bmj.com

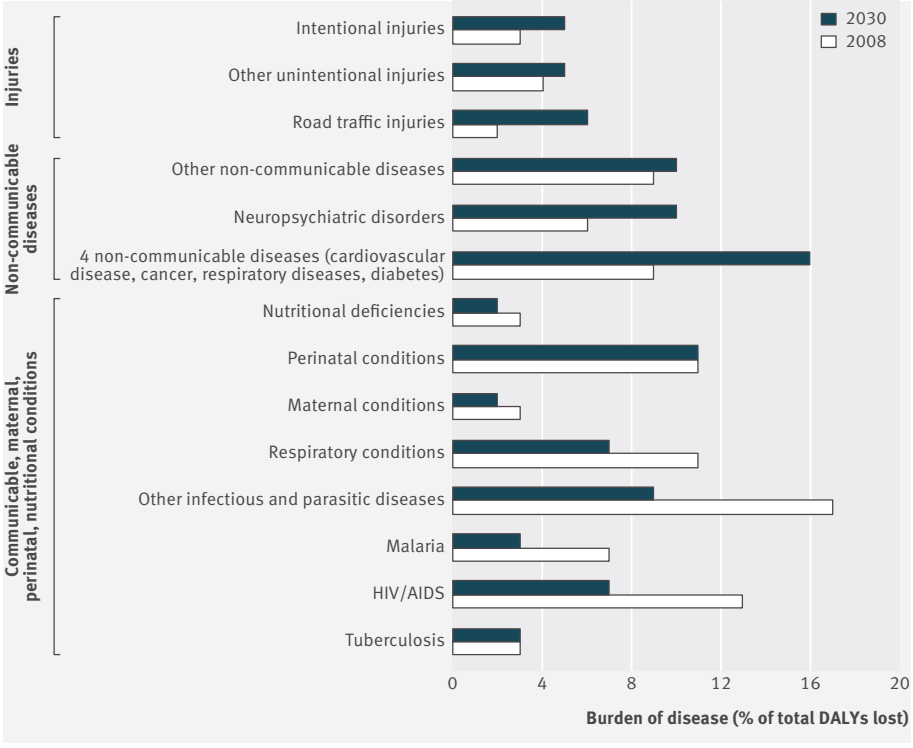
- Analysis: What are the priorities for prevention and control of non-communicable diseases and injuries in sub-Saharan Africa and South East Asia? (*BMJ* 2012;344:e586)
- Research: Cost effectiveness of strategies to combat cardiovascular disease, diabetes, and tobacco use in sub-Saharan Africa and South East Asia (*BMJ* 2012;344:e607)

AFRICA'S NEXT BURDEN
Non-infectious disease

Sub-Saharan Africa is facing a double burden of communicable and non-communicable disease. **Patricio Marquez** and **Jill Farrington** argue that coordinated programmes are needed to prevent and treat both, without creating new silos

While much of the health focus in sub-Saharan Africa, has been directed at communicable diseases (particularly HIV/AIDS, tuberculosis, and malaria), non-communicable diseases are a growing problem for the region, causing almost one third of total deaths.[1] The May 2012 World Health Assembly resolution on setting a global target for reducing non-communicable diseases[2] and the pronouncements made at the 19th International AIDS Conference in July remind us of the similar challenges faced by these two sets of disease and the potential shared solutions. The theme of the AIDS conference "turning the tide together" seems apt and should give pause for thought in the lead-up to further debate about non-communicable diseases at the UN and other international forums.

The approach to preventing and treating HIV/AIDS—exemplified by an intention to build on lessons learnt, take account of recent scientific advances, and demonstrable ability to scale-up key interventions—seems particularly relevant to non-communicable diseases. But how should sub-Saharan Africa, well represented at the AIDS conference, gear up to the challenge of non-communicable diseases in a way that avoids creating new vertical programmes in competition for scarce resources?



