transformation and that's a very important thing. We are now seeing people of 50, 60, and 70, who should have been treated much more vigorously earlier on and they weren't. We know that now.

What is the course of the depression? 70 per cent of patients with a first episode of a depression will have a second depression. Almost all bi-polar disorders, those that have the ups and downs, are recurrent. There are longer intervals between the earlier episodes and there's a progressive shortening of intervals of remission with recurrent episodes.

How do we treat depression? This is a slide given to me years ago by an American psychiatrist - social manipulation. And I thought in a group of legal people I should use that word. We are social manipulators in many ways and it's not necessarily malignant. We have to find the treatment that is important. Psychotherapy, talking therapies, there are many different types, supportive, cognitive, inter-personal. There are 200 different schools of psychotherapy in the literature. They all think they've got something different but they haven't really. Behavioural treatments and biological treatments. And for people with the clinical depression that I'm talking about here tonight, they need medication.

So anti-depressants are important and so is expert personal counselling. There are people in our community who call themselves counsellors I wouldn't send a sick chook to. Combination of medicines and counselling. And in severe depression, ECT.

We have many different anti-depressant drugs. The new one, Metazapine or Remeron. Avanza has just been launched but we've been using it for some time. And of course we have ECT. That's the one treatment which causes more controversy than anything else. Psychiatrists are head shrinkers, they use ECT, and they do dreadful things to you. When I'm depressed and have my true unipolar or major depression, heaven forbid, I hope my clinicians will give me ECT.

However, if you look at the probabilities of recovery of depression under various conditions, there is a group up to 20 per cent that may get spontaneous recovery, some that respond to placebo, those are the neurotic depressions, anti-depressants up to 85 per cent and then through to ECT. There are problems with drugs and I'm not denying that and for the medicos amongst you, some of the problems are the cardio-toxicity. If any of you are prescribing tricyclic anti-depressants today, shame on you. You should not be prescribing a tricyclic today. I'm campaigning against them. Burrows, Voira, Sloman and others years ago showed that tricyclics were very toxic drugs. We have very effective drugs.

The prophylaxis of depression is important, of course, because suicide or para-suicide is always a risk in depression and if somebody says they're going to kill themself I always take it seriously. Drug overdose is the common way of doing it. There are also problems in prophylaxis because these drugs have problems such as sexual side effects. The SSRIs which are the common ones today, there are five of them here, Zoloft, Prozac et cetera, cause sexual side effects.

Now depression may lead to problems in the legal situation. We see people who are depressed who go shoplifting. Why do they go shoplifting when they're depressed? We see people who have drug-taking behaviour because they're depressed. We see people who have gambled because they're depressed. They may have been depressed before they went gambling; they become depressed after gambling too, some of them. Homicide is very infrequent, but there is a group of people who are depressed who kill others and the homicide/suicide connection is not uncommon to us psychiatrists.

Shoplifting. These people are depressed. You notice guilt was one of the symptoms. They feel they need punishment. They need to be found out. For example, the middle-aged female who shoplifts who is depressed, she takes things she doesn't need, she can afford and she takes them and she doesn't even know why she takes them.

Drug-taking behaviour, of course. The depressed, they take it to lift their mood. The commonest cause of people taking drugs, the younger group too, is that they're depressed. They take the marijuana, the heroin, and the other drugs because they're depressed and they take them because they give them highs. Of course that leads to violence, motor vehicle accidents and so on.

Gambling. If you're depressed and you gamble too much, and I've seen a few of these people from those who've gambled $35, and a pensioner can't afford that, to a gentleman who will be before the court soon who's gambled $10 million and a solicitor who gambled one and a half million dollars. Theft, embezzlement, financial and family breakdown; you've seen that on the TV recently.

Homicide. The person kills because they're depressed. They have disturbed perception. They have delusions. They have guilty feelings. It's a wicked world. "I've got to kill you to save you. I've got to kill others." They save the loved ones from a bad world. The homicide/suicide, the person who kills their loved one and then kills themself because they're saving this person, the bad, the wicked, the hopeless, helpless, no future, the illness of now and they can't be saved.

For those who really want to read about it, that's all of you, there's an excellent report "Understanding Depression" and, guess what, a Burrows happens to be there.

JUSTICE VINCENT. Professor Burrows has, in his inimitable fashion, presented us with an image of the prevalence of depressive illness in this community and the manner in which depression can impact upon the lives of those who are unfortunate enough to suffer from it.

I have spent many years in the law and something like 40 years in the area of the criminal law. That experience has given me a powerful impression of the significance of depression in affecting the lives of a huge number of people with whom I've come into contact in that system. I have worked with them as a barrister, as a chair of the Parole Board and as a trial judge.

The sense of hopelessness possibly accompanied by related feelings of anger frequently provides the background for anti-social and self-destructive activities. Commonly, when the history of the offender is explored, a picture emerges of childhood abuse and neglect, followed by some type of acting out behaviour. There is early alcohol and drug abuse, early state intervention, possibly in the form of incarceration and, finally, an acceptance by the individual of the inevitability of failure attended by the consequences of that acceptance.

In the law we tend not to use the word "depression." What we speak about is lack of self-esteem. But frequently that is a term which is being employed in place of and masking a very substantial level of depression, a form of clinical depression or some serious effective mood disorder that is influencing the individual in every aspect of his or her life. Self-medication by the use of illegal drugs or the abuse of prescription drugs is, of course, well recognised.

While these patterns have long been identified, I think it would be fair to say that their significance in the area of the criminal law with which I've been involved for the major part of my adult life, has received minimal attention. We do not talk about these conditions in terms of mental states. We use a whole variety of other expressions sometimes because of the problems with which we're confronted once we acknowledge their origin.

There are a number of reasons why I suggest that we do not deal with these issues appropriately. First, in only a very small percentage of the cases with which I have been concerned over the years was there any demonstrable history upon which a diagnosis of depression could be made. The issues would arise in an adversarial system in the context of a particular type of possibly reprehensible behaviour and in a framework in which a full exploration of the individual's backgrounds or problems would often have been perceived - and correctly perceived - as having adverse consequences to the person concerned. So much material is not, by reason of the proceeding and the character of the activity in which we're engaged, brought into the open.

Frequently, and it is disturbing to see it, you can look at a criminal history and you can read the social development, you can read the state of mind of the person from it without anything else. You can see the transition from the scared kid who is acting out in a particular way into a very nasty young teenager who is rebelling and hurting himself and others around him and then you can see the hardening which develops as a consequence of the responses of the very system itself, until eventually - and this has been my experience on a large number of occasions - the individual with whom you are confronted is very badly damaged indeed and probably almost completely resistant to any kind of intervention or treatment.

It is difficult to know what to do from the legal perspective in that circumstance. You may well understand the origin of the problem. You may well perceive the development of a depressive illness or the development of what we tend to call "this lack of self esteem", but ultimately what you are confronted with is an individual who engages in very anti-social behaviour of a kind which has a potential to hurt others in the community and you may ultimately be left - as we are sometimes left - with nothing other than the power of the state to attempt to control that situation by incarceration.

The courts acknowledging this kind of framework and these kinds of issues are on many occasions suspicious of these kinds of diagnoses. Sometimes for good reasons. They are regularly made *ex post facto*. The material upon which they're based cannot be tested and they are often perceived as devices for the avoidance of responsibility rather than being explanations of conduct in which individuals have engaged. Even the very diagnosis of the presence of a depressive illness can be problematic in a great many cases. There is more than one definition, of course. The term is used as loosely by medical practitioners as it is by lawyers and the community generally. It encompasses everything from sadness to very severe states of being. When one has to look at the extent to which regard is to be had to it in a criminal law context, you can appreciate that it is difficult indeed.

Given that you are dealing with a situation in which it can be said that an individual acted in a particular fashion and that person was at that stage suffering from some level of depression, the question then arises as to the relationship between that depressive state and the behaviour in which the individual engaged and that can pose extremely difficult issues from the perspective of the law. What impact has that state of depression had upon the individual concerned and to what extent can it be seen to have contributed to his or her engagement in the behaviour with which the court is concerned.

Generally speaking, the law attributes responsibility for involvement in serious crime on the foundation of "knowledge" and "intention." Take, for example, the crime of murder. This offence is committed when a person of "sound mind" causes the death of another through the performance of a conscious, voluntary and deliberate act, which act is carried out with the specific intention of either killing the victim or of causing really serious physical injury to the victim. An individual suffering from a quite significant level of depression would nevertheless almost certainly be able to carry out the deliberate and intentional act of killing another. It is not a situation normally in which one would anticipate that it could be said in argument that the individual did not act at all in a conscious and deliberate sense, as we understand it.

The person may also - although this is perhaps more debatable - be able to reason about the moral wrongness of the act as perceived by the general community. In other words, this would render any approach by way of a defence of mental impairment not appropriate in most cases, I would suspect, of depressive illness. As I understand the situation with respect to the effect of such an illness, it is not that one does not perform the act consciously or that one does not understand the significance and meaning of that act, in the sense that I have described, but the relationship between the performance of that act, and the external world and the circumstances perceived by that individual, are distorted in a very serious way.

In Victoria a person charged with murder in the situation that I have described would encounter great difficulty in presenting a defence or an argument in mitigation based upon an accepted state of clinical depression. I used "an argument in mitigation" because I was adverting to the notion of provocation which we have in our law.

It might be possible - and I don't know that this would be sound in terms of the medical understanding - to conceive an extreme situation in which a person was so depressed that he or she could be argued to be in some kind of dissociative state and therefore there be no conscious voluntary act in the legal sense. This would give rise to a question of possible mental impairment impacting upon the legal responsibility of the person. But I suspect such occasions would be very rare indeed and I would also suspect that there would be very considerable resistance to the acceptance of that position in a legal context.

If a person was, however, able by reference to the presence of a state of clinical depression to avail himself or herself of the defence of mental impairment under our law then, as many of those who are present tonight would be well aware, the consequences would be uncertain and may, indeed, be quite horrific as far as the individual is concerned and have very little to do with the actual mental state of the individual at the time of the trial or, indeed, the management of that mental state subsequently.

Supposing, however - and I now refer to this aspect of provocation - the person was suffering from clinical depression and he or she reacted to a perceived provocative act committed by another. There is doubt, in my mind as to the extent to which this could be taken into account in our law at this stage. I note that the House of Lords quite recently decided that it was a factor to which regard could be had in consideration of the question of provocation.

In Victoria this would operate in a curious fashion. Our High Court has said that the test to be applied in a case of provocation is that of the possible reaction of an "ordinary" person. Now perhaps for those who have no understanding of all this exotica of the law, I need to provide a general, albeit loose description of the fashion in which the law operates. The legal system accepts that an ordinary person can under certain kinds of pressures commit the extraordinary act of killing another; that there can be provocative behaviour of a kind which might cause an ordinary person to lose self-control to the extent that a killing can occur.

Now the test we apply, as I have said, is that of an "ordinary" person and let me tell you, that as a test it is a nightmare. One of the aspects that has been debated for years is who on earth is an "ordinary" person for this purpose? And we have had a lot of different ways of looking at, until at one stage it was decided that the ordinary person might be, for example, the "ordinary" person with all the characteristics of the individual concerned. It was decided that as an objective standard for the operation of our law this really presented a problem. So the High Court eventually said that the "ordinary" person for this purpose had to be a person of ordinary firmness of mind.

Now we've got our individual who has got clinical depression. The one thing we can say with a reasonable degree of confidence about that person is that he or she probably does not have ordinary firmness of mind. Nevertheless the individual in our example has responded to the provocative behaviour of another, so in our wisdom, in order to accommodate that person's position, we would now have to argue that "Ah, but you see, we're talking about a person of ordinary firmness of mind who also suffers from clinical depression." We have, through this process, created a circular situation.

In some jurisdictions in this country it is possible to have regard to the presence of depressive illness in the context of diminished responsibility. We do not have that notion in the law in Victoria. It is the position in New South Wales and permits some flexibility to operate which accommodates a little more satisfactorily the variety of conditions which are not encompassed by McNaghten Rules and which really do need to be addressed in any sensible structure.

At the sentencing level the position is a little simpler. A judge or magistrate can have regard to the presence of a depressive state for a number of purposes. It can, of course, impact on the level of personal culpability or responsibility attributed to the individual. It has relevance to whether or not the application of a principle of general deterrence would be regarded as just in the circumstances and the extent to which other sentencing principles can operate. However, you must remember that judges and magistrates, as a practical proposition, have only a limited level of discretion when sentencing, despite what you may have been led to believe by the media and the talkback commentators. We have only a limited range of options available and must have regard to many factors of which the personal culpability of an individual is only one. Regrettably, there are occasions on which it is necessary to impose deterrent sentences or retributive sentences on people who are seriously disturbed in this way.

Even if it established that there has been some depressive illness present that has contributed to the conduct that has brought the individual before the court, it should not necessarily follow that the matter will be appropriately addressed at that point. Regularly there will have been a long history of criminal activity which will limit significantly the options that are available to the sentencer. I've already adverted to the problem presented to a sentencer in the case of someone who is badly damaged, whose underlying social and mental problems may never have been appropriately addressed and who has reached the point where almost no real prospect seems to exist for any change in the situation.

If a non-custodial option is being considered, difficulty will be encountered in securing the appropriate services to address these sorts of problems. They are just not present in our community in sufficient numbers and particularly in the regional areas. Within the prison system the services are also extremely limited although I will say, in fairness, that over the last decade or so a considerable effort has been made to improve that situation.

From the legal perspective, the emergence of depression as a modern plague is likely to have an increasing effect upon our community. Our reasoning with respect to criminal responsibility and our responses to anti-social behaviours that have already been exposed as relatively primitive in a number of respects will almost certainly need to adapt. We ought to be looking at a wider range of options and a far more basic analysis of the origins of the criminal behaviour with which we are concerned. Sometimes I think our approach to these matters is similar to that of the individual who believes that he can bridge a language barrier by shouting even more loudly at the person who doesn't understand him. I am concerned that we are approaching the problem from that perspective but are placing greater reliance on stricter law enforcement; the application of greater levels of force.

Before I finish I would like to mention something that I was looking at today in this context. Recent figures provided by the Bureau of Justice in the United States are alarming and represent the same kind of path along which we are proceeding. 25 per cent of the individuals in the prison system in the United States are self-reported as having received treatment for some emotional or mental illness. One in three report that they have had difficulties of that kind. I suspect that if one explored the histories of inmates in greater depth it would be found that the percentage of people who actually suffered from some form of disorder would be considerably higher.

I noted also that there are over 2 million people in custody in the United States at the present time, that 9 percent of black adult males were presently in custody, that 28.5 per cent of black males could, on the current sentencing practices, be expected to undergo a prison sentence at least once in their lifetime and that one in every 32 people in the United States is currently subject to some form of corrections order; a probation, parole, prison or gaol sentence.

I don't want to see us proceeding down that path. It would be far better to consider far more carefully the relationships between social disadvantage, mental illness generally and criminal responsibility. Our primary objective ought to be to reduce the incidence of anti-social behaviour and to reduce the level of pain and distress in the community that anti-social behaviour causes and can be seen to be manifested in a variety of ways.

QUESTION: In view of this problem of sentencing someone of sound mind but who is depressed, how does that equate with you psychiatrically, Graham?

PROFESSOR BURROWS. This is really a Pandora's box or a bag of worms. In 1967/68 I was in Ararat and I used to oscillate between the Ararat Prison and the Ararat Mental Hospital and what His Honour said is quite true. I could have gone over there and taken a third of the people out of the prison and put them in the mental hospital and vice versa. And that's part of the dilemma really.

I feel sympathy for the legal system because what I'd be saying about depression that would give me a defence would be that those who we would consider had severe depression where they had delusions, hallucinations and they believed things which are false, they were truly of unsound mind. I would be very concerned. I haven't actually been to court on the defence of depression. Never.

JUSTICE VINCENT. It almost never happens.

PROFESSOR BURROWS. I've been to the court on many times in the defence of other things, such as social disorders and so on, but never on depression. I thought of the number of people that I've seen that are severely depressed who have committed a crime; it's really not large. You do see them in the Magistrates' Court with shoplifting and gambling and those sorts of things but not in the Supreme Court. I was being provocative about post-traumatic stress disorder; it's over-diagnosed. It's actually getting ridiculous. You get post-traumatic stress disorder because the boss fired you, or you get post-traumatic stress disorder because you almost got run over as you crossed the road. The famous case of post-traumatic stress disorder is the one where somebody had, in clowning, put an artificial penis on her desk and after that she was a real wreck.

I think His Honour is quite correct. I didn't find myself disagreeing with anything he said in this sort of regard. I think he's right in the end when he said we have to look much more at the humanistic aspects and not the punitive aspects, when we're sentencing. I worry about those American figures also.

QUESTION: DR NAVE. Rob Nave, eye specialist. I'm quite concerned about the apparent difference in the definition of depression between the medical profession and the legal profession. Professor Burrows presented a whole series of signs and symptoms of depression whereas the legal profession take it as a loss of self-esteem. Now a lot of people who commit crimes have got low self-esteem and so they should have, but it just seemed to me that there's fundamentally an enormous difference there between these two.

JUSTICE VINCENT. The legal system does not have definitions for these notions at all. That's one of the features that separates us by a very long way. I was not suggesting that we were equate clinical depression with "lack of self-esteem." What I was saying, was that it was pitifully obvious to me in a large number of cases that people who have simply been referred to as lacking self-esteem were deeply depressed and had been so for a very long time. Their condition would never have been recognised as a state of depression by the legal system at all.

PROFESSOR BURROWS. I think I pointed that out with my 22 different classificatory systems. Having said that, I will tell you that the majority of psychiatrists can spend 99 per cent of their time arguing about one per cent of problems and they can agree about the others. So that if we take the area of depression we do have two major classificatory systems, the ICV10 and the DSM4 and one from Europe and one from America and we actually do agree most of the time and we would certainly agree on what was called moderate or severe depression. We might argue about the mild or the borderline-type areas.

Now what His Honour sees commonly, of course, is not depression; he sees major personality disorders most of the time and that's quite different. That's not to say that a person with a personality disorder can't suffer from a depressive disorder but it's not really the depressive disorder which created most of the problems. However, I do think the legal profession is going to have to learn a little bit more in that area, just as we have to learn a bit more about the legal profession.

QUESTION: Is there a pattern to spontaneous recovery or is every case peculiar to itself? You said that after three depressive episodes a person should be under treatment for life but at what point do you accept that maybe the treatment was a failure? Have you ever satisfied yourself that there was actual evidence that supported a recovery without medical intervention?

PROFESSOR BURROWS. You've opened the Pandora's box. And, in brief, I'm not talking about the mild depressions, the Mondayitises, the people who get depressed because they've been rejected by a lover or their job or their mother and so forth. I'm talking about "clinical depression" quite deliberately. I was being provocative because you won't find a classificatory system which says there's a thing called "clinical depression" but we clinicians know what it is because we see it all the time.

Having said that, when I'm talking about the need for ongoing treatment after one or two or three episodes, I'm talking about moderately severe depression, I'm not talking about the psychological depressions, I'm talking about the so-called biological depressions. Most clinicians know the difference between what is mild neurotic depression in a reactive situation to loss of some perceived kind and a true major illness. And that's the problem because we're really saying, "How long is a piece of string?

QUESTION: You talked about anti-depressants and everyone has heard about Prozac in the media. But what about the community responsibility towards treatment of depression? Isn't it all about trying to give someone a purpose in life and to feel supported and valued in the community. I think that's what we should all be looking at doing rather than just examining the quite narrow medical and legal elements of the whole problem.

PROFESSOR BURROWS. I couldn't agree with you more. In 1994 we relaunched the National Depression Awareness Campaign because we wanted the community to take notice. We went into 300 schools, we ran prevention programs and it would be fair to say that in the field of psychiatry and psychological medicine we haven't done enough in the area of early detection, early prevention and health promotion. But that's what the Mental Health Foundation and other groups we're involved in are about.

Yes, I think depression is a community problem and as I pointed out when we looked at our young people who suicide, 50 per cent of them had never been near a doctor and if we'd actually been able to educate their families, their community. What started me on this was a young boy who went to one of our better schools. For two months before his

VCE results came out he was becoming more and more withdrawn, he wasn't sleeping so well, he was losing his appetite, he was withdrawing completely, he wasn't communicating and all his parents could think was that he was in adolescent turmoil. The morning before his results came out he killed himself. The day his results arrived he passed with flying colours. And what was true about this young lad - and I've done autopsies on all sorts of people - is that he had a depressive disorder as recognised by clinicians which could have responded to treatment.

And when I talked about the medications, I was talking about the severe group down the other end. Down the mild end, if the patient believes it and you believe it, it probably works, whether it's colour therapy, flat earth therapy, or touchy-feely therapy, whatever it is. But we clinicians and scientists would like to discuss and look at the major end.

QUESTION: MR MOLONEY. Your Honour, Stephen Moloney, barrister. Your Honour adverted to the sentencing principle of deterrence. I was wondering whether if there's a point with an accused where they're short of a finding of insanity but they're suffering from a serious mental illness, then the extent and the serious nature of that mental illness is able to cancel out some imposition of deterrence in the sentence?

JUSTICE VINCENT. Yes, of course. We attribute responsibility on the basis of knowledge and intention. Underneath our terminology there is a foundation of morality. An individual is considered to be responsible for controlled behaviour, in the sense that he or she has chosen to act in a particular way, or has whilst possessing an actual or constructive awareness of the potential significance of being engaged in conduct that is regarded as socially damaging and deserving of punishment. This underlies much of our law. As I indicated earlier, this notion is challenged once questions are asked about these concepts of knowledge, intention, and the moral culpability that underpins the system. We have a lot of difficulty at that level in the legal system. It is reflected in an area like the one under discussion.

How can one sensibly attribute moral culpability in the same way to an individual who is in a deeply depressed state at the time a particular action is undertaken as one might to an individual who is not so depressed? We have developed a system which has given a superficial clarity to these terms but that system has been under increasing stress as other disciplines have developed. Other methods of analysis of the very same behaviour are becoming available using different kinds of modelling processes and using different techniques for information gathering of the kind to which Professor Burrows has adverted.

