Health care: an African solution

In 2006, WHO's World Health Report detailed the perilous state of health-care provision in sub-Saharan Africa. The statistics are familiar to anyone with an interest in global health. Africa had only 2·3 health-care workers per 1000 population, compared with 18·9 in Europe, and this workforce had to deal with 24% of the global disease burden, with just 1% of the total global funding for health. Since published, these statistics have formed the introduction to many subsequent publications on health in Africa, but so far, practical solutions have been in short supply.

A key problem is training and retention of medical staff, including doctors. *The Lancet* Commission, *Health professionals for a new century*, has shown this to be a global problem. A health policy paper from the sub-Saharan African Medical Schools Study in this week's issue of *The Lancet* has laid bare the difficulties involved in educating medical students in sub-Saharan Africa. Fitzhugh Mullan and colleagues' thorough survey of 105 medical schools details problems in accreditation, postgraduate education, and coordination between ministries of health and education; all these shortcomings contribute to inadequate provision of doctors, especially in rural areas. Absence of faculty and infrastructure, and retention of graduates were the main problems. The paper is a worrying read, but there is a glimmer of hope.

On March 7, 2011, 240 people from 30 medical schools in Africa and 20 institutions from the USA met in Johannesburg for the first annual symposium of the Medical Education Partnership Initiative (MEPI). Never before have so many stakeholders come together with the aim of improving medical education in sub-Saharan Africa.

MEPI, whose main funding comes from a new initiative of the US President's Emergency Fund for AIDS Relief (PEPFAR), aims to turn medical education in sub-Saharan Africa around, starting with deploying US$130 million in grants to medical schools in the region. Significantly, all of the awards are made directly to the African institutions in keeping with the Obama administration's foreign-aid principle of country ownership. 11 5-year medical education focused programmatic grants of up to $2 million per year, and eight grants supported by the US National Institutes of Health have been awarded. Partnerships between African grantees and other medical schools in Africa or the USA will implement this initiative.

Workforce development is the linchpin of MEPI, and retention of graduates is a key aim of the programme. The emigration of African medical graduates has contributed greatly to the continent's shortage of doctors; in 2005, the International Organization for Migration estimated that within 5 years of graduation around one in five African doctors have migrated to a high-income country. To encourage more graduates to stay where needed MEPI schools will use a combination of factors including the use of community-based education, early exposure to rural practice, creation of clear career paths, and support for regionally relevant research. MEPI's aims of improving infrastructure and increasing faculty should improve the quantity and quality of graduates.

Another boon for health-care provision in Africa came hot on the heels of the MEPI symposium, with the inaugural meeting of the African Society for Laboratory Medicine (ASLM) in Addis Ababa, Ethiopia. Funded by a $4·2 million grant from PEPFAR, ASLM's aim is to coordinate top quality laboratory services across the continent.

In a similar vein to medical education, laboratory services in Africa lack infrastructure and meaningful accreditation. There is also no professional body of qualified staff. But at the end of their meeting, the ASLM delegates were hopeful that they had set out along a path to revitalise laboratory services. The plans to professionalise services, train staff, and have a stepwise and pragmatic approach to accrediting laboratories, should lead to a marked improvement in service provision. This will hopefully break the seemingly never ending downward spiral linking poor laboratory services, with lack of use, and lack of investment. The creation of the *African Journal of Laboratory Medicine*, promotion of research, and the development of networks to provide global expertise should also help support and retain staff.

Although logistical difficulties lie ahead for both MEPI and ASLM, their foundation should be celebrated as efforts to provide African solutions to health care within Africa. Indeed, March, 2011, has the potential to be an inflexion point in the history of African health-care provision. Hopefully those responsible for change can continue to ride the wave of enthusiasm, which will often not be easy, and work together towards an African future in which good health care is the norm for all. ■ *The Lancet*

Sean Sprague/Lineair/Still Pictures

See **Health Policy** page 1113

For ***The Lancet* Commission** see http://www.lancet.com/education-of-health-professionals

For **WHO's World Health Report 2006** see http://www.who.int/whr/2006/whr06_en.pdf (accessed March, 2011)

