

## Risk to Human Health Posed by Avian Influenza

The prospect of a virulent human influenza pandemic causing large scale mortality and morbidity is a cause for global concern. The most likely candidate is the avian or 'bird' flu which is a strain of influenza virus named because it is found in birds. There are three groups of flu viruses, influenza A, B and C. Type A viruses are able to infect a wide variety of warm-blooded animals. B and C types are mostly confined to humans. Avian influenza is caused by a Type A virus and typically affects birds' respiratory, digestive and nervous systems.<sup>1</sup>

### Avian influenza is a virus that mostly affects birds

All kinds of bird can be infected with avian flu. All strains of influenza A originated from aquatic birds as shown by analysis of their genomes. At least 15 variants of the virus have been identified. Migratory wildfowl – mainly ducks – are the natural reservoir of the virus. Some of these birds have some immunity to the virus but may still carry the virus. In wild ducks and other aquatic birds the virus primarily infects the gut. Domestic poultry are particularly vulnerable. Outbreaks in domestic poultry are generally thought to result from contact with wild birds or contamination of food or water supplies by wild birds. Live bird markets may increase the spread of the infection. Infection also spreads by contaminated equipment. Bird flu viruses can survive for long periods in the environment especially when temperatures are low, and can persist indefinitely in frozen material. Birds that survive infection excrete virus orally and in droppings for up to 10 days after recovery. The virus has also adapted to infect other animals, such as cats.<sup>2</sup>

The infection that causes the greatest number of bird deaths is called *highly pathogenic avian influenza* (HPAI). Highly pathogenic H5N1 avian influenza virus is endemic in domestic ducks in Asia. Some strains kill ducks but others are benign in ducks but lethal for chickens and possibly humans.<sup>3</sup> Avian influenza A viruses do not usually infect humans. It is believed that most cases of the current bird to human transmission are by the H5N1 strain. It was first recognised in Hong Kong in 1997 and the strain that has recently re-emerged is a slightly altered form of this strain. Overall there have been more than 100 human infections, with more than half of them fatal, since the first case linked to widespread poultry outbreaks in Vietnam and Thailand was reported in January 2004.<sup>4</sup> The majority

of these cases were in direct contact with infected poultry. However there is the possibility that person-to-person transmission has occurred.<sup>5</sup>

### What causes an influenza pandemic?

The influenza epidemics that occur almost yearly are caused by what is known as *antigenic drift*. Antigenic drift is a minor change that occurs within the virus. This change is different enough that a new vaccine needs to be developed each year. But it is not different enough to change the overall mortality or morbidity within a population. Influenza pandemics, however, occur every few decades and occur because of a different phenomenon called *antigenic shift*. The process occurs in only influenza A virus. This is when the virus, including subtypes from different species, swaps or 'reassorts' genetic material and merges to create a completely new influenza virus to which the general

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population has no innate immunity. Pandemic strains are designated according to their surface antigens, e.g., Spanish flu (H1N1) in 1918, Hong Kong flu (H3N2) in 1968.<sup>6</sup>

The H5N1 virus has not achieved pandemic status because it is not effectively passed from person-to-person. It is speculated that this virus will genetically adapt into a human-tropic virus or mix with another human influenza virus to produce a novel pandemic strain.<sup>7</sup> Subtype H5N1 mutates rapidly and is good at acquiring new genes from viruses infecting other animal species. Conditions favourable for the emergence of antigenic shift have long been thought to involve humans living in close proximity to domestic poultry and pigs. Pigs are susceptible to infection with both avian and mammalian viruses, including human strains. Pigs, and humans themselves, may become the vehicle for the reassortment of genetic material into a novel subtype.<sup>8</sup> That is, an ordinary human flu virus and the avian flu virus could mix genes, creating a new type of virus that could be lethal to many humans.

## The clinical course of avian influenza in humans

*Highly pathogenic avian influenza* affecting humans was made a quarantinable disease on 23 March 2004. Australian models suggest that an avian flu pandemic would last at least two months and return in a second wave within the year. General influenza viruses are highly contagious, spreading by droplets when an infected person coughs or sneezes. Pandemics of flu are spread from person to person by coughing and sneezing, touching things that are contaminated by respiratory secretions and then touching your mouth, eyes or nose, and through spread of particles in the air in crowded populations in enclosed spaces.

The exact effects of the next likely human pandemic flu and how lethal it might be are unknown. In humans infected with avian flu, the signs and symptoms are similar to other influenza infections. The clinical course includes fever, sore throat and cough. Fatalities arise due to severe respiratory distress secondary to viral pneumonia. Young children, who have immature immune systems, may be particularly susceptible, as are the elderly who may succumb due to co-morbid complications. The exact incubation period is unknown because there have been so few cases, but various citations suggest that it ranges between two to ten days. People may be contagious before symptoms appear. Typically the flu lasts four or five days. An adult would likely be infectious for up to a week and a child up to a fortnight.<sup>9</sup>

