

**CORONIAL INFORMATION
SYSTEMS:**

Needs and feasibility study

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Executive Summary

Responding to the initiative of coroners in Australia, the National Injury Surveillance Unit agreed to undertake a feasibility study for a national coronial information system. This paper contains the results of this investigation.

Major findings

- Current coronial information systems are not able to provide the quality of information or efficient access to information which is required by both the coroners and major users of coronial data. They are mainly paper-based, have few systematic ways of indexing data and vary in terms of detail and quality of information
- There is a commitment by coroners to the development of a better information system and the sharing of this information with appropriate, interested parties.
- Development is limited by lack of resources, lack of familiarity with and access to modern computer technology in many jurisdictions, and a fragmented approach by the many users of information.
- There is a need to develop a systematic way of investigating and recording information about deaths, taking into account the needs of major users of information, and using systematic coding procedures.
- Major users expend a great deal of effort and large amounts of money accessing coronial data. Much of this is due to the way in which records are stored and a lack of appropriate indexing systems. Even where information from coroners is coded by external agencies, the resulting indexing systems are not provided to the coroner for use in the performance of coronial duties.
- Reallocation of these resources to an efficient computerised system would allow ongoing operation of the system with increased utility of coronial information to all users.
- The estimated maximum cost of establishing the system is approximately \$270,000. Annual running costs would be around \$210,000. Use and upgrading of existing facilities should reduce these costs.
- A national coronial information system will contribute significantly to planning the prevention of death and injury. This has the potential to produce major reductions in the costs of injury to Australian society.

Technical Recommendations

The following recommendations were developed in the course of this project.

- 1. It is recommended that coroners and administrative personnel from each jurisdiction develop plans for computerised administrative systems that include at least a common core of information which can support a national coronial information system. This may include cooperative development of systems or merging into a single system.**

- 2. It is recommended that the Australian Coroners' Society (ACS), in conjunction with specialists with an interest in particular causes of death, design standard investigation and recording protocols for significant classes of death and promulgate these for the investigation process.**

- 3. It is recommended that the ACS develop a set of standards for the reporting of findings and promulgate this for use by all coroners in Australia.**

- 4. It is recommended that the ACS develop a standard approach to facilitate the reporting of matters which are transferred to other courts and, where necessary, that coroners request that changes be made to Coroner's Acts to permit this approach to be implemented.**

- 5. It is recommended that a strategy be developed by interested parties, including the coroners and major users, to develop a national coroners' database during the 1995-96 financial year, with a view to stage one operation commencing in early 1996.**

Recommendations of coroners and users

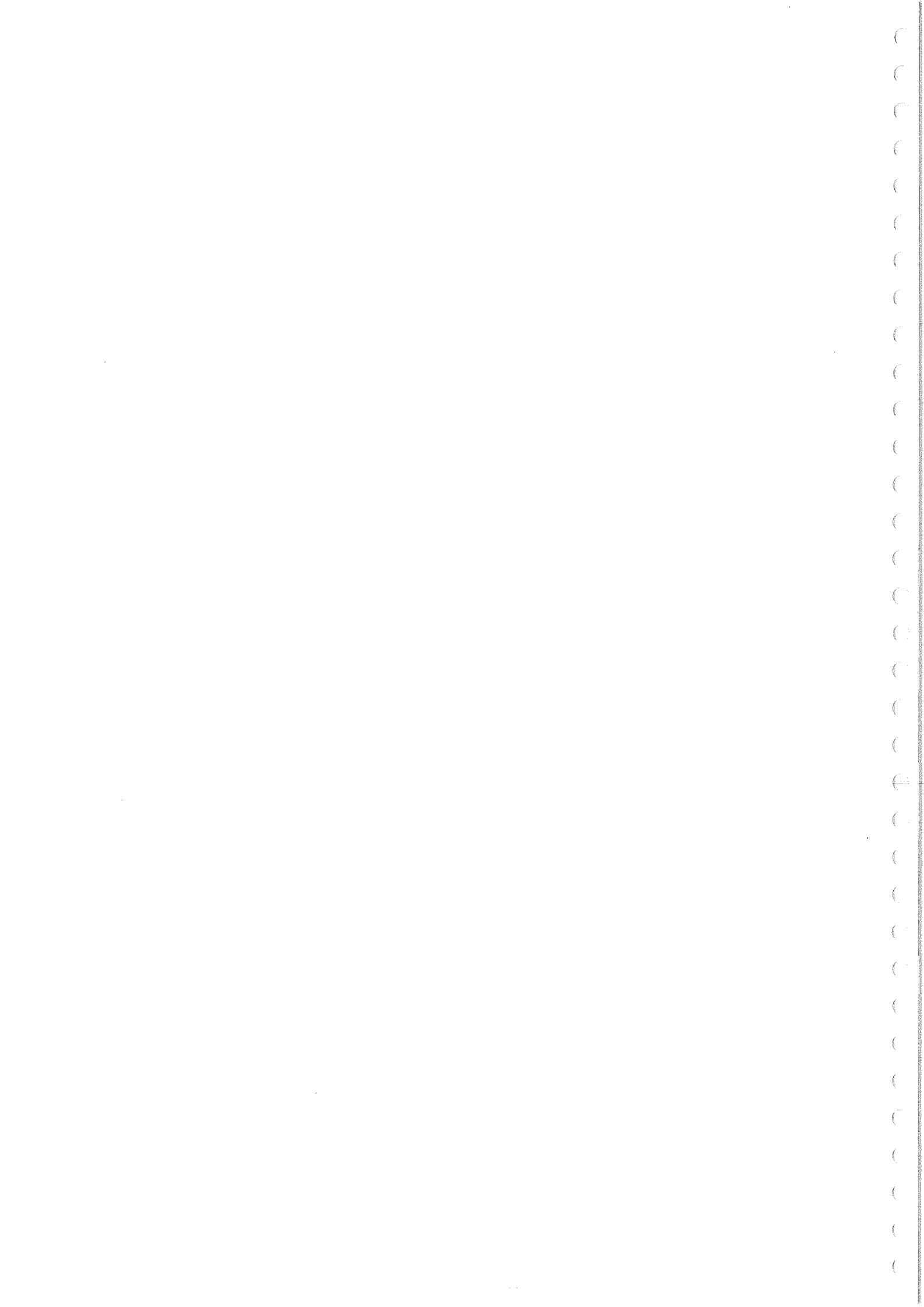
A meeting of representatives of coronial jurisdictions and major user groups was convened on 27-28 October 1994 to respond to the draft report of the needs and feasibility study. A list of participants appears in Appendix 3.

The meeting endorsed these five recommendations and made the following additional recommendations:

- 6. That the ACS:**
 - a) endorse the findings of the feasibility study;**
 - b) approach the State and Federal attorneys-general to gain support and resources for the development of a national coronial information system (NCIS);**
 - c) seek the formal commitment of major users to the establishment of the NCIS;**
 - d) establish a timetable for the implementation of the NCIS;**
 - e) establish a steering committee whose charter includes the oversight of the establishment of the NCIS, nomination of an auspicing body and site of operations, and establishment of ongoing management mechanisms. The steering committee shall include State coroners or their nominees (empowered to act on their behalf) and representatives of major user groups.**

- 7. That each coronial jurisdiction take steps to inform its Attorney-General and other relevant decision makers of its support for the development of an NCIS as outlined in the needs and feasibility report.**

- 8. That organisations which are major users of coronial information indicate in writing to the ACS:**
 - a) in principle endorsement of an NCIS;**
 - b) ways in which they can facilitate and resource the development and operation of the NCIS;**
 - c) appropriate points of contact for further negotiation.**



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List of Acronyms Used in the Report

ABS	Australian Bureau of Statistics
ACS	Australian Coroners' Society
AIC	Australian Institute of Criminology
AIDS	Acquired Immune Deficiency Syndrome
ANZCO	Australian New Zealand Classification of Occupations
ANZSIC	Australian new Zealand Standard Industry Classification
ASGC	Australian Standard Geographic Classification
BAC	Blood Alcohol Concentration
DCA	Defined Classification of Accidents
FORS	Federal Office of Road Safety
HIV	Human Immuno-Deficiency Virus
ICD	International Classification of Diseases
ICD9	International Classification of Diseases 9th Revision
ICD9CM	International Classification of Diseases 9th Revision (Clinical Modification)
ISIS	Injury Surveillance Information System
NCIS	National Coronial Information System
NISU	National Injury Surveillance Unit
NMDS(IS)	National Minimum Data Set (Injury Surveillance)
PM	Post Mortem
RUM	Road User Movement
SIDS	Sudden Infant Death Syndrome
SLA	Statistical Local Area
US CPSC	United States Consumer Product Safety Commission

Introduction

History

The role of the coroner has developed throughout history. A conservative view of the coroner as the one who investigates a suspicious death and establishes its cause, has been tempered with more activist views which see the coroner as “allowing the community to view the circumstances surrounding death”¹ and, most recently, as an active identifier of preventable injuries and deaths.² In Australia, coroners have actively debated their role and, in particular, the information needs associated with an active preventive stance.

There have been a number of instances in recent years where coroners have identified possibilities for prevention through the thorough investigation of a single death or the patterns seen in a series of deaths. Perhaps the most publicly acknowledged activity of this type, was the identification of problems associated with a particular model of Mistral fan, which had been involved in a number of fires. The fans were subsequently recalled. The ability to undertake this role is limited by the fragmentation of data between jurisdictions and by the difficulty of identifying common factors in an information system based on paper documents.

In 1993 a national meeting of coroners canvassed the need for an expanded national coronial information system with a number of interested parties including the National Injury Surveillance Unit (NISU). The Australian Coroners’ Society (ACS) supported the cooperation between coroners of each State and Territory and published a statement that among other things contained the following;

“The Australian Coroners’ Society

- (a) regards as essential to efficient coronership, a computerised process with database, to enable the results of coroners’ investigations to be nationally accessible,
- (b) recognises that a needs analysis and feasibility study is required to effect the above objective; and
- (c) resolves that endorsement be sought from each State and Territory government.”

As a result of this initiative, NISU agreed to undertake a feasibility study into the development of such an information system. NISU and Worksafe Australia jointly funded the project.

Purpose of the paper

This paper presents the results of the feasibility study. It analyses the state of information systems in coronial jurisdictions across Australia, the views of coroners about what is required, and the needs of other major users of coronial information.

The paper sets out to :

- describe what is possible using current information and systems;
- detail the processes involved in the collection and dissemination of information;
- define what is needed;
- consider what changes are possible and the time frame required;
- make recommendations on ways of proceeding.

The coronial system

The history and changing nature of the coronial system was extensively explored at a conference held in November 1991 at the Australian National University.³ The role of the coroner has long been “to determine the identity of the deceased, when and where they died, how their demise came about, what the cause of death was and whether anyone contributed to their departure from this mortal coil.”⁴ Not all deaths come under a coroner’s attention. The coroner specifically investigates deaths that involve violence, unnatural deaths or sudden deaths of which the cause was not known and those which occur in prison.

In addition to these basic functions coroners have, from time to time, made comments and recommendations “designed to prevent the recurrence of fatalities similar to that in respect of which an inquest has been held.”⁵ This function has grown and changes to the Coroner’s Act in several Australian jurisdictions since 1975 specifically make provision for the coroner to make recommendations “on any matter connected with a death which the coroner investigated, including public health or safety or the administration of justice.”⁶

The basic functions of the coroner vary only slightly from State to State. One important difference is the role of the coroner when criminal charges relating to the death are to be laid. In some States the coroner’s case proceeds to a finding, albeit that this is delayed until the criminal case is heard. In others, the criminal process takes precedence and the coronial process is terminated.

The organisation of the coroner’s administrative system, however, varies more. In SA, Vic., NSW and the NT a State coroner’s system has been introduced. This places the responsibility for the coronial system to rest with one coroner, who coordinates and oversees the activities of a number of local coroners. In the ACT, Tas., Qld and WA a move to a State coroner’s system is mooted and draft legislation has been, or is in the process of being introduced. This arrangement has considerable significance. Under a State coroner’s system, it can be expected that centralised information systems will be more easily managed; that investigation practices and the nature of findings will be more

consistent; and opportunities for gaining an overview of all cases in the jurisdiction, increased.

Investigative practices also vary from State to State. In all States the coroner's clerk is a key organiser of the investigative resources on behalf of the coroner. Australia has a population concentrated in a number of dense urban areas with a small proportion of people living in varying levels of density across a vast continent. Investigation systems reflect this. In small jurisdictions such as the ACT and Tas., police investigation of coronial matters are limited to specialist police officers. In the NT, despite its vast area, the small number of coronial deaths also make it possible to undertake police investigations with a small specialist force. In States with larger populations (and so more deaths requiring the attention of the coroner) and where vast areas can be encountered, coronial investigations are conducted by numerous police officers under the direction of many coroners. In some States, magistrates act as local coroners. Forensic pathology and toxicology services also vary from centrally based specialists to decentralised services based on professionals employed by health services mainly for other duties.

While coroners have great similarities in function, and there is general agreement among coroners about their role, there are considerable differences in way the work is organised which require attention in the design of a national coronial information system (NCIS). Individual coroners retain a high level of autonomy. Examination of findings and processes reveals considerable differences in investigative procedures, the information gathered and the nature and level of detail of findings.

The coroner

The key functions of the coroner require more detailed examination. The coroner is primarily an investigator. The traditional role of the coroner has been as a case investigator but the expanding role described above has required the coroner to move into the role of investigator of classes of events and of patterns in causes and effects. The coroner's role in managing investigations requires the assistance of others with the requisite skills and resources. The backbone of this investigative process is the police officer aided by an appropriate range of experts. It is, however, primarily the coroner who determines how a case or group of cases will be investigated, what evidence is obtained and what is determined to be relevant. The Coroner's Act determines the powers of the coroner to gather evidence. The coroner determines the need for an autopsy, the relevance of toxicological studies, the range of information about circumstances leading to death and the evidence necessary to identify the deceased. The legislation also gives the coroner considerable latitude to determine the level of inquiry and whether an inquest is necessary or can be dispensed with.

