

13<sup>th</sup> May 2009

Waste Policy Taskforce  
Department of the Environment, Water, Heritage and the Arts  
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Dear Sir/Madam,

**National Waste Policy: Managing Waste to 2020**

The Biohazard Waste Industry (A Division of the Waste Management Association of Australia), represents many stakeholders involved in the management, transport and treatment of clinical and biohazardous wastes across Australia.

We appreciate the opportunity to provide a submission to the Department of the Environment, Water, Heritage and the Arts in regards to the proposed *National Waste Policy: Managing Waste to 2020*.

Please note that this submission is in addition to that provided by the Waste Management Association of Australia.

BWI would be happy to provide clarification or additional information as required. Where necessary additional references can be provided in support of our discussion and recommendations.

Yours sincerely,

**Lincoln Falconer**  
**CHAIRMAN**  
**BIOHAZARD WASTE INDUSTRY**



## A National Waste Policy: Managing Waste to 2020

### Biohazard Waste Industry Submission

#### Introduction:

The Biohazard Waste Industry (BWI) is a Division of the Waste Management Association of Australia.

BWI is the new title for what was previously referred to as the Australian and New Zealand Clinical Waste Management Industry Group (ANZCWMIG). The Biohazard Waste Industry (A Division of the Waste Management Association of Australia), represents the majority of organisations involved in the management, transport and treatment of biohazardous wastes across Australia. The primary aim of BWI is:

*"To achieve consistency of industry practice through uniform guidelines on classification, handling, transportation, treatment and disposal of clinical and related waste in Australia and New Zealand. In achieving this, the waste generators, transporters, disposal and treatment facilities, along with the regulators of this industry, have a focused understanding of, and commitment to, the best practice required to ensure cost effective, safe and environmentally sound management of clinical and related wastes."*

Biohazardous waste is generated from the following types of facilities and activities; hospitals; nursing homes; doctors; dentists; veterinarians; pathologists; body piercing facilities; emergency services; home healthcare; sharps and clinical and related waste from commercial buildings and workplaces (eg. first aid waste); sharps from public areas; needle exchange programs; universities; blood banks; mortuary; crime/trauma scene remediation and other similar practices.

It also includes commercial practices/activities that manage and handle what would be considered biohazardous waste.

Note: The term "**biohazardous waste**" has been used in this submission to cover items such as 'medical waste' and 'clinical waste' but acknowledges that the scope is broader and includes wastes with similar characteristics that are increasingly being generated outside of healthcare activities.

Biohazardous waste by its nature creates a number of issues in terms of its collection, containment, transport, storage, processing and disposal that are unique to the waste stream and need to be specifically considered in the context of a National Waste Policy.

The risks associated with biohazardous waste can be classified into two main groups; microbiological and chemical. Chemical risks arise from the pharmaceuticals and diagnostic materials. However, it is the microbiological risks that are not known when the waste is generated. This should not prevent effective management of these wastes.

In summary, BWI's issues of concern for the current status for management of biohazardous waste, and ones that could effectively be addressed by the development of a National Waste Policy and its effective implementation by all States/Territories are:



- The lack of consistency in definitions in different jurisdictions.
- A need to ban the landfilling of untreated biohazardous waste.
- Streamlining of Government responsibility for the treatment of biohazardous waste.
- Little or no enforcement of current management requirements.
- Unnecessary risks to the environment and human health resulting from inappropriate biohazardous waste management requirements.

**1. Are there opportunities to further coordinate, harmonise or streamline approaches to waste management across jurisdictions?**

**YES.** These opportunities apply to a broad range of regulatory approaches implemented and guidelines published for the management of biohazardous waste. The issues relating to definitions, transport and treatment of biohazardous waste are discussed separately below.

**Key strategies to improving waste management of biohazardous waste across jurisdictions include:**

1. Adoption of a national definition<sup>1</sup> for biohazardous waste coupled with supporting guidelines and enforcement of management requirements. This definition to include sources of waste such as public areas (where waste from drug use is found) crime scene, trauma and forensic clean-ups.
2. Due to the considerable risk associated with biohazardous waste (both microbiological and chemical) BWI believes that it is important that all aspects to do with the collection, treatment and disposal of biohazardous waste be coordinated/managed on a national level.
3. The Australian Dangerous Goods Code provides a suitable framework for the management of transportation of biohazardous waste but has not been adopted or enforced nationally. National adoption of this Code would ensure consistency and effective management of the transport of biohazardous waste.
4. Application of a zero exemption limit for the transport of biohazardous wastes.
5. Standardised testing regimes for efficacy of treatment standards, monitoring and reporting conditions need to be developed and applied equitably by all jurisdictions to all treatment technologies.