## Containing the threat of a pandemic

Australia has had five outbreaks of avian influenza in commercial poultry. The most recent outbreak was in 1997. All outbreaks were successfully eradicated.<sup>10</sup> The current outbreak of bird flu could reach our shores by in-

fecting migratory birds infecting the local bird population. If a human to human transmission eventuates it would probably arrive through international travel. Total funding of \$133.6 million has been provided over five years to the health and ageing portfolio to protect Australians from potential outbreaks of human pandemic influenza.<sup>11</sup> This figure has now been updated to \$170 million.<sup>12</sup>

The World Health Organisation (WHO) recommends measures to minimise global health risks by: halting the flu's spread in poultry; vaccinating persons at increased risk of exposure; workers wearing personal protective equipment and taking anti-virals.<sup>13</sup> Basic infection-control measures such as source containment, case management, contact investigation, infection control at health care facilities, and community containment worked well to contain the SARS threat. These measures may be instrumental in slowing the spread of infection, at least to enable an effective vaccine to be produced.<sup>14</sup> Another suggested strategy is to delay spread by detecting the first clusters quickly and then literally swamping the outbreak area with antivirals. This is based on models which use a disease's 'reproductive number' – the average number of new infections that one infected person will cause. This is typically low for flu, but the incubation period is brief and flu spreads fast.<sup>15</sup>

Doctors in Australia have already been sent a bird flu awareness kit. After the Bali bombing the Government established a *National Incident Room* that would help monitor and coordinate our response in the event of a large scale disaster, such as a pandemic disease. Proposed plans include advising people to stay at home to avoid infection. Infected families could be restricted from leaving their homes. Schools and universities would be closed and large public gatherings would be discouraged. Office buildings and factories might also need to close. International travel would also be closely monitored with every passenger required to make a health declaration.<sup>16</sup>

## Personal precautions

The Australian Government has advised Australians travelling to areas affected by avian influenza to avoid situations where they may come into contact with farms and live bird markets, and ensure that all uncooked poultry and eggs are handled hygienically, followed by careful hand-washing. Quarantine officers in Australia are maintaining a high level of alert for birds and bird products from bird flu affected countries. Based on current bird flu strains, individuals exposed to the virus may be quarantined for 7-10 days.<sup>17</sup>

General advice in the advent of an outbreak of human to human transmission of avian flu includes regular hand-washing, cough hygiene (turn away, cover mouth, dispose of soiled tissues, protective masks etc), and if unwell to avoid public places and contact with children or people

with underlying illness, as well as maintaining good general health and keeping current with recommended vaccinations.<sup>18</sup> According to the *Health Protection Agency*, currently available vaccines, such as the annual 'flu' vaccine will not protect against disease caused by the H5N1 strain in humans.<sup>19</sup> However, people are encouraged to continue getting their annual flu vaccination to not only maintain their continued good health but to reduce the opportunity for an 'avian' flu to mix with a 'human' flu.

## Prevention and Treatment

Because viruses mutate, at least four months is needed to produce a new vaccine in significant quantities, capable of conferring protection against a new virus subtype. By inducing adaptive immunity, vaccines protect where innate immunity, which evolves slowly and regionally, cannot.<sup>20</sup> The Australian Government has signed contracts with two vaccine manufacturers, however the vaccine may take at least 3-6 months to produce.<sup>21</sup> The Australian vaccine manufacturer CSL has begun human trials of a vaccine derived from a strain of the H5N1 bird flu virus from an infected person in Vietnam. The virus is killed after being incubated in eggs so there is no live virus in the vaccine.<sup>22</sup>

Specific treatment and prophylaxis by antiviral drugs shown to be effective against influenza A strains is available.<sup>23</sup> Indeed many rich countries have been stockpiling antivirals in anticipation of a pandemic occurring, although there is no guarantee that these drugs will be effective against a mutated human to human variant. There is also a possibility that the virus would develop resistance to these antivirals. Unfortunately antiviral supplies are limited, and it is the poorer nations, most at risk in an initial outbreak, who are reliant on the supply of resources from their richer neighbours.<sup>24</sup>

There are four different influenza antiviral drugs, amantadine (Symmetrel), rimantadine (Flumadine), oseltamivir (Tamiflu) and zanamivir (Relenza), that are approved by the US *Food and Drug Administration* (FDA) for treatment and/ or prophylaxis of influenza. All four have activity against influenza A viruses, although there is resistance in some strains. The 2004 H5N1 virus, isolated in poultry and humans in Asia, has shown resistance to amantadine and rimantadine.<sup>25</sup> Tamiflu is the antiviral of choice, however, Relenza is reported to be at least as effective as Tamiflu.<sup>26</sup> Australia has mostly stockpiled the antiviral Tamiflu.<sup>27</sup>

## ENDNOTES

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<sup>13</sup> WHO, *Avian Influenza*, 15/1/2004, [www.who.int](http://www.who.int), accessed 26/8/05.

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Anne Moates



## Ethical Issues in the Management of Bird Flu Pandemic

*Following on from the previous article by Anne Moates, I will take for granted the need for all infected birds to be tracked down and destroyed. I am assuming the scenario that some human beings may be infected by a mutated form of the highly pathogenic H5N1 avian influenza so that this modified bird flu virus can be transmitted from human to human by social contact. Some of the ethical issues that arise in this possible scenario need to be briefly considered.*

Protection of public health and prevention of the spread of a disease like the highly pathogenic avian influenza must be given high priority in the provision of health services in all Australian States and Territories. It is imperative to plan for the possible eventuality of this potential national disaster, comparable to the Spanish Flu pandemic that hit the world in 1917-18 and killed up to 40 million people, including about 12,000 in Australia, isolated as it was, before commercial aircraft started to land thousands of international travellers.

