



The **Academy of  
Medical Sciences**

## **Science of Violence Meeting**

Report by the Academy of Medical Sciences

**Report of proceedings of the Science of Violence meeting  
19 October 2006**

**January 2007**

## Introduction

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This report provides a summary of, and commentary on, issues raised at the Academy of Medical Sciences '*Science of Violence*' meeting which took place on 19 October 2006.

Violence is a matter of national concern, with the impact of violence as much an issue of public health as of criminal justice. Research into violence can show what may be done to prevent it and how the harms caused may be diminished. All too often criminological research into violence lacks the methodological rigour of medical research. A scientific approach to the study of violence, incorporating a medical perspective and applying quantitative public health and epidemiological methodology, would enrich our understanding of its causes, correlates and prevention.

At the beginning of 2005 the then Home Secretary, Charles Clarke, vowed to make driving down violent crime a number one priority. Around about the same time the National Policing Improvement Agency was created to support self-improvement across the police service and to drive forward the Home Secretary's national critical programmes detailed in the National Community Safety Plan. At the international level, in 2004 the World Health Organization (WHO) set up the Violence Prevention Alliance to provide different stakeholders with the opportunity to unite around a shared vision and approach to violence prevention. Given these developments, the Academy of Medical Sciences considered that a meeting on the Science of Violence would be a timely contribution to the ongoing debate.

The objective of the meeting, initiated and convened by Professor Jonathan Shepherd FMed-Sci, was to consider the scientific methodology used to study violence and associated policy issues. It provided a rare opportunity to bring together medical scientists, policy-makers, lawyers, the media, the general public and law enforcers to discuss ways in which the epidemiological, medical and public health sciences could contribute to the evidence-base underpinning policy developments targeted at violence.

This report captures the main themes that emerged from the speakers' presentations and subsequent discussion. A copy of the meeting programme and more detailed abstracts of the speakers' talks are annexed.

## Report of proceedings

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### Background

We tend to think of violence as the province of the police and the criminal justice system. Violence that leads to injury, however, is also a major concern for doctors and health workers. In fact, they are more likely to be aware of a particular incident than the police, especially alcohol-related and domestic violence. Medical treatment is more concerned with the causes and consequences of violence, and criminal investigation with establishing the facts in relation to a particular act. But while each profession has a particular view of the pattern and incidence of violence, they both have a strong interest in prevention.

So can medical science shed light on the reasons for violence, and make common cause with those seeking policies to reduce it? The Academy of Medical Sciences' meeting on the Science of Violence reviewed the latest answers to this question. The discussion covered matters of method as well as research findings. The medical mode of investigation considers the factors that increase risk of crime and violence – in other words the epidemiology and causes of violence. And it encourages the use, where possible, of controlled trials of measures that may reduce violence or injury. At the same time, violence is a complex social and behavioural problem, and other disciplines also have a role in obtaining a full understanding of its causes.

### What leads to violence?

The use of violence varies between cultures and over time. Some violence is officially Here we are mainly concerned with the latter. But understanding the kind of

violence that leads to visits to the Accident and Emergency (A & E) department or the police cells on a Saturday night, or to worse outcomes such as murder, rape or child abuse, is essentially a matter of trying to discover what kind of people, under what circumstances, are more likely than others to become the perpetrators or victims of violence.

Young males tend to grab most of the headlines when it comes to anti-social behaviour – as recent reports about 'hoodies' attest. But medico-social research suggests that it is helpful to get behind the stereotypes and try to examine who ends up becoming an anti-social adult. Research has uncovered a set of risk factors that are significant. Long-term studies have confirmed that a large proportion of violent offences are committed by a small proportion of people, usually males who are repeat offenders. The same group is also at higher risk of violent injury.

So is it possible to identify at an early age who is in danger of being in this small group as older adolescents or adults? Longitudinal cohort studies that follow people from birth or early childhood through adulthood, and in some studies on into middle age, indicate that there are individual risk factors, such as low empathy for others or a tendency to impulsive behaviour. There are also family risk factors, including family conflict and disruption, poor parental supervision and inept or harsh discipline, as well as having criminal parents and coming from a large family.

One potentially important finding has emerged from the Dunedin Study of people born in the New Zealand town in 1972.