Burden of disease (% of total disability adjusted life years (DALYs) lost) by groups of diseases and conditions, sub-Saharan Africa, 2008 and 2030 predictions[1]

What is the essence of the problem?

Although communicable diseases have traditionally been leading causes of disease and mortality in sub-Saharan Africa, rapid urbanisation, changes in dietary patterns, behavioural and biological factors, and major improvements in the prevention and treatment of communicable diseases, particularly AIDS, that are helping raise life expectancy, are all contributing to a shift in disease patterns. For some countries, such as Mauritius and Seychelles, and some populations, such as people aged over 45 years, non-communicable diseases are now the main cause of death. In 2008, the African region had the highest age standardised mortality rate for non-communicable diseases in the world for males (844/100 000) and females (724/100 000), and over the next 10 years, the biggest rise in deaths from these diseases globally is expected there. Leading non-communicable diseases (cardiovascular diseases, cancer, chronic obstructive pulmonary disease, and diabetes) are expected to become the main cause of disability adjusted life years (DALYs) lost in sub-Saharan Africa by 2030 (figure).

Wealthy communities in this region experience higher risk of chronic diseases, while poor communities experience higher risk of communicable diseases and a double burden of communicable diseases and non-communicable diseases.[3] Non-communicable diseases are at least as common in the poor as in the more affluent groups,[4] and the observed increase in obesity

JACOB SILBERBERG/PANOS

ROBIN HAMMOND/PANOS

Nigerian fast food (above) and a cigarette seller in Zimbabwe (right). Rapid urbanisation and changes in diet are contributing to a shift in disease patterns

and hypertension with wealth are ominous in the fast growing emerging economies.[5]

Care for chronic conditions threatens to overwhelm fragile health systems and send health and social care costs soaring. Lack of adequate social protection will drive families and individuals further into poverty. In Tanzania, for example, out-of-pocket health expenditures are a major contributor to poverty.[6]

What is the approach to take?

Much focus in recent years has been on identifying the most cost effective interventions to combat non-communicable diseases[7 8] A combination of multisectoral approaches aimed at population level and high risk individuals in the health system are proposed, including a strong emphasis on fiscal and regulatory measures to encourage reduced tobacco and alcohol consumption and, where feasible in primary care, cardiometabolic risk management and low cost screening for cervical cancer.

But how can sub-Saharan Africa respond given its already resource constrained environment? We believe there are three ways that this might be achieved.

Capitalise on the links between conditions

Not much attention has been paid to the extent to which communicable diseases contribute to the burden of non-communicable diseases and to the potential for common intervention strategies. Underlying social conditions, such as widespread poverty that limits access to proper nutrition and basic health services, affect both disease groups in terms of causation, comorbidity, and care. Many people have both communicable and non-communicable diseases, and one can increase the risk or impact of the other. Poor maternal nutrition before and during pregnancy, together with smoking tobacco during pregnancy, contributes to poor intrauterine growth, resulting in low birth weight, which in turn predisposes to metabolic disorders and non-communicable diseases in later life.[9-11] Gestational obesity is a strong predictor of future health of both the mother and child, both of whom may develop diabetes and cardiovascular diseases later in life. Thus, the current poverty in much of sub-Saharan Africa may result in an epidemic of cardiovascular diseases in middle age for those who survive.[12] The problem is compounded by the dual epidemic of HIV/AIDS and tuberculosis—for example, low birth weight and malnutrition are more common in HIV infected children.[13]

Some infections cause or are related to non-communicable diseases—for example, cervical cancer, the most common women's cancer in Africa, is caused by the human papillomavirus (HPV). Better treatment of communicable diseases such as HIV infection also means that more people are surviving long enough to develop non-communicable conditions such as cardiovascular disease.[14] And non-communicable diseases or their risk factors can also increase the risk of infection—diabetes and smoking each increase the risk of tuberculosis, and comorbidity of tuberculosis and diabetes can worsen outcomes for both diseases.