The Government should rely on the expert advice of the Commonwealth's Chief Medical Officer and his advisory committee in drawing up relevant Australia wide policies for prevention, containment and treatment of bird flu, especially in its potentially lethal variety H5N1 which could transmit infection from one person to another by social contact. The same would apply in the States and Territories. Efforts must be made to ascertain the most up to date information on the scientific facts relating to bird flu and the efficacy of potential drugs for treating it in humans. In this situation it would be desirable for all Governments in Australia to take the respective Opposition Leaders and Health Shadow Ministers into their confidence by adopting bi-partisan approaches of sharing with them the same information that they receive from their respective health professionals, doctors, scientists and other experts. Public health and the community's compliance with health precautions and quarantine during a pandemic should not be put at risk by the public airing of conflicting opinions on how to manage the pandemic. The time for debate is prior to the formulation of policy, not when the pandemic is upon us.

Mandatory reporting of contagious infections and the quarantining of infected persons will cause necessary hardships. While values like autonomy, privacy and confidentiality are important, they have to give way to the extent that this is required for the protection of public health or the saving of human lives during a community health emergency caused by a bird flu pandemic. Disci-

pline at all levels in the population is needed, much the same as it is during a war.

### Medical nursing and other personnel

Doctors, nurses and other hospital staff have to continue their normal duties caring for current patients in existing hospitals. Only a few could be spared to serve the needs of extra patients brought down by the pandemic. Indeed, nobody can be morally or legally obliged to take risks of infection by being in contact with patients with a contagious and potentially lethal disease. It would be necessary to call for volunteers with the necessary qualifications to treat and care for these patients. As has already been mentioned in the press, retired doctors and nurses could volunteer for service. Health professionals need to be brave and generous to volunteer to care for the sick. Even if they have received antivirals, their services would not be risk free. Other volunteers need to be specifically trained for this kind of service. It would be necessary for all volunteers expected to be in contact with infected patients to be given antiviral drugs to minimise their risk of infection. This could encourage more people to volunteer for non-medical services as well. It would be too late to look for volunteers once the pandemic strikes.

The protection of the nation's public health requires contact details of medical, health professionals, nurse volunteers and others be drawn up in advance of the onset of a pandemic. While citizens volunteer to take the risks of caring for infected patients, this does not mean they should not be paid adequate remuneration for themselves and their dependents. This must also be factored into the cost calculations.

Religious ministers and leaders ought to motivate health professionals and ordinary citizens to volunteer so as to be ready for any emergency situation. They should also encourage people to follow health directions and to foster peace and harmony during the stressful times induced by a pandemic. The underlying moral fibre and heroism in

Australia's population will need to come to the fore if we are to avoid a national disaster caused by any eventual bird flu pandemic.

## Prevention of infection

Prevention is better than cure and preventive measures will need to, and already are being, taken at all levels in Australia -- Federal, State and Territory. Any birds suspected to be infected by flu should be isolated and destroyed at their point of entry. Consultations with relevant national and international expert scientists, immunologists, public health specialists, doctors, nurses and health administrators need to be organised to improve preventive steps and provide antiviral treatment for infected persons wherever possible.

Coordination is needed for the effective provision of health professionals, medical support, catering and environmental services staff, and personnel from essential services, including police and the fire brigade. Priorities are to be established for the supply of protective vaccines and antivirals in good time for those serving in the front line. Clearly the first priority must be given to all those who place themselves at risk of contagion by tending to the needs of infected persons. This would include carers, allied health professionals, ancillary staff, catering staff, and hospital administrative staff.

Provision must also be made to produce or obtain effective bird flu vaccines and antivirals to adequately protect the estimated number of people who will need them. Australia's antiviral *Relenza* is reported to lessen the impact of flu symptoms when taken within 48 hours of contracting the flu, and to prevent symptoms if taken before getting the flu.<sup>1</sup>

All members of the relevant essential services, such as ambulance officers, the police force, fire brigade, armed forces, and other members of essential services, must be provided with protective drugs. Since governments need to continue functioning for the duration of a pandemic, Commonwealth and State Cabinet members must also be given vaccines and antivirals. Vaccines would also need to be given to people who work in funeral parlours and public utilities such as power, gas, phones, water, waste disposal, and sewerage etc. The usual demands on law and order enforcement officers would likely be greater during a bird flu pandemic, as we have recently seen after Hurricane Katrina in New Orleans.

Without neglecting Australia's needs, we should be generous in donating vaccines and antivirals for the protection and treatment of our Asian neighbours whose needs may well be far greater than our own. This would be an effective way to show our solidarity with them, regardless of whether this gesture would lessen the likelihood of the bird flu virus reaching our shores by way of migrating

birds or travellers.