From the practical viewpoint of a sentencing judge, I would obviously not regard someone who was suffering from a level of depression as being in precisely the same situation as someone who was not, for a number of reasons. Clearly it would not be appropriate to use an individual as an example to deter others when that individual has acted whilst suffering from some kind of impaired function as a consequence of a disorder of that kind.

We grapple with these difficult problems all the time. They are inherent in the exercise of sentencing discretion

QUESTION: Graham, last year I was examining in great detail a small number of very tragic suicides that occurred on tricyclics and I compliment you for bringing up, not only for the medical but the legal people present, just how dangerous in over-dosage tricyclics are. When I went through what had actually happened, part of the problem was that they had gone back and refilled the repeat prescriptions the very next day and it amazed me that they could do that in a country town where there's only one pharmacy and it must have been realised that it had been filled the day before. I'm just wondering what can be done to prevent that sort of situation?

PROFESSOR BURROWS. Yes, good question. I wish I had a simple answer and I know you know there isn't one. You can get a printout of every drug that's ever been written by every doctor and for every patient and sometimes that's an interesting exercise to do. I think you highlighted the problem in that town because it was one pharmacist; he should have known. I think the answer to all this is education in the long run and we have to educate, as you've said, why prescribe a tricyclic when we have better drugs, but that's controversial. We have to educate the pharmacists, as we are trying to do. We have to educate the community. We have to educate the legal profession and I suppose that is what this meeting is all about in some ways. That would be my standard. I think progress throughout the world has always happened through education and the wider you can spread that education the better.

Medicine at the Extreme

by

Professor Jeffrey Rosenfeld

An address delivered at a meeting of the Medico-Legal Society
at the Melbourne Club held on 12 October 2001.
The Chairman of the meeting was Ms. Pauline Shiff.

I would like to start my lecture on "Medicine at the Extreme" by looking at the third world extreme. I will then move to the diametrically opposed extreme: first world neurosurgery which really takes us to the cutting edge of medical practice today. I will speak about what neurosurgery will be like in the third millennium and some of the problems that are being created for us as medical practitioners and presumably for you as lawyers.

The Australian Defence Force of which I've been a member since 1984 is able to transport a medical facility wrapped up in containers in a single Hercules aircraft anywhere in the world. A field hospital can be set up on the ground from these containers within a few hours to become a functioning operating theatre, reception facility, resuscitation element and ward. This is one of the attractions of working in the Australian Defence Force (ADF) as a medical practitioner. We are able to provide remote care to individuals be they military personnel or civilians. For example we set up a hospital on Bathurst Island in the Northern Territory. Portable anaesthetic apparatus can be placed in one of these facilities. The surgery was performed within a tent and the ward was also in a tent. This Aboriginal health support was in fact by someone in our audience tonight, Colonel David Kings. This endeavour was supported by the Northern Territory government to enable these aborigines to receive eye and ear surgery in their own remote home environment. They much prefer to have this surgery done on Bathurst Island than travel to Darwin. They also prefer to be in open-air tents as wards than to be in the fixed buildings of the Darwin Hospital. They much prefer to be without the encumbrances of the first world in Darwin and much prefer to have their surgery in their own setting. Many patients had their sight saved and their deafness cured by Australian military surgeons.

There were also primary health activities which involved general practice, health surveys and correction of basic health problems. In this way, the ADF builds strong trusting relationships with the indigenous people of Australia. The Australian Defence Force also must operate in a very unfriendly environment. Following the genocide in Rwanda in 1994, there was total disruption, dislocation, disorder, anarchy and destruction of the society. This genocide was not on the same scale as occurred in Nazi Germany but nonetheless was a horrific and evil event.

The Australian Defence Force deployed to Rwanda with 5,500 UN personnel and the Australian contingent provided the health support for the mission. There were about 300 Australian personnel deployed to Rwanda. 2 million people were displaced out of the country, half to a million people were murdered and a half to one and a half million remained in refugee camps in Rwanda and about 4 million remained where they originally had been residing. You can see a total dislocation of the population of this very small country, which is about the size of Tasmania Prior to the genocide, Rwanda was one of the best developed and most beautiful countries in Africa. It had one of the best developed education, legal and health systems of any country in Africa. So you may well ask the question, how could a country like that descend into such levels of depravity? Just as you could ask the same question of Germany during the Second World War - how could it happen and how can we prevent it happening again?

What were the conditions on arrival? When the Australians first arrived in Kigali, the capital of Rwanda, and set up their hospital in the Kigali General Hospital there was a major security problem. It was a very hostile environment against UN personnel and any foreigners. There was civil war with Tutsis killing Hutus and vice versa. Infectious disease was rife and epidemics were breaking out. This scenario sounds very familiar because it is like what is happening in Afghanistan right now.

There were no civil authorities; no justice system; no police; no civil service; corruption was rife. There was population flux, community crime and unexploded ordnance. There were mines within the ground that people were treading on and losing limbs and lives.

The hospital itself was filled with filth and litter. There were scattered corpses throughout the hospital building. Looting of hospital equipment had occurred. When I was there this equipment was appearing in the local market up for sale. There was physical damage to the hospital buildings resulting in a leaking roof which was a major problem with patients in the hospital. There was no power, no sewerage, no clean running water and no refrigeration. There were no medical supplies. There was a gross shortage of national doctors and nurses because they'd been murdered. They were from the educated class, the Tutsis, who were murdered by the Hutus. There was a gross over-demand for medical services and HIV and other infectious diseases were running at extraordinary levels. You are now able to see why only a military operation under the control of the United Nations can restore this sort of situation to some semblance of order and peace. There were 5,500 personnel in Rwanda from mainly African countries but also Canada, Australia and England and to a small extent, the United States.

The nature of peacekeeping itself is of interest to us all. It involves protection of innocent victims, prevention of further conflict, reaching consensus with the warring parties, being impartial, using minimal force to achieve the peaceful objectives, adhering to strict rules of engagement which vary according to the operation and liaising with local authorities to try and restore peace and order.

The military task in this situation is to protect the relief operation. Trucks going into Afghanistan now are not protected and we read recently where the drivers of those trucks have been attacked by Afghanis to steal their cargo or extort money. This is one of the prime tasks of the military operation, to protect the relief getting through, protect human rights, control movement and provide general assistance to the UN missions. The military mission in Rwanda was to provide security and to assist and coordinate the humanitarian support of participating countries, organisations to facilitate a rapid and effective end to the crisis in Rwanda. The execution of the mission in Rwanda was to concentrate the force operations on creating secure conditions to facilitate the delivery of humanitarian assistance and the return refugees and displaced persons to their homes.

The Australians set up the hospital in the pre-existing Kigali General Hospital. The operating theatre had Australian equipment and we were able to do many types of surgery that could be done in Australia. The intensive care unit (ICU) could offer most of the treatments that ICU could do in Australia but with very limited resources. The main ward in the hospital was a typical developing world scene: beds very crowded, often two patients to a bed, one facing one way and the other in the reverse direction, often the relatives sleeping near the bed. No food was provided by the hospital. Relatives had to fend for themselves to bring the food to their loved ones in the hospital and many of these patients in the medical wards were dying of HIV. A horrendous situation, I'm sure you will agree, but not unusual throughout the developing world, particularly in Africa, and not even in the war-torn situation Rwanda was in. One finds that sort of ward situation in many developing world countries.

The challenges we faced as medical practitioners in Rwanda were a broad range of conditions including paediatrics and obstetrics. Medical personnel in the Australian Defence Force are not necessarily used to dealing with young children or women in labour which may be complicated. The general surgeons have to cope with a situation where one might have to do an emergency Caesarean section, as I've done several times, or operate on a young child with an acute problem that may be life-saving. The surgery required ranges from basic surgery to advanced surgery. There is pressure on the ADF to provide this surgery to the local people who may not otherwise be treated. This often prevents deformity, pain, suffering or death. The equipment in this situation is inadequate when you compare it to the advanced equipment we have in Australia and must adapt to limited resources being able to use essential items.

Re-supply becomes an issue in this situation and in this case we were being supplied by the United Nations which can be a very inefficient organization, and supplies don't necessarily get through to where they're supposed to get through in a timely fashion.

There is a lack of investigative facilities. There is a personal risk of contracting infectious disease. There may be a mass casualty potential. One may be forced in this situation to reject some of those patients for treatment because the resources are not available to treat them or because their chance of survival is so remote that you have to concentrate your resources on those who do have a reasonable chance of survival. This concept of negative triage is foreign to our first world practice. Family separation is also an issue. It's a very strange environment. There are peculiar medical politics. There is the personal threat of mine injury and assaults on the street. All Australian personnel in these environments may be armed for personal protection. The absence from one's medical practice obviously creates problems.

I would like to discuss landmines because it's become one of my crusades to help solve the landmine problem. Obviously, it is going to take many, many decades to reduce landmine numbers significantly but it is something that can be done and we should all be working towards that goal. Landmines are a scourge and create enormous damage to people's lower limbs, but also arms and hands. Landmines are causing tremendous damage to innocent victims, in many cases children and women. Breadwinners in these developing countries are desperately needed in their families to do the work on the farms to create an income for the family. If the breadwinner is lost, what happens to the family? If children are killed or maimed the future earning capacity of the family is destroyed. Not only that, but the psyche of these poor victims is ruined for life just by having these sort of horrific injuries. I think you can see this by the visage of this young child, the look of total devastation on his face. A child should be smiling at his age but this poor child has lost both his legs and is totally ruined for life. All of this is quite preventable.

There is a wonderful organisation called "Handicap International" which is based in France and helps the victims of war. I came across them in Rwanda. They set up a limb-making factory in a developing country using local materials, local manpower to create prosthetic limbs for these unfortunate landmine amputees so that they can at least walk around. These prostheses are not attractive limbs but they are effective. Landmine education is of vital importance and often large posters are displayed to try and teach the local population what to do to avoid being injured or killed by landmines. Land mine clearance is possible. The estimate of a total of 130 million mines to clear at a cost of $33 billion is probably an over-estimate. It costs between $US3 and $US30 to manufacture a mine and between $200 and $1,000 to clear it. It requires about 80 days for a prodder to clear one hectare of mine-sewn land.

The International Campaign to Ban Landmines of which I am a proud member is involved in mine clearance, assistance for victims, monitoring the implementation of the Ottawa Treaty, which I will shortly describe, and works with non-state actors such as guerrillas who are often the predators and the culprits involved in laying landmines. The ICBL also lobbies for the universalisation of the treaty. The Ottawa Treaty was developed by the ICBL in conjunction with the UN and the fortieth country to ratify the treaty was Burkina Faso in 1998. The convention then entered into international law in March 1999. Australia signed the treaty in December 1998. Interestingly, USA, China and Russia still have not signed the treaty. Adherence to the Ottawa Treaty means no use, no production, no stockpiling, the destruction of any landmines that the country possesses and no transfer of landmines or assistance with other nations who do not comply. Unfortunately, the worst offenders are the countries who are not signing the treaty, both in terms of production of landmines and in terms of the countries that are faced with the landmine disaster on their own doorstep.

We can increase cooperation with the Ottawa Treaty gently by dialogue, education, declarations, unilateral agreements, particularly with rebels and the non-state actors and identifying the mine-free zones and building peace in the longer term. The Australian Government has done a great deal in this area and the Minister for Foreign Affairs Mr. Alexander Downer should be congratulated for his efforts in this regard. It has been a priority of Australian foreign policy to build a solution to this problem. There has been an appointment of an Australian special representative on de-mining. The Australian Defence Force is actively providing specialist personnel to international mine clearance efforts, as are many other non-government aid organisations. Australia will allocate $100 million for de-mining and related problems by 2005 and is participating in the conference on disarmament.

There is a wide range of medical problems on a peacekeeping operation. The main problems are trauma and infection, for example, fractures, stab wounds and osteomyelitis. Tetanus occurs because there is no immunisation. Tetanus is a fatal disease in most cases. Parasitic infestations are also common. Unusual problems such as chronic infection developing in a child's eye following a traumatic perforation required the removal of the eye. Complicated obstetrics is also common and challenging. One also encounters horrific examples of what war does to children. In Rwanda there was a girl who had been burnt severely in an explosion and has a grotesque fixed deformity of the neck and would go through life with that deformity unless something was done to correct it. I was able to excise the scars and perform a split skin graft to the area and bring her neck back to a more normal position.

The Australian Defence Force has also been involved in Bougainville. About 100,000 people were murdered during this civil war, and the multi-national Peace Monitoring Group - was formed to restore and maintain peace. The copper mine close to Arawak, the capital of Bougainville was shut down by the civil war. A tent city of Australian, New Zealand, Vanuatuan and Fijian personnel providing logistic and health support to the people of Bougainville was set up in the aluminium storage facility. The PMG is shortly to wind down as peace treaties have recently been signed between the PNG government and the Bougainville people.

Timor is a tropical third world country with many small villages. East Timor was one of the poorest provinces of Indonesia. There was a disastrous civil war, conflagration, destruction, rape, pillage, murder and destruction of a society. The buildings of East Timor were burnt to a cinder. The infrastructure was destroyed and many people were murdered. INTERFET was the peacekeeping operation set up by the United Nations initially, with the permission of Indonesia. Twenty nations including Australia deployed to East Timor to restore the peace. Australia, New Zealand and the other contributing nations commanded by General Peter Cosgrove deserve credit for the success of the mission.

The Australian Government has been previously embarrassed by relationships with Indonesia and East Timor. Indonesia has run a clandestine campaign in East Timor over many years to maintain a submissive population and suppress the movement for self-determination. However, since the referendum in East Timor, Australia has certainly done its part in restoring peace to this troubled nation. I had the great privilege of meeting Mr. Xanana Gusmau only a few days ago when he was in Melbourne at a United Nations function to receive a peace award which was very well deserved.

The Australian Defence Force continues to contribute to the peacekeeping operation in East Timor. The Forward Surgical Troop (FST) is a field hospital which has been set up in the old museum of Dili. Within tents and air-conditioned connexes, are medical and dental facilities from which health support is provided to the United Nations personnel. Humanitarian support is also provided to the local population using spare capacity. A major component of the work done in this operation and on previous peacekeeping operations is humanitarian support.

Inside the operating theatre you could imagine that you were back in Australia although it is somewhat cramped. The ward is set up in tents and the patients are kept beneath mosquito nets so that there is no cross-infection of malaria or dengue fever which are endemic mosquito borne diseases in East Timor. The Australian Defence Force is active in trying to prevent mosquito proliferation in stagnant water to reduce the risk of malaria and dengue fever. Dengue fever produces a rash very much like measles. It presents very much like glandular fever. It causes an intense tiredness and lethargy which may last many months. It can be a very debilitating serious condition which has no definitive treatment because it is caused by a virus. You have to just stop the mosquitos biting if you wish to prevent it.

The first night we arrived in Dili we were faced with the situation of a bus crash in which twenty Timorese victims were thrown out of the bus and injured. This is a mass casualty scenario that one must be prepared for in a military environment. One of the women had bleeding in the chest and abdomen. She would have died without the support of the FST. She made a good recovery and walked out of the hospital within a week.

I want to conclude this component of the talk by discussing developing world medicine in general because I am interested in delivering humanitarian support, or more specifically tertiary health services, to the developing world. It is assumed by many that the health needs of the developing world reside almost solely with prevention and primary health care of infectious diseases such as gastro-enteritis, pneumonia, measles, HIV and tuberculosis and trauma and other common problems in the third world. And very simple measures can be undertaken to try and reduce the incidence of these problems and to treat them using primary health care resources. However, what has been neglected over many years is money being spent on tertiary health services. The developing world has poor resources, deficient equipment, and a shortage of trained personnel and there is often poor morale in those who are working. There are Florence Nightingale-style wards at the Port Moresby General Hospital which are vastly improved over what the wards prior to this. The new wards were built using Japanese foreign aid to PNG. Japanese foreign aid has produced quite a nice building but still a very crowded environment and resources are in very short supply. The failure of the electricity or water supply is common and there is an epidemic of suburban crime in Port Moresby. Recently a priest was murdered in his home. Who would want to go to PNG and do any work there? It is still possible to work in this environment and to do a lot of good and that's what I try and do.

Vietnam is a developing country. It has about 80 million people. It has about 100 neurosurgeons. The Cho Ray Hospital in Ho Chi Minh City is the biggest public hospital in Vietnam. Within their operating theatre there is basic surgical and anaesthetic equipment. I'm sure Dr. Dick Sutcliffe, a consultant anaesthetist in the audience, would comment on this and say this equipment dates from the 1930s. The equipment in the intensive care unit is primitive compared with what we are using in Australia. The diathermy machine looked to me like one of the original machines from the 1920s but they are still using it. It still works but it's a far cry from what we would need to do modern surgery. But the Vietnamese struggle along with this apparatus and these lack of resources, as do many other peoples of the developing world.

This is one of the reasons why I wrote "Neurosurgery in the Tropics" with the former Professor of Surgery at the University of PNG, David Watters. We wrote this book for the generalist to assist the management of neurosurgical patients in the developing world. It is another fallacy in the developing world, that neurosurgical problems are esoteric, few in number, expensive to deal with, with poor outcomes and that we shouldn't be concerned with neurosurgery in the developing world, that it's in the "too hard" basket, and that there are too many other priorities of health needs in these countries. However, neurosurgery includes a lot of conditions that can be treated very simply with minimal resources by generalists, or by neurosurgeons. That is what we are showing on the front cover of the book. A brain abscess which is quite treatable and curable in a child, a man with tuberculosis of the spine who was becoming paraplegic, a man who broke his neck in an accident and a young child with hydrocephalus who has excess fluid in the brain. All very common problems in the developing world: infection, including tuberculosis, trauma and hydrocephalus. All are eminently treatable.

Now we move to the opposite extreme of medical practice. I think I am a very fortunate person to be able to work at these extremes of medicine. Most people in medicine are working somewhere in the middle. It is just the way I've developed in medicine, that I've been able to move towards each end of the extreme and have been able to function at those ends of the extreme. That's quite difficult to do, as you can imagine, from being a neurosurgeon doing delicate neurosurgery to doing much more general surgery in the developing world. I suppose I'm one of the old guard that's been trained in a very general sense and become very sub-specialised in what I do now, so I'm still able to bridge both worlds. But there are not many people left who can do that.

Where is neurosurgery taking us in the third millenium? Neurosurgery in the past has been really quite gross and has involved quite gross manoeuvres within the cranial cavity with retraction of the brain, exposing the deep structures. It was not necessarily destructive but quite invasive. Neurosurgeons have been practising that sort of neurosurgery even until the last decade. Neurosurgery now has become much more refined, precise and minimally invasive. One example is an eyebrow incision which enables us to enter the skull through a very small opening to achieve much the same aims as we achieve with a much larger exposure. We can do very delicate vascular neurosurgery, clipping aneurysms through these small windows. We create small corridors through the brain or under the brain to reach a selected target.

It's interesting that military technology and space technology have impacted on neurosurgical practice. Developments in imaging, electronics and computer technology from the space program have impacted on the imaging of the brain in the operating room. The jet fighter pilots use heads-up display with crosshatches in their goggles so that they can aim their laser-guided missiles. We have crosshatches in our microscope eyepieces that lead us to a target in the brain which is exactly the same target as we would be seeing in the patient's own brain images on the screen beside the patient undergoing the operation. This is frameless stereotaxy which allow us to do very precise, minimally invasive surgery on the head and the spine.

We can also place fine telescopes (or endoscopes) into the brain to examine the very deepest recesses of the brain through the ventricles which are the fluid-filled spaces within the brain. We are able to perform minimally invasive surgery through these endoscopes. There is a television camera attached to this scope and we can view the patient's brain remotely on the television monitor using this apparatus. We can see inside the ventricle, as we approach the foramen of Monro, which enables us to enter the third ventricle. We can then create a window through the floor of that ventricle to allow the escape of cerebrospinal fluid.

Another trend in neurosurgery is minimally invasive spine surgery where through very small openings quite sophisticated constructs of metal and screws and bone grafts can be placed in the spine. It can even be done using endoscopes. Aneurysms in the brain can be treated by passing snakelike coils of metal through the femoral artery in the groin and into the aneurysm. The head doesn't even have to be opened to treat these aneurysms.

The use of magnetic resonance imaging in the operating room is a new use of the technique. A small magnetic resonance scanner which is much smaller than the ones you would have seen can be placed in the operating room and lifted up beside the patient's head during the procedure to obtain images while the operation is underway. The reason this is done is to verify that the tumour has been removed.

I think in the future we will be seeing the use of prosthetic devices to restore damage in the nervous system such as vision. There will be electronic grids placed on the visual cortex of the brain which will connect with glasses so that light images in the glasses will be converted into electric impulses which will be then fed back into the brain so that the brain will see what the electronics is seeing. That can already be done with hearing and Professor Clarke in Melbourne has been at the forefront of the development of the bionic ear, but we're going to see the bionic vision coming in the next decade.

There are many challenges in neurosurgery. For instance, the head injury. A large blood clot pressing on the brain after a motor vehicle accident or in a second case, a very swollen brain with smaller haemorrhages renders both patients deeply unconscious. There is tremendous structural damage to the brain caused by a high-speed motor vehicle accident. This type of injury can lead to permanent disability such as personality change, chronic headaches, visual loss, memory problems, etc. We don't have a cure for these problems. We can ameliorate them to some degree but we don't yet have a cure for the primary brain injury where nerve cells have been torn asunder. There are still too many patients ending up with severe brain damage after severe head injury. We need to do something about that. One of the things that we are doing at the Alfred Hospital is to do more invasive monitoring of the brain which involves measuring oxygen directly in the brain or measuring brain temperature. This allows us to get a better appreciation of the deranged physiology within the brain to try and restore it to a greater degree of normality.

Parkinson's disease is another area that I have been interested in for many years. We place fine electrodes in the brain which stimulate deep structures in the brain to correct many of the features of Parkinson's disease. Parkinson's disease causes tremor, stiffness and rigidity. Balance is disturbed and there is poverty of movement as the disease progresses. Surgery can alleviate many of the ill effects of Parkinson's disease. The electrodes are implanted in the brain under local anaesthetic so that we can test the patient during the procedure to obtain the best result. The permanent electrode is connected to a battery-operated pacemaker which delivers a gentle continuous low current to the brain to relieve the tremor. The pacemaker is placed beneath the skin of the chest wall.