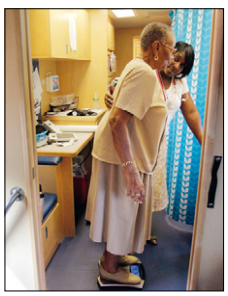
For more on the **Medical Education Partnership Initiative** see http://www.fic.nih.gov/programs/training_grants/mepi/index.htm (accessed March 21, 2011)

For the **International Organization for Migration, World Migration Report 2005** see http://publications.iom.int/bookstore/index.php?main_page=product_info&cPath=37&products_id=176

For more on the **African Society for Laboratory Medicine** see http://www.afslm.org (accessed March 21, 2011)

For ***The Lancet*'s special issue on human resources for health** see *Lancet* 2008; **371:** 623–96

Key indicators of health in the USA



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The US Government's *Healthy People* initiative aims to improve the health of Americans. Last week, the Institute of Medicine released *Leading Health Indicators for Healthy People 2020*, prioritising 12 health indicators and 24 health objectives among 42 topics and nearly 600 objectives. Those health indicators are access to care services, quality of health-care services, healthy behaviours, physical environment, social environment, chronic disease, mental health, injury, maternal and infant health, tobacco use, substance abuse, and responsible sexual behaviour.

Several objectives are targeted for reduction: deaths from cancer (563 875 in 2007) and coronary artery disease (one of every six US deaths), tobacco use (one of five preventable deaths), adolescent pregnancies (10% of US births), central-line-associated bloodstream infections (the third most common health-care associated infection), the proportion of adults with hypertension (74·5 million), the proportion of obese children (one in seven low-income, preschool-aged children), and the proportion of people who have major depression (one of 13).

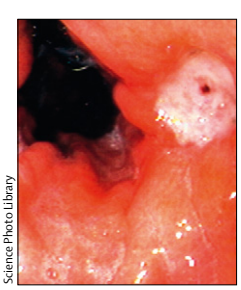
Increases are planned in objectives focused on health literacy (90 million of US adults are considered health illiterate), the proportion of adults who get sufficient sleep (50–70 million have chronic sleep insufficiency), the proportion of sexually active people who use condoms (use is as low as 17% among white adults), and the proportion of adults who are physically active (10% are not active at all and 60% do not exercise regularly).

Objectives for lesbian, gay, bisexual, and transgender health are addressed for the first time in the report. They include an increase in their health insurance coverage (they are twice as likely to be uninsured when compared with a heterosexual partner) and a reduction in obesity (lesbians and bisexual females are more likely to be overweight).

The report's objectives must be implemented and work together with the Patient Protection and Affordable Care Act of 2010 to improve Americans' access to health-care services and the quality of health care. This will require coordinated interplay of health players at the federal, state, and local level. ■ *The Lancet*

For the **IOM report** see http://www.iom.edu/~/media/Files/Report%20Files/2011/Leading-Health-Indicators-for-Healthy-People-2020/Leading%20Health%20Indicators%202011%20Report%20Brief.pdf

Managing acute upper gastrointestinal bleeding



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On March 15, a new toolkit (commissioned by the UK's National Patient Safety Agency) for service planning for acute upper gastrointestinal bleeding was released. More than 50 000 patients in the UK have such a bleed each year—mortality is about 10%. The report highlights that out-of-hours care is a particular problem, and that patients are not always seen by appropriately trained staff, the necessary equipment is not available, or that patients are not transferred to a specialist unit.

Treatment aims to stop the bleed and reduce risk of rebleeding. If an upper gastrointestinal bleed with blood loss is suspected, the patient should be stabilised before diagnostic endoscopy; the toolkit recommends that urgent-risk patients undergo endoscopy within 6–12 h. Depending on the site and type of vessel, endoscopic management can be mechanical (eg, banding, clipping) or by thermal or electrical coagulation, usually followed by local injection of epinephrine or a sclerosant.

Radiological interventions should also be readily available. For rebleeding that cannot be stopped by repeat endoscopy, radiological intervention might be needed to localise the site of bleeding and to continue treatment. In severe cases, surgery might be needed to stop the bleed. If the patient is in a high-risk category for surgery, radiological intervention is the preferred approach. The toolkit recommends that these interventions must be available 24 h a day, 7 days a week.