The choices made by the coroner are determined by the merits of each case and the preliminary information provided soon after the discovery of the body. The information which is gathered and the way it is recorded is largely determined by the individual coroner operating within the provisions of the relevant Coroner's Act. The extent of information required to make a determination on a particular case may be less than that required to fulfil the public interest role. Given that a strong emphasis of this broader

role has only developed in the last ten years or so, it is not surprising that there have been considerable differences between coroners about what information is relevant, how the information should be gathered and defined, and how it should be stored and indexed. This has resulted in different practices and subsequent difficulties in exchanging and comparing information.

The coroner's preventive role goes beyond the prevention of death. Often, a small number of deaths is just the tip of the iceberg of a broader injury problem. The coroner has the ability to investigate the deaths, identify other injuries and make recommendations which not only prevent deaths but many non-fatal injuries as well.

The modernisation of the coroner's role has therefore created an imperative for changes to the scope and definition of information and the development of different retrieval and research approaches.

Forensic pathologist

The forensic pathologist contributes to the coroner's investigation by providing information which can be used to determine the cause of death. The use of the phrase 'cause of death' can result in some confusion. In public health terms, the cause of death may well be a motor vehicle crash or drowning, but the pathologist is primarily interested in the patho-physiological cause of death. Australia operates a system which has both full-time specialist forensic pathologists and those who are part-time in this role. State Forensic Units have been established in Vic., NSW, SA QLD and WA. There has been considerable debate about the role of the forensic pathologist, the relationship to the police system and the degree of specialisation required. It is not the role of this study to enter into this debate, but to recognise that information about cause of death varies from case to case depending on where the death occurs and who conducts the post mortem, and that the information needs of forensic pathologists will differ according to the support structure in which they work. A good information system will provide access to information about approaches of forensic pathologists across the nation.

The nature of coronial investigations

The coronial investigation starts when a notifiable death occurs. There are minor differences in the wording of definitions of a notifiable death from State to State, but essentially the same types of death are included in all jurisdictions. Notifiable deaths consist mainly of violent deaths both accidental and intentional, sudden deaths where the cause is unknown or the death unexpected, and deaths which occur in prisons or residential institutions. Police attend the death scene and gather preliminary evidence. The coroner then determines the level of detail of the investigation according to this preliminary assessment and other observations made if the coroner attends the death scene. Decisions are then made about what evidence is to be collected, whether a post mortem is to be completed, or toxicological examinations done. The decision about whether the case will proceed to an inquest is based on this information and the requirements of the State Coroner's Act. This process varies considerably from coroner to coroner and from jurisdiction to jurisdiction. Current information systems do not

permit the patterns of investigations, or even the use of post mortems of individual jurisdictions to be described in detail.

The level of detail, and the scope of information gathered, varies greatly. Some of these variations are quite appropriately related to the type of case. A sudden death from a myocardial infarction attracts a totally different response than from a suspected homicide, and a road crash often results in a full mechanical analysis, sometimes referred to as a vehicle autopsy. There are, however, variations from jurisdiction to jurisdiction and coroner to coroner which result in potentially similar cases being investigated in a different manner. While this may well be justifiable on a case by case basis, it presents difficulties for an information system which attempts to aggregate information across cases. An information system must be able to retrieve relevant cases consistently, without missing cases or including cases which are not relevant. Missing information, or the use of different terminology by different users, can severely affect the reliability and validity of the retrieved information. This, to some extent, can be offset by sophisticated text retrieval systems, but even these rely on all appropriate search terms being defined and sufficient selectivity to exclude irrelevant cases.

There are so many investigators and information providers involved in coronial investigations that there is a need to address the question of the standardisation of what is covered in each type of investigation and how this is recorded.

The nature of coronial findings

The coroner's findings vary from brief descriptions about the place of death, the identity of the deceased and the cause of death, covering less than half a page on a standard form, through to detailed descriptions of the circumstances leading to death, the standard information described above and detailed riders or recommendations concerning what could be done to prevent similar deaths and injuries. The variety of cases makes this entirely appropriate, but examination of the processes in each jurisdiction shows that the scope of coverage and level of detail in the finding is not consistent across similar cases. The variation is most marked between jurisdictions, but also occurs between coroners in the same jurisdiction and even for the same coroner for different cases.

The coroner's finding is very important to other coroners who are investigating a similar death and to researchers who wish to aggregate information in order to reveal patterns of contributing factors associated with deaths. A national information system would benefit from a more uniform approach to presenting findings. This is likely to occur naturally if the system allows rapid interchange of information, but will also require coordinated effort by coroners to develop a system of reporting which is consistent between individual coroners but has sufficient variability to cater for the wide range of cases encountered.

The role of an information system

The role of an information system is to permit exchange of information between coroners and interested parties with a view to the efficient identification of issues requiring attention. Coroners' investigations provide a rich source of information capable of forming a basis for sound preventive activity. An information system must be able to assist coroners and researchers to identify clusters of events which may be fruitful areas for prevention. Currently this process is severely limited because coroners' records are based on manual filing systems and lack indexes to identify or retrieve clusters of like cases. A new information system is required which permits a wide range of disciplines to assist in the process of issue identification and problem analysis according to their own research paradigms.

The research paradigms of major users

An information system must meet the needs of its major users. The needs generated by the administrative process are discussed later. The needs of those who use the information for research purposes vary considerably. Different research paradigms are appropriate for different tasks. Different professions and disciplines are trained in different research processes and therefore tend to seek information in different ways. It is important to understand these differences when designing an information system. The system must be flexible enough to accommodate both the information needs and the information seeking strategies of the users. The strategies and information needs of key users are analysed below.

Coroners

Coroners are primarily legal practitioners. The major research interests of coroners are centred around cases and clusters of cases. Common research questions relate to determining if there is a precedent for an investigation procedure, or finding out whether a pattern can be discerned in a series of possibly like events such as clusters of youth suicides using a particular method. Research is therefore qualitative in nature and uses inductive reasoning. An information system to meet these needs will need to retrieve cases according to factors involved in the cause of death, the nature of the person, the nature of the means of death, the nature of investigations carried out, the legal precedents used in determining findings and commonalities between findings. The material retrieved will need to contain detailed descriptive data which allow each case to be compared with other cases.

Forensic scientists

Forensic scientists are medico-legal practitioners. Their research paradigm is derived from the legal case oriented approach, the medical case oriented approach and the epidemiological approach. Ranson notes that,

“Both the legal profession and the medical profession have their roots in a work practice that is related to the individual handling of matters on a case by case basis. Dealing with each case as an isolated event. Over the years however the medical profession has reaped benefits in terms of research and understanding of the basis of disease by analysis of groups of cases with similar features.”⁷

Common research questions relate to the patho-physiological causes of death, the circumstances in which particular pathology arises, the techniques used to identify and describe forensic phenomena and the identification of commonalities in the sequence of events leading to particular sorts of death. Research is therefore based on both qualitative and quantitative methods. Case comparison with very detailed information is required. Additional information about procedures of examination and the reliability and validity of these procedures, clear identification of causal agents and physical sequelae are also required. These needs can best be served by a mix of case oriented and aggregated information which provide a mixture of detailed description and the ability to identify commonalities through quantitative procedures. Both structured and unstructured search and retrieval systems will be required and both open-ended text and classified data will be important. As classification and aggregation will be more important, schemes of classifications, training in their use, and assessment of reliability and validity will be necessary.

Preventers and policy makers

Broadly the other major users of information can be classified under this heading. This group is nowhere near as homogeneous as the above categories. The research traditions vary according to discipline and subject of study. Users of information include work safety authorities, road traffic safety groups, sudden infant death researchers, policy makers interested in the prevention of suicide and deaths in custody researchers to name but a few. There are many different traditions of measurement and research. This will present challenges in designing an information system. If information is to be relevant to users in this category, some form of translation will be necessary. Either the information will need to be translated into the language of the different users, the users will need to learn to understand the language of the coronial system or a mixture of the two will be needed. One of the principal difficulties is that the information required to undertake a broad analysis of a series of cases requires the relevant information to be available for all of the cases, regardless of whether it was necessary to making a determination on each particular case. There is a need to negotiate the level of information that it is possible to gather, the ways it is to be classified and a clear recognition that the task of classification of data for use by users other than the coroners and related investigators cannot be seen as a routine task for coronial administrative staff.

The information required for the purpose of prevention and policy research is much more likely to be aggregated and require detailed classification systems. Such coded information can also be very useful to other users as a classification system can also be viewed as an indexing system and creative use can assist with segmenting text-based searches and deriving subsets of possibly relevant cases. The maintenance of data quality and validity requires careful attention and adequate resources must be available to maintain quality.

Coronial system needs

Despite the importance of research needs, the coroner's system is primarily oriented towards case management. An information system must help the coroner to maintain proper administrative control. The broader information and research potential of the system can only be realised if it operates effectively as a part of the routine administrative system.

Case management

The coronial information system is required to maintain up to date information on current cases and access to information about completed cases. A case starts when a notification of death is received. The coroner is then required to manage the investigation. The case management requirements of the system are as follows:

- receive and hold information concerning the case;
- provide this information to the coroner;
- provide appropriate details to investigators, relatives and funeral directors;
- track the body, property belonging to the deceased and evidence;
- track the investigation process providing reports on the stage of the case and reminders where delays are experienced;
- assist in the scheduling of workload and hearings;
- report on the case flow including details of completed cases, number of determinations and inquests, patterns of investigation and case processing times.

Identifying common issues

Both the investigative and public interest roles of the coroner require that patterns of events or causes of death can be identified. Information from a range of cases can clarify the type of investigation required, the relevant finding and the relevant recommendations on a particular case or class of cases.

Coroners have identified the following information axes which are useful in their work:

- manner of death;
- specific factors involved including make and type of vehicle, workplace practices and machinery, consumer products, drugs and medications;
- classes of person (e.g. young males who have experienced juvenile detention);
- specific toxicological findings;
- specific pathological findings;
- locations of death scene.

Preventive activities

The coroner's role in prevention has been clearly identified by Johnstone⁸. It extends beyond the need to identify common issues and requires the coroner to be able to access

information which will be useful in obtaining the best evidence from a wide range of experts. A key feature of an information system, then, must be to permit the interaction of a range of disciplines and professions with the data in order to undertake analysis which will assist the coroner in identifying problems and solutions which may be applicable to classes of cases.

A flexible and interactive information system can assist in developing a range of technical networks for the coroner. Provision of information to consumer safety researchers and administrators, for example, can lead to the return of information about consumer product safety complaints and investigations from around the world, which can in turn form the basis of coroners' recommendations. This interchange can assist the coroner to tap the relevant expertise and play a complementary role in identifying preventive strategies.

External User needs

There are a number of key users of coronial information. While there is no statistical record of the information requests to coroners, each coroner was able to list a number of inquiries and point to a stream of requests for information about classes of deaths including scuba diving, youth suicide and large studies on work-related fatalities and road injuries. The systematic provision of information on Sudden Infant Death Syndrome was highlighted as one area where a coordinated approach to information gathering and provision had supported ongoing research and prevention.

Current manual information systems and limitation of coding in electronic systems restrict the availability of information and increase the cost of retrieval significantly.

The following sections detail the requirements of major users. Many of these users target large expenditure at manual information retrieval. A modern information system would considerably reduce the need for this sort of expenditure. A side effect of the present system is that, even when detailed information is extracted and systematised by an external user, this is not linked back to the coronial record system and the coroner cannot make use of the information to search his own records, nor to ease the task of subsequent external users.

Australian Bureau of Statistics

Causes of death data in Australia are collected and processed by the Australian Bureau of Statistics (ABS) in conjunction with the State Registrars of Births, Deaths and Marriages. Most deaths from natural causes are certified by medical practitioners and the death certificate carries sufficient information for coding according to ABS requirements. Many of the deaths which fall under the jurisdiction of a coroner are more complex in nature and information provided on death certificates is not always sufficient to permit coding, especially the external causes code. Coroners' files are routinely retrieved and information required for classification of deaths extracted. This is then used to complete the deaths data file. The complete investigation of deaths takes some time and an examination of deaths data files shows that approximately 10% of injury deaths

are registered after the release of each year's statistical information by the ABS. Deaths data for 1993 were due for release in October 1994.

A coronial information system which ensured collection and specification of data necessary to complete coding would save a great deal of manual searching. The automation of data transfer to the ABS, as soon as it was verified, would also reduce the number of cases not included in a current year, and could reduce the time delay in releasing deaths data.

ABS deaths data contain the following items:

(NB Not all items are collected in all States)

- State of registration
- Registration number
- Registration district
- Month of registration
- Year of registration
- Sex
- Age at death
- Usual residence (5 digit)
- Usual residence (9 digit)
- Occupation
- Birthplace
- Duration of residence in Australia
- Marital status
- Age at marriage
- Date at marriage
- Place of marriage
- Issue (ie number of children)
- Date of death
- Cause of death (ICD external causes code for injury and poisoning)
- Certification (ie whether certified by coroner or medical practitioner)
- Aboriginality
- Date of Birth
- Post mortem (information on this item appears only to be routinely collected in WA)
- Drowning flag
- Cancer flag
- Maternal death flag
- Tuberculosis flag
- Leukaemia flag
- AIDS / HIV flag
- Drugs, alcohol and smoking
- Diabetes flag
- Asbestosis flag

While this information is collated and processed, and could be linked back to coroners' files through individual identifiers, this does not occur. The ABS data set could be used as an index to coroners' cases if it was viewed as a dual purpose system rather than only a national deaths statistical system. It could also be used to identify cases which have

been certified by a medical practitioner but should have been notified to the coroner. Currently, this process relies on checking by each State registrar of deaths who refers cases which may require a coroner's attention. A review of deaths data for 1990-92 suggests that this works well. Falls among the elderly, however, are not always referred to the coroner as they are specifically defined as being exempt from the general requirement that "external causes" deaths be notified to the coroner, unless there are suspicious circumstances.

Health

A large proportion of the deaths reported to coroners involves events which are of concern to health departments. These include injury deaths (both intentional and unintentional), deaths under anaesthetic and related to medical procedures, and sudden and unexpected child deaths. A focus on injury among public health workers over the last ten years has led to an increased demand for more detailed and timely information on injury deaths. ABS deaths data allow broad analysis of death patterns but do not allow follow up of details of specific cases, nor the early identification of emerging patterns of death. The NSW Health Department has monitored child deaths through a paediatric mortality committee which obtains preliminary notification of deaths from the coroner's office using a photocopy of the police notification of death form. Negotiations to extend this to cover all deaths is currently underway, but manual copying of forms and the need to meet requests of other users for similar information are barriers to this development.