Neural transplantation has also been used to treat Parkinson's disease. Here is an example of the media going to extremes of misrepresentation and hyperbole about a very limited technique which is still highly experimental.

"A leading transplant surgeon has been given the brain of a monkey in an amazing 14 hour operation. British born professor, Callan McDonough underwent the pioneering surgery after his own brain was severely damaged in a car crash. Now the 33-year-old professor is well on the way to complete physical recovery but there are mental problems. He has not regained full power of speech and can only repeat single words like "banana."

There are of course many examples of responsible journalism as well. "Cures from the Womb" is a headline referring to the use of foetal cells to treat many different diseases in humans including Parkinson's disease but it does give us some glimpse of the future. But there are going to be major problems in harvesting foetal nerve cells, and President George W. Bush has been grappling with this issue. Australian medical ethicists, legal experts and politicians are also considering the issues surrounding the use of foetal tissue and stem cells.

Foetal neural transplantation has improved the outcome of some patients with Parkinson's disease, but there have been some recent reports of the procedure causing serious side effects. You may recall reading in the newspapers that there have been some patients who have had these transplants who have developed dyskenesia (abnormal movement) that they didn't have prior to the surgery. This has occurred because the transplants are producing high levels of dopamine which aggravates their movement disorder. There are also great problems in collecting the tissue.

We can also obtain foetal cells from stem cell populations which are derived from embryonic cells and which keep replicating. We could also obtain them from other animal species, like the pig. In the USA, pig brain tissue has been transplanted into human brain to correct Parkinson's disease. The results were not impressive. And before too long there will be ways of reducing the immune response to xenografts, which are grafts from other species. I predict that within a decade it will be possible to transplant porcine tissue without it being rejected.

We can also obtain these cloned cells from the individual themselves. For instance, in the mouse we can take the mouse egg from the ovary and fuse it to the cells from other parts of another mouse's body, a mature mouse, join it to the embryonic egg cell so that it becomes an embryonic stem cell, but it has the machinery in it to make the same cells as in the adult individual, the same genetic components. And now people are trying to do that with human cells. You may have read reports where bone marrow cells have been harvested and can be transmuted into other cell types. These are stem cells from the bone marrow of adult individuals that can be transformed into other cell types, e.g. nerve cells or blood cells. It is also possible to identify stem cells in the mature brain, a feat that was thought impossible until only a few years ago. Dr. Perry Bartlett, Head of Neurobiology, and his team at the Walter & Eliza Hall Institute of Medical Research have been able to identify these stem cells in the mouse brain. The adult mouse brain has these primitive stem cells within it. These cells could be cultured so their numbers multiply and you could theoretically transplant these cells back into the damaged brain of that individual. Scientists are trying to replicate this work in the adult human brain, although no one has been successful to this time. It would seem that the number of stem cells in the human brain are far fewer more delicate and more difficult to culture than they are from the mouse brain. What is the potential use of the stem cells? Neuro-degenerative diseases, stroke, motor neurone disease, spinal cord injury and even head injury. A lot of biological development still needs to take place but I think stem cells have a very bright future and not necessarily embryonic stem cells but stem cells derived from the adult individual.

Epilepsy surgery has come a long way even in the last decade. The magnetic resonance (MR) scan can detect subtle abnormalities of the cortical architecture. Abnormal groups of nerve cells called cortical dysplasia may cause intractable severe epilepsy. It is possible to identify this pathology using MR imaging and then do other tests to look at brain function, such as the SPECT scan, and to even implant electrodes in the brain to identify abnormal electrical impulses and the source of the epilepsy. We can stimulate the brain through these electrodes to map speech and motor areas of the brain in the awake patient. We actually did that in a 15-year-old boy at the Royal Children's Hospital only a year ago, probably one of the youngest patients to have this done.

We can remove dysplastic areas to treat focal epilepsy. We also can remove larger areas of brain, like the temporal lobe of the brain in the very common temporal lobe epilepsy. A recent randomised trial, published in the New England Journal of Medicine, showed this technique to be of significant benefit compared with medical therapy alone. This is a well-tried technique which has been around since the 1930s but it has been refined over the years. The most extreme example of brain resection for severe epilepsy is the hemispherectomy. I present the example of a child with intractable severe epilepsy, already paralysed down the opposite side of the body, where we can remove almost half the brain to stop the epilepsy, which indeed it does in most cases, and usually also improves the weakness.

I would like to say a few words about the operation that I've become particularly involved in. In fact I'm proud to say that our team at the Royal Children's Hospital has now done the largest number of these patients in the world and we are attracting patients from all over the world for this operation. The reason is because the parents of these children communicate on the Internet. There is a website for children with hypothalamic haematoma which is a condition of an abnormal arrangement of nerve cells in a lump deep within the brain in the hypothalamus which is an area that up until recently neurosurgeons have been reluctant to operate on because it's such a delicate area and it controls so many vital functions.

We decided that the only way to cure these seizures was to remove these lesions completely and we have achieved excellent results with a low rate of complications. These children may be having up to 100 seizures a day and their life is totally destroyed by that epilepsy. They have no chance of making a go of it in life. They may end up retarded, autistic and totally disabled. They often have behavioural disorders. They may have precocious puberty and they may get secondary generalised epilepsy. The so-called 'gelastic' seizures involve pathological laughter. It is halfway between a laugh and a cry, and is part of the seizure. The hypothalamic hamartomas. Vary in size from 0.5 to several centimetres in diameter. We can remove these lesions completely from above, coming down between the hemispheres of the brain through a narrow corridor of access to the hamartoma and remove it. There has been excellent control of the seizures in most cases. We have now done 23 of these cases. At the stage we had only done 17 patients, 14 of them were seizure free and the other five of them were more than 90 per cent seizure free and two of them had less than a 90 per cent reduction. There are very good results compared with what had been recorded previously what was often an untreatable condition. There have been other benefits of this surgery, particularly in terms of behavioural improvement. The children have been much more able to concentrate with much better speech output and social interaction. The post-op electro-encephalogram (EEG) has shown a marked reduction in epileptic activity in the brain.

Where do we go from here? Well, I think the human genome, genetic engineering and proteomics will be major components of medicine in the 21st Century. Proteomics involves the discovery and development of proteins from genes which might act as therapeutic agents rather than the standard drugs we use today. We will be using much more complex protein molecules to correct disorders and that will include brain disorders. Neurosurgery will probably be doing molecular surgery which will involve injecting genes and proteins into the brain to correct various disorders.

We will be using nanotechnology and miniature devices. We will be using robots. Robots are already being used to do remote general surgery, neurosurgery and cardiac surgery. You probably read in the newspaper recently where they were doing minimally invasive coronary artery grafts using robots. Of course the surgeon was directing the robot but the robot was able to do very precise movements in a very confined space. However, there are still conditions in neurosurgery that are untreatable. We don't have an effective treatment for this young woman with a very large vascular malformation in the brain which has a potential to rupture, causing severe haemorrhage and death. It cannot be removed because it is in such a delicate location.

This is a child with a brain stem tumour, a highly malignant tumour. We can treat it with chemotherapy and radiotherapy but that child's lifespan is measured in terms of six to twelve months. Can you imagine a young child of five developing progressive weakness of the face, difficulty swallowing, trouble walking, limping and the parents finding out that the poor child has an incurable brain tumour like this? Imagine what the parents and the child must face. A horrific situation for which we still have no answer.

I would like to finally reflect on some of the challenges that we as neurosurgeons and other medical practitioners will face in the future. I think many neurosurgeons are overworked. We need to spend more time with our families and look after ourselves as well as our patients. Neurosurgeons are becoming increasingly super-specialised which may reduce our general perspective. We face a high medico-legal threat. It is likely to increase. There are ways to reduce it, and that's the subject of probably another full address by someone. I understand that neurosurgeons in New South Wales are likely to be paying up to $200,000 for medico-legal insurance next year if the system keeps going in the direction that it's going in. A totally impossible figure for any neurosurgeon to comply with and remain in practice.

The administrative load of leaders and managers in the public hospital system is becoming excessive. Even for those in private practice, the administrative load, the form filling, the bureaucratic interaction is becoming burdensome. Patient expectations are becoming impossibly high. I have patients coming to me who already have a thick inventory of data from the Internet. They print it off, they will 'doctor-shop' until they find someone they think is suitable. Maybe that's a good thing but it creates a lot of stress for the doctors who provide the advice and deliver the care. We have to allow time for research and teaching. It's very important for us as medical practitioners to pass our knowledge on to those succeeding us.

There is a lot of competition for the health dollar and, unfortunately, neurosurgery being at the extreme end of practice, is probably also at the most expensive end of practice. Neurosurgery is arguably the most resource hungry specialty in terms of the equipment that it requires and the bed days used by the patients. It remains a challenge to adequately fund neurosurgery departments in this environment. How do we maintain first world medicine in an ever-diminishing health resource environment?

The essence of medical and legal practice will still involve the individual doctor to patient relationship or lawyer to client relationship, I'm sure you'll all agree with that. And that relationship principally involves compassion, caring, interest, concern, good communication but, above all else, love for one's fellow man.

QUESTION: DR ARCHER. Can I ask if there's anything on the horizon along the lines of the Parkinson's surgery with dopamine to treatment of depression with serotonin?

PROFESSOR ROSENFELD. I think that with Professor Burrows in the audience it's going to be difficult for me to answer that question with any authority. But let me say that it's interesting that the treatments for psychiatric disease are becoming much more biological as time goes on. There are functional, psychodynamic and family issues which weigh heavily into the causation of mental illness, but medical science is discovering new things about the biology, the neurophysiology and the biochemistry of the brain every day and I believe that the biochemistry of depression is becoming very well understood. It is interesting that there is a new neurosurgical treatment for depression although it's very controversial. There is a device called the vagal nerve stimulator, which is used to treat epilepsy, where a pacemaker is placed under the skin of the chest wall and a device is connected to the vagus nerve in the neck. An electric current goes up the vagus nerve into the brain and it somehow modulates and alters the neurotransmitters in the brain and in some cases relieves depression. Unfortunately, it hasn't been evaluated in a controlled trial and I'm not advocating it. I'm just informing you that neuroscientists are thinking about new ways of treating mental illness. Of course, it is highly controversial and it gets on to the psychosurgery topic, but I think psychosurgery is a field that probably will expand in the future. There will likely be biological therapies for mental illness which may involve neurosurgical procedures. It may not however be in the next five years. I hope that goes some way towards answering your question. It would be interesting to hear what Professor Burrows has to say about that as well.

QUESTION: PROFESSOR BURROWS. As a member of the Psychosurgery Review Board I am interested to expand on that a little. At the World Federation of Biological Psychiatrists meeting in Berlin just recently there was data produced on the stimulator that you talked about in the treatment of depressive disorders, so I think I would also say that it has a future.

QUESTION: MR FRANCIS. Kendall Francis. Why do the United States, Russia and China not fall into line in getting rid of landmines? It seems incredible.

PROFESSOR ROSENFELD. Because the military advise their governments not to sign and the reason is that they still feel that landmines are a legitimate weapon that they can use to deflect the enemy if they're used a 'legitimate' way, which means placing the landmine in very restricted zones which are marked. But, of course, we know that the countries which are using them don't do it that way; they use them in a totally indiscriminate way and drop them from aircraft and lay them anywhere. The Americans are, of course, frightened that if they stop landmine production that a country like Russia or China would still be using them, so it's a game of one-upmanship. If the Russians or Chinese have them, the Americans have to have them too. They all have to maintain their military might. The Australian military has been very sympathetic to the landmine issue and has actually destroyed their stockpile. They exploded them all. They still use the Claymore mine, which is not really a mine as such; it's an anti-tank weapon. It is not triggered by people walking on it. Australians have essentially got rid of landmines.

The Royal Flying Doctor Service

by

Mr. Michael Long

An address delivered at a meeting of the Medico-Legal Society
held at the Melbourne Club on 17 November 2001.
The Chairman of the meeting was Dr. John Marum.

The Flying Doctor Service is important for it's uniquely Australian and very successful and at times such as this, it's important to reflect on something that we've developed which involves generosity, compassion and sharing. The methodology of its development is of particular interest. I thought I d say something about my involvement through medicine and aviation because it's been personally enriching. It will also be good to share with you the visions for the future for this organisation, particularly with regard to remote medicine. I might point to some problems, but it's important to share them with a group like this, because no doubt there will be feedback and I'll be particularly happy to listen to this.

We're dealing with health in remote areas of Australia. What are "remote areas"? They're changing. But generally they are areas of the country where there are no fixed health facilities, hospitals, doctors, or nurses and many other things are also absent. The area we service is most of Australia except, curiously, the northern aspect of the Northern Territory which is serviced separately under another Government contract by the Northern Territory Aero-Medical Service, but we do work in with them. Western Australia covers about 40 per cent of Australia and is truly remote.

Soldiers in wartime do not perform at their peak unless they've got medical and nursing facilities. The same applies if you're trying to open up a country; you require these same services. This led Menzies to comment that the Flying Doctor Service was the greatest single contribution to the effective settlement of the far distant backcountry that we have witnessed in our time.

What do we do? How do we do it? Anyone requiring the Flying Doctor Service in an emergency situation can get it for nothing although occasionally third parties pay for it. We must consider this because you'll see later the horrific expense of this type of medicine. In emergencies the first contact is usually by telephone and less frequently by radio. The patient or the people caring for them can be in contact with a doctor or a nurse or medical people within two minutes. What is more, if an urgent flight sets out for these areas, it can leave within 45 minutes and be within most areas of Australia within two hours. It's extraordinary when you come to think of it. We have other cases that are less urgent and more elective cases and you can get there in a matter of hours.

It's the emergency cases that are dramatic and are potentially dangerous. You have to always ask is this flight really necessary? Does it have to leave at night? Do you have to land at a dark airstrip that you don't often go to in the middle of the night? These things must be taken into account. We have problems with kangaroos which are incredibly dangerous. Already in Western Australia we have had a number of incidents, not only will a kangaroo wipe out an engine, and that's half a million dollars, but there's a real threat to life because of this. Airstrips must be correctly monitored and you have to rely on the people who maintain them, hoping that they've been up and down the strip and that an anthill hasn't grown over the last day. We endeavour to rationalise emergency flights, particularly at night. It's good to leave at first light or arrive during light.

We run clinics which are an amazing way of servicing people, not only in the treatment of illness, but also for health promotion and prevention screening. There's also a rural women's programme that is becoming increasingly active and is funded separately by the government. It is interesting that with that programme, like the Flying Doctor Service, when flying doctors were brought in, the local GPs of various communities were quite hostile. We've found that the introduction of female GPs where there may already be a male or a female doctor, particularly a male, has induced some hostility. But it's amazing that after one or two visits these people change, they fall in right behind these visiting doctors. Many of them realise that for the first time they can get time off.

Immunisation, child health, dental, eye and ear problems are important aspects of our work in the outback. Telehealth began with the radio, but it has developed so that now the government has promised that people living in remote areas will be funded up to $5,000 in order, with the help of Telstra, to have an IBM set up with a satellite dish, satellite telephone modem, video and a camera. Just think of the potential of that; people living in remote areas are, from many points of view, going to be better off than the rest of us.

Inter-hospital transfer is becoming a greater problem. State governments thrust it on us as they withdraw health care from communities. In Western Australia it now amounts to nearly 80 per cent of our work and is funded from the State government not from the Commonwealth. There are these artificial lines and we have to drag the money out of the State government. We build up to a crisis and we threaten them, "We'll have to close bases" - "Don't do that", and "You can't do this", they say. With the last election in Western Australia we were given a couple of million dollars just to shut up, but we had to spend it before the end of the financial year. It's a game.

We are always keen to do repatriation but it's not well developed. It is very difficult to fit in with teaching hospitals so we can take people back, but we won't put on a flight specifically for repatriation. We usually don't fly to offshore places, but we do provide crew to go, particularly doctors and nurses.

Training is an important aspect of our work. Not only do we train our own staff in aero-medical work but nowadays we're asked by the Armed Forces to train them as well. Captains of ships at sea also attend our courses.

The medical students usually lumber along and pick up what they can, and it's been an extraordinary experience for me over many years. I have taken many students on some of these 50 or more trips where I've flown myself to the Kimberley. It's fun to go back to these remote areas and some soul will come up to me and I'll realise that it's someone I took years before as a medical student.

Medical chests are important and we provide about 3,000 of these throughout Australia funded by the Commonwealth Government. They do contain dangerous drugs and you'd think all sorts of people would be breaking into them. We don't have great problems with that, and by a numbering system you can direct people by telephone or whatever means of communication you have, to which drug to use. It is very effective and it is fascinating to watch the doctors and nurses talking to a patient, prescribing drugs. There's something very moving about it. I've been doing it for 30 years and each time I hear it or merely talk about it, I get quite excited by it. The tyranny of distance and the "Mantle of Safety" that John Flynn spoke about have been dispelled in large measure because of the set-up of the Flying Doctor Service.

The School of the Air began during the 1950s using our radio equipment and it's been a wonderful partnership. If you've been to remote Australia and you've listened to the School of the Air in operation, it is just incredible. Now they're moving in different directions. Much of the education is now going to come from major cities and there will be other ways of dealing with that.

We employ 493 people including 91 nurses, 46 doctors and 99 pilots. Some are part-time, we have 73 administrators and some are very important fundraising people.

We have 46 aircraft. Most of them are the Kingair type, a superb aeroplane, costly to buy, twin engine, pressurised and fast. If you were flying in one from Melbourne to Sydney it would do it in about one and a half hours. We also have the Pilatus single engine aeroplane that we're beginning to use now. Curiously, as a pilot I can tell you that the single engine aeroplane is much safer overall than a twin engine aircraft. Those of you who are aware of trying to fly a twin engine aeroplane when the chips are down, the weather's crook and it's dark, on one engine fully laden you realise your time's cut out. It's impossible in the normally aspirated twin; it is feasible in a turbine aircraft. Once you get below a critical speed the aircraft is quite uncontrollable. So the Pilatus which has a very similar performance to the Kingair is now becoming the aircraft for the near future. That was a very difficult decision for us to make, and one of these giant steps that has been made with much criticism from within the service, particularly from pilots. However, once you make the step it is incredible how everyone falls into line and becomes an enthusiast. The Pilatus is roughly the same size and if you look in the cockpit, it is as sophisticated as any airliner. It cruises at about 260 knots and it's got tons of space and the nice thing is that the pilot can get in through a separate door, which you can't in the Kingair. It has a huge door for loading behind.

We have very few of the Navajo Chieftain aircraft left. Over in Western Australia we had some Cessna Conquest aircraft, four of them. We had great trouble in selling these and then all of a sudden, a couple of weeks ago, someone turned up from South Africa and bought the lot and said they will take them back to South Africa. We received a few million dollars from that sale, helping offset the cost of some Pilatus aircraft we've just purchased. This slide shows a Kingair with a logo of CRA on the tail. We don't mind that, they help finance that aircraft. We cover vast distances, 15 million-odd kilometres in a year and about 44,000 kilometres each day.

We attended 190,000-odd patients. There are about 21 health clinics going on each day. We made nearly 24,000 aerial evacuations. 150-odd calls or contacts were made each day via Telehealth or some form of health communication.

Some will ask, "I'm a nurse" or "I'm a doctor" or "I'm a pilot, can I get a job with the RFDS?" I was just looking up the requirements for the jobs and the one thing I saw in each particular advertisement or statement was "excellent communication skills" and "empathy for the bush and its people." Certainly, if you go to the sharp end of the Flying Doctor Service, the thing that impresses you most about the people who count is the way they deal with people. No matter who they are, they're all made welcome and they're all treated well. Nurses need general nursing, midwifery and post-graduate experience in critical care, advanced life support and trauma. They need to know IV insertion, how to take ECGs and how to defibrillate people. They need to be able to do minor surgical procedures, drain abscesses and suture. The doctors, registrable in Australia, need to know resuscitation. They might have done one of our EMST courses so that they can deal with the emergency of trauma. They need to be experienced in anaesthesia. They should have an interest in Aboriginal and Torres Strait Islander health. The pilots need an Australian commercial pilot's licence, current instrument rating, multi-engine, 2,000 hours as pilot in command, 1,000 hours pilot in command of a multi-engine aircraft and turbo prop experience. It is difficult to find people who understand jet engines, but they're much easier to operate than a normally aspirated aircraft. Communication skills and empathy are essential.

Just what does all this cost? Think of the Royal Melbourne Hospital running at between $150-$200 million. RFDS is a small operation you would think; yet it's incredibly important. Of $70 million, we get $40 million from the Commonwealth. We find the Commonwealth much easier to deal with than the States from whom we get the other $20 million. But it's the $10 million that we get from donations each year which is amazing and this is how the Flying Doctor Service began, through the generosity of people. There's a question mark about capital replacement and that is because by and large the Government opts out of capital replacement where it can. In Western Australia, I mentioned, they suddenly gave us a couple of million and said, "But you must spend it and buy aircraft" but they forget we have to turn around and find the rest of the money. It is a major problem for us.

We don't have helicopters. Other people operate those. They're useful just within 100-200 kilometres. Getting to Benalla is the outer limit for useful use of a helicopter. We do work in with the Air Force if they are offshore cases and occasionally with the airlines. You have to remember, if we transport a patient by airline we take six or seven seats from the aircraft and all those people are offloaded. Try doing that in a place like Kununurra and you get into trouble.

This federal set-up can lead to problems with organisation. Historically it began with sections in Queensland and Southeastern which was really New South Wales but it spread its wings into Victoria and Tasmania. Victoria did not ever have a section yet Victorians began the Flying Doctor Service. We set up the first base in Cloncurry and then handed it over to Queensland. Victorians set up the second base in Australia at Wyndham and operated it until recently. Other sections were Tasmania and the Central section in South Australia which covers up to Tennant Creek. Within Western Australia is Eastern Goldfields, which has a group who raise money and have their own aircraft at Kalgoorlie.

There are currently four sections, Queensland, Southeastern, Central and Western, which operate the Flying Doctor Service. The other groups contribute to these sections and often are involved with fund raising. And from this group of seven come seven voting representatives. We also have independent councillors. Initially we had four but it has been scaled down to two, and I'm not sure if that's a good thing. Geoffrey Scott is an aboriginal health worker; an extremely wonderful guy who lives in Ceduna and Malcolm Broomhead is now stirring up Orica. People such as these two come with no set agenda and contribute enormously. The associate councillor, Rosemary Young, is a representative of Frontier Services which is a vestige of the Uniting Church which was the old Australian Inland Mission.