## Quarantining

Once a person is found to be infected by, or known to be exposed to bird flu, immediate isolation of the person is necessary and is legally enforced by quarantine. Others who have been in social contact with the infected person may also have been infected. The H5N1 strain of bird flu is known to be contagious even before the infected person is aware of any flu symptoms. Medical officers may need to quarantine the social or working contacts of an infected person if this is judged to be warranted. It may seem to be wrong to quarantine those who do not yet show symptoms of the flu. But, on the other hand, when it is a matter of protecting public, it is certain that it is morally wrong to expose members of the public to real risks of being infected by a potentially lethal virus. Here the criterion of certitude required for quarantining citizens is not that of the criminal justice system, ie, innocent until proven guilty beyond reasonable doubt. Where the common good and public health is at stake, preventive quarantine must be set in place whenever there are reasonable grounds in the circumstances to believe a particular person or persons constitute a risk of infecting members of the public. So if one member of a household has symptoms of the flu, the others may be deemed to be infected. This is known as moral certitude, which suffices for morally responsible action in daily life. We rightly drive through green lights with confidence, without first waiting to see if stationary cars are about to start off through red lights. This moral certitude is akin to the balance of probabilities criterion which operates in actions for liability in civil courts.

Risk of infection must be determined by the relevant medical personnel, and their orders must be carried out, especially in relation to the quarantining of persons deemed to be a risk for uninfected populations. This sort of decision could be made at an airport once it is determined some passengers on a particular flight may be infected, bearing in mind infection can occur before symptoms of the disease appear. Risks would be dramatically multiplied if the truth about the infection on the flight is only discovered after returning international travellers have returned home and gone to work on trains, trams and buses for several days. International coordinating networks may be able to warn us if anybody on a particular flight needs closer monitoring on arrival.

## Treatment of infected persons

People are familiar with the triage process of sorting out which patients need to be treated before others waiting in a queue in an emergency department of a hospital. It works well and is accepted by the community. The underlying ethical rationale of triage should also be used, wherever necessary, during any lethal pandemic, includ-

ing the bird flu, where large numbers of infected persons are involved. Priority for treatment should be given to those who are infected and will die without it, i.e. people who are in need and will benefit most from it and be cured. Those who are sick but are not in danger of dying are lower in order of priority and can wait for appropriate treatment. But all who are suffering have a top priority for symptom relief, whether they are dying or not. Senior health officials should encourage other health professionals to be firm in carrying out their duties in relation to applying triage and the protection of the community from infection. Triage medical personnel should be given strong support by their superiors to avoid panic and to promote the best health outcome for the common good of the community.

There may be a shortage of hospital beds for patients with bird flu. Alternative places that could serve as temporary hospitals may be needed to be found. The owners of public halls, gymnasiums, residential colleges, etc., could make their facilities available for the sick or for quarantine purposes for the duration of the bird flu pandemic emergency. Such facilities could also be commandeered by the authorities, if necessary.

## Conclusion

Policies for prevention and treatment of bird flu need to be adapted, as required, to people who live in metropolitan or in regional areas. Special consideration should be given to publicising precautions to Indigenous Australians and others living in rural or remote areas which may

be seasonally exposed to migratory birds whose droppings on the land, lakes and dams could transmit bird flu disease to poultry and human beings. In particular special briefings may be necessary on the need for quarantine for all infected persons without exception. The leaders of ethnic minorities in metropolitan and regional areas may also need similar briefings to ensure ethnic minorities understand fully what is at stake in order to gain compliance and willing cooperation with public health policies and procedures.

The public need to know well in advance of any bird flu pandemic the advice of health officials on how to lessen the risk of catching bird flu infection and what to do in case people think they may be infected. Health officials should brief the media on mandatory policies and procedures for all to follow should the pandemic strike. This will enable the public to learn what to expect and what they should do to protect themselves. Clearly members of the public must obey directions from the relevant health officials once a state of emergency is declared. Discipline will be required in the population to prevent chaos and harm to public health. Hopefully with our well-planned national public health strategy, Australia will be able to contain the effects of a global pandemic.

## ENDNOTES

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# Sports Medicine and Ethics

*Australian's are proud of their sporting heroes and support all manner and types of sport either as participants or observers. Increasingly, the limits of what is humanly achievable in terms of speed, distance and endurance are stretched. There are risks to health and well-being inherent in participating in sport, yet physical activity is important for health and well being. The following article briefly discusses some of the moral challenges that may arise in sports medicine.*

## Ethical challenges unique to sports medicine

Several ethical issues in sports medicine have been identified: limits of doctor and patient confidentiality; allowing patients to assume medical risks for nonmedical benefits; use of medical means for enhancing athletic performance; impediments to obtaining informed consent; the application of medical arts to enable dangerous behaviour; medical advertising; fair resource allocation; pressures to use unproven treatments; and special concerns for the paediatric athlete.<sup>1</sup>

## Medico-legal issues related to injury in sports medicine

In Australia, injured sportspersons have successfully sought damages at common law for injuries sustained in competitive sport.<sup>2</sup> A common injury that occurs in contact sports in particular, is concussion. Most are minor but symptoms can persist for months. The risk of extending damage to the brain is foreseeable if the injured athlete resumes sporting activity too soon. Sudden death is possible. Some sports encourage the risk of head injury, for example, the sport of boxing. Controversy about the ethics of boxing continues to be debated not only by the public but by bioethicists in peer reviewed medical ethics

journals.<sup>3</sup> However, the issues such debates raise are not unique to boxing. It is assumed that consenting adults who undertake sporting activities voluntarily do so at their own risk. However, the ethics of allowing children to participate in sports like boxing is questionable.