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<sup>1</sup> BWI has drafted a definition for biohazardous waste that incorporates all sources and materials. This is attached in Appendix B.



## **DEFINITION:**

At present each State/Territory has in place regulations that deal with the management of hazardous wastes and biohazardous waste<sup>2</sup>. However with biohazardous waste, each of the States/Territories has developed different definitions<sup>3</sup> and management approaches for this specific waste stream. This has provided difficulties for all stakeholders (from generators, transporters and treatment facility operators), to implement strategies for the safe and cost-effective management of this waste.

Healthcare providers and waste management operators have shifted from predominantly single jurisdiction operation, to providing services across State/Territory boundaries. Having to manage the issue of differing definitions and management approaches for what is the same waste materials results in undue use of resources to ensure individual regulations are adhered to.

For example

- A healthcare provider that operates in two or more jurisdictions has to develop separate waste management strategies, staff training programs and quality assurance programs for facilities in each jurisdiction.

There are approximately 290 private hospitals in Australia. Of these, Ramsay Healthcare operates 63 in 5 States; St John of God operates 14 in 3 States and Healthscope operates 43 in all States and Territories. This data does not include the operation of medical clinics, pathology services and diagnostic services – all of which generate biohazard waste.

These organisations have a variety of strategies for dealing with the different definitions. Recognising that they must be in compliance with regulatory requirements, they either:

- Develop specific waste management strategies for each State/Territory; or
- Develop one strategy that will ensure all requirements are met.

When coupled with training activities, these organisations have indicated that their resources and costs are increased simply due to the inconsistency of definitions.

- A waste management company can treat a specific type of waste through a treatment technology in one jurisdiction, but in another jurisdiction is not allowed to treat the same waste through an identical treatment technology. An example is with pharmaceutical wastes.

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<sup>2</sup> Note that currently, the term used in each jurisdiction is *clinical or medical waste*.

<sup>3</sup> Refer to Appendix A for the current definitions developed and used in each State/Territory for biohazardous waste.



- Applicants wishing to establish treatment facilities are requested to undertake differing testing regimes (e.g. levels of microbiological inactivation and efficacy), for the same technology for the same waste materials in different jurisdictions.

As an example, an applicant for a treatment technology in NSWs required to conduct efficacy testing for Creutzfeldt Jakob Disease. This is expensive and the need debatable. No other jurisdiction including NSW has requested this of any treatment technology.

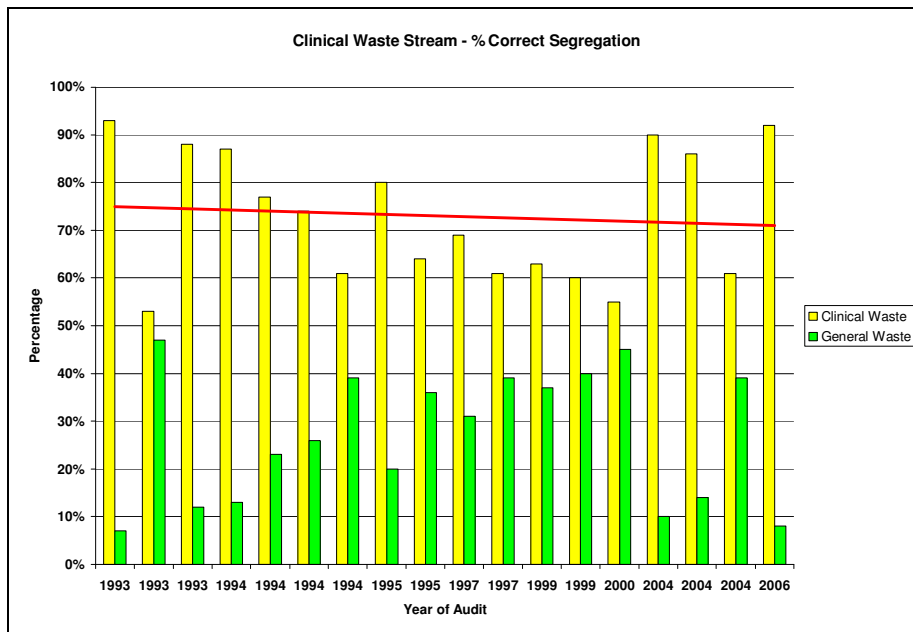
The important point to recognise is that the various definitions are not poles apart. A review of the definitions generated by each jurisdiction concluded that the difference is in the classification of “blood contamination”.

