threats to wildlife than vice versa. In much of the world, reducing disease in domestic animals would improve human health and livelihoods, as well as to help protect wild animals from livestock and other domestic animal diseases. Conversely, our work in Central Africa with Ebola hemorrhagic fever in gorillas and chimpanzees has shown that networks of local villagers and hunters, park managers and staff, government public health officials, and regional laboratories can detect outbreaks of Ebola in great apes and notify local communities of the risks. We believe that due to these efforts in northen Republic of Congo, for the first time, outbreaks in animals have not resulted in the spread of the disease to humans. This broader, one health approach is much more effective and inexpensive than the traditional 'quarantine and stamping out' efforts after an outbreak has already begun. A set of guiding concepts on these themes, called the Manhattan Principles, was developed by human and animal health specialists in conjunction with wildlife conservation professionals and is available at www.oneworldonehealth.org.

Another large-scale example of a worldwide private–public collaborative effort is the Global Avian Influenza Network for Surveillance of wild birds (GAINS), based on the premise that wild birds around the world can serve as sentinels for the early detection of the virus' presence to warn public health and agricultural health professionals. Interest in the GAINS programme continues to grow and working relationships with local institutions are being built in over 34 developing countries (www.GAINS.org).

Human and animal health practitioners need to understand that it is indeed our responsibility to become a part of a collaborative solution. We need to explain to our clients and our patients that our health and the health of all living things in our environment cannot be separated. We must engage the public in discussion about our health rather than just telling them what to do. Global health will not be achieved without a philosophical shift from the 'expert dictates' paradigm inherent to both science and medicine, to a broader, multi-stakeholder approach, based on the understanding that there is only one world and one health.

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Advances and retreats in tuberculosis in the last 30 years

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In the UK, the incidence rate of tuberculosis (TB) has changed little, from 19 per 100,000 population in 1980 to 13 by 2006. During the same period, however, the UK dropped from 12th to 23rd in the league table of the 53 states in the European region of the World Health Organization (WHO) – that is, 22 countries in Europe had a lower incidence by 2006.[1] For the most part, these are small states in Western Europe with limited migration, eg Iceland, Luxembourg, Malta, the Nordic states and Slovenia, where improving social conditions, as well as public health measures, have reduced the incidence. In the UK, there has been a major shift from the bulk of cases arising in native-born people to most cases being in the foreign born, especially in those from the Indian subcontinent. In the former Soviet countries of Eastern Europe, eg Ukraine and Belarus, incidence has remained high, but is lower than in the Caucasus, eg Georgia, Armenia and Azerbaijan, and in Central Asia, eg Kazakhstan (which, for historical reasons, is classified as in the European region). The underlying causes here include enduring poverty, economic crises, especially around the breakup of the former Soviet Union, antiquated approaches to TB control, and inflexible health systems. Overall, however, incidence in Eastern Europe is now falling slowly.

Meanwhile, rates in South East Asia have stayed almost constant, at around 180/100,000, but with a doubling of the population in that time. The region is dominated by India, the number one supplier of TB cases each year with 1.9 million estimated cases in 2006. The Western Pacific, notably China, has seen a gentle decrease to nearly 100/100,000, with more dramatic falls in Latin America, Central Europe and high-income countries.

The biggest jolt to TB case numbers came from HIV: as a result, sub-Saharan Africa has seen incidence treble, rising to an average high of about 420/100,000 in those countries with an HIV prevalence of 5% or more, falling slightly since 2003.[1] Globally, in 2006 there were an estimated 9.2 million new cases of TB, with 700,000 cases in those with HIV infection, and 1.5 million deaths of which about 200,000 were HIV infected. The TB epidemic appears recently to have flattened off, and incidence is even falling although total case numbers are still rising due to population increases (Fig 1). Incidence would have begun to fall a decade earlier were it not for HIV.[2]