I'd like to go over the history of this organisation. John Flynn was born in Victoria in 1880 at Moliagul near Bendigo and he died in his 70s in 1951. He went through Ormond College. He was not a particularly good theology student but eventually he was ordained. He rode furiously around Victoria on a bicycle. He took to working in the Western District and was teaching Sunday School and various other things and was impressed with people working and living in rural and remote parts of Australia. Flynn was a dishevelled looking man, full of energy, tossing off ideas in all directions, some of them good, some of them bad, but he was always pushing ahead. It's probably due to Flynn more than anyone else that the outback has been opened up, because he had a feeling for it. He was concerned about health issues, trying to encourage people to go to the outback. Reverend Andrew Barber was also working in the Western District, and became friendly with Flynn, would pick up Flynn's ideas and help crystallise the thinking process. In 1911 Flynn took up his first appointment at Beltana Mission near Oodnadatta and in1912 he was appointed as the first Superintendent of the Australian Inland Mission. It's interesting what Flynn was saying. Even though the Presbyterian Church was involved, he would emphasise that you worked in a churchlike manner but without preference for nationality or creed. He would say, "Do not tamper with the beliefs of your patients." Just amazing stuff.

The story of Jimmy Darcy really got the country going in 1917. Darcy was about 29 and was a stockman at Ruby Plains, 47 miles from Halls Creek in Western Australia when he was thrown from his horse and sustained a major injury. He was taken in a dray to Halls Creek and the Postmaster F W Tuckett saw that his injuries were serious. After trying unsuccessfully to contact doctors by telegraph in Wyndham and Derby he thought to contact his first aid lecturer Dr Holland in Perth. Holland made the diagnosis by Morse code and said, "You'll have to operate on this man." Those who deal with surgery would be horrified to hear the first operation took seven hours, using Morse telegraphy and a pen knife.

It was a perineal cystostomy, that is trying to drain the bladder by cutting up through the bottom, and it sounds simply horrific. It wasn't successful so he had to re-operate again two days later and this time he made an incision above the pubis and successfully drained the bladder. At the same time Holland caught a cattle boat to Derby and then set out to drive the 500-odd miles to Halls Creek. His car broke down 30 miles out of Halls Creek and he ended up walking the last bit only to find when he got there Darcy had just died. Darcy's brother suggested that the doctor should do an autopsy. He was found to have an enlarged but intact spleen. He did in fact have a ruptured bladder which was successfully draining. He had a huge abscess around his appendix which was not related and there was evidence that he had malaria. This incident got a lot of publicity.

The other publicity was from Lieutenant Clifford Peel also a medical student in Ormond who in 1917 went off to the First World War. While he was travelling to France he wrote to Flynn and said, "This is how we should service the outback; with aircraft and doctors." He was a major stimulus to getting the Flying Doctor Service going. Sadly, he was killed and on my exploring around the Somme and various other places, I found that he was on a photographic mission flying over German lines and was declared missing on 21 September 1918. So many people were killed at about that time. I can't even find a plaque for him in France but I will look further. If you go through the medical record, trying to understand the pathetic and incredibly sad letters from his family, he wasn't killed, he was missing in action. It took several years before he was declared dead. It's quite heart wrenching to see how people try and cope with this type of situation.

In 1921 Kingsford Smith flew a doctor from Geraldton to Carnarvon who operated on a child and then in 1925 flew a Melbourne surgeon and you might have seen the Archibald Prize-winning picture that is in the boardroom at St Vincent's Hospital. The doctor flew from Melbourne to Deniliquin, performed an operation, and was back in Melbourne in time for his customary round of golf. That man was J Forbes McKenzie and he was my grandfather and was one of my mentors, and why I'm involved with medicine and surgery.

H V McKay gave a substantial donation to Flynn. They had been long-time friends and associates and he had set up his factory in Sunshine to make the harvester which got its name from that suburb. This donation helped Flynn to set up the first official base in Cloncurry in 1928. The first doctor was Kenyon St Vincent Welch. He was paid a thousand pounds a year and to help him they covered him with a two thousand pound insurance policy. Because the Depression followed soon after and they were having trouble finding funding, Dr. Welch said, "I'll reduce my salary, you don't have to pay me so much, I'll keep on working." This was typical of so many of these people.

John G Smith who was Lord Mayor of Melbourne, and later the son of H V McKay, C N McKay were all involved in the Flying Doctor Service. The fledging Qantas had a hangar in Cloncurry and some of you have seen the original hangar in Longreach, and it supplied the pilots and the aircraft which was a very fruitful partnership that went on for some time. This slide shows an ageing John Flynn over on the right. George Simpson in the middle was one of the pioneer flying doctors and joined the council and was on it for many years. George Simpson taught some of us obstetrics when we were at the Women's Hospital. The other man is Dr Welch.

Flynn died in 1951. He was succeeded by Fred McKay and I bet lots of you have had some contact with Fred who died last year. He's another of my mentors and christened some of our children. This slide shows Fred with the early pedal radio. He'd just become Moderator-General of the Presbyterian Church. That was fine but he said he had great trouble driving to his inauguration. He was very fussed and tense and he said he drove down the wrong way on a throughway and he suddenly realised his mistake. He was backing out when the police pulled up. He was dressed in his regalia and they said, "Get out of the car" and he put out one foot and they saw the buckles on his shoes and they said, "Where are you going to, grandpa?" Fred was always a gregarious, friendly person. He was a very close friend of Bob Menzies and conducted Menzies' funeral. No matter whom he was dealing with, whether it was the Queen, Fred was just extraordinary. Spending time with him you realised what he did in the Second World War in the Middle East, it's incredible what padres did. He was dragging people out of crashed aircraft, burying people, and not only that, he maintained contact until he died with the widows of the people who were killed. I've never met such an extraordinary man.

My personal odyssey with the Flying Doctor Service began with a number of contacts and one was Tim O'Leary. I met him doing a refresher course at the Women's Hospital when I was a medical student, but we subsequently became very close friends and he was a longstanding flying doctor in Charleville.

My father, Arthur Long, was a pilot in the First World War. He had several distinctions. He shot himself down by throwing bombs over the side and being too low and being hit by the shrapnel, and he was the first man to fly Bass Strait, which he did just after he came back from the First World War. My father, who was a sharebroker, disliked doctors and could not trust them. There was no way I was going to do medicine. What is more, even though he was a well-known pilot and also flew in the Second World War, he wouldn't let me learn to fly. He made one mistake and that was he died two weeks before I sat my matriculation exam. Because of that I suspect people felt sorry for me. I got into medicine and Trinity College and I promptly learned to fly.

I bought my first aeroplane for 300 pounds at Moorabbin Airport. It was built before I was born in 1929. It was a Gypsy Moth, a DH60, which I flew extensively. Shortly after I had an Ostia aircraft and with Peter Johnson flew it up to Tennant Creek where we camped out and we had an extraordinary time. The old Conellan Airport at Alice Springs was significant in that it had a cemetery at the end of the runway. It was a very short airstrip but, curiously, a RAAF pilot became confused one day and landed a Canberra bomber on it and they had to completely strip the aircraft before they could fly it out again. It's all housing now. After my father died Ted Marshall DFC, became my father figure. As a medical student he had a job with Flinders Island Airlines and in my holidays I would help him fly Avro Ansen aircraft to Flinders Island, Bridport and St Helens carting crayfish. The significant thing about Avro Ansens is that it took 50 winds of the handle to get the undercarriage up. It's the only aircraft I've been in that when it rains you had to wear an overcoat because the water seemed to come in. Ted was a fantastic fellow who taught me a lot more than just flying. Sadly, he got a carcinoma of the antrum. Weary Dunlop and I looked after him for a number of years and eventually the cancer killed him.

Over the years I've been taking medical students to remote areas but I've also taken a whole host of other people from overseas on these trips. Corry Dunnife was an excellent medical student. He's a superb doctor. I quickly learned that as soon as the students got in an aeroplane they'd go to sleep and their mouth would flop open and I'm sure their oxygen levels would drop. The trouble was you'd arrive on the other side of Australia, having flown them, worried about them, fed them and they'd light up and you'd just be absolutely dead. But it was still a wonderful experience. David Bainbridge an orthopaedic surgeon, who even though when the temperature fell in the aeroplane at 25,000 feet, wouldn't even develop a goose pimple even though it was incredibly cold. He was a very fit person.

Maurice Ewing was the first Professor of Surgery. I've still got this lovely vision of him playing two-up in Wyndham. The Vicar Wakefield mentioned to Murray Stapleton and John Anstey that Ewing was dying and he had never seen Central Australia. We got over that problem by making a stretcher for him and we took him up to Central Australia. We were going on to Broome, if he was fit enough, and he hesitated and said, "No, I'm fit enough to go to Broome." So he came to Broome. He died three weeks later from the malignancy that consumed him. Taking this guy who scared the daylights out of us when we were young, made us realise that these people, particularly plastic surgeons, had, deep down, a wonderful human warmth.

Our problem is money. Certainly raising money from selling lamingtons which we're pretty good at is important, but it's the corporate dollar that we require and, as you know, if you fundraise you've got to give something back to the corporations. John Urich helped us by giving us advice about how to run the RFDS properly. We ignored this advice for quite a number of years, but I'd like to get John now and say "Come and look at us now. All those things you recommended, John, are in place." We don't mind painting an aeroplane anyway they like as long as we can get the aircraft. It is also incredible how the smaller donors later turn up with bequests from left field. If you're buying a Kingair now it costs $6.7 million. A single-engine PC12 costs $5.8 million. Then you have to put in the medical fit-out which costs $700,000. Jet fuel increased 60 per cent in three years. This has created major problems, not only for us but also for the airlines, as you understand. If we buy aircraft or deal in parts we do so in US dollars. So it's not hard to see that there are enormous costs.

Before September 11 things were reasonably straightforward, but our life has become more complicated because of this event. For instance, we have five PC12 aircraft in Switzerland that we're trying to bring out to this country but in between is a war zone. If you work out how you're going to get them out, it's very difficult, indeed. What's more, you can barely get insurance. Normally, you're insured for a ferry flight, but to insure a PC12 for one of these flights costs us about an extra $40,000 per aircraft. The flight plans are through Russia and China. You can't fly over Muslim countries, insurance companies won't let you do that, so over the Malay Peninsula, you have to fly out to sea. All this adds to costs.

Remote areas are increasing. Rural areas are turning into remote areas because hospitals banks, grocery stores and pharmacies are closing. Even though the overall population in the outback is less, you'll find that the area is bigger and these people all require medical attention in one form or another.

We are looking to the future and I have been to Prince Edward Island in Canada and I've seen a little of what they are doing there with Telehealth. In fact they have developed this form of communication to such an elaborate degree that people are returning to live on Prince Edward Island. They suddenly realise they don't have to go to a university in Toronto or Montreal; you can do quite well in a school in Prince Edward Island.

I've also had some contact with the prison system in Texas. There are about 120,000 people incarcerated in Texas. They are put in the most remote part of that State, for obvious reasons, but that brings problems with health care. Another scary thing about these people is that 50 per cent of them are hepatitis C positive. Doctors occasionally flew out or drove for long periods to treat them. Much of this has now been diminished. Treatment is working well through Telehealth and visual aids and is accepted by both prisoners and medical staff.

We need some vision for the future and, being frank, looking at the councils that come from each State, there are very few people who think nationally. We find that a lot of councillors have a State tag attached to them and they tend to compete. Any money they raise they grab it as though it's their own. They are very loath to hand over control to any national organisation like the National Council, but recently we've got this moving. Victoria has had a separate role because we have always thought nationally. For many years we ran the Kimberley health service. We raised money for the whole of Australia and we certainly do now. We're in the process of raising $15 million for our operation in Western Australia. But you can understand that there are difficulties. If you talk to other organisations, they all seem to have the same problems with organisation and State departments and boundaries. But somehow the sharp end of the RFDS keeps operating in spite of that. It's just difficult to get people to think into the future. If you say to them, "Look, fuel's going up and aircraft are more costly. How are we going to afford this? Where do you think we'll be in 20 years?" Most of them are not prepared to look at that. But it's something that we must do.

There are other things I could say but I want to come back to two of my mentors. One was James Darling, a headmaster who I was terrified of, like many of my mentors when I was young, but we became incredibly close friends for the last 20 years of his life. I can remember him saying a prayer when I was twelve years old. Fred McKay was extraordinary. He died last year at over 90 and just before he died he wrote me a letter. And to make sure I got it he faxed it as well. He always signed his letters "I, Fred." He wrote, "Stick with the underprivileged worldwide, good neighbours et cetera. Start again loving God and our neighbours. Think and act as a global family. Make past failures stepping-stones to forgiveness of others. Get cracking in a new millennium for the genuine pursuit of the wellbeing of people everywhere. Make forgiveness of others a mark of greatness. Don't be ashamed to talk about the bonus of human love towards one another." And then his final little thing which he always said, "Let's make it a moment of history and frame an Australian Magna Carta based on health, peace and respect for everybody - world mateship."

QUESTION: You said that you had trouble with the Beechcraft Twins because if one engine went out there was a problem with stability, and that you also found that the access of the single engine was a lot better. I understand that the light high wing Cessnas have a wonderful glide ratio if they should stall, but a large plane like the Pilatus would have a very good glide ratio to get out of trouble if one engine stalled, would that be correct?

MR LONG. That is correct. The Kingair is a superb aircraft and anyone knowing Beechcraft knows the product is the Rolls Royce of aircraft, they are wonderful aeroplanes and easy to fly. But if the chips are down, you are better off with a single engine Pilatus which has an extremely good glide ratio. You can come over a fence without power at about 60 knots and you can steer it in between trees.

QUESTION: DR COURT. I had a happy two months as a locum out of Broken Hill. Do you think it's possible with the development with Telemedicine that the Royal Flying Doctor Service will increasingly become an evacuation service rather than actively involved in the actual care of people in the outback?

MR LONG. Yes, I think it may be. Because you have this icon status you mustn't doggedly hang on to it if there's a better way of doing things. We should always address what is the best for the people in the bush. Even if we have to go back to funny little aeroplanes so we can get out to service them. That's what governments are pressing on us now. More and more they won't pay for inter-hospital transfers. We want to get specialists with status in a teaching hospital to work out in the periphery and they can rotate as they're doing in Broken Hill. You have to give medical people and all people who work in remote areas job satisfaction and included with that must be some sort of status. Now when I mentioned that model to the health minister on Prince Edward Island they said they're developing that same programme.

QUESTION: MR WERNE. The landing at night in these remote areas sounds a particularly hazardous experience to me. If you're stuck with a patient who has to be evacuated and you can't wait until first light, how do you arrange for lighting on the ground?

MR LONG. Yes, the lighting is important. Again, most of the people who operate strips know how to set up lighting; they've got books on how to do it. They use beer cans, and they all seem to have those and kerosene as fuel to light it. They are instructed how to put out flare paths. If the airstrip is not up to a satisfactory standard you can't go there otherwise you're risking the crew and everything else. So you go off to another strip that you can use because you know it is safe. They then truck people across to you, or you try and look after that person as best you can using the telephone.

Navigation used to be a problem. 15 years ago we were always getting lost. But now with GPS, the positioning equipment which is commonplace, you can do what is, in effect, an instrument approach and it's very accurate. It will be bring you right down on to a final approach to an airstrip.

QUESTION: MR MICKELSON. What are the criteria which you apply to invoke the sending of the flight to the site of the medical incident? Obviously a doctor is not always there. How do you know that that an undertaking should be commenced? Is there some test that you apply that makes it legitimate?

MR LONG. It's experience, and it's usually a medical person who makes the decision. In Western Australia - not so with other sections - there is one phone number which brings calls into one place at Perth. There's always a doctor locally accessible and we also know on a board where all the other doctors are. Who's on duty in Derby, Kununurra, Port Hedland and so on? You can contact these people very quickly. But, with experience, you can tell whether it is legitimate. These people have got an inherent knowledge of what's going on and you don't just pick up a doctor and say, "You're in charge of this now, make that decision." What is more, by and large, they know the experience of people at the other end and they know what's going on. It can be a difficult decision. If in doubt you go, but you don't risk lives at night if there's a danger in it.

QUESTION: MR WESTCOTT. I have the pleasure of being a Royal Flying Doctor Service pilot and it's interesting to hear you talk about certain things tonight that I wasn't quite aware of. Touching on the funding problems that the Royal Flying Doctor Service faces, you've left me wondering where the future lies for the Royal Flying Doctor Service, particularly relating to the inter-hospital transfer of patients. I'm aware that in more than one State these services are now commercial contracts. In Victoria, for example, the Royal Flying Doctor Service is fortunate to operate the contract for the Air Ambulance Service. My concern is that in the future low budget operators are going to become attractive to governments. Do you feel that the RFDS is going to survive modern business practice and do you feel that the Government gives credence to the Royal Flying Doctor Service and its experience?

MR LONG. I admire all Royal Flying Doctor Service pilots. They are some of the best pilots I've seen. This is a major problem. The ambulance contracts and other work undertaken by some of the Royal Flying Doctor Service is a business contract, that is, it is fully funded. The donated dollar is not going into these business contracts and so they'll stand on their own two feet on their merits. I am aware of the looming problems of cost of aircraft, fuel and employment of people and I don't know the answer, but I'm sure it's going to be something to do with communication. We are trying to induce people, particularly in Western Australia, to get up to Port Hedland, specialists in particular. We can get people to live in Broome but they won't live in Derby.

They're beginning to live in Kununurra. So things might change there. But you've highlighted the problem. It's enormous.

QUESTION: DR HAVERFIELD. Is there's a nexus between the air ambulance and the flying doctor? Are our colleagues active as pilots in the service itself or do you employ pilots as pilots?

MR LONG. There were flying ambulances around and most of them have disappeared after some sort of angst and hostility. Sometimes we run an ambulance service for hospital transfer, but that's a business proposition. However, over in Western Australia we have to drag money out to go flying in the middle of the night from Derby down to Perth.

There are some pilots who are qualified as pilots who are doctors, but you can't be both. You're either rostered for flying and not medicine or the other way round. There was an instance in Western Australia where the pilots were concerned that there was a doctor who was also a pilot doing a lot of flying and then doing some medicine and, quite rightly, they pointed this out and he stopped flying. The chief pilot said, "He was our best pilot!" I don't think you can do both well or safely.

No Fault Personal Injury Compensation.
What Can We Learn From New Zealand?

by

Dr. Denys Court

An address delivered at a meeting of the Medico-Legal Society
at the Melbourne Club held on 1 March 2002.
The Chairman of the meeting was Ms. Pauline Shiff.

Although I do about 60 presentations a year this is the first time in twelve months I've felt in the slightest bit nervous and I think that's probably because I'm a little concerned that it might be seen by some that I'm here to sell a system and I'm not. I'm not the right personality type to be a salesperson. I'm simply here to tell you about the New Zealand experience with a statute-based compensation system rather than a common law based system, to look at the principles that are involved in that, and to give you some idea of the pitfalls associated with that. I'm not going to draw any conclusions about whether that has any relevance to the Australian scene but relevance has at least to be somewhere in that discussion. I have chosen the title "Statutory Schemes for Compensating Personal Injury in the Health Sector." I'm not going use the term "no fault" more than three times.

First of all I want to talk a little bit about the philosophy of statutory compensation schemes. I want to look at some examples, obviously, the New Zealand one in particular, but also take some points from the Swedish example. I want to look at the New Zealand statutory scheme for compensation in the context of the overall New Zealand medical law system because it is erroneously felt by many outside New Zealand that our statutory scheme for compensation is the only medical law system. It is in fact a significant but minority part. And then I'm going to allude to some possible lessons for other jurisdictions, but I'm certainly not going to draw conclusions, it would be wrong for me to do so.

I'm going to start off with a philosophical discussion about the problem with fault. This is a very good statement recently published in New Zealand Medical Journal. "Most errors are not attributable to sub-standard care but to the actions of competent physicians practising in health care environments that are poorly designed to prevent such errors and mitigate the consequences." I think it's a really important point - if what we want to do is reduce harm in the health sector exhorting doctors to avoid mistakes will have no impact at all on error rates, but providing safer systems in which they practise will.

The problem is that wherever there are humans there are errors and it always worries me that sometimes it takes people a little while to see the error in this human set-up. In talking about the wish to reduce error rates we have really in all western cultures now what is called a "blame and shame culture." I tend to call it the "blame name chain culture" and it's incompatible with the development of a safety culture. I can't go into detail about what is starting to be called in New Zealand the "trust culture" but basically it is about moving away to some extent from the blame and shame culture to a situation where unless there is true negligence there isn't an attempt to blame or shame doctors but there is in fact a systems analysis, much as there is in the aircraft industry, in order to work out how can we prevent this error happening again tomorrow. And if in the course of that inquiry process it is worked out that there is indeed negligence, of course there is personal professional accountability for that. And that's what we tend to call the trust culture.

Some of you will know about Reason's Organisational Accident Model. It shows where we put all our thought, action, endeavour - most of it - at the moment. We look at what went wrong, the act of negligence, if you like, and the accident or the adverse outcome as a consequence of that. This is the area where most medical law focuses. The problem is that it's this organisational culture that allows that error and unless we do something about this culture in our hospital systems and our medical systems, in particular, we will never have an effect on that.

I like to look at it this way, and that is that unless we do something about the predisposing factors we are never going to be able to reduce the precipitation of error. It's a little bit like, I call it the loading and firing of the litigation gun. It's the background factors that load the litigation gun. It's these that actually fire it and if we look after the loading of it, if we take the gunpowder out of the gun by having a safe system then it won't be triggered so much.

If we look then at potentially what the advantages are of a statutory system for compensation one of the advantages is that fault is not the only gate to compensation. I don't need to tell you, of course, that in common law if there is no negligence the harm rests where it lies. In all systems of statutory compensation around the world there is a wider enquiry, it's not just fault. Fault is always looked at but it is not just fault that determines whether there is compensation.

