

## Communicable or non-communicable, malaria blurs the distinction

As the UN turns its attention to non-communicable diseases is it trying to draw irrational lines? Prof William Brieger raises some interesting questions

### International action

Earlier this year, the United Nations General Assembly confirmed plans for a 'High-level Meeting of the General Assembly on the Prevention and Control of Non-communicable Diseases (NCDs) shall be held on 19 and 20 September 2011 in New York,' with the intent that this meeting 'shall address the prevention and control of non-communicable diseases worldwide, with a particular focus on developmental and other challenges and social and economic impacts, particularly for developing countries.'<sup>1</sup> The focus was mainly on four sets of NCDs: cardiovascular diseases, cancers, chronic respiratory diseases, and diabetes, because these are the biggest cause of death worldwide and have economic impact on the nation as well as the individual and family.<sup>2</sup>

The draft political resolution prepared for the actual NCD meeting stressed that NCDs arise from 'the conditions in which people live and their lifestyles influence their health and quality of life, and that poverty, uneven distribution of wealth, lack of education, rapid urbanisation and population ageing, and the economic social, gender, political, behavioural, and environmental determinants of health are among the contributing factors to the rising incidence and prevalence of non-communicable diseases.' Ironically these same social, economic, political and cultural factors influence the development and transmission of communicable and infectious diseases, including malaria.<sup>3</sup>

Specifically the Report of the Secretary General compared these two sets of diseases by noting that, 'While the international community has focused on communicable diseases such as HIV/AIDS, malaria, and tuberculosis, the four main non-communicable diseases have emerged relatively unnoticed in the developing world and are now becoming a global epidemic.'<sup>4</sup> One cannot claim that the NCDs are the new NTDs (Neglected Tropical Diseases), since 11 years ago the World Health Assembly endorsed the Global Strategy for the Prevention and Control of Non-communicable diseases to reduce the toll of premature deaths due to these diseases.<sup>5</sup>

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Five key recommendations put before the UN Meeting show that the approach to controlling NCDs should be a basic, integrated effort where both NCDs and communicable diseases can be tackled together, since these two categories of disease do not separate themselves into different segments of the population. The recommendations include:<sup>3</sup>

- population-wide interventions that address risk factors (that is a basic public health approach);
- sustained primary healthcare measures, including prioritised packages of essential interventions for both prevention and disease management;
- strengthened capacity to monitor such diseases, their risk factors and determinants;
- effective integration of communicable and non-communicable disease initiatives;
- collaboration among governments, the private sector, civil society, and international organisations.



*Monitoring and record-keeping systems need to be in place to track both malaria and NCDs*

We should take these concepts a step further and observe that the distinction between communicable and non-communicable, especially within the individual person, family or community, is actually quite blurred. The example of malaria shows us that in fact, the two categories may be inseparable.

### Malaria and NCDs

One of the most obvious links between malaria and NCDs come from the realm of human genetics, a topic that is not at the forefront of the UN discussions. Sickle-cell disease evolved in response to *Plasmodium falciparum* malaria. According to Meremikwu and Okomo, 'sickle cell disease causes chronic haemolytic anaemia, dactylitis, and painful acute crises. It also increases the risk of stroke, organ damage, bacterial infections, and complications of blood transfusion. In sub-Saharan Africa, up to a third of adults are carriers of the defective sickle cell gene (which is actually protective for them), [but] 1% to 2% of babies are born with the disease.'<sup>6</sup> Those people who suffer this genetic disorder in sub-Saharan Africa, experience deadly consequences from malaria episodes.

Cancer was one of the main focal points of the NCD Meeting in New York. Donati and colleagues have for some years documented that Malaria and Epstein-Barr virus (EBV) infections are recognised cofactors in the genesis of endemic Burkitt's lymphoma (eBL), the most common paediatric cancer in equatorial Africa accounting for up to 74% of childhood malignant disorders.<sup>7</sup>

A recent review of the research concluded that, 'EBV is necessary but not sufficient to cause eBL. A more dynamic model encompasses incremental contributions from both chronic and acute *P falciparum* malaria leading to alterations in EBV persistence and EBV-specific immunity that culminate in eBL. A better understanding of how *P falciparum* malaria modifies EBV infections in children may allow us to anticipate reductions in eBL incidence coinciding with malaria control programs.'<sup>8</sup>

While mental health conditions are grouped in the same department with NCDs in the World Health Organization, the UN General Assembly Meeting did not stress these among the four focal groups of NCDs. That said, malaria has a major impact on the mental and neurological health of people and communities where it is endemic.

Cerebral malaria, a severe manifestation of *P falciparum*, may have varying presentations 'ranging from confusion to deep coma, often associated with a history of fever, headache, seizures, irritability, and abnormal behavior.' In the long term 'Studies estimate that up to 25% of CM survivors suffer long-term neurological and cognitive impairment.'<sup>9</sup>

Malaria has an interesting relationship with cardiovascular health in the form of high blood pressure. During pregnancy 'Placental malaria was associated with pre-eclampsia.'<sup>10</sup> In addition Ayoola and colleagues found that not only did malaria during pregnancy lead to lower birth-weight babies, but also that, 'malaria through pregnancy, which may attenuate growth of the vascular network, generated higher newborn BPs adjusted for size.'<sup>11</sup> Furthermore, other studies have



*Detecting and treating malaria promptly can avoid the long-term consequences of cerebral malaria*



*Community member inspects his bednet to ensure malaria prevention now (and NCDs later)*



Monitoring blood pressure in pregnancy

shown that 'low birth weight plays an important role in [chronic] disease onset' in adulthood.<sup>12</sup>

### Public health implications

From the foregoing examples, we can see that malaria blurs the distinction between the chronic, non-communicable disease and infectious or communicable health problems. Malaria during pregnancy and childhood sets the stage from chronic paediatric problems such as cancers and cognitive impairment. The consequences of malaria will also carry over into adulthood when one usually expects the burden of NCDs to be higher.

The five recommendations above hold the answer. We must look at the whole person, the whole community. Disease prevention, management and surveillance are crucial public health and primary care activities that should help prevent the immediate consequences of an infection as well as the longer term burden of a chronic condition. Strengthening the health system to control and eliminate malaria also means strengthening the health system to control NCDs and vice versa.

As many observers have mentioned, we are anxious to see the effects of successful malaria elimination on a variety of conditions ranging from Burkitt's lymphoma to cardio vascular disease. The theme should be integration and coordination, not competition among disease control efforts. An investment in malaria control today, should pay off throughout the lifecycle.

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