The patients often at risk include those with a peptic ulcer. Patients with chronic liver disease are also at high risk of bleeding because of complications due to portal hypertension. Patients with other co-morbidities, particularly the elderly population with cardiovascular or lung disease, for example, are at high risk of bleeding complications and death, because the upper gastrointestinal bleed can worsen the underlying condition by decreasing haemodynamic stability.

At present, the mortality rate of acute upper gastrointestinal bleeding, especially out of hours, is unacceptable. The toolkit should bring management to the fore and help hospitals to institute appropriate management pathways and care for this acute medical emergency. ■ *The Lancet*

For the **toolkit** see http://aomrc.org.uk/projects/upper-gastrointestinal-bleeding-toolkit.html

Acute MI: triple-markers resurrected or Bayesian dice?

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Acute coronary syndromes are the acute manifestations of a disease that will ultimately kill around one in six people,[1] a disease that has been feared for centuries and is still revered by physicians. The disease can kill instantly, yet the symptoms and signs alone simply cannot be relied on to differentiate an acute coronary syndrome from much less threatening disorders.[2] Even William Osler, one of the most esteemed diagnosticians in history, said: "One must be a professional Ulysses in craft and wisdom not sometimes to err in estimating the nature of an attack of severe heart pain. There is no group of cases so calculated to keep one in a condition of wholesome humility."[3]

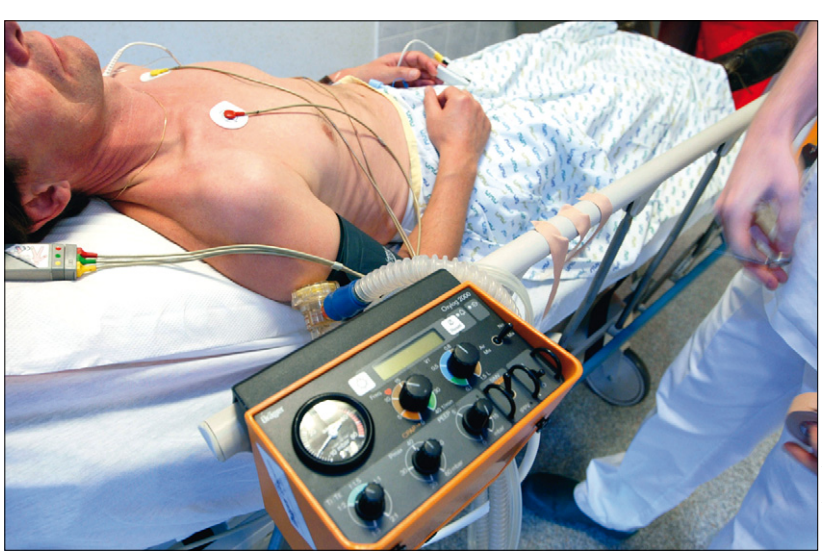
Most people who seek emergency medical attention for symptoms compatible with an acute coronary syndrome do not actually have the syndrome. We do, however, invest substantial time and money establishing that through diagnostic investigations. These investigations usually mandate hospital admission, meaning that such patients account for over a quarter of all acute medical admissions.[4] The need for an effective rapid rule-out strategy to facilitate early discharge from the emergency department has been appreciated for over 20 years. Despite extensive research, however, none has been widely adopted.

One potential strategy that has gained considerable interest over the past decade is triple-marker testing. Creatine kinase-MB fraction and myoglobin rise early after the onset of infarction, while the rise in troponin is late and sustained. In theory, the strategy should detect infarction in patients who present both early and late after symptom onset. However, some of the studies reporting high sensitivities and negative predictive values had important verification bias,[5] while other studies had inadequate sensitivity.[6]

In *The Lancet*, Martin Than and colleagues[7] report the ASia-Pacific Evaluation of Chest pain Trial (ASPECT), a multinational prospective diagnostic cohort study. The study, which included 3582 patients, investigated the diagnostic accuracy of an accelerated diagnostic protocol that would enable early discharge for patients who met the predefined criteria of a Thrombolysis In Myocardial Infarction (TIMI) risk score of 0 (out of 7), no ischaemic ECG changes, and normal point-of-care triple-marker panels at presentation and 2 h later. This strategy would have identified 9·8% of patients as eligible for early discharge, 0·9% of whom went on to have a major adverse cardiac event within 30 days. Use of the protocol could potentially have saved 1–2 hospital bed-days per low-risk patient.