In this cohort, around 20 per cent of adolescent males (aged 15-20) were classified as having conduct problems. But most abandoned their delinquent habits and matured into law-abiding citizens. Only 6-7 per cent went on to become persistently anti-social men. Ten years later, this group had a higher incidence of a whole range of social, physical and mental health problems, as well as accounting for about half of crimes committed by the cohort, and most of the violent crime.

Further analysis reveals that men in this group exhibited a wide range of differences from their peers before adolescence. In other words, the process is not determined by a simple set of factors, but rather appears to consist of a series of accumulating differences and deficits. It may therefore be possible to predict who is at high risk of going down the path that leads to longer-term anti-social behaviour.

As well as the familial and social risk factors already mentioned, this study has focused on early neurodevelopmental indicators. It has also been the source of a widely reported finding that a particular gene variant that leads to low levels of an enzyme – monoamine oxidase or MAOA – that mops up neurotransmitters in the brain, may predispose people in adverse circumstances to violence. Men with low MAOA in general were not found to earn more convictions for violence. But those with both a history of child abuse and low MAOA were.

It is for society to debate the potential use of this finding. It might be possible, for example, to develop specialist support and/or treatment programmes for individuals in this group – but there is a risk that such programmes would cause them further damage, for example by stigmatizing them. This work, however, does illustrate that

genetic and life course or environmental influences are inextricably intertwined, and effective measures are likely to be complex. As it was put in the meeting; *'There seems to be some evidence that the way the genotypes work is to condition childrens' vulnerability or resilience to their social environments. But the genotypes in the absence of their environmental context tell us absolutely nothing'.*

Other individual risk factors emerge in studies of a smaller subset of the population with mental disorders, which is often taken to denote a propensity to violence. People with psychosis are difficult to study, and the work is poorly funded, but we do have some useful knowledge. Even then public perception lags behind the research evidence and those people with psychosis continue to be singled out in the media as a risk to others; *'single cases tend to drive policy in spite of all the evidence'.*

We know most about the association of psychotic illnesses with violence. There are probably two main groups: one group of people who had emotional or conduct problems prior to their first schizophrenic episode and another of people who were unremarkable until the onset of their illness. The pathway to violence in the former is perhaps more similar to that among people without illness, while explanations seem more likely to rest with specific symptoms of the illness in the latter. We are beginning to learn something about the brain structure and function that may underpin violent acts in these groups. However, we know very little about social factors that may diminish or promote safety amongst those with psychotic illnesses, who mainly injure people well known to them. More research is indicated, but is problematic because of its cost and complexity, the difficulties of long-term study of treatments, and an

unwillingness to risk randomising (as part of a controlled clinical trial) severely ill and possibly dangerous people in long-term secure care.

Finally, there are social, economic and perhaps even architectural influences which can also be studied from the point of view of public health. Primarily, this approach contributes better basic data on the incidence of violence. For example, there were 76,000 hospital admissions for facial injury from assault in the UK in 1997 – the face being the most common target in violent attacks, and accounting for about 85% of total injuries. But studies in the UK and elsewhere suggest that barely a quarter of such assaults are recorded by the police. This may be partly because those who commit assaults are also likely to become victims; *'It's the magistrates' court one week and A&E the next'*. But fear of reprisals, being assaulted while drunk, or simply not seeing the assailant clearly are also important reasons why three quarters of victims do not involve the police.

At the same time, hospital-based research shows that there is already a decrease in violence – a finding at variance with police statistics but consistent with overall trends in the British Crime Survey. A national study of A&E Departments in England and Wales shows a steady decrease in injuries due to violence since the year 2000.

Using hospital data can therefore give a useful baseline for monitoring the incidence of violence and the effect of attempts to reduce it. Overall findings show that injury from violence: peaks in the summer; is negatively correlated with unemployment; and is independently correlated with the proportion of the population of ethnic minority origin. Violence increases as alcohol prices fall. More detailed local monitoring

of where violence occurs can also reveal the influence of alcohol sales – the density of licensed premises in a street is a good predictor of the level of assaults, for instance. Indirect measures such as pedestrianisation, which reduces crowding on the street, can also reduce violence, as has been demonstrated in Cardiff.