Sudden cardiac death during sporting events is an often unexpected and tragic occurrence especially if it occurs in a seemingly fit young athlete. A breach of the duty of care principle may be implied if health professionals, particularly sport physicians, fail to fully disclose the risks of sudden cardiac death to the athlete known to have cardiovascular disease. There are examples of litigation from the US brought against medical professionals and sporting organisations who fielded players with known heart problems with tragic consequences, firstly in allowing the athlete to play the sport and secondly in failing to have adequate resources to cope with the foreseeable advent of an adverse cardiac event.<sup>4</sup>

## Injury and Public liability

Since the mid to late 1990's, sports injuries have increasingly been recognised as a significant public health issue and one that needs a strong preventive approach according to the report, *Sport Safety in Australia An Update*, commissioned by the Department of Health and Aged Care in 2003.<sup>5</sup> The report indicates that most sporting injuries are minor, yet the incidence is significant. The costs of sporting injury are substantial and the causes multi-factorial. There is an elevated relative risk of injury in team ball sports, particularly football codes, netball and basketball. Yet overall there is a general lack of information about all aspects of sport injury incidence and prevention.

Injuries which occur as a result of sporting activity may arise either from the action of other competitors, inadequate control or management of the activity or defective equipment. The convenor of the activity and all participants each owe one another duties to take reasonable care. The right to claim damages for injury depends on the circumstances and three elements that must be proved: extent of duty owed; breach of duty; and injury complained of has been caused by that breach.<sup>6</sup> The main defence to a negligence claim as a result of sporting activities is *volenti non fit iniuria*, the voluntary assumption of risk.<sup>7</sup>

The increased participation by people in what are known as 'extreme sports' seems likely to generally increase the number of injuries. A sport or activity is considered extreme if it is high risk, dangerous or challenges the limits of human existence<sup>8</sup>, such as snowboarding. To avoid an escalation in litigation by injured 'extreme' athletes, sporting and recreational organisations have had to implement risk management plans and increase their public liability insurance cover.<sup>9</sup> Unfortunately the rising costs of public liability insurance have negatively impacted on

many less risky recreational endeavours.<sup>10</sup> The community bears the cost of many sport related injuries. Given that some of these 'extreme sports' would not be considered reasonable in terms of risk taking, but rather a dangerous 'death wish' mentality on the part of participants, perhaps the community should balk at continuing to pay so dearly for some 'sport' related injuries.

## Young people and sport

An estimated 40% of all sporting injuries occur in children and adolescents. This includes overuse syndromes from training for a particular sport.<sup>11</sup> However, physical activity is important especially to help combat the growing obesity burden carried by children.<sup>12</sup> Overtraining children can lead to them experiencing a decline in physical performance, loss of appetite, fatigue, illness and depression. Parental pressure is contributory in this context.<sup>13</sup> Children do not always derive benefit from involuntary participation in sport, though increasing physical activity is encouraged. The *Australian Sports Commission* has identified three ethical issues that impact on youth in sport – overemphasis on winning and competition, resource issues (cost of participation and lack of facilities) and parental involvement (too little or too much).<sup>14</sup> In addition there are ongoing problems of substance misuse, violence and abuse perpetrated by those in positions of power over children – in teaching, coaching and caretaking roles.

In Australia, sporting celebrities can be influential especially on young people. It is not helpful when these celebrities appear to be above the law when found to be using prohibited substances, engaging in risky behaviours or driving under the influence of alcohol. The aggressive nature of some sporting performances is also venerated by youngsters who try to emulate their heroes in their own sporting performances. Whether there is a cause and effect significance to this exposure is immaterial, with anecdotal evidence that bullying generally appears to be increasing. It is not uncommon for unsportsmanlike behaviour, such as intimidation and abuse being perpetrated and experienced by the young sportsperson themselves, their coaches, parents and supporters alike.

## Performance enhancing substances

The practice of enhancing athletic performance through foreign substances was known from the earliest Olympic Games. The World Anti-Doping Agency (WADA) has an anti-doping code which consists of three parts; the code, international standards, and models of best practice.<sup>15</sup> Even with the support of WADA internationally, sport authorities confront a variety of perplexing issues as they attempt to address effectively and efficiently the problems posed by doping. Some sport authorities currently use blood tests to exclude competitors whose sample exceeds certain predetermined levels on the grounds of con-

cerns regarding health and safety, and others do not.<sup>16</sup> Privacy and confidentiality issues arise in the way specimens are obtained, and in how results are interpreted and reported.

It is suggested that many top athletes resort to doping to improve their performance by using anabolic steroids, human growth hormone (hGH), erythropoietin (EPO), beta-blockers, stimulants or diuretics. The risks from over-use of anabolic steroids include causing high blood pressure and heart disease, abnormalities in liver function, kidney disease, and fertility problems. Doping with hGH can cause excessive growth of the head, feet and hands, as well as increased risk for heart disease, diabetes and premature death. If EPO levels are too high too many red blood cells are made which can lead to heart attack and stroke due to excessive blood clotting.<sup>17</sup> Beta-blockers, stimulants and even over-use of some diuretics can cause abnormal cardiac effects.

