensure that all the equipment needed is present and working. Mental rehearsal of complex actions prior to the procedure, and thorough briefing of the operating team will also help to reduce the effects of infrequent performance.

Clinical records.

Guideline-derived clinical care algorithms can be used to construct template clinical records and clinical letters, which in turn may be driven by voice recognition software to produce instant clinical records and communications. The extent to which such template records and letters contribute to clinical care is currently subject to evaluation. The views of general practitioners in respect of what they need to see in communications from specialists have been canvassed, and a comparison between how well these requirements are fulfilled by guideline-derived template letters versus historical controls is being undertaken.

The proposed system thus provides:

- Agreed measurable standard care according to current recommendations.
- A standardised approach to common clinical problems, accessible to all health professionals involved in the patient's care including locum staff.
- An automatic check list for avoiding omissions in clinical care.
- A typewritten clinical record.
- An instant letter to the GP with a copy for the patient.
- Standardised information to the patient which is also accessible to other health care professionals.

Clinical networking and multidisciplinary team liaison by e-communication.

Professional teamworking and communication is greatly facilitated by setting up a formal system of e-communication between peripheral units and major centres. This can be in the form of a regular scheduled video link between the peripheral unit and the regional referral centre MDT. In Scotland current examples of such video-MDT links are those between Shetland and Aberdeen for breast and colorectal cancer, and the between Caithness, The Belford and Stornaway with Inverness for GI cases). Alternatively a useful ad-hoc arrangement is clinical e-mails employing e-mail groups corresponding to MDTs set up for dealing with specific problems (as between TPMH and the University Hospital Birmingham in respect to breast and endocrine cases). One regional referral centre is best and the system works if there is mutual respect and good personal contact. In this way the advantages of the MDT approach can be combined with the advantages of care close to home. In many instances part of the patient's care, for example the biopsy of a tumour or orchiectomy for testicular cancer, can be conducted at the peripheral unit after prior consultation with the MDT, whilst the remainder of the care can be coordinated at the parent unit. In this way lead time can be kept to a minimum, costs saved and care integrated to the advantage of the patient.

Parent unit-peripheral unit relationship.

Training and revalidation, clinical networking and MDT working are all facilitated by establishing a formal contractual relationship between the peripheral unit and a selected major referral centre. The contract obliges the parent unit to provide refresher training and clinical support in return for a steady stream of referrals financed by the peripheral unit.

Facilities for high dependency nursing.

High dependency nursing may be required at short notice for post-operative cases and in acutely ill patients where a period of stabilization and evaluation may obviate the need for transfer to a regional unit. The ability to sustain a high-dependency bed for 24-48 hours is generally sufficient [10].

Validation and training

A reasonable concern with regard to community hospital units is that the relatively small numbers and the broad diagnostic range of cases being seen will result in a loss of skills and a lack of experience of the staff. Although staff may be well-trained when they leave their teaching hospitals, it may be argued that the benefit of this training will be progressively lost when they practice in a smaller unit.

This loss of skills and recency of experience is not, however, inevitable. It is less when consultants in small hospitals have a long and thorough clinical experience, and they should not be straight out of training. In Germany small peripheral units remain under the aegis of large university hospitals, and there is a free flow of staff between the two. In Australia, care in remote and rural areas has been achieved to a high standard by providing periodic training for rural health providers in major units. For example the outcomes for bowel resection in rural Australia has now become as good as in the major centres [11].

A useful approach which has been pioneered in Scotland, which borrows from the line check and aircraft type-rating of aviation practice, involves annual refresher training for key staff [16]. Such training ideally takes place at the regional referral unit with which a relationship has already been established for purposes of tertiary patient referral, and clinical networking. The check revalidates, for a set period, the privileges enjoyed in respect to the special interest work depicted as the grey area in Fig. 1. At the same time the contacts established during the annual refresher training facilitate teamwork and mutual understanding. In addition, the Remote and Rural Steering group has set up a virtual school of rural healthcare (RHEAL) which is hosted by NHS Education Scotland (NES). NES in conjunction with the Royal Colleges and the Remote and Rural Steering Group has made recommendations for the training of doctors for remote and rural general medicine, surgery and anaesthesia.

Conclusion

Small hospitals predicate competent generalists, and generalists preferably with one or more developed special interests. This must not be allowed to produce a jack of all trades, master of none. With the right approach to training, it can provide superior care for the patients and a fascinating and rewarding career for the clinician.

To judge from the Australian and Scottish experience, the key to providing good outcomes in a small hospital is to have an established contractual relationship between the peripheral unit and a major referral centre. The Royal Centre of Defence Medicine in Birmingham provides one such pathway for the military hospitals abroad. In Scotland, such relationships have been established between rural hospitals and major centres in Aberdeen and Inverness, which have proved effective and popular. These relationships provide the opportunity for:

- Referral of complex cases to the regional centre, following triage criteria such as those set out in Fig.3.
- Retraining and recertification of key staff at the rural centre by an annual programme of refresher training and assessment. This follows much the same pattern as that used in the commercial aviation industry for revalidating aircrew.
- The establishment of clinical networks whereby systematic e-communications are established between the peripheral unit and the regional centre for MDT discussions of patient care.
- Provision of visiting specialists.

By adopting the above measures it is anticipated that the patient attending a community hospital or a military hospital abroad

will receive the benefits of both worlds – care close to home and community but which is also of a clinical standard at least equal to that obtainable in a larger centre. Development of the Rural General Hospital programme in Scotland is of direct relevance to the situation of British Military Hospitals abroad, and many of the problems are shared.

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Conflict of interests: the authors work in small Military Hospitals abroad.