### **What can reduce violence?**

Studies of alcohol and violence reinforce the importance of public health goals to reduce alcohol misuse, especially binge drinking. As well as contributing to aggression, alcohol makes people more vulnerable to becoming victims of violence. These studies have given rise to a range of experiments in preventing violence, or reducing its effects. They range from early work with parents and children to programmes involving people already convicted of violent offences. And there is also evidence about a range of indirect interventions such as use of CCTV.

One message from the cohort studies is that a propensity to anti-social behaviour and violence in adults may be a long-term, cumulative condition, and prevention programmes need to take this into account. Primary prevention may best begin in early childhood, perhaps through picking up early neurodevelopmental problems. Children, their families and schools may all need to be involved.

Trials in several countries indicate that parent training programmes and home visiting can be effective, as can skills training with children and adults. The people involved may be those considered at risk of developing into anti-social individuals, young people who are already exhibiting anti-social conduct, or prisoners or probationers who have already fallen foul of the law. Techniques range from advice on

child-rearing, nutrition and discipline, through to cognitive behavioural therapy for convicted offenders. A major outcome measure is conviction rate, but outcomes are often confined to reoffending rates. Official criminal statistics give only a modest indicator of anti-social behaviour, and are susceptible to variation between cultures and over time as social mores change. Questions about the true extent of negative behaviours, and most particularly well-being, prosocial adjustment and positive contributions/reparations to society are rarely tackled.

Few of these experiments have been specifically aimed at violence, and their effects can be difficult to replicate. First efforts under ideal conditions may tend to get better results than follow-up programmes; *'nothing spoils a good intervention like applying it broadly'*. This was not an argument against wider application of these kinds of intervention, but for funding them properly and continuing to monitor their effectiveness. Nevertheless, it was argued that enough is now known to build on these findings, especially in early intervention and skills training.

Aside from work with individuals and families, there is evidence of the beneficial effects of CCTV installation in town centres, of the introduction of toughened and plastic glasses in bars, and of targeted policing. CCTV both increases police detection rates and allows early intervention in incidents so that injury is prevented. More elaborate schemes involving, for example, visits to those licensed to sell alcohol by medical staff, have also been trialled. And targeting police patrols using both CCTV and data from police and A&E records can reduce violence significantly. One important finding is that combined police-NHS work, involving

A&E data and personnel, is a more effective approach than involving the police alone. This finding supports the partnership approach embodied in the 1998 Crime and Disorder Act, and there are now nearly 400 such partnerships in England, Scotland and Wales.

### **What should be done next?**

The research is promising, and suggests where interventions may have positive effects, but more is clearly needed. So where does current knowledge of causes, consequences and preventive strategies indicate that future efforts might develop?

A principal message was for more randomised controlled trials of developmental, social and criminal justice interventions to reduce violence. These are important where interventions are expected to have fairly small, if significant effects, which tends to be the case in this field. Randomised trials do, however, have their own limitations. Only people who are willing and able to participate as experimental subjects can generally do so, and for interventions that require a long period of time to establish an effect there is inevitably a bias for selection of those who are more prosocial and stable, whether initially or as a result of drop out as the trial proceeds. In studies of interventions for people with psychosis, those who have been violent, or who are thought for some reason to have a propensity for violence, are more often than not explicitly excluded from them. Among offenders without overt mental disorder, there are studies that might support large-scale implementation of, for example, skills training for offenders. But much more needs to be known. Most randomised controlled trials are conducted in North America, but even there the number undertaken in criminal justice is tiny compared with the

number in medical science. At the same time, bearing in mind the caveats about the potential hazards of large-scale implementation based on the results of small experiments, proof-of-concept and translating findings into violence reduction practice is crucially important. There is also scope for developing a more sophisticated public health economics, to help evaluate all costs of violence and all benefits of effective prevention or treatment programmes. Many of the interventions under discussion are relatively low cost, and the benefits extend beyond crime prevention. But better data are still needed.

A second finding was the need to create university schools for policing, probation and other aspects of criminal justice that integrate research, training and education. The clinical school shows how this might work; *'If there's one thing the medical science community can share with the criminology community it is this model'*. It was needed because *'research is a contact sport'*, as is implementation of the measures found to be effective in experiment. Whatever the details of the organisation, it is important to involve practitioners in research. The earmarking of a portion of NHS money for medical research provides precedent for a similar approach for criminological research by the Home Office.