Athletes who engage in hormone doping increase their risk of developing adverse health problems. Some hormones are endogenously produced and detecting their use in a non-therapeutic context is challenging. Over time, drug misuse trends in sport have changed from the use of the relatively short-acting stimulants towards administration of androgenic anabolic steroids, presumably in an attempt to increase muscle size or strength. Currently, the popularity of steroids is being replaced by Human Chorionic Gonadotrophic hormone or Human Growth hormone.<sup>18</sup>

The pressure to enhance performance, especially for elite athletes, is tremendous. If athletes believe that their rivals are using performance enhancing drugs then the desire to level the playing field can be enormous. It may be argued that competent adults should be allowed to make this choice. Yet another argument is that the decision to use performance enhancing substances is not always an entirely free choice, with some being doped without their knowledge or consent.<sup>19</sup> There is clear evidence that some countries have engaged in the systematic and programmed use of hormonal substances by their athletes without the permission of the individual athletes. On the other hand, sport physicians who participate in doping athletes with banned drugs, with or without their consent, are engaging in unethical and illegal activity. However, it is acknowledged that sport physicians do have conflicts of interest because they choose to work with athletes, and their priority is to enhance performance rather than to treat.<sup>20</sup>

The dilemma seems unlikely to diminish as pushing the limits of human sporting endeavour continues to be both lucrative and entertaining. There are certainly many who believe that enhancement of athletes should be an inevitable consequence whilst individuals, communities and nations continue to be obsessed with sport. As Murray sug-

gests, 'if we ban performance-enhancing drugs, but they are used anyway, then an athlete faces three terrible choices... to leave the sport entirely ... continue to compete knowing that they are at a disadvantage ...or...give in and use the drugs'<sup>21</sup>.

## Gene manipulation to enhance sporting ability

Gene doping is poised to become another concern in sports medicine. It has been determined that elite athletes may have some natural genetic advantage.<sup>22</sup> This finding is being used to market a test to see if children carry the 'sporting' gene and then selectively stream them into the appropriate activity.<sup>23</sup> Gene testing for sporting ability is controversial.<sup>24</sup> DNA testing is being considered by AFL clubs to determine the potential ability of players but has been criticised not particularly for its privacy implications but for its potential to discriminate.<sup>25</sup>

The next step along this path is genetic modification or gene transfer. At the moment this is restricted to models of human disease. The use of gene modification to enhance human traits is said to be an impending problem especially in the lucrative world of athletics.<sup>26</sup> Scientists have experimented with genes that produce insulin-growth factor 1 which helps muscles grow and repair themselves. This science could be used to create a competitive advantage. It would also be possible for athletes to receive the gene that produces EPO, rather than the hormone itself. However, the science of gene therapy and gene modification is in its infancy and long-term benefits unproven. Gene therapy is currently strictly regulated in countries such as the US, UK, Germany, France, Italy, Sweden, Japan, China and Australia.<sup>27</sup>

Along with uncertainty about the potential benefits or harms to future generations, societies and the environment that gene modification may bring, Miah suggests that a further concern is that it will 'lead to an investment of interests based solely upon genetic information, when genetics should be understood as only one element of what influences human achievements'<sup>28</sup>.

## Our sporting future

There is mounting evidence that lack of physical activity is detrimental to health. There is also ample evidence that any exercise by the individual or groups for fitness, fun or competition is beneficial for physical and mental health. The *Australian Sports Commission* is responsible for implementing the Australian Government's National Sports Policy which encourages and promotes participation in sport. However, Bull and colleagues report ... 'after promising strategic developments through Active Australia in the late 1990s, physical activity policy and the role of the federal health sector has become less clear, with physical activity policy existing now only as a com-

ponent part integrated into other chronic disease prevention policy initiatives<sup>29</sup>.

Whilst it is unlikely that sport will ever be free of the risk of injury it is possible to manage many risks not only for professional sportspeople but for everyone. Wherever there is competition with stakes high in terms of individual status and wealth, but also the opportunity to represent Australia, so will be the temptation to gain a competitive edge – legal or other-wise. Reaching consensus, legally and ethically, on what constitutes doping for unfair competitive advantage, as well as being consistent in the surveillance methods used across all sports, and in the prosecution of offenders is urgently needed. Bioethical issues in sports medicine are very topical, particularly in a nation which reveres competition, sport and its sporting heroes.