The statutory systems tend to be less adversarial. They have lower administration costs. They tend to be, and these are potential advantages, equitable in relation to patient access to compensation. They should result in faster resolution of claims, there should be more uniformity amongst the awards and I think, very importantly, with my clinical risk management hat on, they should allow coordinated error prevention and rehabilitation. So in theory at least, these are the advantages that can or should pertain to a statutory system of compensation which is broader than simply an analysis of fault.

Owen Woodhouse, although he was a New Zealander, first tried to sell his statutory scheme of accident compensation in Sydney and the New South Wales authorities told him to go back to New Zealand, so he did, and he managed to foist it upon the New Zealand community. The five principles that he espoused were, firstly, community responsibility. He felt that the issue of rehabilitating people who had suffered harm and compensating them was a community responsibility. Now we must remember that the environment here at this time (1972) had nothing to do with medical negligence, it was to do largely with workers' compensation. So this whole scheme was put together really to deal with the workers' compensation crisis at that time and the affordability of that. Medical misadventure got caught up on the coat tails of that because, indeed, it was physical injury from accident. So, as a secondary consideration, it was brought under that umbrella, but it wasn't the primary focus at that time and, indeed, medical misadventure was not even defined in the first Act.

Community responsibility for the harm and rehabilitation included comprehensive entitlement, complete rehabilitation where it's possible, real compensation - and that's a problem - and administrative efficiency. There is what tends to be referred to in writings about our statutory system, the concept of a social contract. That is the community was to share the costs of providing realistic levels of compensation for all injuries - not just medical misadventure, all injuries - and rehabilitation of the injured to their former position where that's possible, in a way that is efficient in time and costs.

As a consequence of the social contract there is in New Zealand to this day, but maybe not as of next month, a statutory bar to proceedings being taken in a court or tribunal in New Zealand for compensatory damages for personal injury. Basically, if ACC looks at an issue and says, "Yes, this comes under the cover, according to our empowering statute" then their decision that there is cover, regardless of the level of compensation that they provide with that cover, means there is a statutory bar to proceedings. That statutory bar does not include exemplary damages and it does not include third party damages. In effect, compensation is more closely related to the harm suffered by the patient than by the culpability of the professional conduct, because it's no longer simply a fault consideration.

The two definitions that have existed, interestingly, weren't initially in the Act. There have been five amendments and they are certainly now enshrined in statute. But after that statutory bar to proceedings first came out in the 1972 Act, it was the common law that defined medical misadventure. It said there were two limbs: medical error for which you can read simply negligence and medical mishap which is, I think, a very fine distributive justice part of our legislation which accepts that even when there isn't fault if, as a consequence of properly given treatment, somebody suffers a rare and severe complication then they will be compensated for that.

Comparing the New Zealand system with the Swedish system, the inquiry in New Zealand and Sweden starts out the same. Firstly, did medical management cause the adverse outcome? If medical management does not cause it, there's no compensation. If the answer is "yes", the next inquiry is was there a reasonable standard of care? In other words, was there negligence? If there wasn't a reasonable standard of care then compensation obviously arises from that because that's compensation for negligence. However if the standard of care was acceptable, in common law that would be the end of the inquiry in a tortfeasor system.

If, however, the standard of care was reasonable this is where the two jurisdictions differ. In New Zealand the inquiry is, was the injury rare and severe and, if it is, it's compensated. Interestingly, in Sweden the inquiry is, was the injury avoidable? And if the answer to that is "yes" then it's compensated. So we have two different ways of looking at the "no fault" part of the inquiry.

What that comes down to is medical error or negligence in both jurisdictions. This is an interesting thing because it's systems error. So what the Swedish are compensating for is negligence on the part of individuals or error in systems. What they're saying is if it's avoidable or if it should have been prevented, regardless of whether it should have been prevented by the individual or by the system, then it will be compensated. Whereas in New Zealand if it's rare and severe it will be compensated.

If you look at those two different ways of dealing with these things and the statutory systems, both the rare and severe criteria and the preventability criterion are in fact equity social justice arguments. The rarity and severity argument is that unanticipated adverse outcomes which are rare and severe and independent of fault which are suffered by an unlucky few should be compensated. The problem with it, of course, is why should accident be differentiated from disease? Why should it be that, under our system, accident compensation will care for a child with cerebral palsy for life if it can be demonstrated it was related to care and yet a child with Down's syndrome is not compensated in any way at all. So the parents of the child with cerebral palsy get massive community support for life and the parents of the child with Down's syndrome get extremely little. Is that justice? We don't have the time to argue that, but that's the philosophical shortcoming of that system.

The preventability criterion of the Swedes, also unanticipated, relates to systems errors. It's a very good idea because what it says is "We are compensating you for deprivation of an opportunity of a normal outcome" and if you look at the Down's syndrome child there was never the possibility of a normal outcome because of nature's accident. There was never a lost opportunity because of human endeavour. And what the Swedish system compensates for is lost opportunity because of medical endeavour.

Knowing something about our politicians in New Zealand, I imagine it was by accident more than endeavour that they've actually introduced this into the latest version of our legislation which is called The Injury Prevention, Rehabilitation and Compensation Act, which is the fifth enactment of our statutory scheme. Each time the name gets longer and more difficult to remember.

It adds the preventability principle and therefore there are now three inquiries. Was there negligence of an individual? The professional responsibility principle. If not, was there a systems error? The preventability principle. If not, was there a medical mishap? The rarity principle. So we have the individual responsibility, the preventability and the rarity principles. So we now have a fairly complete system from a philosophical point of view.

I don't want to talk about the Finnish statutory system other than to say I think it's quite arbitrary that they simply pick out four bits that they say they will compensate and I think it isn't as well principled, although I don't understand it as well, I must admit.

In New Zealand recently, as in your own jurisdiction, and as in the United States, there have been studies done to look at the mishap rates, or the error rates in institutions. How many people who go into hospital suffer harm as a consequence of the treatment? Professor Davis found that 12 per cent in total suffered harm as a consequence of the treatment. Now this might have been something very minor like, whoops, they got the wrong drug and they got a little bit of a reaction which lasted five minutes and there was no problem. So it includes all sorts of things and even things that happened after they left hospital.

If you break that 12 per cent down according to the principles I've talked about before, approximately half would get compensated. This is projection on my part, I must admit, by putting Professor Davis' findings together with the statistics from the Accident Compensation Corporation which looks after the statutory system I'm talking about. One per cent would get compensated for systems error, another one per cent for medical error. The rare and severe medical mishap would be probably four per cent and the things that aren't due to negligence, aren't avoidable and aren't rare and severe would probably be 50 per cent. Now although 50 per cent is a lot, they're also very much the more minor things.

So under our system about 50 per cent of people who suffer harm in hospital would be compensated. One of the things that's often thought is that we only have the Accident Compensation Scheme and that's the total system that applies to injury. In fact, ACC - Accident Compensation Corporation - looks after simply the compensatory damages for physical injury. It does not look after pure mental injury; it has to be a physical injury and doesn't look after exemplary damages or third party damages. They can all go to a court system. We see very few cases.

We have in fact a four limb statutory system of which the ACC system that I've been talking about so far, the accident side of it, the physical injury side is just one part. This is the major component of our accountability system in New Zealand. The Health & Disabilities Commissioner who has the task of determining where the patient's rights have been breached looks after something like 1300 complaints per annum, which in a small community of only 3.8 million is a lot. Per annum, 10 per cent of doctors have a complaint laid against them with the Health & Disabilities Commissioner because it takes them anything up to two years to deal with them, so much for speedy resolution. It does mean that at any one time about 20 to 25 per cent of doctors actually have a current claim against them and cannot get a certificate of good standing as a consequence of that. They, therefore, can't move to Australia which most of them want to do.

The Health & Disabilities Commissioner determines whether patients' rights have been breached. He has all sorts of powers if he determines there have been breaches. For instance, he can refer a doctor for disciplinary action. He can refer these cases off to determine whether the doctor is competent or requires further training to regain competence. ACC looks after compensation for the things we've been talking about. The Medical Council looks after registration, competence and health. It's the regulatory body and there is an independent medical practitioners' disciplinary tribunal that looks after discipline.

That's how the system supposedly runs. If you've been sitting in my chair in my office for a couple of years this is how the system runs. This is the "no fault" part of it. The rest of it is all about fault. When you hear people say, "The 'no fault' system doesn't work in New Zealand" what they're saying is "the whole system doesn't work" and they're right. It is about process. This is what happens when you have 3 million people, one and a half million pressure groups, 120 politicians and 70,000 sheep and it's the sheep who run the country. 80 per cent of the complaints that go into the system exonerate doctors. Complaint has got very little to do with negligence.

So when the patient makes a complaint what happens? It takes two or three years to work around the system, through multiple bureaucracies. The end result is that the patient ends up totally disillusioned. The doctor ends up totally disillusioned. After two years the patient has spent the money that they think they're going to get out of this so they want blood instead and the doctor thinks, " I'll go to Australia because although their medical indemnity is awfully expensive, life must surely be better over there." They don't realise just quite how much trouble there is in medical indemnity at the moment. So the system is a mishmash. Our system has become all about process and, unfortunately, seems to forget the reality that it should be more about resolution. And until that gets tidied up - and there is a lot of work going into now tidying it up - nobody will say anything complimentary about the New Zealand system, but don't blame it on the statutory compensation system. The reason it's going to be tidied up very soon is that a woman entered this system three years ago whose cancer of the cervix wasn't diagnosed when it should have been. She died before her complaint process was finally over. That finally put a pin in the backside of the politicians and they decided it was time to act.

The other problem is that the politicians. They've lost heart in the scheme to some extent. They've suddenly realised, "Well it's quite expensive providing all this compensation and we're not quite sure where to get the money from, so let's peel away at some of the layers of the onion."

So they've eroded the social contract. In 1992 they abolished lump sum compensation. Now how logical is that? It's not. We know they've reintroduced the concept of fault with medical error which happened in a statutory way in 1992 but it had been defined already by the common law and they decided to try and shove the whole lot out to the insurance sector in 1998. The Labor Government got in about six months later and cancelled all that, so it's back under the bureaucratic system again. There is this unfortunate lack of bipartisanship about the whole system.

As a consequence of that there's dissatisfaction with the level of compensation that's provided and that tends to distort what happens. A woman who has lost her uterus after the birth of a child because the post partum haemorrhage wasn't managed properly will try to sue for the third party effect of her husband having post-traumatic stress disorder. Now that has got to be a distortion, does it not?

We see a lot of effort in trying to win exemplary damages cases which wouldn't normally attract exemplaries but where people think, " I can't get good compensation from the statutory scheme, and so I'll do anything to try to get it from the courts." That's not working either, and creates further bitterness.

The problem with the New Zealand system is not the concept but the lack of will in the community, or in particular the political community, to make it work properly. And I jokingly say that we started off with a no fault compensation system and now we've got a no compensation fault system.

The process is hugely bureaucratic and that is a problem because inherently a bureaucratic system is less transparent than a court process. It comes directly under political control. It comes under the control of the Minister of Health and the Minister of Accident Compensation Corporation. The judicial independence of a common law system is lost with a statutory system.

There are issues with both discovery and natural justice for exactly the same reason. I think it's absurd but there is no representation for parties in this bureaucratic process. There's no actual physical appearance of the parties at some kind of tribunal hearing. It's all done on paper. Now I think that's poor. It doesn't have to be that way as part of a statutory system. If you had a statutory system that was based around tribunal appearances then I think it would be much more robust. As a consequence of it all being done on paper there is no face-to-face cross-examination. I would like to suggest that possibly the thing that makes the common law so robust is in fact that all evidence is crossexamined, or almost all, and I think that's what tests the veracity and credibility of that evidence.

I've alluded already to the new Act which came out last September and actually comes into force on 1 April. A lot of our Acts come into force on 1 April. All of the accident compensation ones do. I don't think that's a coincidence. The point I want to make is that it does finally, thankfully bring back lump sum compensation. If we again get back to the cerebral palsy argument, a cerebral palsy child would be supported by the State for life. Now we know, of course, about the Simpson case: $13.4 million plus interest

I want to just talk a little bit about the medical misadventure fund because some of you must be asking yourselves by now "Well, where does the money come from for this scheme?" In 1992 as part of the then enactment it was made possible for the medical profession to be levied for the cost of medical misadventure. The problem with that was the medical profession went bananas. The reason they went bananas is that 4/5ths of the cost of medical misadventure is medical mishap. In other words, where the care was properly given and there was no negligence there is this philosophical objection to the profession needing to actually fund adverse outcome when there was no negligence.

In New South Wales, it costs $82,500 for an obstetrician to get medical indemnity and the true cost of medical indemnity for a New South Wales obstetrician/gynaecologist is about $135,000. For O and Gs in New Zealand it's about $26,000. So it's substantially less. It is impossible for me to work out why it's less but one part of that, and I do not mean this disparagingly – is that there are fewer lawyers in the process. The bureaucratic system is a lot cheaper but it may be less robust.

There are other Bills related to accountability in the health sector before Parliament at the moment. I just want to allude the Health and Disability Commissioner Amendment Bill which will repeal the barter proceedings that I talked about before. So even though there may be coverage by ACC it will still be possible to take proceedings in New Zealand against doctors but only in a specialist Complaints Review Tribunal. The Complaints Review Tribunal already exists. It is a very good tribunal, apart from the fact that its chairperson was recently to be found to be double dipping and had to resign. With that exception, it's actually a very good tribunal and it hears all the cases from the all the Commissioners in New Zealand such as the Privacy Commissioner, the

Ombudsman and the Banking Commissioner. All commissioner-type cases go to the Complaints Review Tribunal if there is going to be an assessment of damages or other resolution. It will now be possible for medical cases to go there because there won't be a statutory bar.

This is basically how our system will work. All complaints will initially go to the Health and Disability Commissioner. He processes, mediates or may investigate them himself. If it's declared that there is a breach of the standard of care he can refer it on for disciplinary proceedings. The Director of Disciplinary Proceedings or the Director of Proceedings who is an independent prosecutor within the Office can take the case to the Complaints Review Tribunal.

At the same time, the ACC system can already compensate the patient for loss of income and other direct financial losses, and the Complaints Review Tribunal will also be able to compensate up to a maximum of $200,000. Now that is an absurdly low amount. It should be substantially higher. It should at least be a million or two and in time it will work its way up to that, I guess. But don't forget there also may have been a huge amount of compensation here including such things as exemplary damages.

The system that we're likely to have in a few months time will be more streamlined with two potential routes for compensation being controlled really from the Health and Disability Commissioner's office.

In summary, excessive political interference and unmet public expectations have tarnished the public's perception of medical professionals. The one thing you can say is that administrative costs are less than legal costs for tort law and there is going to be increased access to common law remedies. The undoubted advantages of a statutory system are certainty of access to the compensatory process and a greater part of each dollar getting to the injured party. But the undoubted consequence is that it is tightly controlled by statutory limits to be affordable to the community.

The question really is, is it a failed social experiment in New Zealand? Is there a place for it in any other jurisdiction? I think the bigger question is are there some medical misadventure issues which tort law simply cannot deal with? Should they be dealt with by a statutory system where any compensation is not determined by fault alone because of the social implications of that issue? And, obviously, cerebral palsy is an example of something that should go through that inquiry process. Indeed, the AMA in a background paper last

May said a national needs-based statutory compensation scheme for all cerebral palsy children may reduce indemnity costs whilst providing an equitable compensation for such patients. So this inquiry is, indeed, going on.

You can't exhort doctors to avoid mistakes; you have to do something about the systems. I think the biggest opportunity for the statutory compensation system is that the adversarial and individual nature of tort law induces silence, frustrating efforts to understand and prevent errors. I believe our comprehensive statutory system arguably places us in the enviable position where we can actually move forward with error prevention initiatives. That is now a statutory obligation of the Accident Compensation Corporation. It is supposed to evaluate the nature, incidence, severity and consequence of injury in order to prevent injury, so there will be a lot of that work done in medical misadventure.

In conclusion I believe all jurisdictions should consider whether there is a need for some aspects of statutory compensation and, if so, should it be a part or not all of the system of compensation. It should exist in specific types of medical misadventure where the common law can be demonstrated to be inferior. It challenges you to define the future place for statutory systems in any jurisdiction.

I believe that medical mishap, as defined in New Zealand, the rare and severe complications of properly given treatment, the "no fault" aspect of compensation, is a recognition of society's need to compensate rare and severe complications which occur despite an appropriate standard of care. I think it's a very valuable social constraint and I hope we never lose it in New Zealand, but there is an awful lot of work to be done to make it a system which is appropriate for the community. Thank you.

DR NISSELLE. I look round the room and see the President and Chief Executive of both Victoria's major medical defence funds, a number of members of the boards of those defence organisations, a number of lawyers practising for both defendants and for plaintiffs, so I'm looking forward to a very interesting discussion. I have two questions. The first is, is our current system broken and, secondly, if so, is the New Zealand type solution one that will fix it?

Addressing the first question first. The timing of tonight's meeting is extraordinary. As of the end of last year the only three insurers that were offering medical malpractice insurance into the Australian market simply quit, not offering renewals and not offering any run-off covers.

The last few days we've seen the announcement, the appointment by APRA of a regulator to New South Wales and Queensland's major fund, United Medical Protection who are admitting they have got very substantial financial problems. Is the system broke?

In the Calandra Simpson case, one can argue that she got every cent that she deserved. The fact that that the case will probably run out at something of the order of $16 million may be a perfect expression of the common law principle of restitution. The court has attempted to restore her to the position she would have been in had the damage not occurred. She happened to come from an extremely wealthy family which means that the home improvements required to make her home wheelchair accessible didn't just apply to the home in Vaucluse but also the beach house at Palm Beach although the judge did renege on the home improvements to the ski chalet at Thredbo, thinking she probably wouldn't get much use out of that.

The judge, of course, had no cause to consider that that one judgment represents $20,000 for every practising obstetrician in this country, bearing in mind that the Medicare rebate for the management of a standard pregnancy is something less than $1,000. That means every specialist obstetrician in this country will be doing 20 deliveries this year to pay for that one case. Obviously, it's not as simple as that.

The principle of restitution does have problems and the issue is that any system of compensation is ultimately an argument that illustrates tension between equity and affordability. There are many people properly representing plaintiffs in personal injuries cases that will argue the principle of restitution, saying it's not for them to determine where the money comes from, it's for them to determine that their client is properly compensated for the damage received. However, the other side, the affordability side, the balance between equity and affordability, argues that the money must come from somewhere and it's not a bottomless pit.

The other point of issue in considering whether our current system is broken is the cost of the process, if not actually the cost of the compensation. We can throw round arguments which are almost true to say that for every dollar that the current system puts into the pocket of an injured patient, roughly a dollar goes into the pocket - I always say "of a lawyer", but I mean it costs about a dollar for process, defendant and plaintiff costs, court costs et cetera. Now that's slightly skewed. It's probably more like a 60/40 split, but it's not far off a dollar for dollar cost. That is a grossly inefficient system for managing the assessment of claims for compensation.

When I made this point at a meeting of the Australian Plaintiff Lawyers in Queensland not that long ago, someone said to me, "If you're touting the New Zealand scheme, it's sending the country broke. It's far more expensive than our current system." It certainly is overall but that's because its greater accessibility allows more people the choice to try to access it. The cost per claim in New Zealand is substantially lower. If you set a hurdle lower a much higher percentage of people will attempt to jump over it. The best evidence we had probably stems from studies like the Harvard Medical Practice Study from New York in the mid-1980s which suggested that only about 10 to 12 per cent of people who could successfully sue a doctor actually choose to do so. If we analyse that figure the plaintiff lawyers in the rooms will say "Well, that shows how inequitable the current system is because a lot of people are barred from getting the keys to the courtroom by the process and we need to have a simpler way in which they can address their claims for compensation."

But the other way of looking at it is what I just heard for New Zealand; lower the bar, more people will jump over, greater cost. But another analysis of Harvard is the people who say - and again this point has been put to me many times in the past - "Why don't you doctors just practise better medicine and you'll get sued less often." Quality improvement is important and doctors have been committed now for many, many years, since the early 1970s in formal programs, but you know, since Hippocrates was a lad, to try to improve the quality of care to their patients. The reality is, if you accept that figure from Harvard, that only about 10 to 12 per cent of patients who could so actually choose to. If the quality of medicine improved by 900 per cent but that remaining percentage of patients who were injured all chose to sue we would still have a system of the same cost. So it will take many, many years for quality improvement to be reflected in reduced costs of compensation.

Stephen Duckett who is Professor of Health Policy, Dean of the Faculty of Health Sciences at Latrobe University and Chair of the Board of Bayside Health in his annual report last year made the comment that the whole culture in hospitals of blame and claim is getting in the way of quality improvement and he's argued very strongly for a much more simple way of compensating injured patients so we can get that out of the way and actually get on to quality improvement. We certainly know that quality assurance activities are being hampered by the doctor's fear of openly discussing problems that have occurred for fear that the minutes of various quality assurance committees not properly surrounded by legal privilege will be subpoenaed in later years against them.

I think we really only have two options. If you accept my premise that the current system is broke, that costing a dollar to put a dollar into the pocket of a patient is an obscenely expensive way of awarding compensation to patients, what can we do? Both options may be unattractive to the lawyers present. One is to have a very strict statutory scheme along the same lines of, say, the Workers' Compensation Scheme and Motor Accident Compensation Scheme that looks to make a much simpler process available but severely contain heads of damages et cetera, heads of payments of compensation. That's one approach.

The other approach, if we continue with the common law process, is to have rigidly imposed statutes of limitations so that those who set themselves up in business to try and insure or indemnity doctors for their liabilities can rule off their books after a defined period of time and not have multi-million dollar claims coming out of the woodwork after 15, 20 or so years. The other is to have caps on various heads of damage, to have an affordable system.

There's an analysis for those of you who get the Australian Health Law Bulletin which shows the impact of the impact of the New South Wales Health Care Liability Act, if it had applied to the Calandra Simpson case, remembering that Calandra Simpson brought her claim before that Act was enacted. And it assesses that instead of getting of the order of $15-$16 million her total award would have been something of the order of

$9 million. Now that would have reduced the cost per obstetrician in this country from something like $20,000 a head to something like $12,000 a head. It is still an obscenely expensive process and there is simply no pot of gold available to meet those sorts of claims simply on the common law process of restitution and also there is no pot of gold to continue to pay the costs of that process.