In medical science, there is a clear distinction between disciplines concerned with understanding causes and those which study the effectiveness of interventions. In the academic foundations of the criminal justice system this is not the case. Criminologists should continue to focus on the causes of violence, while practitioner-academics build up evidence on effectiveness of interventions.

Some felt that criminologists may wish to

remain more detached from the criminal justice system and policy-making – adopting the stance of a *'critical friend'*. It was also emphasised that, from the perspective of the social sciences, the experimental method is not the only way to understand violence. Cultural factors might merit more investigation – anthropology demonstrates that some societies accept violence as a way of solving disputes more readily than others.

In our own society, some regarded just looking at *'risk factors'* as a limited approach to the problem. It was also stated that the kind of interventions which can be tested might reflect a low ambition for what can be achieved. Small, pragmatic measures might neglect or obscure the need for larger-scale adjustments, including changes to the wider socio-economic context. Equipping bars with toughened glassware has direct benefits for example, but the drinking economy is also susceptible to intervention; once the bars are competing for business, *'the whole city centre becomes a stage set for violence.'*

Some recognised the case for sustaining a mixed economy in research methods, and a full multidisciplinary discussion. Others focused more on pragmatic planning and what was politically possible and effective under prevailing circumstances. While the controlled trial was not the answer to all questions, it was still the case that in order to evaluate something, experiment is needed. Following the medical analogy, while a randomised trial is not the best way to investigate mechanisms of disease, it is the best way to test interventions. The barriers to using such trials to evaluate how to reduce or prevent violence need to be overcome.

Finally, the case for increasing research rigour is strengthened by the need to take the long view. Backing good science and increasing research capacity is a way of guarding against knee-jerk reactions and the short-term horizons of some policy-makers.

## Appendix I Programme

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11:00	<b>Welcome from the Academy</b> Professor Sir Michael Rutter CBE FRS FBA FMedSci
11:10	<b>Introduction</b> Professor Jonathan Shepherd FMedSci
11:15	<b>Violence: biological risk factors and interventions</b> Professor Terrie Moffitt FBA FMedSci
11:45	<b>Violence: individual and family risk factors and interventions</b> Professor David Farrington OBE FBA FMedSci
12:15	<b>Questions and discussion</b> session Chairman and Speakers
12:40	<b>Lunch</b>
13:40	<b>Chairman's introduction</b> Professor Graham Watt FMedSci
13:45	<b>Violence: epidemiology and public health interventions</b> Professor Jonathan Shepherd FMedSci
14:15	<b>Violence: psychosis risk factors and interventions</b> Professor Pamela Taylor FMedSci
14:45	<b>Questions and discussion</b> session Chairman and Speakers
15:15	<b>Conclusions</b> Professor Jonathan Shepherd FMedSci
15:25	<b>Closing remarks</b> Professor Sir Michael Rutter CBE FRS FBA FMedSci
15:30	<b>Close</b>

## Appendix II Speaker Abstracts

### **Violence: biological risk factors and biosocial interactions** **(Life-course persistent offenders from birth to age 32: outcomes of violence and physical health)**

Speaker: Professor Terrie Moffitt FBA FMedSci

This lecture summarised findings about life-course persistent offenders from a 32-year longitudinal study. The research shows that life-course persistent offenders' anti-social behavior has its origins in neurodevelopmental processes early in life. It begins in childhood and continues persistently thereafter into midlife. Life-course persistent anti-social individuals are rare, but their behaviour is persistent and pathological, and likely to develop into serious violence. The lecture also showed how the life-course persistent antisocial lifestyle infiltrates multiple adult life domains: illegal activities, truncated education, problems with employment and financial dependency, and victimization of intimate partners and children. This infiltration diminishes the possibility of reform.

The life-course persistent group was contrasted against a group of offenders whose crime is limited to the adolescent period, who are common in the population, and who are unlikely to become violent. Over the past 10 years this taxonomy has been used to focus research into anti-social personality and violence toward the most promising causal variables. It has also been used to guide intervention planning. For example; preventing life-course persistent anti-social lifestyles requires early childhood interventions in the family, whereas preventing adolescence-limited offending requires individual treatments during the teen years to counteract delinquent peer influences (instead of group treatments that facilitate deviant peer networks). Some writers have argued that the justice system should identify adolescence-limited delinquents and give them room to reform, while taking an incapacitation approach to life-course persistent offenders.