ASPECT was well designed to achieve its objectives, and shows that it is possible to achieve an acceptably high sensitivity when triple-marker testing is used in the appropriate population. However, that selection of the appropriate population was pivotal to the success of the accelerated discharge protocol. Triple-marker testing alone had a relatively low sensitivity, at just 82·9%. The overall sensitivity of the protocol increased to an acceptable level because of the application of Bayesian principles, with biomarker testing only in patients with a low pretest probability of disease (ie, patients with a TIMI risk score of 0 and a normal ECG). Thus, predicting just over 80% of major adverse cardiac events in an already low-risk population yields an even lower net risk.

Most people will probably consider this net risk to be statistically acceptable. However, if properly informed, low-risk patients might feel differently about the relative merits of waiting for definitive 6-h laboratory-based troponin testing or going home after 2 h on the basis of results from a test that correctly identifies serious coronary disease, when present, in just over eight of ten occasions. This issue is particularly pertinent in view of the recent development of highly



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sensitive troponin assays, some of which can have a sensitivity of around 90% (for acute myocardial infarction) at the time of presentation and possibly up to 100% within 3 h,[8,9] and by research into other promising biomarkers such as heart fatty acid binding protein and copeptin.[10,11] It therefore remains important that triple-marker testing is compared with some of these more recent alternatives. Now, more than ever, it will also be important to compare the relative merits of point-of-care testing with laboratory-based assays that have much higher analytical sensitivity and precision.

Finally, the recent Randomised Assessment of Triage with Panel Assay of Cardiac markers (RATPAC) trial[12] showed that, although triple-marker testing increased the proportion of patients successfully discharged from the emergency department and reduced the median length of initial hospital stay, such testing was also associated with increased mean length of hospital stay and greater use of coronary care, which might be a function of the low specificity and positive predictive value of the biomarker panel. The findings of a cost-effectiveness analysis are expected shortly.[13]

In the ASPECT trial, the biomarkers alone had a positive predictive value of only 20·1%. Although it is not imperative that the overall specificity of the accelerated diagnostic protocol is high (ultimately, the specificity of 10% still potentially means that 10% of "healthy" patients are eligible for early discharge when they would otherwise have been admitted), the low specificity of the biomarker panel (56% in ASPECT) might be more of a problem. It could be harder for clinicians to ignore increases in biomarkers that supposedly indicate myocardial necrosis, thus prompting over-treatment and over-investigation.

Ultimately, ASPECT has successfully established that an accelerated diagnostic protocol incorporating triple-marker testing successfully identifies a group of patients at very low risk of major adverse cardiac events who could reasonably be considered for early discharge. The field must now ask whether the strategy defined is indeed optimal, whether more sensitive and specific assays might improve performance, and whether these promising data will stand up to subsequent analyses of cost-effectiveness and patients' preference.

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I have attended two advisory group meetings for Roche Diagnostics (no fees were paid and travel expenses were not claimed). I have done research supported by collaborative agreements with Alere Diagnostics (involving free transport and testing of samples), Roche Diagnostics (involving donation of reagents for serum testing), and Randox Diagnostics (involving loan of equipment and donation of reagents to test plasma samples). Siemens Diagnostics will donate reagents for a research project I am leading. I have received honoraria for speaking engagements with Bristol-Myers Squibb and PASTEST, and have spoken at meetings sponsored by Roche Diagnostics and Randox Diagnostics (no honoraria). I received an honorarium for assisting Bristol-Myers Squibb to prepare educational presentations. Roche Diagnostics and Randox Diagnostics have arranged travel and accommodation for presentations at company-sponsored symposia in Europe (with Randox Diagnostics, this is still pending). I attended a lecture and subsequent meal sponsored by Brahms Diagnostics.

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