DR ARRANGA. I will have to declare my interests. For those of you who don't appreciate it, I am a plaintiff lawyer and I spend all my day suing doctors. I specialise in medical negligence. Plaintiff lawyers are very much like doctors. We see people with problems. People come to us with a problem. The problem is, generally speaking, they are dissatisfied with the care they've received from the doctor, hospital, nurse, chiropractor, whoever is providing the health service and my role as a solicitor mirrors, to some extent, what I used to do as a doctor. That is, you take a history, you look at the problem and you think about the possible solutions.

One of the possible solutions that's been put forward is a statutory compensation scheme, a universal scheme, although it's clearly not universal, it's limited to those people who meet the criteria set by the legislation. As Dr Nisselle says, that's a bar, it's set somewhat lower than the bar in the common law but it's still a barrier which excludes some people from compensation for what they perceive to be their injuries.

As a theoretical construct I think it's fine. If people could be adequately compensated for their injuries, as a lawyer, as a doctor, as an individual I think that's a perfect system. The problem is - as has been said - it's subject to political interference. Anyone who deals with the Victorian WorkCover Authority or the Transport Accident Commission can appreciate the extent of the bureaucratic and political interference in the compensation that people receive.

Now my understanding of the New Zealand scheme is limited and I appreciate now that there may well be a reintroduction of lump sums, but my understanding was when it was introduced in 1972 there was a lump sum for pain and suffering of the order of $5,000 which increased over ten years to approximately $17,000 and then was abolished. The entitlements were those of economic loss - up to 80 per cent of pre-accident earnings with a maximum of about $1,200 or $1,300 per week, which is great if you're an earner at the time of your injury. It's not too good if you're a mother at home or if you're an elderly person. So anyone who wasn't an earner had no access to the benefits, apart from the healthcare benefits that might have flowed whether or not those were substantially more than those that were available to you as an uninjured citizen.

So the scheme as it was essentially compensated earners up to a certain amount and you were still then subject to bureaucratic restriction. That is, if the Commission or the Corporation thought you had an earning capacity and that there was work available and you chose not to take it because you felt it was unsuitable, then your entitlements would be abolished.

Now the sort of scheme we're talking about is fine in theory but in practice tends to leave people dissatisfied. In our firm we deal with many injured workers who view the scheme as their enemy. They view the system as their enemy and the continual reliance on a weekly payment, fronting up to the doctor to prove you are in fact still injured tends to be a significant disincentive to recovery. People are worn down by the system.

As a plaintiff lawyer, and I have a self-interest here, I view common law as a better way of compensating those people who meet the requirements. Clearly, the requirement in common law is fault. That is, you establish that, the care provided or the standard of the workplace provided was reasonable, you get access to the court, you get access to compensation. I would prefer that the system provided more compensation for more people but the reality is there's a trade-off and if we're going to compensate everybody fairly it becomes too expensive. The trade-off that seems to have developed in New Zealand is you compensate a lot of people but not very well. Whether that's a better system that's for other people to judge. I'm not sure that it is.

I would like to make some comments about Dr Nisselle has to say about whether the system is broken. There have been a large number of very large awards in personal injuries cases, mostly medical negligence cases and if you look at them they all come from New South Wales. If you look at the insurer they're almost all UMP.

I have practised in medical negligence since 1995. I'm not aware of a settlement of a similar proportion to the Calandra Simpson case occurring Victoria and the reason is that the litigation environment differs from State to State. I think we should also make the point that as far as I'm aware the MDAV isn't about to go under. Mr Dickens could probably tell us if it is. And I think it would be wrong of us to look at what's happening to UMP and suggest that that's a failure of the system. I don't know if there's anyone from UMP around, but I suggest that that's a failure of UMP both in its litigation strategies and in its insurance strategies. The crisis isn't that they've not got any money. The crisis is that they can't meet APRA's regulatory requirements and that may well reflect the fact that they have failed to consider IBNRs, that's incidents that occurred but not reported for several years.

So to say that the system is broken because of what's occurring in New South Wales I think over-simplifies the situation. The insurance situation in this country is difficult but as a plaintiff lawyer I don't think it's all my fault. I don't think I caused the crisis in insurance. There are many other factors but they relate to the international insurance environment as much as they do to any local factors.

In regards to compensation schemes or tribunal systems that reduce legal costs, I heard Dr Nisselle give his figures before and while I accept that they're based on an analysis of his data, the reality is that none of us have ever seen the data. Plaintiff lawyers make this request on a regular basis, if there's a crisis and it's based on the figures, show us the figures so that we can see them.

Now I know that litigation process can be expensive and the most expensive component of the litigation process, quite frankly, is getting medical reports. The substantial costs that are incurred in the litigation process occur in the courts. As you get a matter to court and you run it for ten days and you've got silk on both sides you're going to be paying lawyers and other people very large bills. But the reality is that the vast majority of the matters I pursue, the matters dealing with insurers don't get to court. We say in our practice that 95 per cent of medical negligence claims or other personal injuries claims never get to court. In six years of practice I've never run a case to conclusion; they've all settled. Now that may be because I'm a timid lawyer but I think it's because I select cases that are likely to be resolved.

So the answer I think to the cost issue is that you have parties who are willing to take sensible positions. Now you can't guarantee that. Everyone has clients who are unreasonable on both sides, but with reasonable people acting you can usually resolve matters. I think the system we have in Victoria is effective, particularly if you look at the County Court medical list where there is tight control in the due process by the court. There is compulsory mediation and there is a small group of practitioners who concentrate in the area, provides a model which is different from a statutory model but provides a similar effect. That is, you resolve cases relatively quickly with fewer costs than you would get in a very litigious environment where everything goes to a judge for determination. But you still retain for those cases where parties can't come to an agreement, you still retain the process of judicial review, you still retain an independent, impartial and usually fairly fearless decision-maker who can resolve the issue and you still have the ability to obtain what the community considers to be fair compensation.

Now from my point of view, from the point of view of those lawyers who work in medical negligence, we believe that we are honourable, that we do a good job for our clients. We are aware of the impact that our work has on doctors. I'm aware of it every day because I'm married to a doctor. But we certainly don't believe that removing the rights of people to seek adequate compensation to protect essentially insurers is a fair way forward

QUESTION: Do you think it may be the case simply that the word "appropriate" is the one that's most important when it comes to trying to sort out this mess? I'm sure there's a huge amount of goodwill in this room trying to pursue the interests of sick people, patients, litigants, but there must be an informed community consent for going for the money because it has bad implications for the whole society. The biggest insurer in the world has walked away from this area.

DR COURT. I'm probably not the right person to answer the question. I would, however, like to make two points in relation to the question. First of all, I have never and will never challenge the motivation, principles or anything else of anybody involved in the common law and I have no problem with what the common law endeavours to achieve. The reality is, however, that sometimes I hear an argument that affordability should not be taken into consideration because where does that leave my client? And my response to that question is why should the common law on negligence and tort feasors be the one area in society that doesn't have to face up to the reality of affordability? Because the consequence of a system not being affordable is that it will eventually fall over. The other reality is that it does impact upon the people who provide healthcare. Whether it should or shouldn't is not the point. It does. If you want to recruit a rural obstetrician in New South Wales now, where do you start? I don't even practise medicine any more. I've had three offers from rural New South Wales in the last month. They arrive in my mail on a weekly basis. There is an issue and affordability does have to be taken into consideration. It is not a problem with the principles of the common law, it's the consequences.

QUESTION: MR CURTAIN. I must say I was surprised at the start by the suggestion that the New Zealand scheme would reduce incidents as opposed to the Australian scheme and I saw nothing in the material to support that. Is there a reduction in negligence by doctors because of the scheme? And where you have a scheme over here where doctors are subject to peer review and all sorts of steps are taken, is the elimination of common law rights going to improve on that? I see no reason to believe that.

I would also like to raise another matter. It's ironic that a member of the Federal Government is agitating for removal of rights to sue. One of the significant costs of verdicts of damages in the common law scheme is the cost of ongoing care and cost of income forsaken. When a person has an injury and gets compensated the first thing they have to do is pay back all the medical expenses to the Commonwealth Government, they are excluded from the privileges of a pension which they would otherwise be entitled to, whether it be with a carer or not, and the Commonwealth Government benefits significantly from every one of those awards of damages. It seems to me a median path might be to say that if that person had been injured, the compensation that they get at common law will take into account the pension and the free medical care under Medicare that they could have otherwise got and the community bear the load in that way. Those ongoing costs are not insignificant and it would be of great assistance to doctors if the Commonwealth did not deduct those matters and there wasn't an exclusion.

And, finally, as a barrister who sees doctors sued regularly, I would like to say I'm appalled at the amount of money doctors are remunerated under the Federal Benefits Scheme, particularly obstetricians and gynaecologists. I've never understood why a person would give up a life that could be lucrative to deliver babies for I think insultingly low rates, and I think the community should be made to understand that they should bear the cost of good care by paying doctors adequately so that they can afford to be properly insured.

DR COURT. The point I need to respond to is obviously there's been a misunderstanding of something I said and I regret that and apologise for it. What I was trying to say was that New Zealand's system is not a "no fault" system and that the only way of improving safety so that there are less cases under any system is to improve trust in the system and to get away from the secret of response to anything that does go wrong in health so that appropriate clinical risk management manoeuvres and quality assurance manoeuvres can actually improve the safety in the systems. New Zealand's system doesn't currently achieve that and there's nothing about a court system that inherently achieves that either. I was making the point that that's something that all systems need to face up to, that the only way of reducing the number of claims and complaints is to reduce safety in health and that that actually does need a move away from aspects of the "blame, name, shame" culture. We haven't achieved it.

QUESTION: DR NISSELLE: Picking up on your point about is there any evidence that either a statutory scheme or common law actually influences standards of care, the best evidence of that comes from the Harvard Malpractice Study. That study is a retrospective analysis of something like 30,000 hospital records and of the people who the assessors found had been injured as a result of avoidable mistakes in the healthcare - avoidable negligent errors - only about 12 per cent chose to sue. However, of the people who sued, two-thirds were not on the list who had been harmed as a result of avoidable negligence. And I sum that up for doctors by saying that would suggest that if you were a doctor in New York at that time, if you were negligent you were unlikely to be sued and if you were sued you were unlikely to be negligent.

So the short answer is that there is actually no apparent connection between the actual act, the medical act and the decision to sue. I am very, very reluctant to put data about medical litigation into a public forum because it is almost irrelevant to any discussion about quality care. The number of medical negligence claims that come through is a minute fraction of the total volume of medical care delivered and, quite frankly, a minute fraction of the total number of medical accidents. So it's a very, very imperfect measure.

QUESTION: I was going to make a slightly provocative comment and suggest that the entire discussion is perhaps a little narrow, that the concept of compensation is actually much wider and perhaps Australia's motto could be "omni compensatum", if I've got my Latin correct. What we're seeing, in the medical sense and in the legal sense, is really only a small part of what we're seeing right across the country and whether or not you run a water slide up on the coast or boats out on the bay, we're seeking exactly the same thing that given the notion that you perhaps did not have a responsibility or did have a responsibility can be arguable but compensation is possible and that we see in the paper every day of our lives.

If one wants to take the extension of this, it creates almost a second social security system. Now if one takes the logic of that, it will be paid for initially by individuals, either individual businesses or insurance, but ultimately the community will decide on the payment they can afford because no-one is going to work for nothing, whether they have a water slide or whether they deliver babies. So, ultimately the cost will come back to the community.

There are lots of examples of doing things that will impact on rates of claims. There's good evidence for it. Let's just pick one. There's an indemnity organisation in Colorado called COPIC. COPIC is a small indemnifier, you could call it a boutique organisation that basically says, "If you want to join us and be indemnified by us we are going to impose some obligations on you. Over the last ten years or so our members have been too frequently successfully sued for issues related to informed consent so we will expect you to go to informed consent workshops which we believe will impact on the rate of that." Now for the first three to five years their workshops showed no impact on the rate of their members being successfully sued for breach of the standard of informed consent. However, after five years they noticed a marked difference and now for the last five years there has not been one successful case brought against one of their members - they've got 4,500 members. There are definitely things that can be done about claims rates and that's why the culture needs to change so that those sorts of things can be done, none of which means that the common law system has to be shut down. You know, it's a matter of trying to look at the broader picture.

QUESTION: Thank you. I wanted to compare the two systems in Australia and New Zealand from the point of view of the psychological reasons why people sue and which one addresses those reasons better. Sometimes I suspect people sue for psychological benefit rather than monetary.

DR ARRANGA. I can only comment from that point of view on my own experience of my clients and my observations of them. I think the first thing to be said is that the vast majority of people who come to me don't have a medical negligence claim and, as I said, most of them have a complaint. I see or speak to about 50 people for every claim that I issue, and the vast majority of those people are angry about the way they were treated by the doctor or the hospital, sometimes justifiably, sometimes because of a misunderstanding. Doctors, for all their best efforts, don't always communicate the facts in a way that the patient understands or remembers and we are all aware that at times of stress people don't recall very much of what's said to them. But there is a percentage of people whose major motivation in seeking to lodge a complaint or commence a claim is anger, revenge. It's usually put somewhere along the lines of "I want to make sure that this doesn't happen to anyone else" and my general response is, "Well, I can't guarantee that. If Dr Smith's been practising in this way for the last 50 years, I suspect that nothing you or I do is going to change the way he practises." But, certainly, a very large percentage of the people I see are motivated by anger, initially, and then a small percentage of them, for want of a better word, are "nutters" and we deal with those. And I suspect that the "no fault" scheme produces the same sorts of clients.

DR COURT. Because the threshold is lower there's some argument that it increases the number of vexatious complaints. It's all about communication and what causes people to sue doctors is not because of standards of care, it's because of a breakdown in the relationship - full stop. There are countless studies that demonstrate that. There's not one study that demonstrates that that principle is wrong.

QUESTION: DR NISSELLE. It's very appropriate for a meeting of the Medico-Legal Society that we end up with a position of "heated agreement." But there are any number of studies from overseas, the classic being a study published in Lancet in June 1994 that looked retrospectively at a number of people - well over 200 - who had sued a particular hospital in London. Now remember they commenced litigation and all litigation can do is give people money, but only 25 per cent of the people said that their primary motivation for commencing the litigation was to seek compensation. Almost a third used words like "It was the only way we could find out what really happened" and this relates back to the comment I said earlier about Stephen Duckett, that everyone is now pushing towards a policy of open disclosure and seeing that early and frank and complete open disclosure is what would help reduce litigation rates and lead to better resolution of patients' anger at what's happened to them if they've had an adverse outcome. But Stephen Duckett's point is that a culture of blaming and claiming and naming (to use Denys's comment) is getting in the way of open disclosure. Perhaps one of the real solutions to the Australian problem that may emerge over the next few years will arise from the work of a consortium being appointed by the Quality, Safety and Healthcare Council looking at open disclosure and trying to develop a policy on open disclosure and health in Australia.

Stem Cells

by

Professor Alan Trounson
and
Dr. Rufus Black

An address delivered at a meeting of the Medico-Legal Society
at the Australia Club held on 4 May 2002.
The Chairman of the meeting was Ms. Pauline Shiff.

PROFESSOR TROUNSON. This is a topical issue. It is one which is stretching the imagination. It is challenging the ethics and it may well be a revolution in medicine. I think it is too early to decide how it is going to absolutely impact on us but I suggest to you that perhaps by the end of the talk you will be convinced that it will have some impact on our lives, at least in the next 20 or 30 years.

I changed my research interests from simply making embryos to help infertile couples and diagnosing genetic disease, to wanting to know more about how the early human embryo developed and what was going wrong in these early stages that resulted in abnormal development and cancers in foetal development and in early childhood. We have never been able to look into the early human embryo because it's been attached to the womb. You can't look at it in the culture laboratory and you can't really take it away from the uterus. It was an area where the view of it was dim and the only understanding came from research we were able to undertake on animals.

In 1994 I went off to Singapore to see if I could grow what are known as human embryonic stem cells. The view at that time was to try and understand some of the early events of what we call "differentiation"; how completely undifferentiated cells start to grow into the tissues of the organism and how an integrated model of an organism would develop.

In this talk I want to tell you what stem cells are and why we're interested, why I am interested and maybe why you should be. Where do they come from and what can we do with them? What is the probable impact on our community as patients and as people who are interested in what they might do? Stem cells are clonegenic, that is they are self-renewing. For example, we are shedding skin all the time and we have to replace skin otherwise we'd be exposed. In our tissues many cells need to be replaced all the time and they are replaced by stem cells. There are two types of stem cells, broadly the first is known as "embryonic" or germ-line stem cells, which go to form all the tissues of the body. These are undifferentiated cells that exist in the early embryo which go to make up every tissue of the body, so they're what we call pluripotential, they have the capacity to produce everything or anything.

The others are formed in our organs: liver, brain, and there they are managed, they are looked after. They are very difficult to find sometimes and in fact we don't know what they really look like in a lot of tissues because we haven't got markers that recognise them. But we can recognize them in some tissues, like bone marrow. About one in half a million cells are stem cells and they go to form new blood cells. They form all the blood cells, platelets, white blood cells and red blood cells that we have. So they are adult multi-potential stem cells. They don't normally form the nerve cells or muscle cells but in some experiments they have been known to transdifferentiate, that is jump from their known lineage into something else. However, that is under very rare experimental conditions and not many of them do that. We are interested in trying to understand whether we can actually induce them to jump those lineages but currently very few of them will do that. They are cells that can be found living in some tissues. We can expand some of them such as neuronal stem cells to some extent but we can't expand blood cells, so when we find them we have to use them, we can't multiply them. On the other hand we can multiply embryonic stem cells endlessly. So it is clear that there are some particular differences between the two cell types.

I want to talk now about embryos. Imagine an eight-cell embryo, they are the embryos we produce in our IVF programs and they are the ones that are normally frozen down. In the early embryo every single cell of a two cell, or four cell embryo is totally potent and can produce a whole organism by itself. However, once it's beyond the eight cell stage or further it can't. Thereafter you need a number of cells to produce an embryo.

The blastocyst stage is the embryo just prior to embedding in the womb. We grow this embryo in a laboratory. If we keep it out on the laboratory bench by the seventh or eighth day it's completely abnormal and it can't develop normally thereafter. We have to get the embryo into the maternal uterus for it to develop normally before this happens. The blastocyst stage embryo is about 100-150 cells and has an outside layer and a group of about 30 cells sitting on the inside. It is these "inside" cells that go on to form all the embryonic and foetal tissues, and it's these that we're interested in. The outer layer is the ones that embed in the uterus and form the initial part of the placenta that invades the uterus and attaches the embryo. We can make the "inside' cells in the laboratory and then we can drive them in differentiation through to the adult stem cells. We naturally link up with adult stem cells along the way as we produce tissue-like blood or central nervous system brain tissue, peripheral nervous system tissue, the nerves of the peripheral systems, liver and so on. Although we've never done it, there is a group in the United States, which has also got a germ-line stem cell from the embryonic gonads, and they can also form most of the tissues that we see in the body.

Where do the cells come from? They come from IVF patients. We normally collect eight or ten eggs and then form eight or ten embryos every cycle of treatment for our IVF patients. However, we never put that many embryos back at one time. Essentially, we are limited to one or two embryos to transfer to the patient because we don't want the patients to have triplets or quadruplets. We actually would even prefer them not to have twins. We freeze the rest of the embryos for the patients. In, say, 30 per cent of cases patients will get pregnant every time we transfer some embryos. But in 70 per cent of the cases, the patient won't get pregnant. We can then go back and get one or more embryos from the freezer and hopefully, a pregnancy will be achieved on the next cycle, or even the one after. The embryos are stored for them under systems that we set up in the 1980s for future use.

In Australia there are currently around 70,000 embryos in the freezer. Most of those patients want to use them. There are probably around 20,000 or 30,000 that are excess to requirements, because after the first child, or maybe the second child, that's enough and the remaining embryos are not "wanted." What is the option? They can be donated to other couples, but not a lot of people do that, or they can be disposed of, thrown away. It is these embryos that would normally be discarded that we've asked the patients for consent to use them for making embryonic stem cells. The disposal procedure is fairly simple, because you can fit ten of them on a full stop. They're in a little plastic straw, we take them out of the liquid nitrogen and we leave them on the bench for an hour and we put them in the bin. That's how it works. There's nothing more magical than that. But if we're going to use them for embryonic stem cell research we take and preserve 30 cells that sit in the centre of these embryos.

What is the legislation and what are the regulations in Victoria? We can only store embryos for our patients for five years, so they must be donated or discarded within that time, although we can apply to ITA, the Infertility Treatment Authority, for an extension. Some patients do and they have to give the reason for extending that. But it's very clear that we're not allowed to keep them for more than ten years. There's a time limit and in Victoria it's usually five years. In other states it can be up to ten years. In our IVF programs as we make the on this embryos, we transfer them to the patients or we freeze the extra embryos. We may thaw some of those to give the patient a chance at their first or next pregnancy or either donate or discard the embryos. Here in Victoria we are not allowed to use embryos for research, that's in the law, so we're not permitted to make embryonic stem cells. This is why we have had this discussion with the Prime Minister and the Premiers. This resulted in a COAG agreement that we would have access to those embryos that are currently stored for making embryonic stem cells. However, it still has to be ratified by free votes in the Federal and State Parliaments, so we have to wait until that is completed before there is a real legislative agreement to do that.

What about these embryos? The inner cell mass is a little nest of 30 cells that has actually got a shape to it because it's very important - it has a memory for axis. It can remember where the head is and the tail is and the left and the right because it has to go on and make an organism. It has to put the head in the right place, the legs in the right place, the arms, and the spine, all the things that have got to go in the right place. But it loses that memory very quickly if it is taken out of the embryo. If it is taken away from the trophectoderm (the outside coat of cells) or if it is not put in the uterus, it loses that whole memory for axis and it can't then figure out where to put its differentiated cells.