Our own investigations of this taxonomy have been carried out mainly in the Dunedin Multidisciplinary Health and Development Study, a 32 year MRC-funded longitudinal study of a birth cohort of 1000 New Zealanders. The lecture included our most recent findings, which document that life-course persistent offenders followed to their thirties exhibit poor health across many domains, including dental, sexual, psychiatric, substance dependence, injuries, respiratory, cardiovascular and immune function.

### **Violence: individual and family risk factors and interventions**

Professor David Farrington OBE FBA FMedSci

Key information about individual and family risk factors for violence has been obtained in prospective longitudinal surveys with repeated interviews in large community samples. Important individual risk factors include low empathy, high impulsiveness and low intelligence/attainment. Important family risk factors include poor parental supervision, erratic or harsh discipline, child abuse, disrupted families, criminal parents and large family size.

The most convincing evidence on the effectiveness of interventions has been obtained in randomized controlled trials. Effective prevention methods include cognitive-behavioural skills training, pre-school intellectual enrichment programmes, parent management training, and parent education in the context of home visiting.

### **Violence: epidemiology and public health interventions**

Speaker: Professor Jonathan Shepherd FMedSci

Violence has become an issue for medical science for two principal reasons, first, because of the substantial physical and psychiatric morbidity and mortality associated with violence and, second, because it is now known that, in all societies, a great deal of violence which results in treatment does not come to the attention of the police and other criminal justice agencies. These findings have prompted research which has demonstrated the effectiveness of distinctive medical contributions to violence prevention which can be integrated with traditional criminal justice approaches. For the first time, violence is being measured using injury data, an exercise which is bringing clarity to local and national violence trends.

Examples of cost effective science based (randomized controlled trials) interventions include: early family support, pre-school education, supplementing police intelligence with information from hospital emergency departments and the use of tempered and plastic glass in licensed premises. Examples of effective secondary and tertiary prevention include brief interventions to reduce alcohol misuse and cognitive behavioural therapy to ameliorate the symptoms of post traumatic stress. Importantly, these interventions have been incorporated into a new care pathway that is accessible both from the criminal justice system and from health services. Implicit in this pathway is that these medical contributions are victim centred - designed to reduce victim risk factors whilst also providing treatment of physical and psychological injury - and complement offender management.

These findings have prompted the development of the prototype Crime and Disorder Reduction Partnership in 1996, now replicated throughout the UK, and have informed new crime reduction and other legislation, WHO violence prevention policy and a switch to tempered glass in the alcohol industry. The wider contributions of medical science to criminology, which is predominantly a social science, include: proposals and innovation designed to raise evidence standards and to integrate research, training and practice in the criminal justice system, for example to develop university policing schools consistent with the medical school model.

### **Violence: psychosis risk factors and interventions**

Speaker: Professor Pamela Taylor FMedSci

In the 1980s, it was recognized that psychosis could make people violent, and there was growing understanding of an association with homicide. But it was not until the 1990s that there were sound epidemiological studies showing a small but significant association between psychosis, in particular schizophrenia, and violence generally. However, less is

known about how the two are related. It is likely that there are a number of routes to violence among people with psychosis, with two main subgroups:

- Those for whom certain symptoms of psychosis may drive violence. The main group of symptoms implicated – pathological beliefs or delusions – are common in psychosis, so further questions arise about the qualities of delusions that may be dangerous and the conditions in which they may become so. It is likely that people who were unremarkable before onset of their psychotic illness, and perhaps with specific identifiable routes to delusion formation, are most vulnerable to acting violently on delusions.
- The other main subgroup is of people with psychosis with evident conduct and emotional problems in advance of the onset of their psychosis, and for whom substance misuse and perhaps more criminal thinking styles may be more important than psychotic symptomatology in mediating violence.

Research is needed to further understanding of explanatory mechanisms and provide new hope for people who suffer from the dual problem of violence and psychosis, and for the victims of their violence, most commonly family members and carers. It is needed from both social science and physical science, including brain imaging studies. Treatment outcome studies to date are crude, ranging from 'black box' studies of institutional outcome, through more encouraging 'naturalistic' studies of specific medications and a striking absence of any material on psychological treatments.

## Acknowledgement

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## The Academy of Medical Sciences

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