Some infections cause or are related to non-communicable diseases—for example, cervical cancer, the most common women's cancer in Africa, is caused by the human papillomavirus

The organisation and delivery of more integrated and comprehensive healthcare services for people with multiple illnesses and complex symptoms is a major challenge.[15] The good news is that some of the interventions to prevent non-communicable diseases come straight out of the communicable disease weaponry:

- The scope of immunisation programmes could be expanded to include not only vaccine preventable diseases in children but HPV vaccines for young girls to protect against cervical cancer, particularly now that the GAVI Alliance has decided to support the introduction of HPV vaccines at reduced prices[16]
- People diagnosed with HIV infection can be screened for hypertension and raised blood sugar levels
- The scope of maternal and child health programmes could be widened to provide combined interventions to alleviate malnutrition and reduce smoking in pregnant women, increase the uptake of breast feeding, monitor birth weight, promote healthy nutrition in families, identify and manage hypertension and diabetes in pregnancy, and promote smoke-free homes
- Collaboration with reproductive and sexual health programmes could raise awareness of early signs and symptoms of cervical and breast cancer and increase coverage of low cost cervical cancer screening, such as visual inspection with acetic acid, which does not require laboratory facilities and can enable treatment of pre-cancerous lesions with cryotherapy.[17]

Focus on common care needs rather than disease categories

Cross fertilisation of care approaches is growing between communicable diseases and non-

AUBREY WADE/PANOS

A slum in Freetown, Sierra Leone, with the world's worst infant mortality. Combined interventions in health programmes could promote healthy nutrition, identify and manage hypertension and diabetes, and promote smoke-free homes

communicable diseases, not just in chronic care models but also in palliative or end of life care.[18] Care models from HIV/AIDS and tuberculosis are being extended or adapted to chronic conditions and comorbidities—for example, the DOTS (directly observed therapy, short course) framework for tuberculosis has been applied to the management of people with diabetes mellitus in Malawi.[19] Models already exist for collaboration with tuberculosis control programmes in primary care to benefit patients with non-infectious respiratory disease such as asthma. In Zambia, with the support of the recently launched Pink Ribbon Red Ribbon women's health initiative, the availability of cervical cancer screening and treatment—especially for high risk HIV positive women—and the promotion of breast cancer education are being expanded by leveraging existing HIV/AIDS platforms and investments (D Oluwole, executive director Pink Ribbon Red Ribbon Initiative, personal communication).

Chronic care models usually used for the care of non-communicable diseases are also being applied to infectious chronic diseases. Projects to integrate and improve quality of care for chronic conditions such as HIV, hypertension, and diabetes are under way in Uganda, Tanzania, and South Africa.[20 21] There have also been moves in Zambia to apply self management programmes from chronic non-communicable diseases to the care of HIV/AIDS.[22]

Capitalise on existing resources and capabilities

There has been increasing enthusiasm for leveraging HIV resources, experience, and models for the prevention, care, and treatment of other chronic conditions.[23 24] The case has been made for reconceptualising primary healthcare as part of a continuum of care involving coordinated primary, secondary, and tertiary care as well as the community with patients at the centre.[25 26] Innovative strategies to expand the capacity of health systems to address multiple health challenges include delegating tasks done by physicians to staff with lower level qualifications or someone without a formal education who has been specifically trained for that task.[27] The Global Forum for Government Chief Nursing and Midwifery Officers in May 2012 called for nurses and midwives to have an enhanced role in control of non-communicable diseases.[28] And given that women with hypertensive disorders in pregnancy (pre-eclampsia or gestational hypertension) have been found to have a substantially higher risk of developing diabetes and cardiovascular risk factors,[29] training nurses and midwives to identify and manage or refer women with these complications appropriately seems an effective approach.[30 31] There is also potential for more efficient use of existing resources—for example, using common procurement and supply lines for getting essential drugs to remote clinics and scaling up the use of new technologies. Mobile phones and electronic medical records are being used successfully in the care of patients with HIV/AIDS and chronic conditions in countries such as Uganda and Kenya,[32 33] and Malawi is beginning to widen use of these technologies from tuberculosis and AIDS programmes to the care of patients with diabetes.[19]