Some use the term ‘blood soaked/expressible’ or similar, with others using the term ‘visible blood’.

Materials have been classified as biohazardous waste due to the potential OHS, community health and environmental hazards associated with these materials. Such classification is supported by the Precautionary Principle.

However, differing government agencies tend to base the rationale for classification of biohazardous waste in accord with that agency’s charter. A health agency will focus on infection rationale for the definition, whilst an environmental agency will base its decision on a mix of environmental and health related rationale.

In Australia, audits of hospitals biohazard stream regularly reveal that there are high percentages of general waste in the clinical waste stream as indicated in the chart below. The trendline demonstrates that correct segregation has slightly decreased in respect to percentage correctness for hospitals since 1993 (Thornton 2007).





Clinical waste generation per Occupied Bed Day (OBD), within different jurisdiction is illustrated in the following table. These differences are due to differing definitions of clinical waste (as well as interpretation of the definitions by waste generators).

Average KG/OBD	
State	Clinical Waste
NSW	1.43
VIC	0.46
QLD	2.48
WA	0.41
SA	2.63
TAS	0.87

### **TRANSPORT:**

As with the definition, requirements within each jurisdiction are similar. However, there are differing requirements currently in place, as well as being drafted, for limits on the quantity of biohazardous waste that trigger regulatory compliance issues.

State and Territory agencies mandate as to how wastes are to be transported. This then guides the waste generator as to how it will package and label the wastes. As transport is one significant cost of the management pathway; if the transporter is not obligated to meet minimum standards (apart from general pollution control obligations), then this cost is not passed onto the generator.

Differences in the threshold limit applicable to waste tracking regulations exist throughout Australia. For example, in Western Australia and NSW the exemption is 200 litres. In Victoria there is currently a zero threshold. However, in the *Environment Protection (Industrial Waste Resource) Regulations 2009* in Victoria, a limit of 200 kg has been suggested. This quantity (200 kg), equates to approximately 5.0m<sup>3</sup>.

Based on exemptions as cited above, companies such as pathology service providers collect waste and transport it in vehicles back to a central depot. This fraction of the biohazardous waste stream would be considered extremely hazardous due to the proliferation of pathogens in this waste.

This results in biohazardous waste being transported without the waste being secured or appropriately containerised and poses significant risks to emergency services personnel should an accident eventuate.

These differences in requirements result in non-dedicated vehicles used to transport biohazardous waste, while those subject to regulatory control face increased costs to ensure compliance – these costs are passed onto the waste generator with the regulatory authority not knowing the extent of waste transported by exempted vehicles.

These exemptions also result in those they apply to not adhering to the requirements of the Australian Dangerous Goods Code. Non-use of placards is one of the main issues raised by emergency services personnel.



In addition, there has been an inconsistent application of the NEPM for Movement of Controlled Waste between States and Territories. [For example, a biohazardous waste contractor has a “run” that collects waste from Western Victoria and the South Australian/Victorian border areas, and deposits the waste at a licenced site in South Australia. Permission under this NEPM was granted. However, on the return run waste collected from the same areas, but in a reverse manner, is not allowed by EPA Victoria to be imported into Victoria for treatment.]

### **TREATMENT:**

The types of treatment facilities that are licenced to treat biohazardous waste in Australia include incineration, chemical disinfection and autoclaving.

Different jurisdictions have applied differing standards/requirements for treatment facilities. That is, the technology can be identical, the waste identical, but emission standards, testing and reporting regimes can be considerably different.

Similarly, the same treatment technologies have been requested to meet differing efficacy testing regimes. In NSW for example, a technology was requested to provide evidence of capability to deactivate CJD. This has not been requested in any other Australian or International jurisdiction as far as BWI has been able to ascertain.