When we're making our embryonic stem cells we just lyse (dissolve off) the outside cells of the blastocyst stage embryo, and the inner cell mass is popped out. It has an oblong shape, so the head is at the thick end and the tail is at the thin end and it has a left and a right side. The colony underneath it is a week older and has absolutely no memory whatsoever of axis, none at all, and it's growing there on some feeder cells. That's important, I think, because after a week the cultivated embryonic stem cells lose the memory and can't make an embryo, it can only make a solid state teratoma, that is essentially a "tumour" made up of a mixture of tissues. You find these teratomas in the gonads, in the ovary and in the testes and they are taken out if they're located. In the past, they would grow to very large sizes because they weren't diagnosed. They have everything - teeth, hair muscle and brain tissue, but it's all mixed up, and it's not an organism it's a teratoma. We can stain those colonies with different coloured stains and that would tell us whether they're differentiated or undifferentiated. We can look for what are known as transcription factors, these are genes which are expressed which govern the fact that those cells will remain undifferentiated.

Between 1995 and 1998 I used 32 embryos in my work in Singapore to work out how to do this and then we used 11 embryos to produce 6 cell lines. It took us an amount of effort to do that. But these are the

6 cell lines that are recognised by the National Institutes of Health in the United States. There was a group called "The Moonbeams Inc" and, during President Clinton's time, President Clinton agreed that the United States National Institutes of Health should be able to work in embryonic stem cells. "The Moonbeams Inc" came with a suit against the President and the administration to stop him from doing that because "The Moonbeams Inc" were the people who were receiving the donated embryos and they felt if we made embryonic stem cells then there wouldn't be "little moonbeams" (embryos) to pass to patients. It had a very strong religious component to it.

Now my group went into litigation to assist President Clinton. There were six senior US researchers, two Australians (myself and one other), Christopher Reeve, another patient and a very clever lawyer who was President Bush's father's senior counsel when he was in his presidency. This was a hard case and there were a lot of issues dealt with and a lot of material passed between the parties and two days before were to go into court, President Clinton said that he was going to fund embryonic stem cell research for only those embryonic stem cells which were in existence. Of the 60 cell lines that were in existence at the time, 6 of them were ours. As it turns out there were only really about 16 that were useful, so 6 of those 16 are the ones that we made. We made one set of those along the lines that were required by President Clinton's initial agreement to fund it. The company that I helped form now is receiving a large amount of money to provide the stem cells to researchers who get NIH funding. President Bush got in on a very close margin and so "The Moonbeams Inc" evaporated because President Bush was very strong anti-abortion, anti-embryonic stem cells. He had a very strong view about not funding embryonic stem cells.

These embryonic stem cells are immortal, they keep replicating and they never stop replicating. That's very unusual. We age because our cells eventually stop replicating and that's the case when you grow tissues in cells in culture in the laboratory, they all stop after a while. These cells never stop. We've had them for five years and they are continuing just as they were in the beginning. We can produce billions and billions of them and we can supply them to academic research institutions all over the world. We've supplied around 200 institutions and there are 2,000 institutions wanting these cells.

These cells are also called "the mother of all cells" because when we let them differentiate they can produce anything; lung tissue, gut tissue, early nerve tissue or tissue that you would expect to see in the foetal brain, muscles and ganglions, teeth and hair and you can find everything. The challenge is that we need to learn how to direct these billions of cells to go into the tissues that we want to use to help patients. All the research is about holding, multiplying and directing these cells in their differentiation programs. It is a complex business because the cells are really responding to complex signals and we're working out what we call the progenitors, the cells that sit at the top of the tree and form other cells.

We always see nerve cells in our culture. We can recognize them because if we stain them with Encam, a stain for neural stem cells, they stain them up nicely and if you pass messages along them they will pass electrical current from one to another. We know how to differentiate these cells. We know how to manage these cells, if you like. We turn them into neurospheres by a very clever piece of detective work and neural stem cells lie down on the culture dish and produce mature nerve cells. If we take those cells we can put them into brains of rats or mice. The human cells just diffuse into the parenchyma as if they were mouse brain cells. You find them on the transition routes, on the migratory routes you would expect of those cells, going down towards the olfactory areas. They behave as if they are mouse and they integrate into the brain of the mouse quite normally. Whether it's going to be a smart mouse or not, I don't know, but it's got human cells in it.

The tricky part about it, to be honest, is that if we want to correct Parkinson's disease we have to get dopamine-producing nerve neurones into a special place in the brain. Currently we are trying to teach these cells to go to places where they are meant to be, not all over the place. The research is becoming mature in this area and we are learning how to coax these cells to do these things.

We can also produce cardiomyocytes, heart muscle cells, and we learn how to do that by also being very smart. If you take heart tissue and you grow it into a cell line and then you put your embryonic stem cells with it, it gives the embryonic stem cells a message to go and make cardiac muscle cells. So there's an instruction coming from tissue in the embryo that's nearby. If you use those same cells and you put them together with human embryonic stem cells they can actually produce beating heart muscle cells. If one takes a colony of our embryonic stem cells these cardiac muscle cells gather together in groups in the culture dish, and these cells are really quite spectacular when you see them because they start beating at the same rate as these cells beat in your chest. My father died of heart disease a bit over a year ago but he said, "Why don't you do something important and grow heart muscle cells" and I said, "It's going to take too long, Dad." So he went to the Victor Chang and said, "Come on, you could do it." Now we can do it but he didn't see them and I would have loved to have shown him human heart muscle cells in a dish beating at exactly the rate at which a heart beats. Importantly, if you have a mouse or a rat that's had an infarct induced so you've got some damaged heart muscle cells, you can inject these cells into the blood stream and they will go and colonise the heart area that has the infarct and they will start beating at the same rate as the mouse heart muscle cells do, fortunately for the mouse. We would expect if they were injected into the human they would beat at the same rate as human heart muscle cells. So when they congregate together they behave as instructed.

I have an interest in using these cells to replace retinal cells in the eye for people who have gone blind. You can see the picture outside WHO in Geneva of the blind man being led by the young boy. You have to have somebody to lead you around in Africa when you lose your sight. If we could go and repopulate those people's eyes with retina stem cells and get some sight back, maybe not the best sight in the world, but if we got them back some sight they wouldn't have to wait for the young boy to come out of school to lead them.

These embryonic stem cells can be used for research and discovery and there are interesting and new options. They can be used for drug screening because these cells, if they're good enough will respond in particular ways to the drugs, in the same way as the cells in the living body will react to the drugs. We can also use these cells for screening for toxicology so that we don't have to go into large-scale animal trials looking at toxicology. There will be pharmaceuticals which could be used in regenerative medicine. If you have a protein that will actually move your neural stem cells into a regeneration phase, they might be particularly useful for some conditions where we want stem cells to move up and replace lost cells. The proteins that are yet to be discovered could be worth as much to the economy of Australia as the whole grain industry. If we discovered 20 of them a year we would turn the economy of this country around quite dramatically.

Interestingly though, the fruits of this research may also be used as vehicles for the delivery of gene therapies. About 12 to 15 years ago $2.5 billion on the New York Stock Exchange was invested for gene therapy. This line of research has basically evaporated now because the genes that were being used were being delivered by viruses and they had unexpected and unpredictable results, and there were a few patients who died from the treatment. However, it can come back because with the developments I have indicated we can put the genes into these cells and these cells will go to the right place, so the results are going to be totally predictable.

We may also use them for new immunisation strategies, because if you get a cell and you put it in an antigen that blinks on, blinks on, blinks on, the body may keep making antibodies and give you a much longer immunisation. They may also be targeted for cancer, so it can make killer cells wandering around the body looking for nasty cancers or cells which have gone on migration and may form metastases. In the future they can be used for cell therapy, clearly for the neurodegenerative disorders and diabetes, perhaps cystic fibrosis, vascular and heart disease and maybe, hopefully, one day for Christopher Reeve, to help him get out of his wheelchair.

I will tell you a little story about an experiment. This is about a mouse in a "bubble". You've heard of the boy in the "bubble". There are some kids and some mice that have severe combined immunodeficiency. If you let them out the pathogens in our environment will kill them and so they have to live in a controlled environment, the "bubble". What was done in this experiment was to take some skin cells from the tail of the mouse. These were cultured in the laboratory and injected into a mouse egg where they made an embryonic stem cell. This can be done by self-fusion but it is a nuclear transfer procedure which is known for use in the cloning procedure. Embryonic stem cells were made by homologous recombination, the bad gene can be knocked out and the right gene can be dropped into the bad gene's place in the stem cells. Then another gene, a homoeobox gene, was inserted which drove all the cells into the haemopoietic linage which is where they need to go. Then they were injected back into the tail of the mouse and they recolonised the bone marrow of the mouse which was completely cured and could come out of the "bubble".

We could cure lymphomas. We could cure a lot of genetic diseases, diseases of the blood, for example, haemophilia, thalassemia, sickle cell anaemia and Fanconi anaemia. We should get on and do that in the next five or six years because there are lots of young kids who need that help because they're going to suffer a miserable life without it.

If you talk about nuclear transfer procedure we get a big response really because it's called "therapeutic cloning." I don't see it is too much of a difficulty myself, but other people do, because you form an embryo briefly for a few days while you are making embryonic stem cells. But if it was a woman she could make her own embryonic stem cells because she'd have her own eggs and if it's a mother she could make that for her child. It is only the men really who have got the problem I think in this area, because you need a source of eggs and there is not a ready source of eggs available. We are going to have to develop some alternative to this procedure.

Sometimes cells naturally fuse together, but you can fuse embryonic stem cells with sematic cells, skin cells if you like, and they turn into embryonic stem cells. So not only the egg is dominant over the sematic cell but also the embryonic stem cell is dominant. We could probably use the cytoplasm of the embryonic stem cells to reprogram them all. There is an alternative there that may not require us to make embryos, even for a short period of time.

You have a number of choices. You can take the child who is sick, take a skin cell from the child, hybridise it with the mother's egg, make your embryo, make the embryonic stem cells, drive them into the cells that you want to treat the child and they will be completely compatible as a transplant for the child. The mother could just provide her own egg and you don't even need any sperm, you can parthenogenetically activate those eggs. The best way is to put a bit of alcohol on them. You can make embryonic stem cells that way and they've done that in the United States in monkeys. Of course, they would be completely compatible for the woman, so she could have her own embryonic stem cells that way. Or we can use a fusion technique where we can fuse our stem cells together with embryonic stem cells and make them compatible for people.

There is another interesting recently published piece of information that says if you give an animal such as a rat an injection of embryonic stem cells, a month later you can go and transplant to that animal, across an MHC histocompatibility barrier. Now this is unheard of. You can actually go and give that animal a piece of heart transplant and it won't reject it. The only thing that the rat had to have was an intact thymus so we think that the embryonic stem cells have somehow got into the thymus and have told them "the next time you see that tissue, it's "us", it's not something foreign." If that is the case then it is an extraordinary advance for both adult and embryonic stem cells. It is a fantastic advance because there is a way of making tolerance for grafts. This is why I proposed this centre to the government where we link together the embryonic and the adult stem cell researchers across the nation. We are now waiting to hear whether they will support that. I think it's sensible to do that, because the lessons going either way are going to be fantastic and they will more quickly lead to clinical trials and anything else we can do.

In relation to legislation affecting stem cells, the Infertility Treatment Authority here in Victoria prohibits cloning of embryos and people, forming embryos except for a treatment procedure and importing and exporting embryos. Even though people can wander around, you can't take embryos around without the approval of ITA. It stops you from altering a sperm or an egg and it stops any research on embryos. So the Premier and the Minister of Health have to fix up the Infertility Act if we're going to do stem cell research here and they want to do that, so I think that's terrific.

It's interesting that an embryo defined under this Act in Victoria is defined as an egg and a sperm and, hence, the procedure I just talked to you about wouldn't be covered by the Act because we are using adult stem cells to put into the egg. Western Australia bans nuclear transfer so it would stop all of the work on that, and it bans research, so it bans growing embryos. They have to do quite a bit of work to fix up that particular Act. South Australia bans production of two or more embryos from one embryo. Any research is detrimental to an embryo and so you could argue that forming an embryonic stem cell is not in the best interest of an embryo. It may be of interest to the embryo than being thrown in the bin! It would be interesting for a lawyer to argue that case. And it bans alterations to genetic structures and nuclear transfer. So, again, that Act has to be tidied up. There isn't any legislation in the other states.

So, in conclusion, I think these are incredibly interesting cells and I'm committing the rest of my research life to them. They are pluripotential so they form all the tissue of the bodies, they're immortal so they can be grown in infinite numbers and I think that's just an incredible characteristic. We will use them to identify progenitors and key regulators and factors that direct differentiation and, hopefully, in due course, cell therapies to improve tissue regeneration or repair, and as vehicles for gene therapy. We will also bio-engineer some primitive organs. New nanotechnologies will warn us about what's happening to us, because they will put those nanotechnology instruments in us and tell us whether we're at risk of heart attack or something else and use them for drug discovery and drug toxicology.

But I would say right now that stem cells haven't cured one single thing and so this is about getting on and doing the research. Having the support of the community is incredibly important to us and that's really what the last few months of my life has been about.

DR BLACK. Theology is always a matter of biography and my biography has been about a constant conversation between life in the secular world and contemporary academic theology and ethics. That life has taken me into the worlds of law and business, universities and schools, hospitals and medical research institutions. The sort of theology and ethics that arises from this exchange demands that theological and ethical reflection live in harmony with the fundamentals of modern biology, physics, history and psychology. It is ecumenical and interfaith, believing that no tradition has a mortgage on the truth but that all contribute to it. It is not a theology that takes a leap of faith where reason fears to tread. It is a theology that thinks that much of value for living a fully human life has been lost from modern thought. It is the role of contemporary theology and, indeed, ethics to engage in a conversation to help recover what has been lost for believers and unbelievers alike and that really it is time that theology re-engaged that conversation vigorously.

I want to take three steps to determine the shape of an ethical response to the use of embryonic stem cells. First, I want to ask what type of ethics are we to apply. Second, what is the ontological status of the embryos from which the stem cells are removed, if that's the path to obtaining them? And, third, what are the ethical obligations that arise; given the type of ethics we're going to use and the nature or our understanding of the status of these embryos.

I think it is important to take all three steps and not to cut the conversation and the discussion short, because that is what has happened in a great deal of the public reflection on this topic. We need to think about the ethical methodology and the key philosophical assumptions such as what is the nature of a person, because there are distinct and incompatible ways of thinking about these issues and what answers we arrive at in relation to those, what some would see as preliminaries, largely determine the answer we arrive at.

If we don't resolve these first elements about what type of ethics we are to use and what are the nature of these entities then, in a sense, the debate will become assertion and counter-assertion, political, in the end not rational. And when it comes to issues which some will claim affect fundamental human rights that is an unsound way to form public policy.

So I want to begin with these first two steps. And that first question is what type of ethics are we to use? In this discussion I want to consider two broad possibilities: ethics that stands in a utilitarian tradition and ethics that stands in a moral realist tradition. The reason is that they represent the main positions in the current public debate over the use of these kinds of stem cells.

Now utilitarianism, which is probably the most widely though often largely unconsciously used ethics in the Western world, is, I think, the place to begin. It is an approach that, simply put, says choose the option which will bring the greatest good to the greatest number or choose that option which will bring the greatest happiness or perhaps, more accurately, the morally right choice is the one that will bring the better proportion of benefit to harm than any other choice available. A utilitarian approach will hold that embryonic stem cell research is ethical, put simply, if the good that comes from it outweighs the harm. And we should note that for this type of approach whether or not embryos are persons will not be determinative of the outcome because the good brought from the destruction of even people could be outweighed by the benefits brought for others. Utilitarian judgments license the intentional killing of innocent civilians at Hiroshima and Nagasaki on the basis that fewer lives would be lost through that method of forcing the Japanese Government to surrender than if a land invasion were attempted.

So while utilitarianism is in many ways widely attractive for its apparent ease of use, it suffers in fact from very deep logical flaws and these flaws are important to point out because many of the major figures in bio-ethical debates, people like Peter Singer, base their arguments explicitly on this type of reasoning. I want to point out just one of those flaws. It is what I think we could call the "omniscience flaw", because utilitarianism determines which course of action is ethical by comparing the likely consequences of the alternatives on offer. The problem is that you would need to be, not just omniscient to know what all the consequences would be, but omniscient in a determinist's universe, otherwise you're simply not going to know what the consequences will be.

One of our human constraints is that we are limited by our capacity to know and to see into the future and by our capacity to recognise the breadth of impact of even simple decisions we might make. One of the insights of chaos theory which gets popularly talked about in terms of the beating of a butterfly's wings causing a hurricane in another part of the world is that we increasingly recognise that we live in a world of such complex inter-related physical and human systems that predicting the consequences of even apparently simple actions is extremely difficult. If we introduce the possibility - and it's, I think, highly defensible that humans make free choices - then the prediction of consequences is, quite literally, impossible.

So in the case of the use of embryonic stem cells it is on this kind of reasoning impossible to determine whether the medical good that is likely to come from the use of these cells, great as it appears to be, would outweigh the contribution that knowledge would make to the development of the type of genetic technologies that might permit the creation of the kind of brave new world that few would want to set us on the path towards creating. That ambiguity about which path to take is all the greater if one of the choices is between the use of embryo stem cells and the stem cells in adult bodies.

It may be that a refusal to allow the use of embryo stem cells would accelerate the discovery of ways to use adult stem cells to the same ends while reducing the likelihood of some kind of brave new world outcome. The difficulty for a utilitarian way of thinking about these problems is that it is impossible to know which of those consequences is going to be what happens. You can guess that one might be more likely than another but determining ethical questions as fundamental as that on a hunch or a best guess about the future is a very unsound way to make ethical decisions.

So if on topics like this we are able to paint plausible future different scenarios then this kind of ethics is not going to do the job for us. An alternative way to make ethical decisions is to use a form of moral realism. Ethics, according to this approach, is the reasonable pursuit of what is genuinely humanly fulfilling in community with others. It gets called "moral realism" because it is the reality of human nature and our existence that sets the boundaries on what human fulfilment is and how it can be reasonably pursued. It is our human nature that means we can find fulfilment in features of life like our friendships with others, exercising our physical skills, enjoying beauty and being healthy. Similarly, it is the nature of our existence such as that we have limited time and energy and that the world has limited resources that gives rise to the requirements of reasonableness in ethics, such as we should cooperate with others, that we should make and sustain commitments and that we should be efficient in the way we do things. In a world where we have limited resources, limited time, if we are not doing those things we are acting unreasonably.

In its most contemporary forms, this kind of moral realism represents the fusion of two great Western traditions of ethics. An Aristotelian tradition which asked, "What must we do to ensure human flourishing and fulfilment in a community?" and a Kantian tradition which asks, "What practical reason, the kind of reason we use to make decisions, requires of us?" When you bring those two traditions together, as modern, moral realist thought does, you get the kind of approach which says, "How do you get that Aristotelian end of a life that flourishes in a fully human way? How do you get there reasonably?"

Probably one of the greatest expositors of this kind of ethical tradition at the moment is the Australian legal philosopher, long resident in Oxford, John Finnes. This kind of thought is now at the cutting edge and you will find it behind the thought of people like Amartya Sen who recently won the Nobel Prize for Economics. It's reshaping the way we think about ethical questions, providing a strong alternative to the utilitarian tradition. This type of ethics enquires into the intention behind our decisions. It asks, at the very core of it, what we intend by our decisions - is it a reasonable pursuit of what's humanly fulfilling? If it is, you can say the decision is ethical. If it's not, it is unethical. And central to this kind of approach is a recognition that our intentional choices shape our character. If, for example, our intention is to constantly care for others then our character will become a caring one because our ways of thinking and feeling become aligned around our taking and making such choices. So if we consider the use of embryonic stem cells our focus will be on the intention of the researcher in his/her interactions with the embryos the cells come from. We will be asking whether in using cells from an existing stem cell line or extracting cells from embryos or creating an embryo to extract cells from, what is their intention in doing it and is it reasonable?

But to understand what that intention is we need to know what the nature of these embryos are that are being dealt with. We need to ask what their status is. And in Western culture it is the second step that we need to take to get to a conclusion in this kind of area. There really are two broad traditions about the ontological status of embryos. One of those traditions, in its strongest form, sees these cells as mere human tissue and the other tradition, in its strongest form, sees that early embryo as a human person. I want to look at both and to suggest that there is in fact a middle path between them which may offer us help in this environment. The contemporary idea that embryos are merely human tissue has its origins in Enlightenment thought. That movement placed rationality at the centre of the definition of what it was to be a person so that those, like Peter Singer, who stand in that tradition call on enlightenment philosophers, like the Scot John Locke, and his definition of a person as "a thinking, intelligent being that has reason and reflection and can consider itself as itself in thinking the same thing in different times and places."

Now although the idea of rationality as the feature that distinguished humans from animals is deeply rooted in the Western tradition and at least that feature of the tradition is probably no longer sustainable, in the work of John Locke and others a significant shift occurred. It was a shift from the notion that if it was in the nature of a creature to become rational and possess self-consciousness then it was a person, to the idea that it was the current possession of rationality and self-consciousness that defined a person. So with that shift, while the foetus might be judged to be - on an old way of looking at things - a person because they may one day come to possess that capability, on a post-Enlightenment view they can no longer be judged a person because they do not possess those capacities, especially at that early stage, for rationality and self-consciousness.

That kind of tradition of thought takes its place comfortably in a modern, analytic tradition of philosophy that seeks to define things by the properties they possess. To that turn of mind, it is unambiguous that an adult is a person and so to start the definition of a person with what the properties an adult possesses seems the right way to begin. So we begin with properties like autonomy, self-consciousness and rationality. From that kind of standpoint the claim that a foetus is a person appears at best strained and the claim that an embryo is a person appears flatly wrong.

However, what's intuitively appealing about this position is that when you peer down a microscope, as we had the privilege of effectively doing tonight, there appears to be a considerable difference between a collection of apparently identical cells and a fully functioning adult. It is a way of thinking that certainly appeals to commonsense.

Now the counterpoint to the view that embryos are human tissue is a tradition which has been shaped and developed primarily by theology and, in the West, by Christian and Jewish theology that sees embryos as human persons. What Christian theology does is to define the nature of an entity in a very different way from the way Enlightenment and post-Enlightenment thought. While an entity is defined in the post-Enlightenment tradition, in terms of the properties it possesses at a point in time, in a theological tradition it is defined in terms of the properties it possesses in relation to time. In a post-Enlightenment thought, space has come to have a primacy over time. In Christian theology, time has a priority over space. You probably can see how this works if we consider the situation of genetically identical twins at early stages in their development. The entities in themselves possess no properties by which we can easily distinguish them. Post-Enlightenment thought will distinguish them by space-related properties - the one on the left and the one on the right - and will hold that in almost all meaningful senses they are identical.