While traditionally the emphasis has been on the raising and pooling of funds, an important additional step would be to link health spending decisions to improvements in care by incentivising adoption of evidence based clinical guidelines (for example, on referral, use of diagnostics, or use of medicines). This would encourage coordination of care and improve the quality of services delivered.

What are the barriers?

In rethinking the approach, there are several risks to be avoided. One is to avoid creating yet another silo or set of silos. Although disease specific programmes have saved millions of lives, they have also made apparent the organisational, financial, and service delivery limitations of health systems, as well as the need to focus on multisectoral policies and actions to tackle the underlying social determinants of health and prevent illness.[34 35] But thinking differently relies as much on the international community and donors as it is does on national policy makers. When developing policies for

non-communicable diseases we need to spend more time considering how they would fit with what already exists within a country in order to avoid wasting resources and ensure that they are sustainable.

It is also important to recognise the power and interest of relevant stakeholders. Any attempt to integrate vertical programmes with health systems may meet with resistance if it seems to take control away from donors and proponents of specific diseases, undermines existing programmes, or fails to take account of lessons learnt.[34-36] The potential for loss of funding and political attention needs to balanced against the positive effect of a greater commitment to investing in integrated health services for managing chronic diseases. In this lies some of the art and not just the science of public health, offering a golden opportunity for the international community to recast its support in sub-Saharan Africa by focusing on strengthening local level decision making and governance capacity in the health system and by facilitating the sharing of knowledge and experiences among countries.

Another risk to avoid is negative effects on more desirable goals. Although it is worthy of better resourced disease specific programmes to offer to share some of their experience and practice,[37] there is a danger that such patronage comes only on their terms, resulting in adaptation of an already limited perspective. This may weaken rather than encourage and promote more coordinated and integrated approaches to disease control and management. A year after her death, we do well to honour the memory of Barbara Starfield by keeping in sight her four pillars for effective health organisation and delivery: first contact care, continuity over time, comprehensiveness, and coordination with other parts of the health system.[38]

Final thoughts

Much illness and inefficient use of resources could be avoided in sub-Saharan Africa if the approach were rethought, building on accumulated scientific evidence and country experiences. Rather than concentrating on a few specific diseases, African governments and the international community should prioritise building health systems that offer universal financial protection against the cost of ill health along with improved access to, and the use of, quality services that meet the multiple health needs of the population. But an effective response also needs to include multisectoral policies and actions for dealing with disease related risk behaviours, environmental factors, and their social and economic determinants in the entire population. Indeed, international evidence indicates that measures such as some of those included in the WHO Framework Convention on Tobacco Control (for example, higher excise taxes to make tobacco products less affordable), are highly cost effective for disease prevention and control, complementing and reinforcing medical care interventions.[39] Unless appropriate action is taken, the poor health status of African populations has the potential to magnify vulnerability among the sub-Saharan African countries, which are already easy prey to a variety of shocks—economic, natural disasters and armed conflicts—that tend to perpetuate poverty across generations.[40]

Patricio V Marquez lead health specialist, Eastern and Southern Africa Region, World Bank, Washington, DC, USA
Jill L Farrington honorary senior lecturer, Nuffield Centre for International Health and Development, Leeds, UK
Correspondence to: P V Marquez **pmarquez@worldbank.org**
Accepted: 24 August 2012
Contributors and sources: PVM has previously worked for the World Bank in the Latin America and Caribbean and the Eastern Europe and Central Asia Regions, and supported work in China and Cambodia. JLF is former coordinator of non-communicable diseases at WHO Regional Office for Europe and has over 20 years' public health experience including working in around 50 countries and three regions of the world. She occasionally works as a consultant for WHO and the World Bank. The views expressed do not necessarily reflect those of the institutions to which the authors are affiliated.
Competing interests: None declared.
Provenance and peer review: Not commissioned; externally peer reviewed.