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Anne Moates



## Indigenous Health

*Indigenous health is everybody's responsibility. This is true from the national policy level, to state governments and clinics on the ground. Whichever way a particular health issue is approached, and new perspectives are certainly needed, the bottom line is that the determinants of health always reflect back to the living conditions, education, past injustices, and socioeconomic circumstances of the Aboriginal population.*

### Health status

In 2002, after adjusting for age differences between the populations, Indigenous Australians were twice as likely as non-Indigenous Australians to report their health as fair or poor. The conditions which account for most GP consultations, and are the main reasons for hospitalisation, are circulatory diseases, diabetes, respiratory diseases, musculoskeletal conditions, kidney disease, eye

and ear problems and mental and behavioural disorders.<sup>1</sup>

Indigenous Australians experience an earlier onset of most chronic diseases. For example, the prevalence of diabetes among Indigenous Australians is nearly 4 times the prevalence reported by non-Indigenous Australians; hospitalisation rates were 12 times higher for Indigenous Australians than for other Australians for care involving dialysis, and twice those for other Australians for both

respiratory diseases and injury.

## Life expectancy

Since the beginning of the 20th century, life expectancy has increased markedly for Australians overall, reflecting improvements in areas such as public health and medical interventions. However, at the turn of the 21st century, Indigenous Australians had, on average, the same life expectancies as the total Australian population in the early part of the 20th century. In 1998-2000, life expectancy for Indigenous Australians was shorter by 21 years for males and 20 years for females compared with the total population.

The significantly lower life expectancy of Indigenous Australians reflects their higher death rates at all ages. In the younger age groups (less than 30 years), and among those aged 65 years and over, death rates for Indigenous Australians were approximately four times that of the total population. However, between the ages of 30 and 64 years, commonly the most productive years, the death rates of Indigenous Australians were around seven times the rates for the total population in those age groups.<sup>2</sup>

## Causes of death

For deaths identified as Indigenous in 2000-2002, cardiovascular disease was the leading cause of death for Indigenous males and females with rates 3.2 and 2.8 times those of males and females of the total population.<sup>3</sup> The next most frequent causes of death were injuries—including transport accidents, intentional self-harm and assault (3.0 times that of the total population), cancers (1.3), diseases of the respiratory system (3.9), and endocrine, nutritional and metabolic disorders (mainly diabetes) (7.3).<sup>4</sup>

## Disabilities

In 2002, 36% of Indigenous people aged 15 years or over had a disability or long-term health condition and 8% had a profound or severe core activity limitation, meaning that they always or sometimes needed assistance with core activities of daily living—such as self-care, mobility and communication. Although these estimates are not strictly comparable with those for the non-Indigenous population, it is estimated that Indigenous people were at least twice as likely to have a profound or severe core activity limitation as non-Indigenous people.

## Compounding poor health

The relative socioeconomic disadvantage experienced by Indigenous Australians compared with non-Indigenous people places them at greater risk of exposure to behavioural and environmental health risks. In 2002, about half

(49%) of the Indigenous population aged 15 years or over smoked on a daily basis. One in six (15%) reported consuming alcohol at risky or high risk levels in the last 12 months and just over one-half (51%) had not participated in sport or physical recreation during this period. One-quarter (24%) of Indigenous people living in non-remote areas reported having used illicit substances in the 12 months prior to interview and 40% reported having tried at least one illicit drug in their lifetime. Furthermore, about eight in ten (82%) Indigenous people reported experiencing at least one life stressor in the last 12 months and nearly one-quarter (24%) reported being a victim of physical or threatened violence during this period.<sup>5</sup>

## Infrastructural improvements

Substantial progress has been made in the past decade in some aspects of Indigenous health, and there have been improvements in some indicators of Indigenous health status. As well, all Australian governments have made a commitment through the Council of Australian Governments to address the enormous disadvantages experienced by Indigenous people. However, unless these commitments are supported by the allocation of resources to at least the levels suggested by a comprehensive review, inequity will remain. Undertaken in 2000 by the Commonwealth Grants Commission (CGC), it concluded that 'the poorer health status of Indigenous people, and their greater reliance on the public health system, would justify at least a doubling of the average per capita expenditure on non-Indigenous people'.<sup>6</sup>

Furthermore, it is a well-established fact that if health-care services are not delivered appropriately, people won't use them. Both the Deeble (1998)<sup>7</sup> and Keys Young (1997)<sup>8</sup> Reports have demonstrated a significant under use of mainstream services by the Indigenous population. This is true not just for Medicare and the PBS, but also other services, such as the Commonwealth Hearing Services Program. This highlights the importance of a non-body-part approach to indigenous health-care funding. For Indigenous people, health is 'not just the physical well being of the individual, but the social, emotional and cultural well being of the whole community . . . a matter of determining all aspects of their life, including control over their physical environment, of dignity, of community self esteem and of justice. It is not merely a matter of the provision of doctors, hospitals, medicines or the absence of disease and incapacity'.<sup>9</sup>

## Health services access and use

Overall, estimated expenditure on health services provided to Indigenous Australians during 2001-02 was \$3,901 per person. This was 18% higher than the estimated expenditure on services delivered to non-Indigenous Australians. However, the ratio of per capita expenditure on Indigenous Australians to non-Indigenous

Australians varies considerably by type of service. While Indigenous Australians were more intense users of community health centres (ratio of 6.5:1) and patient services within the public hospital system (1.7:1), they were much less likely to use medical services (0.4:1) and pharmaceuticals (0.3:1).

Access to services is affected by a number of social welfare issues unique to the Indigenous population. Particular factors impacting on Indigenous health include the proximity of the service, availability of transport, affordability, availability of culturally appropriate services and the involvement of Indigenous people in the delivery of health services. For example, approximately one in five Indigenous people living in remote areas in 2002 had difficulty understanding and/or being understood by service providers and around one-half did not have a working telephone in the home.