The Department of Human Services and Health has a number of responsibilities which require access to detailed data on deaths. These include a therapeutic goods policy and its administration, monitoring the use of illicit drugs, and injury prevention and control (including coverage of suicide, assault and unintentional injuries). The recently released National Health Goals and Targets specify a number of intervention areas which will require detailed information on the circumstances leading to death.

State health departments have responsibilities which cover an even wider range of activities. They monitor the consequences of professional practice, implement programs aimed at preventing injuries, have day to day responsibility for environmental health issues and collaborate with other sectors in developing ways of reducing preventable death.

There is a clear need for Health Departments to obtain early notification of the sorts of death which fall under the coroner's jurisdiction. There is also a need for information to be available in a more digestible format. Classification of deaths and the ability to search by common factors is essential. The existing paper-based information systems make this difficult. The needs of coroners and public health professionals are similar in many ways. It makes sense for data to be converted to electronic form, indexed and classified and made available to both coroners and the health system. The early provision of data carries with it some difficulties. Often the cause of death is not known and public release of such information would pre-empt the role of the coroner. If, however, optimal use is to be made of the knowledge of different disciplines in identifying patterns of cause, or relevant information passed from the health system to the coroner in time for it to assist with the investigation, early restricted release is essential.

Many of the questions which are important to public health workers require more detailed information than is available using the items which are included in the ABS deaths data. The limitations of currently used classification systems are discussed later. Meeting the National Minimum Data Set for Injury Surveillance (NMDS(IS)) would represent a step forward but even greater detail is required to answer questions such as: "What types of death occur on farms and what products, factors and agents are involved?" There is a need for a more detailed classification system, possibly supported by text searching, to meet these needs.

Consumer affairs

It is not possible to identify death associated with consumer products in Australia from existing reported data, even though adequate information is contained in coroners' files. Under the Trade Practices Act, the Federal Bureau of Consumer Affairs has a responsibility to monitor hazardous products and take appropriate action. State consumer authorities have similar responsibilities. To meet these responsibilities, there is a need for early notification of suspected product related deaths. Currently there is no system for undertaking this task. In some States relevant authorities check coroners' closed files manually, but this occurs at irregular intervals and has to wait until the case is determined. It is therefore possible for problems like the Mistral fans fires and related deaths to escape early notice.

The United States Consumer Product Safety Commission (US CPSC) monitors deaths related to consumer products through a sample of medical examiners. It has developed a detailed system for coding information about consumer products which permits monitoring of deaths in great detail. There is a need for a similar level of reporting in Australia but, due to the smaller population, a population coverage rather than a sampling system is required. There is also a need for a clear definition of what constitutes the universe of consumer products.

Information of interest to consumer safety researchers and authorities is:

Product details

- Type of product
- Brand and model
- Year of manufacture
- Manufacturer
- Retailer
- Country of origin of product
- Year of purchase

Circumstances of death

Sequence of events leading to death
Nature of injuries
Toxicology
Contributing factors

Person details

Age
Sex
Height
First language / English fluency

Road

The Federal Office of Road Safety (FORS) has had a history of monitoring road fatalities in Australia. Early notification of road deaths are received direct from the police in each State. A more detailed study of deaths is compiled every two years through an extensive manual search of coroner's records. This is combined with information from other sources. The cost of this detailed search is estimated to be between \$200,000 and \$300,000. The detailed data file allows identification of common factors and possible potential for prevention.

The level of detail available in coroners' files on road deaths is better than for many other types of death. The road safety authorities have developed investigation protocols and ways of classifying information which promote systematic investigation and recording. Police have a specific responsibility to pursue road traffic offences and have an interest in ensuring that evidence for possible charges is available. Some improvement of certain aspects of data is sought and there is a danger of some detail being lost as police in some States reduce the level of detail which they collect, especially on non-fatal crashes. Police already supply data to State road authorities and these are shared with FORS.

There may be an opportunity to reduce the manual handling of data through an NCIS. Equally, it may be possible to include the detailed information required in the protocols for investigating all traffic related deaths, to provide this to FORS, and to use it as part of an index to coroner investigated deaths, to the benefit of coroners and other users.

Information items of interest to FORS are:

Crash (One record per crash in which fatality occurs)

Incident identifier
State where crash occurred
Date of crash
Time of day
Local government area where crash occurred
Type of crash
Road user movement DCA code

Road structure
Speed limit
Horizontal alignment of road
Weather
Surface type
Surface condition
Light
Street lighting
Description of circumstances
Coroner's finding

Vehicles (one record per involved vehicle)

Vehicle sequence number
Vehicle type
State of registration
Driver licence type
Towed away
Operator BAC
Operator sex
Operator age
No of occupants
Vehicle fault
Vehicle autopsy details

Deceased Person (one record per deceased person)

Vehicle sequence ID
Person sequence ID
Road user type
Position in vehicle
Sex
Age in years
Wearing a seat belt
BAC
Cause of death
Toxicology
ICD injury codes
ICD External causes code

Occupational health and safety

Worksafe Australia initiated a study of work related fatalities based on coroners' records covering the period 1982-84. This has provided a basis for most of the Australian research on this topic. A second round of study covering the period 1989-92 is currently being organised. The cost of this project is in the order of \$300,000. Work related fatalities are not adequately identified in coroners' records, nor in the ABS causes of deaths system. This presents great difficulties to researchers in retrieving records. A complex system of identifying cases with a relevant external cause, matching statistical

data to identifiers, searching coroners' records alphabetically, retrieving records from storage, and manually extracting relevant data is required. There is a considerable delay in producing useable information.

A system is needed which identifies relevant deaths to national and State authorities within days of the incident. In addition it should classify deaths according to standard systems and provide statistical information. This would encourage information from the authority's investigations to be provided to the coroner, thereby increasing the quality of information, its timeliness and assisting both the coroners and work safety authorities to meet their responsibilities.

Items which have been useful in the study of work related fatalities are:

Demographic

- Date of birth
- Date of death
- Sex
- Marital status
- Postcode of usual residence
- Country of birth
- Period of residence in Australia
- Death registration number
- Marital status

Incident

- Date of incident
- Time of incident
- Type of place of incident
- Geographic location of place
- Activity at time of injury
- Mechanism of injury
- Agency of injury
- Description of incident and circumstance leading to injury

Injury

- Nature of injury
- Bodily location of injury
- Cause of death
- Date of death
- Time of death
- Time to discovery
- Response to injury (eg first aid, evacuation)

Associated factors

- Toxicology

Use of protective equipment
Training
Procedures
Other persons involved

Employment arrangements

Occupation
Industry
Task
Length of time on current task
Usual job
Experience for this job
Full time / part time / apprentice trainee
Employment status: paid / bystander / student / volunteer etc.
Duty context: work place / on road in course of work / commuting
Working arrangements
Shift on day of incident
Normal shift
Hours on shift at time of incident
Training

Deaths in Custody

Federal cabinet has instituted a monitoring program for deaths in custody, through the Australian Institute of Criminology (AIC), in response to recommendations of the Royal Commission into Aboriginal Deaths in Custody. The Institute uses coroners as one of its information sources, and States have required that all deaths in custody are investigated. Where criminal charges are being contemplated, the investigation moves outside the coroner's jurisdiction and a coronial finding may not be made, even in cases where the criminal charges are dropped. The case coverage, therefore, is incomplete. The Institute has developed a uniform deaths in custody database and provides regular reports from this. Detailed manual searching of coroners' records is necessary to compile relevant material. Some data are not available in some cases.

The information required from coroners by the Institute of Criminology for the monitoring program is as follows:

Person

Name
Gender
Age at death
Marital status
Education level
Occupation
Living arrangements prior to custody
Ethnicity (including Aboriginal or Torres Strait Islander)

Death event

Place of Death

Place of incident leading to death

Custodial authority involved

Date of death

Time of death

Post mortem

Time last seen alive and reasonably OK

Time of found dead or in a distressed state which progressed to death

Contributing factors

Legal status (remand, sentenced)

Reason bail denied

Offence or alleged offence leading to custody

Length of time in custody

Period of sentence served

Manner and cause of death

Health status (physical and mental covering significant events including suicide attempts, etc.)

HIV status

Toxicology

Coroner's finding and supporting remarks

Other users

The needs of other users are diverse, and are not specified in detail in this paper. One important subject currently receiving attention is suicide. Suicide now accounts for more deaths in Australia than road injury. While health authorities are actively involved in suicide research and prevention, the interest and responsibility is not limited to this sector. The education sector, for example, has a keen interest in suicide prevention among young people. The Victorian coroner is currently involved in a detailed study of suicide deaths. The investigation protocol, and definitions of data to be gathered, have been developed in conjunction with a number of interested professionals. The AIC also maintains a homicide database which would be assisted by easier access to coroner's data. This organisation is also conducting research into the implementation of coroner's recommendations. Police research units could also take advantage of coronial data on matters such as domestic violence, research into police involvement in critical situations, and development of streamlined investigation procedures into common types of death.

There is a need to develop similar investigation and recording protocols for a number of categories of death and to apply them Australia wide. Each category would require detailed specification but the following common categories of information would be useful:

Person

Age
Sex
Country of birth

Event

Circumstances leading to death
Contributing factors
Toxicology
Date
Time
Place
Activity
Geographic location

Details of death

Cause of death
Nature of injuries / disease

Information flow

A national coroners' database will need to assist with, and operate within, certain constraints upon information flow. This section describes the processing of cases and the information that is generated at each stage.

Case initiation

Most deaths within the coroner's purview are notified to police, and an officer attends the scene. In some areas, a coroner's constable undertakes the investigation while, in others, general duty police officers are used. Information generated at this stage is outlined in Table 1. It consists primarily of a notification to the coroner of the nature of death and circumstances thought to lead to the death, any identifying information, and the place where the body was found. The coroner then determines the level of investigation required. Legislative requirements determine that certain classes of death must go to inquest. Others only proceed to inquest if the coroner believes this level of investigation to be necessary. The investigation may involve other officers and criminal investigation units where required.

Investigation

Police are the primary investigators of deaths reported to coroners. In some States this involves specialist coronial investigators, in others ordinary police officers, and in some areas a combination of the two.

The nature of investigation carried out depends on the possible cause of death and is determined separately for each death. Where natural causes are suspected, but a medical practitioner was unable to certify the cause of death, minimal investigations are carried out, although an autopsy is usually ordered. Where a motor vehicle crash is involved, investigation is far more extensive. This is both at the initiative of the coroner and the police, who need to determine if there have been offences against traffic laws. Specialist traffic officers or accident investigation units are often involved and a detailed protocol of investigation, developed in conjunction with road safety authorities, is used in most States. In cases where criminal intent is suspected, detailed crime scene analysis is undertaken. The level of detail is also influenced by preliminary post mortem findings regarding the physical cause of death. Not all cases proceed to autopsy. The detail of autopsies and the toxicology ordered also varies from State to State and case to case.

In many cases, specialist information and evidence are required. Departments of labour for example routinely investigate many work related deaths. In other cases the coroner may call for evidence from a specialist in a variety of fields. Paediatricians may provide information about the developmental status of children, ergonomists about human factors involved in the death, and engineers on structural matters. Once again these vary according to the circumstances of the individual case.

Decisions on the depth of investigation

Decisions about the depth and nature of the investigation are the province of the coroner, advised by investigating officers, forensic pathologists and other relevant parties. Primarily they are determined according to the needs of the individual case or group of cases being investigated. In straightforward cases, which do not lead to inquest, the depth and breadth of investigation is less.

This presents some difficulty for an information system which seeks to meet the needs of aggregate based research. Information which may be very useful for identifying a pattern of causality across a group of cases may not be seen as relevant for an individual case and therefore would be missing in the database. It is impossible to collect every piece of information for every case as this would be very costly and totally bog down the coronial system. It is necessary to devise a means of determining what information is required, how it is to be recorded, and where it is to be stored.

Final reporting

The level of detail of coroner's findings varies considerably from jurisdiction to jurisdiction, and from coroner to coroner within jurisdictions. In many cases the minimum information detailing the cause of death, place of death and identity of the

deceased is all that is recorded. The circumstances, or events leading to death, are not included. While this fulfils the requirements of the primary role of the coroner, there is insufficient information for this to be useful for coroners looking for common threads across cases or for researchers undertaking aggregate research. The information required is often in the file but there is a need to organise a way in which a summary that contains the critical element can be made available. Terminology differs from jurisdiction to jurisdiction, with some jurisdictions reserving the concept of a “coroner’s finding” for the formal finding of an inquest. Even when an inquest is dispensed with, there is a need to develop a way of summarising a case. This could be viewed as a coronial summary. It is possible that producing this would require a reorganisation of recording practices in some jurisdictions. Once a minimum standard for this summary is defined, the impact on the workload involved can be properly assessed.

Inquest findings, on the other hand, are usually detailed, present information about the circumstances leading to death, weigh the evidence presented and provide detailed information about the cause of death. They also often include recommendations or riders. The length of inquest findings varies considerably from case to case. The order of presentation, and the general structuring of information, also varies from coroner to coroner.

There is a need to develop a more standard protocol for reporting findings if optimal use is to be made of this information. The ready availability of coroners’ findings to other coroners would tend to increase uniformity, but the ACS could increase the utility of information considerably by developing a set of guidelines for the presentation of findings both for inquests and other cases.

