

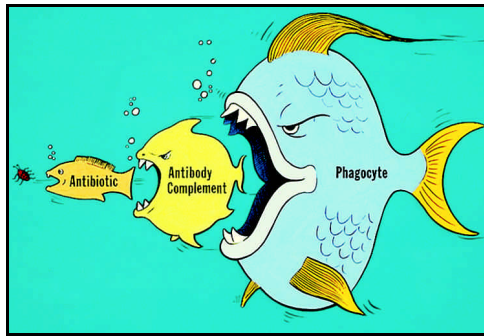
Infectious diseases

RECENT YEARS HAVE SEEN the continuing emergence of new infectious diseases and the re-emergence of old ones. However, there have also been major advances in diagnosis and treatment of infectious diseases, as well as in our understanding of their pathogenesis. Future control of these diseases will require attention to the behavioural, environmental and healthcare factors that drive microbial evolution. For example, the "epidemic" of injecting drug use promotes HIV spread; Legionnaires' disease is "opportunistic" on air-conditioning and water-treatment systems; and immunosuppressive therapies and medical instruments that are difficult to sterilise (eg, endoscopes and phaco-emulsification handpieces) create opportunities for new infections.

HIV and hepatitis C. HIV epidemics are emerging in Papua New Guinea and South-East Asia. Australia successfully combated the first wave of HIV infection in the late 1980s and is in a position to support control programs in these areas. The most important development in HIV control is the concept that treatment is an essential component of prevention, promulgated at the recent United Nations General Assembly Special Session on HIV/AIDS.¹ In Australia, where antiretroviral resistance is now common, the emerging approach to management is immunotherapy (boosting the immune response with agents such as interleukin 2 and vaccines).

Hepatitis C virus has been revealed as more common than expected in Australia, with over 200 000 people estimated to be infected.² It rarely presents as an acute symptomatic infection, but emerges insidiously with symptoms of chronic fatigue, and in some people progresses to cirrhosis and (rarely) hepatocellular carcinoma. Progression to chronic liver disease appears more likely if infection is acquired through transfusion or at an older age.³ For infection acquired through injecting drug use, rate of progression to cirrhosis is 5%–10% after 20 years. Endoscopy is a recognised route of transmission that requires attention.

Creutzfeldt–Jakob disease. The emergence of variant Creutzfeldt–Jakob disease (vCJD) has prompted changes to transfusion services in Australia and review of food and therapeutic products and infection control measures. In routine medical practice, there is a need to identify people at risk of CJD before neurosurgery, ophthalmic surgery and diagnostic procedures that contact infected tissue, and to implement measures to contain healthcare-associated transmission of classic CJD. However, the necessary standards of infection control are neither widely agreed nor practised. As no cases of vCJD have yet been reported in Australia, the cost–benefit of implementing infection control measures for vCJD is uncertain and is currently being actively considered by the Special Expert Committee on Transmissible Spongiform Encephalopathies of the National Health and Medical Research Council. Emergence of vCJD in Australia will



dramatically alter infection control practices, not least because vCJD manifests in a wider range of tissues than classic CJD (eg, in the tonsils). Infection control procedures will be needed for procedures involving lymphatic tissues as well as brain.

Vaccines. *Haemophilus influenzae* type b (Hib) vaccine has substantially eradicated *Haemophilus meningitis* and pneumonia from the Australian community, and the new conjugated pneumococcal vaccines have similar potential to prevent invasive pneumococcal disease. A raft of other new vaccines are in advanced stages of development, including vaccines that stimulate cell-mediated responses against many viruses, *Chlamydia* spp. and even cancers. Vaccines for varicella are currently marketed, and clinical trials are under way on vaccines for herpes simplex virus, human papilloma virus, HIV, malaria and tuberculosis. Key factors in vaccine use are access, funding and long term safety. The role of routine vaccination for pneumococcus, varicella virus and meningococcus in Australia has yet to be debated, but these vaccines will have impacts on routine practice.

Antiviral agents. There are now effective antiviral agents for the herpes viruses, HIV, hepatitis B and C viruses and influenza virus. The range of antiviral compounds is expanding, and their role in treatment and prevention is a current challenge for clinical research.

Diagnostic methods. Molecular diagnostic methods are now established for infectious diseases and are being tailored for easy use in standard laboratories, and even as point-of-care kits for the consulting room. A prion diagnostic kit should be available within two years.

Concepts in pathogenesis. Infection is now recognised to have a role in conditions as diverse as cancer of the cervix (human papilloma virus), preterm birth (bacterial vaginosis) and cerebral palsy (chorio-amnionitis).

In contemplating the future, the bad news is that infectious diseases evolve continuously and will continue to present in new guises. The good news is that molecular biology has provided new tools for diagnosis and control. However, advances have mostly comprised new strategies to control emerging disease agents. The challenge is to modify the environmental, social and behavioural factors that promote the emergence of new infections.

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Figure: Antibiotics alone do not cure infections.

1. United Nations General Assembly Special Session on HIV/AIDS. Declaration of commitment on HIV/AIDS. 2 August 2001. (Accessed Dec 2001) <www.unaids.org/whatsnew/others/un_special/Declaration020801_en.htm>
2. Law MG on behalf of the Hepatitis C Virus Projections Working Group. Modelling the hepatitis C virus epidemic in Australia. *J Gastroenterol Hepatol* 1999; 14: 1100-1107.
3. Freeman AJ, Dore GJ, Law MG, et al. Estimating progression to cirrhosis in chronic hepatitis C virus infection. *Hepatology* 2001; 34: 809-816. □