The CGC conclusion about the inadequacy of spending on Indigenous health services was matched by similar conclusions about expenditure in health-related areas, such as education, training, employment, housing, and infrastructure. In view of the impact on health from these 'up-stream' factors, the achievement of major gains in Indigenous health will require a much greater commitment by governments in such areas. Without widespread changes, it is likely that Indigenous people will remain the least healthy Australian sub-population for many years into the future.

### **Administrative inefficiency**

Questions have also been raised regarding the efficiency of the current system. For example, of \$1.3 million allocated to a trial in the Far-East Kimberley region of Western Australia, only \$327,000 was actually spent on Indigenous people over two-and-a-half years. The rest of the money was spent on salaries, travel and other related administrative expenses of the Department of Transport and Regional Services, which administers the program.<sup>10</sup>

The delivery of health services is also one of the main areas of concern. The NT receives about \$115 million from the Federal Government for Indigenous health. Territory Indigenous leaders strongly believe that, following the demise of ATSIC, the Government should establish powerful regional authorities that would receive and distribute Commonwealth funds for disadvantaged Indigenous people. Both the Darwin-based Northern Land Council and the Alice Springs based Central Land Council have told Canberra that they believe it would be more efficient for federal funding not to be sent first to mainstream government departments and agencies. Independent advisors agree--Beadman, a former head of the NT Office of Aboriginal Development, has written a report stating the establishment of strong regional authorities would be a 'better co-ordinating mechanism for state and territory-

level funding and federal funding.'<sup>11</sup>

### **Disparity and increasing health funding**

The National Aboriginal Community Controlled Health Organisation (NACCHO) and the AMA have jointly launched a landmark economic model for future Indigenous Health Expenditure. The economic analysis known as 'Healing Hands - Aboriginal and Torres Strait Islander Health Workforce Requirements' calls for an injection of \$400 million annually.<sup>12</sup> NACCHO Chair, Tony McCartney said 'If Australia is to move forward as a nation, we must do something about the shocking state of Aboriginal health. Our joint initiative shows that there is a massive underspend in Aboriginal health. How can we tolerate a situation where the health of Australia's first peoples comes second last in the world on a table of life expectancies published this year?' He went on to say that Australia is staring a health and moral crisis in the face.<sup>13</sup>

### **Dispelling myths**

Misinformation regarding Indigenous health also abounds, both within healthcare and the community in general. For example, many health professionals still believe that the degree of overcrowding experienced by many Aboriginal communities is a cultural issue and not a resource issue. Not only is this incorrect, but this convenient view allows governments to ignore their responsibilities. It is incredible that Aboriginal people, who make up 2% of the Australian population, also make up 90% of those who live in severely overcrowded conditions, with more than 12 people in three-bedroom housing.<sup>14</sup>

Other local-level infrastructure responsibilities are avoided. Many local governments in remote areas receive 'disability' loadings, which factor in various service disabilities and the demographics of the Indigenous population in their funding formulae, but are not putting it to use for Indigenous people. In health, many national or State health strategies have failed to consider health determinants, failed to consult with Indigenous community representatives and offered mere information campaigns often wrongly labelled as 'health promotion', with no evaluation of the outcome. Federal legislation is often formulated through complacent policy advice that has the potential to significantly disadvantage Indigenous people.

Under the present system, Indigenous Australians are often portrayed as nothing more than a group of people who just don't know what is good for them.<sup>15</sup> Rather than utilise the above information for the redevelopment of healthcare financing models to benefit Indigenous health, Indigenous people are blamed for 'not understanding the system'. It is of vital importance that direction in health be guided by a partnership infused with the voice of Indigenous communities. It is time that partnerships in

health give that voice the credibility and importance it deserves. An influx of Indigenous health professionals is both warranted and overdue. What must also change is that, despite the majority of Indigenous people residing in urban centres, there is still a disproportionate epidemiological focus on rural and remote Aboriginal communities.<sup>16</sup>

## Conclusion

Indigenous people remain the least healthy sub-population in Australia, and there is evidence that the disparity between Indigenous and non-Indigenous health, at least measured by mortality, has widened in recent years.<sup>17</sup> The lack of real improvement in Indigenous health in Australia contrasts markedly with the situation among Indigenous people in New Zealand, Canada and the United States. The success achieved in those countries 'generates considerable confidence that effective action in Australia will produce substantial changes in Indigenous health'. It is important for mainstream service providers to recognise the significance of cultural differences, being sensitive to divergent needs and different perspectives. Differences can be broken down with patience and understanding--guides are now freely available on the internet which help explain such differences and dispel myths commonly held.<sup>18</sup> Furthermore, progress will require substantial changes in at least five areas: infrastructure (including physical environmental and socioeconomic aspects); Indigenous self-determination of health services; access to a network of community-controlled primary healthcare services; an adequate level of resources; and a skilled, understanding workforce. Above all, genuine cooperation between indigenous and non-indigenous Australians, both within healthcare and throughout the general population, is needed for health outcomes to significantly improve.

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