Table 1:

Information flow: Coroner's Investigation

Event	Core information	Motor vehicle	Work-related	Suicide	Other accident	Suspicious	Sudden natural cause	Custodial
<ul style="list-style-type: none"> • Preliminary notification 	<ul style="list-style-type: none"> • Place of death • Apparent circumstances • Estimated date • Identity • Marriage particulars • Next of kin 	<ul style="list-style-type: none"> • Vehicle registration details 	<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> • Suspicious circumstances 	<ul style="list-style-type: none"> • Medical report 	<ul style="list-style-type: none"> • Death in custody report
<ul style="list-style-type: none"> • Coroner review 	<ul style="list-style-type: none"> • Preliminary post mortem 	<ul style="list-style-type: none"> • Preliminary post mortem 	<ul style="list-style-type: none"> • Preliminary post mortem 	<ul style="list-style-type: none"> • Preliminary post mortem 	<ul style="list-style-type: none"> • Preliminary post mortem 	<ul style="list-style-type: none"> • Preliminary post mortem 	<ul style="list-style-type: none"> • Preliminary Post mortem 	<ul style="list-style-type: none"> • Preliminary Post mortem
<ul style="list-style-type: none"> • Investigation 		<ul style="list-style-type: none"> • Post mortem • Toxicology • Witness statements • Police brief • Site plan • Vehicle autopsy • Photographic evidence 	<ul style="list-style-type: none"> • Post mortem • Toxicology • Witness statements • Police brief • Site plan • Department of Labour report • Photographic evidence 	<ul style="list-style-type: none"> • Post mortem • Toxicology • Witness statements • Police brief 	<ul style="list-style-type: none"> • Post mortem • Toxicology • Witness statements • Police brief 	<ul style="list-style-type: none"> • Post mortem • Toxicology • Witness statements • Police brief • Details of criminal charge 	<ul style="list-style-type: none"> • Post mortem • Toxicology • Witness statements • Police brief 	<ul style="list-style-type: none"> • Post mortem • Toxicology • Witness statements • Police brief
<ul style="list-style-type: none"> • Determination 	<ul style="list-style-type: none"> • Place of Death • Manner of death • Circumstances leading to death 	<ul style="list-style-type: none"> • Place of Death • Manner of death • Circumstances leading to death • Recommendations / rider 	<ul style="list-style-type: none"> • Place of Death • Manner of death • Circumstances leading to death • Recommendations / rider 	<ul style="list-style-type: none"> • Place of Death • Manner of death • Circumstances leading to death • Recommendations / rider 	<ul style="list-style-type: none"> • Place of Death • Manner of death • Circumstances leading to death • Recommendations / rider 	<ul style="list-style-type: none"> • Coroner may lose jurisdiction 	<ul style="list-style-type: none"> • Place of Death • Manner of death • Circumstances leading to death 	<ul style="list-style-type: none"> • Inquest required
<ul style="list-style-type: none"> • Inquest 	<ul style="list-style-type: none"> • Place of Death • Manner of death • Circumstances leading to death 	<ul style="list-style-type: none"> • Expert evidence • Place of Death • Manner of death • Circumstances leading to death • Recommendations / rider 	<ul style="list-style-type: none"> • Expert evidence • Place of Death • Manner of death • Circumstances leading to death • Recommendations / rider 	<ul style="list-style-type: none"> • Expert evidence • Place of Death • Manner of death • Circumstances leading to death • Recommendations / rider 	<ul style="list-style-type: none"> • Expert evidence • Place of Death • Manner of death • Circumstances leading to death • Recommendations / rider 	<ul style="list-style-type: none"> • Coroner may lose jurisdiction • Criminal court evidence • Place of Death • Manner of death • Circumstances leading to death 	<ul style="list-style-type: none"> • Rare for this class to proceed to inquest 	<ul style="list-style-type: none"> • Expert evidence • Place of Death • Manner of death • Circumstances leading to death • Recommendations / rider

Key: **Bold** always, almost always Plain often *Italic* sometimes

NB: Columns do not represent mutually exclusive categories (e.g. a death may involve a motor crash, be work related and involve suspicious circumstances).

Data quality

Coverage of cases

The Australian coronial system covers nearly all non-natural deaths. Coroners certify 91% of external causes deaths. Falls among the elderly, where death occurs as a result of pneumonia or other related complications, are often certified by medical practitioners, and are not notified to coroners. When this category is excluded, coroners cover 97% of all other external cause related deaths. Investigations are completed, and findings handed down, on the majority of coroners' cases. Cases where criminal or other charges are laid, may, in some jurisdictions, be removed from the coronial jurisdiction, and not have a coronial determination. The Australian coroners' system thus represents a rich source of information, and has the potential to form the basis of the most comprehensive coronial information system in the world.

Types of cases

Investigation and recording of details is more uniform and detailed for some types of case than for others. Criminal cases and road crash cases are investigated in great detail. Agreements between road safety authorities and the police have resulted in the systematic collection of certain key variables and standard procedures for vehicle autopsies. These agreements greatly assist with the task of obtaining uniform information on these cases. Other types of death are, however, not subject to the same degree of consistency. There is no uniform protocol, for example, for the investigation and recording of information about child domestic swimming pool drowning. In some cases, the state of the fence and gate systems, the conformance of the fence to Australian standards, and information about how the child gained access, is clearly defined and reliably recorded. In other cases it is not. The comparison of cases and identification of preventable causes is therefore difficult.

Work done with the SIDS Foundation is one example where key information has been identified and protocols for investigation and support of families introduced. There is a great potential to develop more uniform strategies for investigation and recording of information in many other areas.

Region of investigation

The spatial distribution of the Australian population provides a great challenge to coroners. Mechanisms are in place to ensure that relevant deaths are notified and to undertake investigation. The management of the investigation process is, however, difficult. A large number of coroners and police investigators are involved. Coronial practice varies from jurisdiction to jurisdiction and within jurisdictions according to geographic area. The information which is collected is often determined locally, especially for non-contentious cases. There are, therefore, considerable differences in what information is collected, how it is defined, and how it is reported. Even in Vic.,

which has the most sophisticated coroner's computer system of any State, country files have only minimal details entered. Police in the country may not have had any experience in investigating a particular type of death and may, therefore, not take important measurements or include all information which may be relevant.

Various strategies have been adopted to minimise this problem. The move to State coroner systems provides one central reference point in each jurisdiction. In smaller States and Territories, specialist coroner's police investigators are used. There is a need, however, to further develop greater consistency between jurisdictions and between investigators and coroners within jurisdictions.

Reliability and validity

The coroners' commitment to a public interest role, and the requirements for data to be able to be used for population studies, increase the importance of ensuring the reliability and validity of the data. The threats to reliability and validity described above are:

- lack of appropriate definition of the information required;
- lack of uniform ways of recording and presenting information;
- a wide range of data providers with differing levels of experience.

These problems can more easily be tackled as part of the development of a national information system than, separately, by individual jurisdictions. The ACS is in an ideal position to assist with development of definitions and procedures and promulgation of these. Increased reliability and validity of data would considerably enhance the use of the data. High levels are attainable, because the overall quality of the investigation processes is already high.

Obtaining uniform information standards

There are trade-offs in implementing uniform information gathering and classification procedures. Ranson has argued:

“We are also aware, however, that in order to produce a database capable of being used on an interstate and international level, a level of uniformity with regard to procedures and documentation is required. Such a uniform approach to data collection, however, while introducing consistency to a database, may stifle it by failing to allow freedom of description and procedure. These departures from procedure, although unusual and idiosyncratic, may in future prove to have been singularly appropriate.”⁹ ✓

There is a need to implement procedures which allow for aggregation and comparison of information, but not all information should be codified and classified. The following would be useful:

- the development of a small number of investigation protocols for major types of case;
- the definition of minimum information to be gathered;

- use of standard definitions when reporting data or recording data;
- inclusion of free text descriptions of procedures and findings;
- training in the use of the above.

Coverage of relevant information

Differences in information: case investigation and population study

More attention needs to be paid to the differences in collecting information for individual case determination and for population study. The emerging role of the coroners in injury prevention, and in making recommendations in the public interest, requires not only that information for assessing the cause of a particular death is recorded, but also that information which may be associated with patterns of death is consistently collected. It is somewhat difficult to predict which information is required for the latter purpose. In these circumstances, there may be a temptation to collect as much information as possible and wait for patterns to emerge. This is not desirable. The resources available for investigation, data collection and information processing are finite. Many jurisdictions have very little experience with computer applications and the resources necessary to support an open ended system are not available. Informed choices about what needs to be collected, how it is to be classified, and how it is to be stored are necessary for a viable system.

Existing coronial information systems

Each State and Territory has its own information system. Table 2 summarises how these operate.

Table 2

Summary Of Current Status Of Coronial Information Systems 1994

	Case management	Case information retrieval	Statistical reporting	Information transfer to other users	Development plans
• NSW	• Prime computer system using INFORM	• Programmers assistance required for all but name, suburb, date of death and event class searches	• Programmer's assistance required • Limited classification system only	• Manual release of police forms • Manual extraction of other information from files	• New courts' computing system under investigation. Coroners system rewrite will be required for new equipment
• Vic	• Sun Unix X windows with Ingres database	• SQL on any field including text searching of coroners findings and forensic reports Name searching on country records only	• Annual report on Unnatural deaths. Operates on separate PC system and requires manual extraction of country cases	• Electronic information transfer through AARNET and wide area electronic systems. Floppy disc transfer of data to some users	
• Qld	• Manual	• Manual by name. Forensic science centre has computerised system from 1988	• Not available	• Manual extraction from files	• Extended computer system seen as desirable with introduction of State coroner
• SA	• Manual	• Manual by name	• Not available	• Manual extraction from files aided by use of Forensic science system.	• Feasibility study for full computerisation being undertaken
• WA	• Manual	• Manual by name	• Not available	• Manual extraction from files	• Computer system seen as desirable with introduction of State coroner
• Tas	• Manual with DOS PC Excel spreadsheet	• Manual by name	• Not available	• Manual extraction from files	• Links to courts administration system may be possible but not seen as a priority
• NT	• NT Government computing system	• Programmers assistance required for all but name search	• Programmers assistance required • Limited classification system only	• Manual extraction from files	• Increased flexibility of statistical reporting and information retrieval supported. Development is linked to the NT Justice Information System
• ACT	• IBM AS 400	• Programmers assistance required for all but name search	• Not available	• Manual extraction from files	• Case management system under development. Possibilities for wider enhancements are dependent on budget

The emphasis of information systems has been mainly on case management. Systems have usually been administrative in nature. Vic. has led the way with the development of a broader model for coronial information systems. The use of text searching procedures, the storage of autopsy results, toxicology and coroners' findings as electronic text documents, and the supplementary coding of case information has made the system the most flexible and accessible in Australia. This has only been achieved for the Melbourne metropolitan area. Questions of how to ensure consistency of information content and terminology and systematic coding of information still require addressing. The resources required for this have been extensive and the computer technology involved far beyond that available in other jurisdictions.

Other jurisdictions have much more limited information facilities but are on the verge of developing more sophisticated systems. The lack of uniform classification systems has resulted in a number of different coding protocols being used in different jurisdictions. Many of these have severe limitations as they do not necessarily clearly define categories, do not ensure mutual exclusivity between categories, do not adequately separate different types of cases, and do not match the definitions used by major external users.

In most jurisdictions a great proportion of the documentation is word processed including autopsy reports, toxicology results, detailed police reports and coroner's findings. There is potential to capture these documents for text searching and electronic transmission. Scanning and optical character recognition could be used to capture typewritten documents. Text searching, however, requires moderately powerful computing resources and a balance needs to be achieved between text and coded data.

There is a need to develop a minimum coronial information data set, consisting of both free text and coded information, specifically designed to meet the information needs of both the coronial system and major external users. The separate development of computer systems in each State and Territory would be inefficient and could present problems with information sharing. Shared development is preferable in the interests of uniformity and cost efficiency of development and operation. Before making specific recommendations for proceeding it is necessary to consider the coding systems which are currently supported by major users.

Coding systems available for death and injury event coding

Coroners' classification systems

Only NSW and Vic. routinely code information for computerised retrieval. Some limited coding of type of case has been used in Tas.

There are two information systems operating in Vic. The Victorian coroner's system and the Institute of Forensic Pathology's system code cases according to three groups of codes. The first classifies events into homicide, suicide, accident, natural and other or undetermined. The second describes circumstances surrounding death. Within this

group multiple choices can be used and some coverage of setting, contributing factors and place of death is included. The third identifies a number of common causal and significant contributing factors, with multiple coding allowed. While this system provides useful information, it is far from comprehensive, and category divisions within axes are not always clear. It is also not consistent with the statistical reporting of death required internationally by agreements with the World Health Organization. Three years of deaths data have been coded in the Caseflow Analysis Section of the Courts Management Division. This system has obtained access to individual cases and extensive coding has been undertaken. The coding system is multi-axial, and based substantially on the ISIS coding system discussed below. It covers common demographic categories, manner of death, intent, activity precipitating event, mechanism of injury, factors associated with the death, ICD external causes code and location. It is by far the most extensive statistical database on coroner investigated deaths in Australia.¹⁰

NSW utilises a number of classifications. These include the type of death suggested by evidence, the type of death found in coroner's inquest finding, a broad manner of death code which contains 36 categories identifying common types of death such as overdose by one or more drugs, overdose by one or more drugs and alcohol, gassing from car exhaust, etc. A separate code group covers manner of slaying and a further 20 codes describe manner of suicide. In addition, country of birth is coded, drugs found in toxicological examination are coded in detail, as is marital status. This system includes many duplications between code groups and does not easily separate out the activity at time of death, the factors involved in death or the intent. It has been developed as an administrative aid and is difficult to use for finding groups of cases or undertaking reliable statistical reporting.

International Classification of Diseases

The International Classification of Diseases (ICD9) in its ninth revision is used in Australia and by the World Health Organization to classify death and hospital inpatient morbidity cases. It forms the basis for national reports on mortality produced by the ABS. Two parts of the classification are relevant for a coronial information system.

The first is the classification of external causes of injury. This system forms a single axis and describes circumstances leading to accidental and intentional deaths. Suicide and homicide are classified under separate code groups which results in loss of detail compared to unintentional deaths by the same means, especially in the case of poisoning. Type of place is also coded under a separate code group. The level of detail of this system is inconsistent and does not properly separate activity, place of death and factors contributing to the death. It is impossible, for example, to identify type of machinery, or the role of a consumer product. Information in the coroner's system is adequate for coding the external cause and this is already done by the ABS.