## **2. Are the categorisations, definitions and standards used to manage waste between and within the different levels of government effective and appropriate?**

**NO.** As indicated in the response to Question 1, different agencies in the jurisdictions can have differing input into the level of controls applied to the management of biohazardous waste. It is accepted that while an environment agency may seek the input of a health or OHS agency to ensure all issues are effectively addressed in management strategies, it is when the environment agency solely relies on advice from a health agency and applies requirements based on this advice that inconsistencies and misdirected focus arise.

This type of approach results in the stakeholders being unclear what level of Government or agency is responsible for enforcement. Importantly, they may mistakenly believe that one agency’s guidance is “law” and only follow that, or that the relevant Australian Standards for management of Clinical Waste and Sharps are also “law”.

For example, in NSW, the DECC has essentially deferred responsibility for the day-to-day management of clinical waste to NSW Health. This agency has produced a guideline for hospitals. However, BWI has found that many waste generators believe it is the NSW Health publication that needs to be adhered to rather than anything published by NSW DECC.

Another issue is that some Government agencies relied on the standards contained in the National Health and Medical Research Council publication “National Guidelines for Waste Management in the Health Care Industry, 1999”. This was a document published by the health sector for that sector, yet until the time the document was rescinded, it was viewed as



the authoritative guideline – although it did not address environmental and OHS issues in the necessary detail.

Kaiser (2001) stated that the range of government agencies that had responsibility for components of hospital solid waste management was staggering. A point further highlighted by Jacobsohn (2005) and Cys (2003), in describing the issue of confusion for waste generators (and other stakeholders), resulting from many government agencies having separate regulations for the management of clinical waste.

**Key strategies to improve effectiveness of categorizations, definitions and standards used to manage waste within different levels of government:**

1. Ensuring that there is consistency in government agencies responsible for biohazardous waste management. For example, there should be no transferring of responsibilities to health agencies where only infection control rationale is applied to biohazardous waste management rather than a coordinated health and environmental approach.
2. Encourage WorkSafe agencies to apply OH&S standards to all stakeholders involved in the management of biohazardous wastes.

**3. Do the current waste management frameworks across jurisdictions:**

**a. deliver an effective regulatory framework?**

**NO.** All States and Territory governments have specific legislation that defines clinical or biohazardous waste. However not all have guidelines that provide clarification of the differing responsibilities for all stakeholders. For example, there are inconsistencies in how biohazardous waste can be treated within a State/Territory causing confusion on how to effectively manage biohazardous waste.

Importantly, most guidelines produced by State/Territory government agencies are outdated and not reviewed (or not reviewed frequently enough to cater for changes in management approaches).

The situation now is that government agencies have established a regulatory framework, but have not in all instances, produced guidelines to assist stakeholders, know of, understand and develop strategies to meet these requirements.

**b. provide an appropriate suite of approaches to address waste and resource recovery issues?**

**NO.** At present there is little or no focus on resource recovery issues for biohazardous wastes primarily due to perceived health risk issues. Most government guidelines focus on strategies to ensure what wastes that are generated are managed in a safe manner within the facility that generates it, as well as meeting regulatory obligations.



A review of one government's hospital design guidelines found that space allocated for waste management did not provide capacity for the number of containers used in contemporary hospitals for waste and recyclables segregation.

However inappropriate disposal of biohazardous wastes is causing serious occupational health and safety risks to those working in resource recovery where this material is being found consistently.

Opportunities exist in the treatment of biohazardous waste in energy recovery (incineration) and the recycling of treated products (using technologies other than incineration).

**c. work effectively in conjunction with planning and other environmental legislation?**

**NO.** There is a need to ensure appropriate disposal services are included in the planning stages of developments. Those generating biohazardous waste are not always aware of their responsibilities with respect to proper disposal. Including these issues at the planning stage will not only educate but ensure proper collection, transport and disposal of biohazardous waste.

**d. provide the right incentives to manage materials, products and waste sustainably and holistically?**

Not applicable to BWI and management of biohazardous waste.

**e. need improving, and if so, how could this be done?**

**YES.** As indicated in Question 1, a common definition, consistent transport and treatment standards are the main issue. If government agencies addressed those issues, coupled with developing guidelines that contemporary and developed as a result of a good consultation process, then stakeholders would be able to ensure that they understand their management obligations.

Enforcement of these requirements would also be a key plank of this recommended management approach for biohazardous waste.