1 WHO. The global burden of disease: 2004 update. WHO, 2008.
2 WHO. 65th World Health Assembly closes with new global health measures. Press release, 27 May 2012. www.who.int/mediacentre/news/releases/2012/wha65_closes_20120526/en/index.html.
3 Agyei-Mensah S, Aikins ADG. Epidemiological transition and the double burden of disease in Accra, Ghana. *J Urban Health* 2010;87:879-97.
4 Steyn K, Damasceno A. Lifestyle and related risk factors for chronic diseases, in disease and mortality in sub-Saharan Africa, 2nd ed. World Bank, 2006:247-65.
5 Schneider M, Bradshaw D, Steyn K, Norman R, Laubscher R. Poverty and non-communicable diseases in South Africa. *Scand J Public Health* 2009;37:176-86.
6 Haazen D. Making health financing work for poor people in Tanzania. World Bank, 2012.
7 Chisholm D, Baltussen R, Evans DB, Ginsberg G, Lauer JA, Lim S, et al. What are the priorities for prevention and control of non-communicable diseases and injuries in sub-Saharan Africa and South East Asia? *BMJ* 2012;344:e586.
8 WHO. Global status report on noncommunicable diseases 2010. WHO, 2011.
9 Delisle H, Agueh V, Fayomi B. Partnership research on nutrition transition and chronic diseases in West Africa—trends, outcomes and impacts. *BMC Int Health Hum Rights* 2011;11(suppl 2):S10.
10 Gangopadhyay R, Karoshi M, Keith L. Anemia and pregnancy: a link to maternal chronic diseases. *Int J Gynecol Obstet* 2011;115:S11-5.
11 Amuna P, Zotor FB. Epidemiological and nutrition transition in developing countries: impact on human health and development. *Proc Nutr Soc* 2008;67:82-90.
12 Mbewu A, Mbanya J-C, Cardiovascular disease. In: Disease and mortality in sub-Saharan Africa. 2nd ed. World Bank, 2006:305-27.
13 Baingana FK, Bos ER. Changing patterns of disease and mortality in sub-Saharan Africa: an overview. In: Disease and mortality in sub-Saharan Africa. 2nd ed. World Bank, 2006:1-9.
14 Tseng ZH, Secemsky EA, Dowdy D, Vittinghoff E, Moyers B, Wong JK, Havlir DV, Hsue PY. Sudden cardiac death in patients with human immunodeficiency virus infection. *J Am Coll Cardiol* 2012;59:1891-6.
15 WHO. The world health report 2008. Primary health care (now more than ever). WHO, 2008.
16 GAVI Alliance. Human papillomavirus vaccine support. 2012 www.gavialliance.org/support/nvs/human-papillomavirus-vaccine-support/.
17 Ginsberg GM, Lauer JA, Zelle S, Baeten S. Cost-effectiveness of strategies to combat breast, cervical and colorectal cancer in sub-Saharan Africa and South East Asia: mathematical modelling study. *BMJ* 2012;344:e614.
18 Harding R, Higginson IJ. Palliative care in sub-Saharan Africa. *Lancet* 2005;365:1971-7.
19 Allain TJ, van Oosterhout JJ, Douglas GP, Joukes S, Gadabu OJ, Darts C, et al. Applying lessons learnt from the 'DOTS' tuberculosis model to monitoring and evaluating persons with diabetes mellitus in Blantyre, Malawi. *Trop Med Int Health* 2011;16:1077-84.
20 Isenhower W, Kyeyagalire R. Chronic care design meeting: transforming health systems and improving quality care for chronic conditions in Africa. University Research Company, 2011.
21 Levitt NS, Steyn K, Dave J, Bradshaw D. Chronic noncommunicable diseases and HIV-AIDS on a collision course: relevance for health care delivery, particularly in low-resource settings—insights from South Africa. *Am J Clin Nutr* 2011;94:1690-6S.