The second coding axis is the physical nature of disease or injury. This is a detailed classification system which has been used as a basis for a number of injury severity scores, especially in the field of motor vehicle related injury. This set of codes is more consistent than the external causes code system, but is not currently used in cause of

death statistics in Australia. This is a major deficiency. The description of anatomical findings at autopsy is not always specific enough, or in the terminology necessary for ICD coding, and extensive work is necessary to code this information from autopsy findings.

ISIS

The ISIS system is a multi-axial coding system specifically developed for the coding of information about injury cases presenting to hospital emergency departments by the National Injury Surveillance and Prevention Project. The axes are as follows:

Location
Activity at time of injury
Text description of events leading to injury
What went wrong event code
Factors and products involved in what went wrong
Mechanism of injury
Factors and products involved in the injury event
Intent
Safety measures being used
Motor vehicle seating position
Nature of injury
Body part
Job status (on or off the job)

Factor codes are based on the United States Consumer Product Safety Commission codes, expanded to cover industrial equipment, natural features and other non-product factors. In addition, standard demographic information is collected. This system proved too complex for sustainable use in a wide range of emergency departments and the NMDS(IS) system has been developed for this purpose. Some axes have been limited for emergency department use, including the nature of injury and body part classification which provides only a limited level of anatomical information.

Refinements of the breakdown and mechanism coding systems have been suggested to define a longer chain of events. In the coroner's setting, where detailed investigations are made, elements of this system could provide a useful indexing and statistical reporting function. ISIS codes are not easily recoded to ICD codes.

NMDS(IS)

NISU¹¹ proposes the use of an NMDS(IS) as a minimum standard, capable of identifying major categories of interest, and of being applied to the various major sources of data including mortality, hospital inpatient morbidity and emergency department cases etc. The NMDS(IS) a multi-axial system covering:

Type of place
Activity
A text based event description
Human intent
Nature of injury

Body part
Geographic location of injury event
Broad ICD external causes categories or fill ICD9 E-code

The NMDS(IS) system is less detailed than ISIS and, in some respects, than ICD codes. It has the advantage over ICD of having better conceptual clarity and separate axes and, in some areas, it carries more detail.

Road fatalities

There are a number of road fatality and injury information systems across Australia. FORS compiles a database from police that contains a common set of information. This is less than is desired by FORS, but is limited by what is possible in each State. Variables are coded according to a number of agreed protocols. Information on the needs of the road sector details the major variables (see page 15).

Occupational health and safety

Worksafe Australia has specified variables which it requires for the study of work related fatalities and these are found in the user needs section of this report. Worksafe also uses a coding system called the 'Type of Occurrence' classification system for categorising injury events. This system was introduced as part of the development of the National Data Set for Compensation Based Statistics. It includes the following axes.

Nature of injury / disease,
Bodily location of injury / disease,
Mechanism of injury / disease,
Agency

The coding system assumes that multiple injuries and multiple agencies will occur and these are coded according to seriousness of injury and the temporal order of agencies, starting with the critical or breakdown event. The system is designed for use in workers' compensation cases and therefore limits the specificity of the coding system to the level possible in this setting.

Factors affecting information release

Privacy and confidentiality

Coronial findings and records of investigation are in the public arena and there is a proud tradition of public accountability. Public access to coroners' records for legitimate purposes, once a case is determined, is supported in all State Coroners' Acts. Coroners routinely provide access to information for broad research purposes and to individuals with a specific legitimate interest in one or more cases. On rare occasions, the coroner exercises his power to close an inquest to the public and to

restrict access to information. This mainly occurs where information may damage a particular individual or jeopardise criminal investigations or proceedings.

The ABS has stringent control on the release of statistical information about deaths. Unit record data is only available to a few users with the consent of each State Registrar of Births Deaths and Marriages. This is in sharp contrast with the coroners' approach. Summary data can be purchased from the ABS in routine publications or, at a greater cost, in the form of special tables.

Development of a national information system which can efficiently access information will make it easier to meet users' demands for data. Most new requests for information can be expected to be for aggregated information and it will not be necessary to provide identifying information. There seems to be no reason for the coroners to move away from their stance that the coronial process is in the public domain and completed case information should continue to be available.

It will be necessary to develop a system of privacy and confidentiality provisions which adequately caters for different types of information release. The basic classes of release would be:

- early release to privileged users with strict confidentiality and privacy controls;
- release of statistical data without identifying information following the completion of the coronial process;
- release of detailed information without identifiers following the completion of the coronial process;
- release of detailed information with identifiers following the completion of the coronial process.

Privileged users

There is a clear case for privileged users to have access to information before the coroner's determination is made. Early identification of fatality trends and clusters of deaths is more likely if authorities with an interest in specific sorts of deaths are informed of the possible cause of and circumstances leading to death as soon as possible. An early notification system for subscribers who have been approved to use such information would also result in information about research in the area, and other relevant information being provided to coroners. Work safety authorities, for example, may have information on a number of non-fatal injuries associated with a particular work setting. If they are informed of another death in similar circumstances, they may be able to use their information more effectively and provide the coroner with information on the injury cases, providing evidence useful at an inquest.

There are a number of candidates to become privileged users. These are various authorities with responsibilities for matters of safety in certain jurisdictions and researchers undertaking ethics committee approved research on particular kinds of deaths. These users could be routinely notified of certain types of death and contribute to the investigation process. This approach has already been accepted in the provision

of information of early release of circumstance of death information to the NSW Health Department and coroners involved in the investigation of youth suicide in Vic.

Statistical information

Statistical information which is openly available to the public should usually be based on complete cases and no identifying information should be included to protect privacy. The Victorian publication on unnatural deaths¹² provides a great deal of useful information on deaths in that State and represents the finest level of detail which could be released. Release of statistical information based on cases which have not been finalised may be useful in some circumstances, but it must be clear that these are preliminary figures so that differences between early release data and final data released through the ABS can be understood.

Unidentifiable detailed information

In-depth research studies will often require access to detailed information but have no requirement to receive information which will identify particular cases or the witnesses or institutions involved. The release of this type of information presents very few problems. It should be remembered however that coroners' hearings are open to the public and that the identities of parties involved in the case may already be public. The coroner's prerogative to withhold information must be protected.

Identifiable detailed information

Some in-depth research requires access to records which includes identifiers including access to case files. This is necessary to link to other information not held in the coronial setting, or to aggregate cases by family or by the setting where the death occurred. While the coroner's hearings are public, with only a few exceptions, it must be recognised that information reports are far more widely accessible and therefore there is a need to address release criteria. At present, control is maintained in the coronial system by staff making decisions about who should access the records. There is a need to ensure that users of the electronic system are properly authorised, can only obtain information for which they have authorisation, and have agreed to use the information only for the purposes specified.

It is envisaged that an electronic system would only be accessible to users who have a legitimate need, that information will be restricted only to that which is necessary for their purpose, and that the system would log information requests to ensure that procedures are working.

Ethics clearance.

In order to avoid a situation where authorisation for access is approved individually by each jurisdiction, it will be necessary to develop privacy and confidentiality guidelines to apply to standard requests and to implement an ethics committee to deal with requests which do not fall within the scope of routine approval.

Assessment of existing systems

Coronial information systems in Australia are generally unable to meet the needs of coroners or the research needs of major users. Vic. has the most advanced and flexible system which covers the Melbourne metropolitan area and cases which proceed to inquest. A separate code-based system has permitted release of statistical material for 1989-90 and 1990-91 for the whole of Vic.¹³ NSW, NT and ACT have computerised the administrative function and made some attempt to include basic coding. Coding systems however are not compatible with major users' needs.

At present, a great deal of expensive effort is required to tap the valuable information hidden in coroners' files. ABS, Worksafe Australia and FORS spend large amounts of resources manually extracting and coding information. None of this coding effort is returned to coroners, who could benefit from indexes based on the coded information.

There are serious difficulties with information quality. Coroners' investigations are thorough and have the potential to provide excellent data. Inconsistencies in investigation protocols make it difficult to interpret aggregated data. The level of detail of coroners' findings also varies considerably. There is a need to ensure that a minimum standard and ordered layout of coroners' findings is developed.

The various systems are operated separately and there is no opportunity for coroners to access information across jurisdictions without a laborious process of phone calls, the recall of possibly relevant cases by coroners' clerks, retrieval of documentation filed by name, and photocopying and mailing of relevant details.

With the exception of Vic., the coronial system has not had the advantage of the level of resources available to other courts. Effective, modern coronership requires a major investment of resources to permit it to meet its statutory obligations. The developments recommended later in this document will not only assist in improving the effectiveness and efficiency of the coronial system, but have major benefits for research into unnatural deaths and for the effectiveness and efficiency of key agencies with statutory responsibilities.

Information systems needed

Progress needs to be made toward a more efficient and effective way of storing, retrieving and reporting on information held about deaths investigated by coroners. The very different stages of development of systems in different jurisdictions and the links which some systems have with justice and courts administrations make the task of developing a national system more difficult but it is still achievable. It will be necessary to develop common systems among those who have not started on computer development (SA, Qld, WA and Tas.), and to extend and standardise systems among those who have significant computerisation (Vic., NSW, NT and ACT).

It is useful to distinguish between the administrative and research tasks of a coronial information system. Administrative systems deal with the case management process. Research systems deal with the retrieval and processing of information for both case based and aggregate research.

Administrative system

Information systems for case management need to cover the following tasks:

- recording the occurrence of a notifiable death;
- record information from preliminary police report;
- record decision of the coroner about investigations required;
- maintain record of the identity of the deceased, next of kin;
- manage record of property of deceased;
- manage body location, transport tracking, burial order and release of body;
- manage communication with next of kin
- manage communication and reporting to the Registrar of Births, Deaths and Marriages;
- record request for post mortem, status of post mortem, interim and final post mortem finding
- record request for other investigations, status of investigation, interim and final reports;
- record determination of coroner without inquest;
- record transfer of matter to criminal jurisdiction;
- manage the scheduling of inquest, inquest documentation and coroner's findings;
- report on case flow;
- report on patterns of investigation.

The case management system tracks the activities in the case and receives the raw information which can be re-processed to form the basis of a research system. It is possible to operate these as a single system covering both functions, or to pass relevant data from the administrative system to the research system which then classifies and arranges it to facilitate research.

Research system

The research management system needs to cover the following tasks:

- retrieval of cases according to selections of key variables by coroners and other authorised researchers for in-depth analysis;
- retrieval of cases which include particular patterns of textual information;
- notifying researchers of deaths relevant to their research;
- retrieving unit record classified data for production of research reports and processing by research agencies;
- assess the validity and reliability of information held in the system;
- provide aggregate reports on classes of cases.

Technical possibilities

The task of upgrading the coronial information system is technically quite simple. Either a single computer system or a distributed computer system, combined with national network access, would be quite capable of handling all of the needs identified. The major difficulties arise from using different operating systems, hardware and software. The interchange of data between these systems is quite easy providing there is a commitment to undertaking the necessary software development in each jurisdiction and that systems for ensuring security of linked information on justice systems are put in place.

It is technically possible to develop a system with on-line access for all coroners. All reports now on paper could be converted to electronic form, and all text documents to searchable text form. Modern CD-ROM technology is capable of providing adequate archiving systems to permit access to many years' data. There has been no indication, however, that funding for such a sophisticated system is available.

National networks capable of carrying coroners' information are available and have the necessary level of security to permit coroners and privileged users to access information on incomplete cases and exclude access to particular cases or fields of information. Access to international networks, and the systematic release of completed information and reports of various kinds, are already in place in Vic.¹⁴

Computer technology is advancing rapidly. A new system should aim to create opportunities to use the new capabilities becoming available. The state of knowledge of computer systems, familiarity with use of computer systems among coroners and their staff, and the limited availability of resources suggest that a simpler starting point is required. The development proposals below seek to put in place a process which will result in immediate benefits and open the doors, in the medium term, to a more sophisticated and efficient system.

Development required

Administrative systems

The development of a uniform administrative system is made complex by differences in legislation, arrangements with the police, forensic services and links to courts administration and justice information systems. If there is sufficient commitment, a single administrative system capable of managing the differences between jurisdictions could be developed. Negotiations would be complex and the cost relatively high.

Major benefits could be derived by developing a set of core information and communication standards and by ensuring that jurisdictions develop systems to meet these. The core information would form the basis for a research system. This would open the possibility of cooperative development between jurisdictions just starting out with computerisation, sharing development costs, or forming a partnership with an

already operating system. Small jurisdictions may choose to team up with a larger jurisdiction and receive bureau type services, thereby saving development and capital costs.

Several States are in the position of needing to develop systems from scratch (SA, Qld, WA, Tas.), another is developing a system (ACT) and yet another needs to redevelop due to changes in hardware and software availability (NSW). Only the NT and Vic. have fully operational computerised case management and administrative systems, and the Victorian system has limited information on country cases.

Cooperative development seems to offer the best cost efficiency. Each State will need to decide how it will proceed, but development of separate systems in each jurisdiction would not be efficient, and the danger of data incompatibility and reduction in ease of access between jurisdictions would be high.

Recommendation 1

It is recommended that coroners and administrative personnel from each jurisdiction develop plans for computerised administrative systems that include at least a common core of information which can support a national coronial information system. This may include cooperative development of systems or merging into a single system.

Even if the case management and administrative functions remain as a manual system, the standardisation of core items of information and the inclusion of these in a research system, will be feasible and provide major benefit. The major benefits to the coronial process and access to information by both major and minor users, could still be achieved.

Resources will be needed to assist with this process. Some of these could be available as part of the research system development, but it should be recognised that the development of administrative systems is a routine cost of operating a coronial system.

Research systems

The development of a research system needs to ensure the maintenance of data quality. Similar cases need to have similar items investigated and reported. Text based reports need to have a simple structure so that information is easy to find and appropriate items need to be coded to ensure similarity of definition and ease of access.

Data quality

Investigation protocols

There is a need to develop simple investigation protocols for common case types. This has already been done in the case of SIDS and, to a great extent, for motor vehicle crash related deaths. One example raised during this study is domestic swimming pool drowning. Investigation reports may or may not detail the nature and state of repair of fencing, the functioning of the gate or other key features. Even if these are mentioned, key measurements of fence height and foothold size may or may not be included. Some reports are detailed and thorough while others are far more limited. There is a need to systematically develop the recording of information so that it can be validly compared from case to case.