Christian theology will deny that they are identical at all. It will distinguish them by observing that in relation to time they possess very different properties because both are on unique historical trajectories. And I think it's useful to understand the background to this very different way of thinking about the nature of knowledge, thinking about where this priority of time over space comes from. It is found in Hebrew and Greek scriptures and whatever we think of them as documents for religion they have been vital documents that have shaped the Western secular mind as well. And if we look at them we can see where this idea that time might actually have a priority over space in the way we understand the world comes from. We can see that in the way God is understood. Time actually plays a critical part. When God reveals God's self to Moses in the burning bush the words that are attributed to God have a dual meaning: "I am who I am and I will be who I will be"; "The future of God is important to the nature of God as God's present." At a community level the identity of the people of Israel is defined by their history, not what they currently possess. It is the central events of the exodus from slavery and into the Promised Land and the stories of their ancestors; their history defines who they are. When they recount who they are in the Psalms they do so by recounting their history and at an individual level it is the historical relationship of people with God that defines their identity. In the prophet, *Jeremiah* we find "Before I formed you in the womb I knew you" and "Before you were born I consecrated you." In Psalm 139: "For it was you who formed my inward parts, you who knit me together in my mother's womb."

So in this and many other passages we find a person able to talk about "I" historically right from those earliest beginnings. And if the Christmas stories have any currency they point to the ability to identify the beginning of that particular human person right from the beginning.

So in the Annunciation stories, the person who will or has come to be as the result of the work of the spirit is identified as a particular person. And when Jesus' identity is established it is actually not by powers he possesses, they are merely signs, but by his historical role as the Messiah. All of that data meant that Christian theology recognised that time was actually central to the definition of what something was and future time absolutely pivotal in a Christian tradition which understands Jesus' identity by looking to the future not to the past.

Now whatever judgment one passes on the data that was used to establish that insight it stands as an important corrective to contemporary thought which in so many ways marginalises and denies the integral time boundedness of everything. And we should note that Christian theology has not been entirely alone in modern times in emphasising the importance of time in understanding what an entity is. The great German philosopher, Martin Heidegger, interestingly well schooled in theology, took two properties as central to understanding the nature of what it is to be a human: being, existence and time. So it is on the basis that the history of an entity is critical to our understanding of what it is that enables us to, I think, understand why theological tradition has seen a human person beginning at the moment of conception.

However, and it is critical to recognise it, that tradition that saw it beginning right at the moment of conception is actually relatively recent. Until 1887 when Pope Leo saw it as an error to say otherwise, the common view amongst theologians, owing much to Thomas Aquinas, was that a fertilised egg began to grow as an animal and only later became a human when it was animated by a soul. That made a great deal of sense to a Christian theological tradition which has maintained that a human person was the indivisible unity of a body and a soul and we can translate "the soul" for modern purposes simply into the term "a mind."

Now given that contemporary knowledge about how integrally related the bodily brain and the mind are, there is much to be said for an account that holds that a human person is an integrated body and mind. So the kind of tradition that has wanted to assert that it was a human person from the very beginning actually, I think today, struggles. It's a difficult argument to sustain that it is a person from the moment of conception because there simply is no soul. Now we know enough about embryonic biology to account for its development solely through biochemical processes. We don't need to posit entities like "souls" to explain its development and, what's more, there's no obvious means by which an immaterial reality like a mind or a soul could exist in an embryo, there's no physical mechanism to support it. So those theologians who maintain that such entities have souls have to, in a sense, argue the logically implausible, though not impossible, position that somehow God maintains that soul in the entity until some point where a brain is able to, in a sense, take over the powering of it. That is an implausible view, I think, of what a mind is and how it might be maintained.

So they are two great traditions and I think we can find a middle path if we combine the two perspectives. First, that an entity is defined by reference to time, which means that an embryo's nature is defined by the personal history of which it will be a part and, secondly, by a tradition that says an embryo is not yet a human person. I think the outcome of bringing those two positions together is to suggest that an embryo is a personal body.

We might get a better sense of what that means by thinking about the other end of life. When a person is dead we still treat his or her body with respect, we treat it as a personal body. When a person is dead we expect that if their body is to be used in medical research their consent will have been obtained or that consent will be obtained from their family and we treat that body with respect. And there are laws that govern the way in which we have to treat such bodies with respect and, in doing so, I think we are recognising that the body is an integral part of the person and that the nature of that body is defined in terms of time, in terms of it belonging to the personal history of that person. So if we see time as important to understanding what an entity is, that is why we understand a dead body as a personal body. And I think embryos can be treated in the same way. They are not merely human tissue but neither are they a human person. They are, I think, a personal body.

The question then becomes what kind of obligations do we have to personal bodies? That is really where we begin to be able to define what it is and what are the ethics governing the use of these embryonic cells and how we get them. And if we're to understand that, and I want to apply a moral realist tradition to do it rather than a utilitarian tradition, because I think that account is flawed, the question we have to ask is what is our intention when we deal with these bodies? And our obligation will be that we should never intentionally harm a person and then have to say, what is it when we go to have to deal with these bodies?

I think to understand that we need to recognise that we make distinctions between what we intend to do and the kind of side effects that we are prepared to accept and probably the easiest way to understand that is to think about the use of therapeutic drugs. When we use a therapeutic drug our intention is to assist a patient. However, we accept that there will be unpleasant side effects to using those drugs and those side effects, however unpleasant, are not something we desire, they're not something we seek to bring about, they're something that we'll do everything we can to avoid. But there's a big difference between our responsibility for what we intend and for what we accept. We must always intend to do that which advances human fulfilment. It must always be our intention in administering such drugs to help, never to harm a patient. But in the case of side effects, is it reasonable to accept that level of side effect? That's the kind of obligation we have in relation to side effects. And the normal way in which we deal with that is to ask the patient whether or not they would be prepared to accept those side effects and if they are we're prepared to administer it.

So we need to ask, what is our intention in dealing with these personal bodies? And I think the question about how you harm a personal body can be looked at in two ways. For what a body is, quite simply, what makes it personal is that it is unique. As a unique integral part of a human person we should never do two things to it: we should never depersonalise it, never treat is as though it were not unique and we should never instrumentalise it, never use it as a mere means to an end. We would never do those two things to living adult bodies that are part of a fully human person. And that duty not to depersonalise or instrumentalise bodies takes its place as part of that wider duty that we understand, not to depersonalise or instrumentalise human life. I think the horrors of the previous century, which continue today, should make us aware that those two breaches of depersonalising, instrumentalising human life lie at the core of many considerable evils. It is that kind of thinking that lies at the heart of genocide and the intentional use of innocent civilians as a method of war.

So to consider whether that duty never to intentionally depersonalise a body or instrumentalise it, how that applies in the question of embryonic stem cells, needs us to think about the different types of sources for such cells. And the first source is those cells surplus to the needs of assisted reproduction and, as Alan pointed out, there are a significant number of them. So, according to the kind of view I have outlined, when a researcher extracts a cell from such a personal body, which is this embryo, her specific intention could be to remove that cell for the purposes of enhancing life, whether through research or using the cell to develop some kind of medical technology. Her intention passes the test for reasonableness. Her intention is wholly good. However, at present, we know that the removal of such a cell will destroy the embryo but that destruction need not be part of her intention. And that's clear, because if the embryo survived her purpose would in no way have been thwarted. Indeed, if it were possible to keep pulling cells out of that embryo, it would be a highly satisfactory thing.

So the only question is, is it fair to accept the side effect of that personal body being destroyed? And there's every good reason to think it is fair to accept that side effect. Certainly, even a Catholic tradition will accept that you can accept the death of a person as a side effect of a good choice. Catholic theology will permit the removal of an embryo that would give rise to an ectopic pregnancy because it's judged fair to accept the death of the embryo in an attempt to save the mother's life.

So I think in the case of embryonic stem cells it could be fair to accept the death of that personal body, especially in the case of these bodies which will never go on to become full human persons. And a way of kind of asking the fairness test is to ask, "If there was no possibility of my ever gaining a brain", perhaps thinking at the other end of life, or ever gaining a high order brain function, "would I be prepared to undergo a medical procedure aimed at creating life-saving knowledge and therapies, but a procedure which would result in my death?"

I think it is fair to say that there are plenty of people who would think that a fair judgment to make and, indeed, who make those kind of judgments. So if a couple who are donating embryos for that purpose were prepared, in a sense, to answer "Yes" to that question, it would be fair for that embryo to be used for those purposes, the kind of purposes that Alan outlined. So I think it's possible to recognise that a theological tradition which carries this idea of time boundedness will still permit, in these circumstances, the treatment of embryos in ways that enable the extraction of stem cells and that respect the critical ethical duties not to depersonalise bodies nor to instrumentalise them.

Where I think the problem arises is with a second category of embryos where we are creating them by nuclear transfer, by cloning. In these types of cases what we are really doing is instrumentalising the body. The problem is that the intention is to create an embryo for purely instrumental purposes and to do it in a way that depersonalises the body. The precise purpose of creating that body is to depersonalise it, not to make it unique but to make it part of somebody else. That's a specific intention to deny its uniqueness. And it's also specifically being created for instrumental purpose, to take its place in some kind of therapy. The body is not being valued as an end in itself but solely for the purpose of being added or becoming part of another body.

Now some might think that in fact this kind of cloning seems similar to organ transplantation, but I think the critical difference is that ethical organ transplantation represents the gift of something inherently valued by one person to another person and where organ transplantation is recognised as unethical is precisely at the point where the body is instrumentalised and that is why, rightly, there is a ban on the sale of human organs. And I think the instrumentalising nature of these kind of cloning procedures is acutely highlighted in the report by the House of Representatives Standing Committee on Human Cloning, when they observe that the nature of the artificial creation of these bodies means that they are unlikely in any meaningful sense to have parents so that any of these bodies that go unused will remain in the possession of the laboratory that created them and that the only sensible category they have is as the laboratory's property. In this case we have reduced the category of a body to the category of property which, I think, is a highly unsatisfactory state of affairs if what we are trying to do is to ensure human life is never instrumentalised.

Now a third category of material we need to consider when we're seeking to develop some kind of map of how we should use embryonic stem cells are stem cells that are the product of existing lines, such as the ones that Alan's created. Now these stem cell lines may or may not have been created ethically but the ethics of their creation is not, I think, determinative of whether or not they can be used, because the intention of the researcher in using them doesn't need to extend to the original acts involved in creating them. The researcher using them today doesn't need to intend whatever mechanism it was that led to their creation. It need not be part of his or her intending use of these embryos that the original unethical acts occurred.

The question that he or she has to ask is whether in using these cells he or she is encouraging other people to create such cells in unethical ways. And I think there is good reason to say that that is not a risk, because in fact by using stem cells from existing stem cell lines you are avoiding the need to create more of them. So in fact you are discouraging the creation of further embryonic stem cell lines by whatever means.

So even those researchers who have moral reservations about how they were initially created or those governments who have reservations about how they were created need not have any reservations about the use of those that have been brought into existence.

So what I hope this particular kind of path shows is first, the utilitarian tradition that has been widely used to formulate this kind of public debate is in fact flawed and needs to be set to one side at a very fundamental level. Secondly, that the polarity that's often existed about the way we reflect on what the nature of these entities is doesn't serve us well and that in fact a middle path does exist that enables us to respect human bodies and to respect the wider obligations that we would want to have towards those bodies. And, thirdly, that that approach of combing a moral realist tradition with a view that embryos are personal bodies will in fact permit embryonic stem cell research using stem cells derived from embryos that already exist in a surplus to the requirements of IVF programs, but that they wouldn't license creating of further cells by cloning and other kinds of mechanisms.

More broadly, I hope that what this kind of analysis points out is that the type of ethical position that's usually associated with blanket opposition to the use of embryonic material in research and therapy, the kind of theological tradition that supports a moral realist position and supports the view that embryos are persons does not necessarily lead to that conclusion at all and that thought about in a particular way actually leads to a quite different conclusion.

Finally, I hope that what I have said tonight illustrates that a theological tradition, derided in ignorance by many secular philosophers and commentators, carries in it insights that are still of real value and capable of use in secular thought and, at its best, contemporary theology enables us to have a conversation with the wisdom and knowledge of other ages in order to help us solve some of the most challenging questions for our time and to discover ways to live life more fully and to live life in ways that are genuinely life enhancing. Thank you.

QUESTION: Professor Trounson, how soon can I look forward to having cochlear hair cell implant to stop me being profoundly deaf? Also, while you're at it, I'd love to have big muscles without having to do any exercise. Is any work being done in this direction, please?

PROFESSOR TROUNSON. No. I really have no idea when those cells will be available. I can't tell you that, it's way too early. And I don't know of anyone who's working on that, so that probably even puts it off further. I think you might be asking whether we would use it for trivial things. I would've thought that we're going to have a lot of very serious things to do and really quite difficult things to do. It's not in any way trivial to work out how to get this done. There have been 40 years of bone marrow transplants and we have a lot of patients who really can't be helped. The reason why they have linked the adult work in blood cells together with the embryonic stem cells is to maybe help a larger proportion of patients than we currently do. So I don't think it will be trivialised and I suspect those gene therapies will be aimed very much at very serious diseases affecting young children rather than perhaps the older population as a matter of urgency.

QUESTION: MS SKENE. Loane Skene, Melbourne University Law School. As far as the government is likely to change its approach at all in Victoria, the most it is likely to allow in the foreseeable future is the use of so-called "spare" or "excess" embryos. Could you please explain to us why these embryos will not be satisfactory if we're able to undertake gene therapy? And could I also please put a quick comment to Dr Black with regard tissue taken from dead bodies for the purpose of research, where he says that this could not be done lawfully without the consent of the person before death or the consent of the relatives. In fact in Victoria, as in other parts of Australia, there is a third category of case where tissue can be lawfully removed for research and that is where there is nobody who is available to consent and the deceased is not known to have objected. In this case it's really a utilitarian perspective on the use of this tissue because no wish of the person one way or the other is known.

PROFESSOR TROUNSON. I think in the next three or four years we're going to be busy trying to sort out the pathways for where the cells go, so I don't think we're anticipating doing any clinical trials immediately. But, for example, we have to get new embryonic stem cells because the ones that are being made up currently are "dirty." According to the regulatory agencies, they've been mixed with animal cells in their derivation. So we have to make up some new ones and we have to do that quickly because regulatory bodies would rather see the basic information derived on the cells that you're actually going to use for your clinical work rather than on some other cell type.

New embryonic stem cells do appear to be a little different one to another and whether some make better pancreatic cells or better heart muscle cells than others, we're really not sure, but there is some suggestion that some are better at making some cells than another and that might mean that we need a broader genetic background. The cells that we currently have were all made in Singapore, so they wouldn't be really a reflection of the genetics in this room, they'd be quite different in fact. Now whether that's important or not I don't know but it would be, for example, for skin because skin colour would be quite important if you were trying to replace skin as a tissue. So there are a number of reasons why we would want to make new embryonic stem cells.

The problem when we come to the clinical trials is that these cells when they differentiate will express MHC antigens. These are the antigens that blink on telling you whether you're self or non-self and so it's possible that they could be rejected, if not immediately, in the long term. And so we need some strategies to help us get across these MHC barriers so that we can help everybody and that might be by tolerance or it might be by some smart strategies or it might be that we have to use the so-called therapeutic cloning. We don't like the words because as soon as you say "cloning" it raises these other issues. In fact we're not actually cloning, we're trying to make embryonic stem cells from the embryos but these embryos we know have very little likelihood of developing to term - very little at all. They're not very different to parthenogenetic embryos. We know that in our animal studies that most of these embryos are not fit to do that but they're fit enough to make embryonic stem cells which appear to be okay, completely normal.

There's a wise politician who told me, "What do you really want, Trounson? I know you want a bushel and a half but you can only get a bushel out of this go. Maybe you should just see if you can convince the community and the politicians that having access to the embryos is the important thing and then have the argument, or the debate, about whether you need the nuclear transfer procedure downstream" and that's really what has happened. We will have to argue that case in two or three years' time if we want to expand the technology to include nuclear transfer procedures.

DR BLACK. I'm aware that there is that utilitarian exception and my experience is that when people subsequently have discovered that it has occurred relatives tend to be pretty horrified. That's not to say that it doesn't happen. But the reaction that people have when they find that a body that they have an attachment to has been treated in ways that didn't involve anybody's consent is pretty extreme.

I'm aware of situations in our hospitals in Australia where without consent medical procedures are practised on bodies. Now when that's been discovered both relatives and, indeed, some medical staff are truly horrified. And I think that represents the recognition that at some level this is still a personal body and that at those points the utilitarian tradition is not serving us well.

QUESTION: DR STAVROPOULOU. Dr Mary Stavropoulou, I'm a medical practitioner. Regarding the status of personhood. There is a dissenting view, of course, that there's no such thing as a partial person or a pre-person, that a human being is a continuous living being, whether they're unborn or comatose. I can't understand equating a body with an embryo because the body has finished its physical life whereas an embryo has a different relation to time and it has the potential to have a human life.

We all went through the embryonic stage and I think one question we all have to ask ourselves is, would we have liked it if we had been sacrificed, albeit for supposedly altruistic research or to heal someone? No one wants other people to suffer and have debilitating diseases, I wouldn't wish it on my worst enemy, and my great hope is that science will make it possible without having to sacrifice potential human life. For example, my father had a stroke about three years ago, he's still in a nursing home bed, and I asked him - he's a Christian - I asked him "Would you be prepared to - if you could be cured - using an embryo?" and he said "No" which I thought was pretty amazing and I really admire him for it, because it's one thing to speculate and talk about these things, it's another to live through them.

The other argument was of the end justifying the means, which is a utilitarian argument, and I find that we are using it here tonight because we're saying that "We've got these surplus embryos and they're going to die anyway, so some good might as well come from them." It's similar to the argument that the Chinese use when they're harvesting organs for transplantation from prisoners on death row and, of course, cloning is totally legal in that area. I think we have to look at preventing surplus embryos. I don't think that two wrongs make a right. I don't think that those surplus embryos should be brought into being. So then we can use the argument "Well, they're going to die anyway."

And, lastly, with regards to the Catholic Church - I'm not Catholic, I'm Greek Orthodox - but this talk of ectopic pregnancies being sacrificed to save a woman's life, it's not something we can equate with experimentally surplus embryos because the ectopic came into being naturally, it wasn't something that was manufactured by human beings. In fact all the monotheistic religions, the Christian, Jewish and Muslim church leaders have signed a petition that was tabled in Parliament only recently against embryonic experimentation.

I want to read one sentence from the 1996 article at page 4, para.4 of the World Medical Association of Helsinki, on human experimentation, it states: "In research on man the interests of science and society should never take precedence over considerations related to the wellbeing of the subject."

DR BLACK. Thank you very much for that. To respond to some of those elements. The argument I'm making about when it's permissible to use embryonic stem cells is explicitly not a utilitarian argument, it's not an argument that because all of these are surplus that it would be better to use them than not. It's to say, given that they exist it's possible to have an intention about their use that does not involve an intention that's either instrumentalising or depersonalising. So it's actually an argument to say that given they exist and using a kind of non-utilitarian tradition, it is possible to have a perfectly sound intention towards their use.

The point about ectopic pregnancies was to provide a parallel for the fact that there are times when we will accept the destruction of a body in order to achieve some particular good end. So it's not to treat it in the way you thought I was using it.

It's very fair though to say that it's a strange situation. Indeed, it is an unsatisfactory situation that there are as many so-called spare embryos. That suggests that there is a degree of unreasonableness that has led to that, because that has created a circumstance of where that question about depersonalising probably is operational, it would be desirable to see procedures develop where that number is dramatically reduced.

And explicitly as a theologian, in relation to your mention of the Church's position, I think the Church has actually got it wrong and that theologians who think that - and there are a decent number of them - need to be very public about it and those of us who are not so heavily policed by authority need to be prepared to speak about it. I think here that the thinking has just simply not been careful enough around the nature of what is the intention of researchers when they're dealing with these entities and exactly what these entities are.

QUESTION: MR MARSHALL. Robert Marshall, I'm a surgeon. My question is very simple and is directed to Dr Black. This room no doubt contains many people of the Anglican, Protestant, Greek Orthodox, Catholic and atheist persuasion. The community as a whole shares that diversity and the community as a whole, so far from just approving of embryo stem cell research, approves of such things as abortion, not to mention contraception.

I understand very clearly and Dr Black explained very well, indeed, his basis for his philosophical conclusions and I admire them very much. But my question is how can you possibly obtain any authority from your belief in the Christian God to others who do not share that belief at all?

DR BLACK. I think that's very fair, but it somewhat avoids where I'm trying to get at. I think the role of theologians is not actually to appeal to God in these debates but to say what is it that from the theological tradition informs secular reflection? I don't think that there was anything that I laid out in terms of the philosophical thinking that an atheist couldn't agree with. You might disagree with what prompted people to have some of the thoughts. You might say that the scriptural basis that led theologians to think that time was an important quality to think about when you're defining something, but all of that is, in a sense, without foundation in any divine source and that's not a problem to this argument. What I wanted to do was to say - and it's partly about the role of good theology in modern debates - that I think theology carries in it a tradition of reflection that has largely been lost and that is of considerable value to secular thought. There is no move in any of these arguments that requires a belief in God. The moral realist tradition talks about what the nature of a person is and what the nature of our existence is. No appeal to a God. In thinking about what our intention is, again, no appeal to a God. In discussing what the nature of the entity of an embryo is, it is to say that time may be a critical factor for thinking about what it is and that the philosophical reflection about a mind and a body might be critical to thinking about what it is. Again, there is no need to appeal to a God in thinking about that.

So I don't at all seek to appeal to the authority of God or scripture but purely to reason in this kind of discussion. That I think is the way in which theologians are able to enter these type of debates and why sometimes it's difficult for the Church, to enter as well, because all too often people assume we carry that baggage with us and I don't think we need to and I'm certainly trying not to tonight.