**Key strategies to improve effectiveness of categorizations, definitions and standards used to manage waste across jurisdictions:**

1. Develop National guidelines or legislation that assists stakeholders to understand their obligations for effective management of biohazardous waste. This would include:
  - Adopting a national definition for biohazard waste.
  - Adopting the Australian Dangerous Good Code nationally for the management of transportation of biohazardous waste generally.
  - Broadening the scope of biohazard waste management to include wastes generated outside of healthcare activities, specifically public areas (where waste from drug use is found) crime scene, trauma and forensic clean-ups and home



- healthcare waste.
- Developing a specific framework for managing home healthcare waste.
2. These guidelines should be produced from a national perspective and ensure that there is appropriate consultation and input from environmental, health, OHS and water management agencies.
  3. Ensure that these national guidelines are reviewed regularly with the same consultation process.
  4. Provide a minimum set of standards (i.e., space requirements), for provision of waste management systems within hospitals so as landfill diversion opportunities are maximised.

**4. In the 1992 National Strategy for Ecologically Sustainable Development, COAG endorsed the strategies and objectives for a national approach to waste management (Appendix A). Looking ahead to the next decade, how could these strategies and objectives be updated to provide the basis for a national waste policy that responds to current and future challenges and opportunities?**

Not applicable.

**5. What waste issues would most benefit from a national approach? What strategies could be considered and how could the need for local solutions be integrated with a national approach?**

There is a need for a national uniform approach for the management of biohazardous waste.

The only perceived need that BWI is of the opinion that local solutions may need to be considered is within Regional/Rural areas. However, it is imperative that minimum performance standards apply.

Such needs in these areas could include; storage, transport and on-site waste treatment (i.e. at a hospital).

However, there are also other sources of biohazardous waste that do need to be incorporated into the definition and management strategies implemented. Again, this waste is generated within all jurisdictions and thus needs a national approach. The two main sources are:

- Home healthcare waste. This waste is that generated by a healthcare professional providing a service that would otherwise be conducted within a hospital, clinic or similar.

Biohazardous wastes generated by home healthcare providers pose the same risk of disease and injury as do similar wastes generated in healthcare (or related), facilities. Given that these wastes can end up in the domestic waste and recycling stream they



pose a hazard to waste handlers, landfill staff and staff employed at Material Recovery Facilities.

There is no accurate data on the quantity of clinical and related waste that is generated by home healthcare providers. Estimates have ranged up to “equalling at least that or more than is generated in all healthcare facilities”. A Queensland Waste Industry Development Strategy stated that 60% of “medical hazardous waste” is disposed in domestic waste streams.

Generally, home healthcare waste is not controlled by any regulations in Australia; however there is a clear need for those providing home healthcare services to manage biohazardous wastes in a more responsible manner.

As with identical wastes generated in a healthcare facility, this waste can cause environmental and health & safety impacts to the community and environment, if not managed in the same manner. What BWI is being advised, is that there are more and more cases of sharps and used dialysis tubing being deposited at Materials Recover Facilities, Landfill and Transfer Stations (refer to Question 13).

- There is also a need to ensure that regulators are able to monitor other merging issues. As an example, management of pharmaceutical wastes is a major issue overseas. This is unwanted pharmaceuticals from domestic sources as well as similar materials disposed of inappropriately from healthcare facilities.

Disposal to sewer generally only poses environmental issues, while disposal to landfill poses both environmental and OHS issues. Sewage systems are generally unable to remove pharmaceuticals and as a consequence this waste ends up in waterways, disposal via landfill means that pharmaceuticals can also exit as leachate into waterways.

There is also a broad range of chemical substances contained within the biohazardous waste stream. Research internationally is raising contamination of surface and ground waters as a major environmental and public health issue. The landfills that are allowed to accept untreated biohazardous waste generally also have poor groundwater and leachate management systems.

- Issues such as the current Swine Flu outbreak and ca-MRSA (Community Acquired Methycillin Resistant *Staphylococcus aureus*), have again highlighted the need to fully understand the potential for pathogens to be circulated through a community due to improper waste management practices. Appendix C contains newspaper article abstracts and a transcript from the ABC AM program about the types of pathogens of concern to the healthcare sector and waste managers.

**Key strategies for a National approach to the management of Biohazardous Waste include:**

1. Developing a specific framework for managing home healthcare waste.
2. Conduct research into the potential for pollution of waterways from improper disposal of



pharmaceutical and related wastes.