Investigation protocols for major types of case could easily be developed. These could be used for primary investigations and result in key information being reliably available within a short time after the death. They would greatly assist investigating officers, especially those who do coronial investigations only rarely, to provide better information for the coroner and form the basis of a valid and reliable research database. There is no need for these protocols to be long or complex and they should not restrict inclusion of additional information relevant to a particular case. Each would include the common core of information necessary for case management purposes.

Protocols should be developed for the most frequent causes of death and for those where there are technical issues which require particular attention by the investigators. It is anticipated that the development of protocols for only five or six major causes areas and two or three more technical areas would make a significant contribution to consistency of data coverage and quality of information. The protocols could be developed through cooperation between the coroners, police, and appropriate technical advisers and adopted as a national standard. Resources for a project officer to facilitate this process would be necessary.

Recommendation 2

It is recommended that the Australian Coroners' Society (ACS), in conjunction with specialists with an interest in particular causes of death, design standard investigation and recording protocols for significant classes of death and promulgate these for the investigation process.

Systematic reporting of coroner's findings

The level of detail and content of coroner's findings varies greatly from jurisdiction to jurisdiction and from coroner to coroner. While these findings meet the legal responsibility of coroners for each case, they are currently inadequate to inform other coroners of all necessary information or to be used to extract information needed by

major research users. There is a need to develop systematic ways of reporting which ensure that relevant details are always included in findings about:

- the circumstances and events leading to death;
- the cause of death;
- the identity of the deceased; and
- recommendations and riders.

This should occur regardless of whether the case proceeds to inquest.

Recommendation 3

It is recommended that the ACS develop a set of standards for the reporting of findings and promulgate this for use by all coroners in Australia.

It is also essential that cases which are referred for criminal or other charges to be investigated, are properly reported on by the coroner. There are differences in the way that this is dealt with from jurisdiction to jurisdiction

Recommendation 4

It is recommended that the ACS develop a standard approach to facilitate the reporting of matters which are transferred to other courts and, where necessary, that coroners request that changes be made to Coroner's Acts to permit this approach to be implemented.

Coding and indexing

The coding of data can serve a number of useful functions. Coding:

- makes common retrievals easy by providing an indexing function;
- enables consistent and reliable statistical reporting;
- provides a basis for the use of common definitions.

Early coding of data and interaction between coders with people providing the information assists the process of improving data specificity and quality. Some information system designers argue that coding is not necessary and that modern text retrieval systems can undertake all of the tasks for which coding is used. Text retrieval is beneficial and necessary as it permits searching of cases on complex criteria. For data aggregation purposes, there is a need to ensure that definitions and terminology are consistent so that information can be compared across groups of persons and times. Coding, while time consuming, is essential if the needs of major users are to be met and if reliable statistical reporting of coroners' data is to be possible. Simple items can be self coded into categories during collection. More complex coding can be performed by the transmission of text to a central coding point with coding performed by a coding expert. This maintains accuracy and efficiency.

Different users have different coding nomenclatures and there is a need for easy aggregation of information according to the terminology of each of these user groups. While this involves using a number of coding systems, the information required to use them is in the coroners' files. It will be necessary to use these coding systems if information is to be comparable with non-fatal events in each area. At first glance, the task seems daunting, but a close examination shows that there are similarities between coding systems which enable recoding to meet various needs. The task of coding is not an easy one and maintaining coding quality across jurisdictions would be difficult. It would be preferable for relevant descriptive information be available to a single coding service, which could undertake coding. Some special items might be coded at different locations, depending on the availability of expertise. The coded information could then be linked back to the case file and used as an index and reporting mechanism by coroners and supplied to major users. Resources currently used to retrieve old files and extract relevant information could be diverted to support a continuous coding process with consequent gains in timeliness and accuracy.

Coroners' offices would provide information to be used for coding.

Analysis of user needs and coding systems currently utilised indicates that there need to be two levels of coding:

- a core set of codes used for all cases; and
- codes which apply to particular types of case only.

Core data set

Details of the core data set, the variables required, and the coding system recommended are presented in Appendix 1 Part A. The core data set covers demographic variables, items necessary for ABS death statistics, and death event descriptors. It also includes a flag item to identify cases of interest to each major user. In addition (Appendix 1 Part B), extended death event items, contributing factors and toxicological findings are to be included for all external causes deaths. The core data set will assist coroners with retrieving relevant cases, provision of data to major and minor users, and statistical reporting.

Major user data sets

Four major users of coronial data have been considered in this study; Worksafe Australia, the ABS, FORS and the AIC Deaths in Custody Project. Each needs specific information which is available in coroners' records but not easily accessible at present. Appendix 1 Part C defines the special needs of these organisations. The needs of NISU require that, at the minimum, the NMDS(IS) specification is met. A more detailed data set is highly desirable, and is essential if a preventive approach is to be adequately supported. A combination of requirements of other major users is likely to result in a data set which is adequate to support NISU's work.

Two options are open for implementing the processing of major user data. The first is for the routine collection of information and coding to be carried out within the national coroners' database project, with final data being provided to major users. The second is for the core data set to identify and flag relevant cases, and for major users to

manually retrieve relevant coroner's records and code the additional information which they require. This option would still represent considerable cost savings to major users as a great deal of the cost of retrieval currently arises from the process of identification of cases. A mix of these options could be implemented with some users proceeding with option one and others with option two. This is facilitated by maintaining sufficient information in the core data set to identify cases required for a particular user and, where the user chooses to collect extra information within the system, linking this through the case identifier. Even where additional information is processed outside the coronial system, it should be a condition of access that coded unit record information, based on coroner-provided material, should be made available to be linked back to the coroners' database.

In order to easily link information, variables which flag the existence of additional information have been included in the core data set.

Detailed text and documents

Coded information is not sufficient to deal with such a complex set of information. Access to text information is essential, both for in-depth study of cases or groups of cases, and for identifying phenomena which have not been included in a formal coding system. A great deal of the information in coroners' files is word processed and, therefore, readily convertible to a form useful for computerised text searching. The Victorian system has gone a long way down this track and has proved the viability and usefulness of such a system. Other jurisdictions will have more difficulty in making text information readily available in the short term.

In the first instance, the coroners' database should include, in text form:

- the police summary of circumstances leading to death;
- the summary post mortem findings; and
- the coroner's findings.

As the system develops, the system should carry:

- the full post mortem report;
- toxicology results; and
- investigation reports, such as accident investigation and motor vehicle mechanical reports.

Experiments are currently underway, in some jurisdictions, to produce transcripts of inquests in electronic form. With changes in technology, and the costs of processing, the option of including transcripts in the database could be revisited but, currently, it would present technical and cost barriers which could damage the development of other, more important aspects, of the system. The scanning of photographs and other exhibits is also possible but would not be included in early versions of the database. Designs should, however, keep in mind the possible inclusion of these.

Transfer methods should avoid duplication of effort. Where information is word processed or entered into a computer system, it should be transferred electronically to the central site. This will mean obtaining electronic, as well as paper based, copies of reports. Many police reports are not word processed and it may be necessary to scan these in as a graphics document. This will limit text searching. As time goes on, more and more information will be accessible electronically resulting in more efficient and flexible information capture and access. Coroners should provide as much information as possible in electronic form. The cost of operating the system is based on the assumption that, in the main, only coded information will need to be entered at the central site.

Information access systems

Coroner access

Nationally, networks providing access to all coded items and standard text items, via a simple inquiry system, should be available to all coroners. Coroners contribute the investigation and recording resources for the system. It is therefore anticipated that they should not be charged for system transactions. They will however need to provide facilities capable of accessing the system. In most cases this will involve software enhancements to existing systems, but some jurisdictions may want to enhance access and therefore require hardware development.

Early access subscribers

A system of subscribers should be set up to meet the needs of authorities and research bodies whose work would benefit from early notification of the possible circumstance and demography of new cases. Only subscribers who have undertaken to abide by confidentiality and privacy constraints would be included. Possible subscribers could include (among others):

Subscriber	Topic Area
ABS	Coroner reported death statistical information
AIC	Deaths in custody
Consumer authorities	Consumer products
FORS	Road related fatalities
Health departments	Injury related, anaesthetic and surgery related and drug related deaths.
NISU	All injury related deaths
Worksafe Australia and State industrial affairs departments	Work related fatalities

The early availability of information could assist with preventive activities and enable experts in particular fields to provide relevant information to the coroner. Publication of aggregated early release data should be possible, providing it does not interfere with the proper progress of the case, identify individuals, and is clearly marked as preliminary information subject to review. As new information enters the system, subscribers should receive updates of all relevant information. For example, when toxicological results are entered on the system, they could be notified to subscribers who are authorised to receive information on that case.

The information provided under this system would include basic demographic data, available information on the circumstances leading to death and, as they come to hand, preliminary post mortem and toxicological findings. The majority of cases released would not need to carry material identifying an individual. In appropriate circumstances, it would be possible to authorise the release of information identifying the deceased.

Release of completed case information

Once the coroner's finding is in and the case completed, data can be provided in a number of forms. This includes:

- aggregate reports;
- access to individual case information; and
- unit record data for statistical processing.

The system could be developed to routinely provide reports and information and to enable each coroner's office to produce and release information in answer to specific requests.

Major users

Provision of information to major users would constitute a significant service. Currently, major users bear the expense of manually extracting data. Agreements about the provision of coded and raw information to major users could be made. Revenue received for these services could be used to maintain and develop the system once initial capital outlay is covered.

It could be expected that all subscribers for early release data would also receive finalised data. In addition, access to search the database on-line could be provided at this stage.

Routine release and ad hoc inquiries

Data could be routinely released by coroners in their own State and by the coronial information system nationally. *Ad hoc* inquiries could be dealt with in each State, with access to other States' completed data being available.

International network release

Australia could lead the world in international access to coronial data. Some information on Canadian deaths is already available on CD-ROM. Summary information could be released electronically, on the Internet, using bulletin boards and list servers. On-line searching of the completed cases database could also be permitted if desired. This would promote interchange with coroners and medical examiners worldwide and create opportunities for interchange of information on a wide range of topics. The Victorian Institute of Forensic Pathology already has a sophisticated system performing many of these functions.

Implementation plan

The information necessary to meet the expanded role of coroners, and the needs of other users, is generally readily available during coroners' investigations. Current information systems are oriented toward dealing with a single case and do not, necessarily, systematically record the information required to take a broader view. The challenge in developing a new system is to capture relevant information in a systematic manner and to make this readily accessible to coroners and researchers.

It is difficult to accurately detail the exact number of cases to be processed in each year or the categories into which these cases fall. The table below presents an annual estimate based on ABS deaths data for 1990-1992

Table 3 Estimate of average number of deaths certified by a coroner annually in Australia

Type of Death	Expected Annual presentation to coroners	Source of estimate
Transportation	2550	ABS Deaths 90-92
Work	500	Worksafe study
Consumer product	Unknown	
Deaths in custody	80	AIC 1993
Intentional inflicted by other	350	ABS Deaths 90-92
Intentional self inflicted	2938	ABS Deaths 90-92
Drowning	430	ABS Deaths 92
Total external cause	7500	ABS Deaths 90-92
Non external cause	10500	ABS Deaths 90-92
Total coroner certified deaths	18000	ABS Deaths 90-92

Note: The number of deaths in each category, and the total, are separately estimated as some deaths fall into more than one category. For example 20-30% of work related deaths are also transport related.

The number of cases for which information is to be processed is not large. Many detailed items are not required for all cases. For example, sudden natural cause deaths will require only minimal core information to be completed, brief findings and no detail for major users. The system which is needed, therefore, need not place an undue load on coroners, nor require levels of resourcing which are prohibitive. The processing of core information should be subsidised by major users, and the cost of processing more detailed information for particular users should be covered by the users defining them. Inclusion of the more detailed data would, however, benefit coroners by allowing them to use the variables generated, in the searches and analysis.

This study has identified core information and the information required to meet the needs of key user groups. At first, the list seems large and complex. Most of the information is already included in coroners' files but is not readily accessible. Where it is not, the introduction of investigative protocols for key types of cases and standard ways of recording information across all jurisdictions could easily obtain and standardise the required information. Coroners' clerks already operate to ensure that the necessary information is available to the coroner and would play a vital role in ensuring that information is complete, and that the relevant protocols were used. Table 4 presents a summary of the data required.