22 Kober K, Damme WV. Expert patients and AIDS care. A literature review on expert patient programmes in high-income countries, and an exploration of their relevance for HIV/AIDS care in low-income countries with severe human resources shortages. Institute of Tropical Medicine, 2006.
23 Narayan KMV, Ali MK, del Rio C, Koplan JP, Curran J. Global noncommunicable diseases—lessons from the HIV-AIDS experience. *N Engl J Med* 2011;365:876-8.
24 Rabkin M, El-Sadr WM. Why reinvent the wheel? Leveraging the lessons of HIV scale-up to confront non-communicable diseases. *Global Public Health* 2011;6:247-56.
25 Wagner EH. Chronic disease management: what will it take to improve care for chronic illness? *Effect Clin Pract* 1998;1:2-4.
26 Nolte E, McKee M. Caring for people with chronic conditions: a health system perspective. European Observatory on Health Systems and Policies, 2008.
27 Callaghan M, Ford N, Schneider H. A systematic review of task-shifting for HIV treatment and care in Africa. *Hum Resources Health* 2010;8:8.
28 WHO Global Forum for Government Chief Nursing and Midwifery Officers. Forum statement: strengthening the role of nursing and midwifery in noncommunicable diseases (NCDs). WHO, 2012.
29 Magnussen EB, Vatten LJ, Smith GD, Romundstad PR. Hypertensive disorders in pregnancy and subsequently measured cardiovascular risk factors. *Obstet Gynecol* 2009;114:961-70.
30 Bischoff A, Ekoe T, Perone N, Slama S, Loutan L. Chronic disease management in Sub-Saharan Africa: whose business is it? *Int J Environ Res Public Health* 2009;6:2258-70.
31 Swartz L, Dick J. Managing chronic conditions in less developed countries. *BMJ* 2002;325:914-15.
32 Alamo ST, Wagner GJ, Sunday P, Wanyenze RK, Ouma J, Kamya M, et al. Electronic medical records and same day patient tracing improves clinic efficiency and adherence to appointments in a community based HIV/AIDS care program, in Uganda. *AIDS Behav* 2012;16:368-74.
33 Braitstein P, Einterz RM, Sidle JE, Kimaiyo S, Tierney W. "Talkin' about a revolution": how electronic health records can facilitate the scale-up of HIV care and treatment and catalyze primary care in resource-constrained settings. *J Acquir Immune Defic Syndr* 2009;52(suppl 1):S54-7.
34 Dybul M, Piot P, Frenk J. Reshaping global health. *Policy Rev* 2012;174. www.hoover.org/print/publications/policy-review/article/118116.
35 WHO Maximizing Positive Synergies Collaborative Group. An assessment of interactions between global health initiatives and country health systems. *Lancet* 2009;373:2137-69.
36 Grepin KA. Leveraging HIV programs to deliver an integrated package of health services: some words of caution. *J Acquir Immune Defic Syndr* 2011;57:S77-9.
37 UNAIDS. Chronic care of HIV and non-communicable diseases. How to leverage the HIV experience. UNAIDS, 2011.
38 Starfield B. Primary care: balancing health needs, services, and technology. Oxford University Press, 1988.
39 Sunley EM. Taxation of cigarettes in the Bloomberg initiative countries: overview of policy issues and proposals for reform. International Union Against Tuberculosis and Lung Disease, 2009.
40 World Bank. Africa's future and the World Bank's support to it. World Bank, 2011.

Cite this as: *BMJ* 2012;345:e5812