3. Development of a structure for the identification of emerging issues (e.g. avian flu, swine flu) and the subsequent development of appropriate management structures for these issues.

**6. Are there waste management initiatives in operation overseas that could apply in the Australian context? If so, which ones and why?**

**YES.** Internationally, there are more resources applied to developing appropriate management strategies for biohazardous waste.

In Australia, there is an emerging level of concern over the correct management of crime scene and forensic cleanup waste as well as cleaning of vacated tenancies where there has been considerable drug paraphernalia left behind.

In America, Federal Regulation 29CFR1910:1030 states that no employee can be placed in a position to be exposed to blood spills without first:

1. Receiving bloodborne pathogen training.
2. Having a written bloodborne pathogen exposure control plan.
3. Having been provided with personal protective equipment.
4. Having been offered a Hepatitis B vaccine and exposure evaluation and follow-up.
5. Being provided with a method to remove and properly store the biohazardous waste in a properly marked container for disposal at an approved site.

This is effectively managed by the Occupational Health and Safety Agency. What it means is that if there is a spill of blood in any situation, then a trained and licenced person is responsible for correct decontamination.

This approach needs to be coordinated nationally with specific requirements established so that the process is undertaken by qualified and appropriately equipped organisations.

**Key strategies to improve effectiveness of categorizations, definitions and standards used to manage waste within different levels of government:**

1. Broadening the scope of biohazardous waste management to include wastes generated outside of healthcare activities, specifically public areas (where waste from drug use is found) crime scene, trauma and forensic clean-ups and home healthcare waste.



**7. Australia needs to safely manage hazardous waste and waste containing hazardous materials over the long term. Are there any changes to current arrangements that would improve Australia’s capability to safely manage hazardous waste, for example in regard to adequate infrastructure or disclosing the contents of goods and substances?**

**YES.** A National approach to the definition of, and all aspects of the management of Biohazardous Waste. The detail of this is addressed in BWI’s response to other Questions.

**8. There are a number of approaches to product stewardship operating in Australia.**

**a. What, if any, role is there for a national approach and what would be the costs, benefits, opportunities and focus of such an approach?**

Not applicable to BWI and management of biohazardous waste.

**b. What models might work in Australia?**

Not applicable to BWI and management of biohazardous waste.

**9. Are there any aspects of waste management that could be improved or streamlined through adopting national standards?**

**YES.** See BWI’s response to Question 5 above.

**10. What fundamental data sets does Australia need to collect to better inform waste management policies, practices, investment, business operations and to assess and manage risk?**

Accurate waste generation data for biohazardous waste in Australia are extremely difficult to ascertain due to no mandatory requirement for generators (and particularly hospitals as the major class of generator), to maintain records of such data apart from environment agency requirements (e.g., waste transport certificate or equivalent). Interpretation of the data is also difficult due to different definitions of waste types throughout Australia and the differing interpretations of the definitions by individual hospitals (Clarey and Thornton 1994).

In addition, data accessed from environment agencies is often times unreliable due to issues such as the recording of data in either volume or weight units and no explanation of conversion factors used (EPAV 1991b).

At present there is no comprehensive tracking of biohazardous waste generated at source and the ability to gather accurate information is compromised by the lack of consistency in definitions of biohazardous waste across jurisdictions.



Data from regulatory tracking schemes only addresses a portion of the quantity being generated and some analysis of this data has indicated several flaws in conversion ratios and checking on the accuracy of the data.

As a “regulated waste” biohazardous waste should be subject to mandatory reporting requirements so that regulators can maintain that all is being managed appropriately as well as being used as a benchmark for measuring avoidance and landfill diversion targets.

A lack of data on home healthcare waste. This waste is that generated by healthcare professionals providing a service that would otherwise be conducted within a hospital, clinic or similar.

Biohazardous wastes generated by home healthcare providers pose the same risk of disease and injury as do similar wastes generated in healthcare (or related) facilities. Given that these wastes can end up in the domestic waste and recycling stream they pose a hazard to waste handlers, landfill staff and staff employed at Material Recovery Facilities.

There is limited data detailing the quantity of clinical and related waste that is generated by home healthcare providers. Estimates have ranged up to “equalling at least that or more than is generated in all healthcare facilities”. A Queensland Waste Industry Development Strategy stated that 60% of “medical hazardous waste” is disposed in domestic waste streams.