Table 4 Data Summary Map

All cases

n = 18000

- Sex
- Day of birth
- Month of birth
- Year of birth
- Country of birth
- Marital status
- Aboriginality
- Usual residence SLA
- Employment status
- Usual Occupation
- Age of marriage
- Date of marriage
- No of issue
- Drowning classification
- Cancer flag
- Maternal death flag
- TB flag
- Leukemia flag
- AIDS / HIV flag
- Asthma flag
- Drugs, smoking, alcohol flag
- Asbestosis flag
- Diabetes flag
- State of registration of death
- Date of registration
- Registration number
- Time of death
- Day of death
- Month of death
- Year of death
- Type of place of incident
- SLA of incident
- Place of death
- PM defined cause of death
- PM summary
- Description of circumstances
- Coroner's summary
- Major cause type
- Work related flag
- Road related flag
- Consumer product related flag
- Death in custody External cause flag
- Anaesthetic death flag
- Suicide flag
- Other external cause flag
- Death in custody Natural flag
- SIDS flag
- Other natural death flag

All external causes

n = 7500

- Diagnosis / injuries received
- Intent
- Manner of death
- External Cause of death
- Activity at time of death
- Products and factors
- BAC %
- Prescription drugs
- Other drugs
- Other substances toxicology

Work related

n = 500

- Industry
- Mechanism of injury / disease
- Agency of injury / disease
- Task being performed
- Time on task
- Usual Job
- Experience on task
- Work classification
- Shift
- Usual shift
- Hours on shift
- Response to injury
- Use of protective equipment
- Training history
- Safety procedures

Road related

n = 2550

- Event
- Incident identifier
- Crash type
- Road user movement
- Road structure
- Speed limit
- Alignment
- Weather
- Surface type
- Surface condition
- Light
- Street lighting
- Death vehicle
- Incident identifier
- Vehicle type
- Vehicle make and model
- State of registration
- Drivers licence type
- Towed away
- Operator BAC
- Operator sex
- Operator age
- No of occupants
- Vehicle fault
- Other vehicle
- (1 set per vehicle)
- Incident identifier
- Vehicle type
- Vehicle make and model
- State of registration
- Drivers licence type
- Towed away
- Operator BAC
- Operator sex
- Operator age
- No of occupants
- Vehicle fault
- Deceased details
- Seat belt use
- Position in vehicle

Consumer product related

n = unknown

- Brand and model of product
- Detailed product description
- Year of manufacture
- Manufacturer
- Retailer
- Country of Origin
- Year of purchase
- First language

Deaths in custody

n = 80

- Education level
- Living arrangements prior to custody
- Custodial authority involved
- Time last seen alive and reasonably OK
- Time found dead or in a distressed state which progressed to death
- Legal status (remand, sentenced)
- Reason bail denied
- Offence or alleged offence leading to custody
- Length of time in custody
- Period of sentence served
- Health status (Physical and mental covering significant events including suicide attempts, etc.)
- HIV status

Options considered

A number of options for development were considered. They are listed in order of decreasing preference:

1. *Combination of a wide mix of index and statistical codes with core text information*
This is the preferred system as it meets major users' needs without requiring administrative differences in the States and Territories to be catered for. It has more detailed coding than option 2. This provides a better service to both coroners and major users. This level of coding is already being done, in a fragmented fashion, by individual users, but the benefits do not flow back to the coroners. Text searching of core text fields would complement searching by coded items. A modern, integrated inquiry system would be used to combine text and code searches.
2. *Combination of minimum index coding as per the NMDS(IS) with core text information*
This system is less preferable because it will not directly meet the needs of many of the major users. It would increase efficiency and timeliness of research and coding activities of major users by decreasing the difficulty of identifying relevant cases. Supplementary coding would be carried out separately by users. This would require administration of separate coding groups, and for some cases, classification by more than one group. If this option were chosen, it would be essential that any supplementary coding done was provided back to the coroners' system to assist coroners with their work. Text searching of core text fields would complement searching by coded items. A modern, integrated inquiry system would be used to combine text and code searches.
3. *Scanning of available documentation with text searching only used for case finding and statistical reporting.*
Text searching is a vital component of a coronial information system. However, differences in the level of technology between jurisdictions would make implementation of such a system difficult. The needs of major research users, interested in aggregated information, are not well met without the use of codes, as there is difficulty in maintaining consistency of definitions.
4. *A fully integrated administrative and research system, uniform across all States, with detailed coding and text retrieval.*
This option would require a very detailed systems design to be worked out across all jurisdictions. Differences in legislation, local needs and existing links to wider information systems would make this task difficult. It is unlikely that resources necessary to undertake this development would be available.

Preferred solution

This study has identified core information and the information required to meet the needs of key user groups. At first, the list seems large and complex. However, most of the information is already included in coroners' files, but is not readily accessible. Where it is not, the introduction of investigative protocols for key types of cases, and standard ways of recording information across all jurisdictions, could easily obtain and standardise the required information. Coroners' clerks already operate to ensure that the necessary information is available to the coroner and would play a vital role in ensuring that information is complete and that the relevant protocols were used.

The preferred solution, therefore, is to establish a central information system which meets the research and statistical reporting needs of coroners and major users. This system would receive information from coroners. As much information as possible would be electronically transferred. This would vary from State to State. It is anticipated, however, that local administrative systems could be set up to transfer basic case information and that detailed text information such as police, toxicology and coroner's reports would be word processed locally and transmitted as text files to the central system.

Staff of the central system would then manage the coding of items from the text and other information supplied and develop a complete record for each case. Some coding may physically be done by major users with on-line access to the system. ABS, Worksafe and FORS may therefore code relevant cases. Some cases, for example those dealing with a road accident at work, would accumulate codes from more than one agency. Central operations staff would code other items.

The coded record and text would then be available to coroners interactively via a national network and would form the basis of reports to major users. Searching of cases would be by a mixture of codes and free text.

The central site would operate as data coordinator and quality control manager. Routine reporting approved by individual States, and national information dissemination, would also be performed centrally. Coroners would have access to national data and would be able to extract and provide information to users making requests to them. In order to support a user pays system for information provision, it would be necessary to agree on a basis for charging as this would pay for the continuing operation of the system.

System development

System development could proceed through three stages:

Stage 1

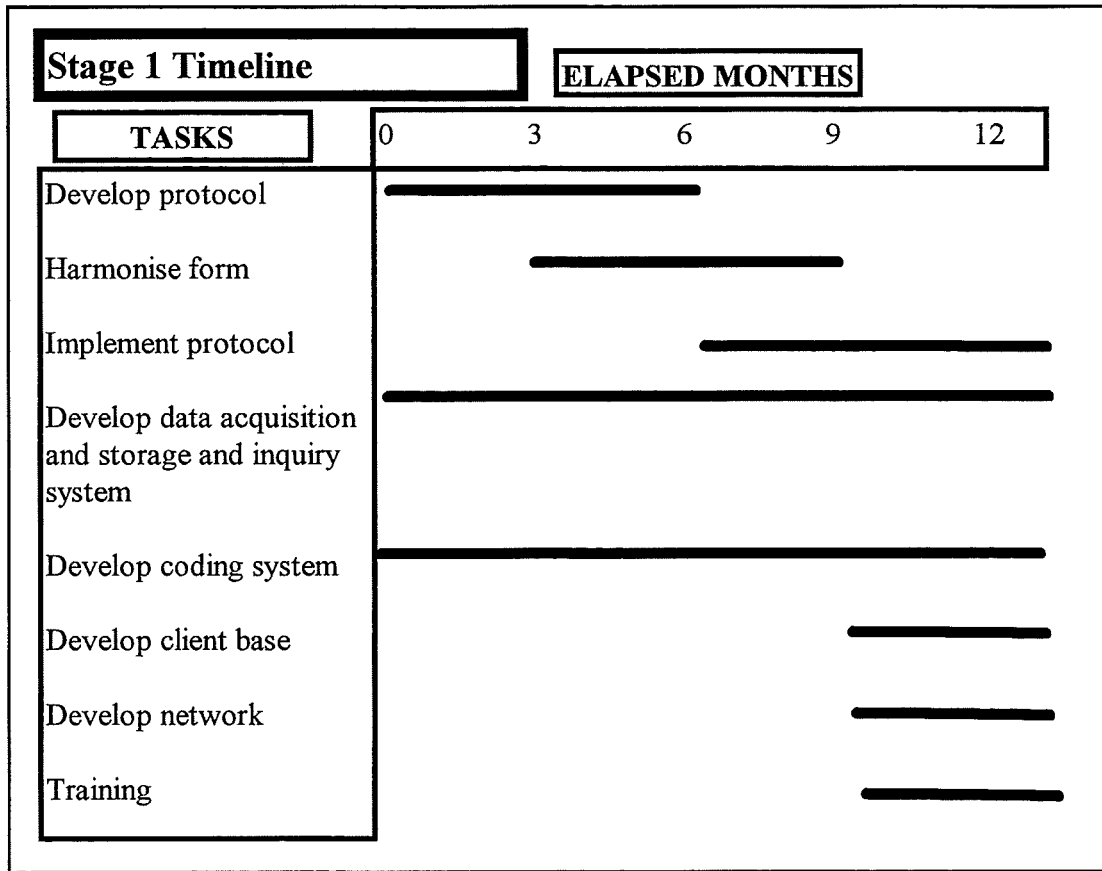
This stage would concentrate on developing a national coroners' database containing data of high quality and validity. This would exist alongside administrative systems

and, where possible, information would be exchanged electronically to limit duplication of effort. The diversity of environments and systems across the States suggests that it is better to proceed with the development of the research data system in parallel with administrative developments, rather than take on the task of developing a uniform integrated system. This will result in more speedy development and avoid difficulties related to the different administrative requirements in each State. Administrative systems could be greatly simplified by being developed without the research data component, but linked to the research data by a unique case identifier key.

Stage 1 would involve the following tasks:

- develop standard investigation protocols for various categories of death;
- design forms that reflect the investigation protocols and provide ways of recording necessary information systematically. These would include self coding or check boxes for simple items (such as gender) and prompted text boxes for more complex information;
- develop procedures to ensure the use of the correct protocols. This could include automated faxing of protocols to investigating officers as soon as a telephone notification of death occurs;
- develop a system for entering self coded and text information into a central database. This would occur differently in different States. Where computerised administrative systems are available, items required for administrative purposes could be entered locally and electronically transmitted to a central database. Other information, and information from States where administrative systems are not computerised could be faxed or scanned and computer transmitted to the central database;
- develop a system for coding and entering text from source documents including forms, initial police reports and coroner's findings into electronic form. Coding of information is a specialised task which requires close quality control. It is therefore envisaged that coding would be done at a single location. The database would be accessible to all jurisdictions;
- develop a nationally accessible computer network which could be accessed by coroners via existing State networks and telephone dial up. An existing network such as the Commonwealth Attorney General's system may be an appropriate vehicle;
- develop a client base and routine early warning reporting systems;
- develop a flexible inquiry and statistical reporting system using both text and structured case selection using modern, user-friendly access tools;
- train staff in the use of the system.

At the completion of stage one, the expressed needs of coroners and many of the needs of major users, could be fully met. Reporting of coded information to the State registrar and the ABS would be possible.



Stage 2

This stage is a technological development stage which would permit streamlining of information collection through redeveloped, compatible administrative systems with a greater proportion of information being transmitted electronically to the central database. If all jurisdictions have developed compatible computerised administrative systems, the feasibility of the central database being reconstituted as a distributed database should be examined. There will, however, still be a need for a central coding and quality control function.

Stage 3

Technological developments are advancing rapidly. The logical next step would be to increase the proportion of coroners' information which is accessible on-line. Many of the documents which flow into the coroner's system are electronically produced and could be accessed via the national system. Each jurisdiction could set its own pace for electronic storage of full post mortem reports, toxicological reports, vehicle autopsy and other documents, including full inquest transcripts. In addition, photographic evidence could be digitised and made available. This would allow the more complex needs of users such as FORS to be met in full. By this time, seamless access to the

documents on cases in which they are interested should be possible, with access via the national system to documents stored on local electronic information systems.

As more information is made available, and the sophistication of access increases, new ideas of how data is to be used will emerge. Coroners will discover new ways of using information in their investigations, and users will request more information. Technology will make access easier and cheaper. It will be necessary to develop a plan for further development which is within the resources available at this point in time.

Funding

Several organisations contribute to the current use of coronial information. The coroners' offices themselves and the departments to which they belong, provide resources for the existing, largely manual, systems. In most States, coronial information systems are under resourced and, as a result, cannot be accessed efficiently. Even where computerisation has been possible, systems have usually only covered part of the defined needs. The lack of efficient systems consumes considerable resources. Coroners provide staff support to those doing research studies, and users also pay for staff to search manually for information which could be retrieved within seconds by a computerised system. Staff from research agencies spend many hours retrieving information manually from files. When the programs of ABS, FORS, Worksafe and various university based research studies are considered, it is likely that the current annual cost of data retrieval from coroners, and reprocessing by external agencies is at least \$500,000. The redistribution of these resources to a national coronial data system would meet the ongoing system maintenance and upgrading costs easily once the establishment costs have been met.

The funding for the development of an NCIS to be viewed in two parts:

- initial funding for system specification, development and commissioning; and
- ongoing maintenance and development costs.

In addition to direct efficiencies involved in streamlining data collection and reporting, the system will also facilitate prevention of death and injury. Injury is a major cost to the Australian community and there is potential for large costs savings. Prevention of even a few injuries and deaths will bring return far greater than the costs of running the system.

Establishment costs

An effective national coronial information system will require significant resources for development. The foundation of a good computerised system is the establishment of agreement on information standards and the development of source documents which can drive the system. In addition, the computer hardware and software and communications links need to be developed. Once the investment is made for establishment, running the system will be more cost efficient than is currently possible.

Appendix 2 details the assumptions on which establishment costs are based. One important assumption is that costs are based on the establishment of new computer facilities. Considerable costs savings, especially in software, could be made if the system were established in conjunction with an existing facility.

Another important variable is communication costs. The cost estimates for both set up and running are based on Austpac connection. This system permits secure connection from anywhere in Australia. Establishment of an AARNet connection for Internet access of selected information has also been included, providing flexible communication across Australia and internationally. Other government networks, such as that operated by the Department of Human Services and Health or the Attorney-General's Department, may be more suitable. The cost impact of using these facilities as an alternative to Austpac needs to be explored.

It is estimated that \$270,000 should be allowed if establishment of an entire infrastructure is required. A 20% saving is likely using an existing site with appropriate software licences and communications facilities. These cost estimates are likely to prove to be on the high side when a full systems specification has been made.

Running costs

Once the system is operational it should be able to be self sustaining through subscriptions from major users. The resources currently used in data retrieval by major users would be used to fund an improved and more accessible system. Each coronial jurisdiction would contribute nominally to the system, maintaining its own linking equipment, and covering network connection costs. It would not pay for information access. Users of the system would pay for access to the services provided by the system. It has already been noted that these users currently pay for the cost of information retrieval, and that these costs are high due to the inefficiency of the system. There are many other potential users that have not been identified in this study. It is likely that the system could produce a superior level of service in terms of data coverage, quality, and timeliness at a lower cost to users. Running costs should be able to be covered by charging users for services provided.

Running costs have been calculated assuming that data will be centrally stored and coded, that all participating coroners standardise their approach to information definition and that major text information is word processed and available to the central site on disk or tape or down loaded across the network. If this cannot be achieved, then some documents will need to be scanned as graphic images and text searching facilities will not be available on these. If a new site needs to be set up to handle the central functions, annual costs are estimated to be in the order of \$210,000, with a saving of approximately 20% for an existing site that already has appropriate software licences and communications facilities. The Austpac networking option, used as the basis of costing, is probably the most expensive available. Other networking options should be possible once firm systems specifications are developed, and access to use of existing government networks is investigated. Communications costs are therefore likely to be reduced, and with them, the overall cost.