The second threat to emerge in the last 20 years is drug resistance, which came to prominence in the early 1990s with multiple outbreaks of multi-drug resistant (MDR) TB throughout the world. MDR-TB is defined as resistance to the two major drugs used in first-line treatment, isoniazid and rifampicin. The majority of these early cases were associated with HIV and with very poor prognosis. Global surveys, coordinated by WHO, observed significant increases in MDR-TB, particularly in the former Soviet Union, but also in China and India.[3] However, it was in a district hospital in KwaZulu Natal, South Africa, that the largest outbreak to date of extensively-drug resistant (XDR) TB (defined as MDR-TB plus resistance to any of the fluorquinolones, and resistance to any one of the injectable second-line agents, amikacin, capreomycin, or kanamycin) was reported. This too was strongly associated with HIV and had a 98% case fatality rate.[4] The underlying causes include failure to supervise patients' treatment (resulting in several different strains becoming extensively resistant) and a lack of infection control measures in the hospital. Globally, in 2006 there were an estimated 489,000 cases of MDR-TB.[5]

TB (and leprosy) is extraordinary among infectious diseases in that the chief diagnostic tool, microscopy, using the Ziehl–Neelsen stain, has remained virtually unchanged since 1886. Culture and isolation have changed little, although liquid culture systems have accelerated the time to diagnosis compared to solid media. However, it is in diagnostics that the first big revolution in the management of TB since the advent of chemotherapy is about to happen. DNA-based line probe assays, using polymerase chain reaction methods, have enabled development of tests that can diagnose MDR-TB from a sputum positive sample within a day. At the time of writing, WHO is about to recommend their deployment at country level.

First-line treatment has not changed a great deal in the last 30 years. Fluoroquinolones have anti-TB activity, but their use has been mostly restricted, at least in the public sector, to treatment of drug-resistant cases. Oxazolidinones are also active against TB, but their cost has confined their use to difficult cases in high-resource settings.

Globally, however, it is not to technical fixes that the advances of the last 30 years, and the flattening of the TB epidemic, are owed. Rather it is to a simple public health methodology that has been introduced in almost all developing countries – the DOTS strategy – based on the pioneering work of Karel Styblo, first in Czechoslovakia, and later in Tanzania, Benin, Malawi and Mozambique.[6] The elements of DOTS are: political commitment, without which little can happen in most places; bacteriological diagnosis, usually sputum smear microscopy, but culture and isolation if it is affordable; directly observed treatment with standardised regimens; a secure supply of quality assured drugs; and a recording and reporting system that evaluates the outcome of every single patient at the end of treatment.

In 2006, WHO expanded its control strategy to keep up to date with new knowledge and persuade countries to address not only drug-susceptible TB, but also drug-resistant cases, and those with HIV.[7] All healthcare providers should be involved in TB control, which in turn, should add to health system strengthening efforts. Communities and individuals affected by TB are encouraged to get involved and research and development is actively promoted. Serious progress towards TB elimination, defined as an incidence of less than one case per million, will demand better tools than we have at present, particularly a more effective vaccine than BCG.

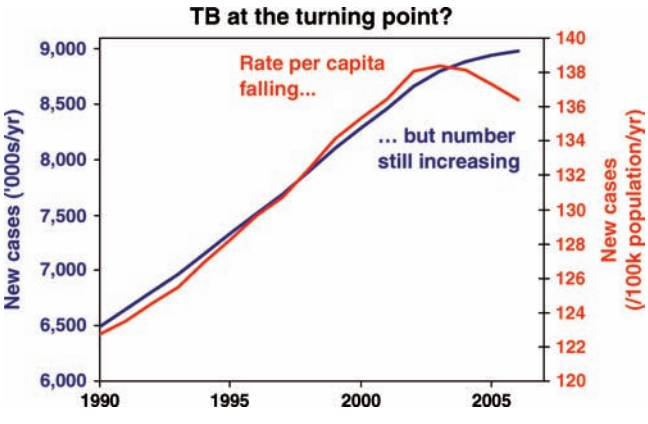

Fig 1. Comparison of global incidence rates (red) and total case numbers (blue). Derived from Reference 1.

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Immunisation in the UK: protected for the future

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Introduction

In the Peckham Report of 1989, immunisation coverage in the UK was among the lowest in Europe.[1] Recently, coverage of seasonal influenza vaccine was among the highest in Europe[2,3]; the UK childhood immunisation programme is widely recognised