A great deal more work needs to be done to finalise the design of the database and to establish access patterns before the final cost estimate can be calculated. This would need to be done during the establishment phase. Training and documentation costs will also depend on the final database design, and the software chosen. The costs presented here, however, are considered to be a reasonable 'ball park figure'. Once the system has been established, major users would be able to obtain far better information, the range of users could be expanded, and coroners operations could be improved within existing expenditure.

Conclusions of the feasibility study

A systematic approach to improving the collection, recording and access to coronial information will be of benefit to both coroners and major users of information about deaths. An investment in systematising investigation and recording information will result in improved quality and scope of data, and better access to information. Coroners have shown a commitment to better coronial process, a commitment to prevention, and a willingness to contribute to the research and policy process through sharing information and use of coroners' recommendations and riders.

The costs of implementing a national coronial information system are not high considering the potential benefit and the resources which are currently put into cumbersome extraction processes. Long term running costs are likely to be lower than the resources currently put into accessing coronial information. Data will be of higher quality, more timely and covering a greater scope.

Recommendation 5

It is recommended that a strategy be developed by interested parties including the coroners and major users to develop a national coroners' database during the 1995-96 financial year, with a view to stage one operation commencing in early 1996.

Consultation with coroners and major users.

A meeting of representatives of coronial jurisdictions and major user groups was convened on 27-28 October 1994 to respond to the draft of this report. A list of participants appears in Appendix 3. The analysis was overwhelmingly supported, and the minor amendments requested have been included in this final version. In addition to expressing support for the report, the meeting made the following recommendations:

Recommendation 6

That the Australian Coroners' society:

- a) endorse the findings of the feasibility study;**

- b) approach the State and Federal attorneys-general to gain support and resources for the development of a National Coronial Information System (NCIS);**
- c) seek the formal commitment of major users to the establishment of the NCIS;**
- d) establish a timetable for the implementation of the NCIS;**
- e) establish a steering committee whose charter includes the oversight of the establishment of the NCIS, nomination of an auspicing body and site of operations, and establishment of ongoing management mechanisms. The steering committee shall include State coroners or their nominees (empowered to act on their behalf) and representatives of major user groups.**

Recommendation 7

That each coronial jurisdiction take steps to inform its Attorney-General and other relevant decision makers of their support for the development of an NCIS as outlined in the needs and feasibility report.

Recommendation 8

That organisations which are major users of coronial information indicate in writing to the ACS:

- a) in-principle endorsement of an NCIS;**
- b) ways in which they can facilitate and resource the development and operation of the NCIS;**
- c) appropriate points of contact for further negotiation.**

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- ⁹ Ranson D, The role of the pathologist, in Selby H (Ed.), *The Aftermath of Death*, Leichhardt Federation Press, 1992, p122-123.
- ¹⁰ State Coroner's Office Victoria, *Unnatural Deaths: Collated Findings of the State Coroner Vol 1 1989-90, Vol 2 1990-1991*, Melbourne State Coroner's Office, Victoria, 1993, 1994.
- ¹¹ Harrison J and Tyson D, Preventing injury, in Selby H (Ed.), *The Aftermath of Death*, Leichhardt Federation Press, 1992, Chapter 16.
- ¹² State Coroner's Office Victoria, *Unnatural Deaths, Collated Findings of the State Coroner Vol 1 1989-90, Vol 2 1990-1991*, Melbourne Victorian State Coroner, 1993, 1994.
- ¹³ State Coroner's Office Victoria, *Unnatural Deaths, Collated Findings of the State Coroner Vol 1 1989-90, Vol 2 1990-1991* Melbourne Victorian State Coroner, 1993, 1994.
- ¹⁴ *Victorian Forensic Pathology Institute Annual Report 1993*, Melbourne Department of Forensic Science, Monash University, 1994.

Appendix 1 Part A Core data items all cases

Demographic

Variable	Content
Sex	Male, female, unknown
Day of birth	Valid day, 99
Month of birth	Valid Month, 99
Year of birth	1800-current, 9999
Country of birth	ABS 4 digit
Marital status	ABS 2 digit
Aboriginality	Aboriginal, Torres Strait Islander, other, unknown
Usual residence SLA	ASGC SLA code
Employment status	Full time, part time, casual, not in work force
Usual occupation	ANZSCO (expanded to include those not in workforce)

Australian Bureau of Statistics - Additional Deaths statistics items

Variable	Content
Age of marriage	As defined in ABS death data set
Date of marriage	“
No of issue	“
Drowning classification	“
Cancer flag	“
Maternal death flag	“
TB flag	“
Leukemia flag	“
Aids / HIV flag	“
Asthma flag	“
Drugs, smoking, alcohol flag	“
Asbestosis flag	“
Diabetes flag	“
State of registration of death	“
Date of registration	“
Registration number	“

Note: not all variables are currently required in all States

Death Event

Variable	Content
Time of death	24 hour clock hour, 99
Day of death	Valid day, 99
Month of death	Valid month, 99
Year of death	1900-current, 9999

Place of incident	To be determined. Capable of providing and exceeding ICD9 type of place classification. Plus 50 char text
SLA of incident	ASGC SLA code
Place of death	To be determined plus 50 char text
PM defined cause of death	ICD9CM
PM summary	Text 1500 chars
Description of circumstances	Text 1500 chars (police report)
Coroner's summary	Text 3500 chars

Class of death

Variable	Content
Major cause type	Natural / external causes
Work related	Y/N
Road related	Y/N
Consumer product related	Y/N
Death in custody external	Y/N
Anaesthetic death	Y/N
Suicide	Y/N
Other external cause	Y/N
Death in custody natural	Y/N
SIDS	Y/N
Other natural death	Y/N

Note: Definitions of these classes will need to be finalised with major users. Additional classes may be added.(eg drowning, farm and homicide)

Appendix1 Part B Additional items for external cause deaths

	<u>Death event items</u>
Variable	Content
Diagnosis / injuries received	ICD9CM (5 most significant)
Intent	NMDS(IS) intent
Manner of death	To be developed
External Cause of death	ICD9 E-code

	<u>Contributing factors</u>
Variable	Content
Activity at time of death	To be determined. Capable of providing and exceeding ICD10 type of activity classification
Products and factors	Extended US CPSC (most significant 5 factors)

	<u>Toxicology</u>
Variable	Content
BAC %	Vol. per cent, 99.9

Prescription drugs	50 char text, concentration, sample type (most significant 3)
Other drugs	50 char text, concentration, sample type (most significant 3)
Other substances	50 char text, concentration, sample type (most significant 3)

Appendix 1 Part C Additional items for specific users

Work related

Variable	Content
Industry	ANZSIC
Mechanism of injury / disease	Worksafe type of occurrence classification
Agency of injury / disease	Worksafe type of occurrence classification
Task being performed	Worksafe
Time on task	Hours
Usual job	Worksafe
Experience on task	Worksafe
Work classification	Full-time, part-time, apprentice, casual
Shift	Worksafe
Usual shift	Worksafe
Hours on shift	Worksafe
Response to injury	Worksafe
Use of protective equipment	Worksafe
Training history	Worksafe
Safety procedures	Worksafe

Road related

Event

Variable	Content
Incident identifier	FORS
Crash type	FORS
Road user movement	RUM/DCA
Road structure	FORS
Speed limit	FORS
Alignment	FORS
Weather	FORS
Surface type	FORS
Surface condition	FORS
Light	FORS
Street lighting	FORS

Death vehicle

Variable	Content
Incident identifier	FORS
Vehicle type	FORS
Vehicle make and model	FORS
State of registration	FORS

Driver's licence type	FORS
Towed away	FORS
Operator BAC	FORS
Operator sex	FORS
Operator age	FORS
No of occupants	FORS
Vehicle fault	FORS

Other vehicle (1 set of information per vehicle)

Variable	Content
Incident identifier	FORS
Vehicle type	FORS
Vehicle make and model	FORS
State of registration	FORS
Driver's licence type	FORS
Towed away	FORS
Operator BAC	FORS
Operator sex	FORS
Operator age	FORS
No of occupants	FORS
Vehicle fault	FORS

Deceased details

Variable	Content
Seat belt use	FORS
Position in vehicle	FORS

Consumer product related

Variable	Content
Brand and model of product	Text 50 chars
Detailed product description	Text 80 chars
Year of manufacture	Year, unknown
Manufacturer	Text 80 chars
Retailer	Text 80 chars
Country of origin	ABS country code 4 digit
Year of purchase	Year, unknown
First language	ABS language codes

Deaths in Custody

Variable	Content
Education level	AIC
Living arrangements prior to custody	AIC
Custodial authority involved	AIC
Time last seen alive and reasonably OK	AIC
Time found dead or in a distressed state which progressed to death	AIC
Legal status (remand, sentenced)	AIC
Reason bail denied	AIC
Offence or alleged offence leading to custody	AIC
Length of time in custody	AIC
Period of sentence served	AIC
Health status (physical and mental covering significant events including suicide attempts, etc.)	AIC
HIV status	AIC

Appendix 2 Coroners' Database - Preliminary Hardware, Software and

Communications Cost Analysis (Central Site)

This appendix discusses broad technical issues and costs for establishing a central storage and inquiry database for general information relating to all coroner reported deaths and specific information for those deaths related to injury. Further consultation with potential end-users will be required before a final solution can be recommended.

The two main issues considered here are: the database storage / query system itself (computer and software); and the communication / access facilities for users. Possible solutions and estimated costs are presented.

The Database

Cases (records) will consist of a mix of text and coded fields. It is estimated that: approximately 18,000 cases (120 Megabytes), will be collected per year; the database will hold the most recent five years data on-line; and historical data (over five years old) will be distributed to external users for local interrogation.

Initially, data will be sent to the central site for validation and additional input and coding. However, the solution should not preclude the ability to add / update data remotely. The search / reporting function must be able to combine coded field and text-based queries in one process. The database should also be capable of automatically generating routine reports of cases based on the needs of external (subscription) users not provided with direct access for query purposes.

Communications

Electronic access to the system will be required to allow uploading of new cases and searching / reporting of the database. At the very least, such access will be available to the coroner's department in each State / Territory. It is likely that other interested groups (eg. ABS, NISU, FORS) will also require search / report access.

Because of the vast difference in computing platforms at these organisations, it is important to select a commonly available communications protocol. Consideration also needs to be given to the method of communicating with the central site (eg. dial-up / dedicated leased line, "piggy back" existing networks) and, in the longer term, that selected reports may be accessible via AARNet / Internet.

In order to increase speed and efficiency and security, the system should be capable of processing queries at the central site and sending only the results back "down the wire".

Conclusion

The system to be used for the central site needs to be capable of:

- providing sufficient memory and storage space for the environment (OS, database, data, etc.);
- providing a single interface for querying coded data and free form text;
- allowing concurrent remote logins;
- accepting data from remote sources and, eventually, allowing remote update of the database;
- processing remote queries locally;
- producing automated routine reports;
- providing a common, platform independent, communications protocol;
- communicating with user sites via differing methods.

Recommendation

The central server should be based on the Unix operating system in either a common vendor specific (eg Sun) or PC (eg SCO) implementation. Minimum storage space should be two Gigabytes, minimum memory should be 32 Megabytes. Additional hardware / software should include tape backup system. Also required are workstations for administrative staff.

Communication with the central site should be based on the TCP / IP protocol.

The database system should be a combination RDBMS (eg Ingres) for the coded data and a text retrieval engine (eg TOPIC) for the free-text data.

It is likely that a combined means of communicating with external users will be needed and further consultation will be required. Possible options are:

- attachment to AARNet/Internet;
- attachment to existing government network (eg attorneys-general);
- dial-in to central host (eg. Austpac/X.25).

Estimated Typical Costs

PC/SCO Unix with 2 Gb hard disk, 32 Mb RAM, DAT tape backup - \$30,000

Sun Server / Solaris with 2 Gb hard disk, 64 Mb RAM, DAT tape backup - \$30,000

2 x Workstations (PC) - \$7,000

2 x Workstations (SUN) - \$10,000

AARNet connection - \$3,500 establishment, \$15,500 pa. ongoing + line costs

Austpac /X.25 - \$1700 establishment, \$11,500 pa. rental

Client dial-up charges - \$120 pa. (modem) + call charges (time & volume based on location/time)

Ingres - Basic 8 connection engine - \$17,500

Topic text retrieval engine - \$30-40,000 (dependant on number of concurrent users)

Staffing

During the establishment phase, the following staff resources will be required.

1 FTE senior information analyst / research manager to oversee systems design and development.

1 FTE clerical officer to manage correspondence, assist with preparation of protocols and systems specifications.

0.8 FTE project officer to assist the manager in the development and promulgation of investigation protocols and harmonised recording systems, to assist software developers with documentation and to undertake training of coroners' staff.

Estimate of likely systems development and running costs

Note: costs have been calculated toward the high end of those expected when a thorough systems specification has been prepared

Establishment		New site	Existing site
Hardware		40000	40000
Site software (database / retrieval)		50000	0
Systems design / negotiation	Management	54000	54000
	Clerical	36000	36000
	Travel / operations	20000	20000
	Programming	25000	25000
	Project officer	28000	28000
AARNet connection		3500	
Austpac connection		1700	1700
Accommodation / support		10,000	10,000
TOTAL		268200	214700
Annual recurrent			
Hardware depreciation		10000	10000
System maintenance		10000	5000
Communications		55000	40000
Staffing	Manager	50000	40000
	Coders (2 FTE)	60000	60000
Accommodation / infrastructure		25000	20000
TOTAL		210000	175000

Appendix 3 Meeting of Representatives of Coronial Jurisdictions and

Major User Groups

27-28 October 1994

List of Attendees

Mr David Bliss
Executive Officer
NSW State Coroner's Office
44-46 Parramatta Road
GLEBE NSW 2037

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Registrar
SA Coroner's Office
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ADELAIDE SA 5000

Ms Erin Cassell
Injury Prevention and Control Section
Department of Human Services and Health
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CANBERRA ACT 2601

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Ms Boronia Halstead
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Mr Brian Holliday
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Ms Renate Kreisfeld (Secretariat)
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Mr Ian Matterson
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Mr Fred Miller
Federal Bureau of Consumer Affairs
C/- Trade Practices Commission
ADELAIDE SA 5000

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