Generally, home healthcare waste is not controlled by any regulations in Australia; however there is a clear need for those providing home healthcare services to manage biohazardous wastes in a more responsible manner.

A lack of data on the amount of biohazardous waste generated outside traditional healthcare activities such as needles found in public areas from illicit drug use, “crime scene and forensic” cleanup waste as well as cleaning of vacated tenancies where there has been considerable drug paraphernalia left behind.

**Key strategies in collecting fundamental data sets that better inform waste management policies, practices, investment, business operations and in assessing and managing risk include:**

1. Implementation of a national data reporting system for biohazardous waste.
2. Inclusion of biohazardous waste into the reporting requirements of the National Pollutant Inventory.
3. Broadening the definition of biohazardous waste to include wastes generated outside of healthcare activities, specifically public areas (where waste from drug use is found) crime scene, trauma and forensic clean-ups and home healthcare waste. Collecting data for all biohazardous waste generated, not just that from healthcare facilities..



## 11. What, if any, place should there be for approaches that seek to avoid waste through changes in design, production processes and transport?

While technically not within the ambit of BWI, the BWI Industry Code of Practice highlighted the need for development of waste management plans and in particular waste avoidance/minimisation opportunities.

Two issues are; (a) the use of plastics that have significant impacts (i.e. air emissions), if not treated properly, and (b) the increase of classifying medical products as single use – this leads to unnecessary waste transport and treatment.

Internationally, there have been considerable resources applied to research to investigate opportunities to avoid/minimise the generation of biohazardous waste. The successes have largely been due to a coordinated approach to ensure factors such as environment, infection control and economics are fully considered.

The potential for significant environmental and economic savings to the healthcare sector is just as real in Australia, but requires guidance that can really only come from an organisation such as the National Health & Medical Research Council.

Daschner (1997) clearly indicates that healthcare requirements and environmental impacts are very much intertwined. Attracting significant attention over the past few decades has been that of management of wastes generated from hospitals. This interest is not only in treatment, but also in the types of products and the materials such as different plastics, that the products are made from (VHA 1989).

There has been an increase in plastics that are the main component of single use medical equipment – which has significantly increased in use. Even as early as 1988 it was estimated that the percentage of clinical waste that was plastic was approximately 30% a growth from 10% composition in one decade (Brunner 1988).

Several authors have provided estimates of the percentage of the clinical and related waste stream which is plastic based (by weight). These are 20% (Reinhardt 1991), 46% (Liberti 1994a), 28% (American Plastics Council 1994), and 30% (Thornton 1996).

### **Key strategies to improve approaches that seek to avoid waste through changes in design, production processes and transport :**

1. There is potential to reduce the resources used for medical products. This needs to be fully investigated and standards that categorise items as “single use” be reviewed.



**12. What changes could be made to improve management of the municipal waste stream and those of the commercial and industrial sector and the construction and demolition sector?**

Home healthcare waste is being disposed of via municipal domestic collections. There is the potential for adverse health impacts on the workers within this industry and the community at large when exposed to this uncontrolled waste either through direct contact at waste facilities or via contact with birds, vermin and other animals scavenging this waste.

**13. Landfill is currently the primary means of waste disposal. What, if any, changes need to be made to manage Australia's waste stream in the long term given current trends in the volume and nature of the waste?**

The allowing of landfilling of untreated biohazardous waste and pharmaceutical waste in some jurisdictions is one of BWI's key concerns.

Some jurisdictions allow the landfilling of untreated biohazardous waste, whereas others prohibit it. Areas where this is permissible generally have poorer designed and operated landfills and scavenging by birds and vermin of biohazardous waste is a high potential health risk.

Given that there has been some documented spread of pathogens from landfills coupled with a substantial lack of research in this area, allowing untreated biohazardous waste to these landfills can have serious human health and environmental impacts. There is also the question of equity where the same standard is not allowed to be applied to metropolitan areas.

There is also a broad range of chemical substances contained within the biohazardous waste stream. Research internationally is raising contamination of surface and ground waters as a major environmental and public health issue. The landfills that are allowed to accept untreated biohazardous waste generally also have poor groundwater and leachate management systems

It has also been discussed that with the advent and subsequent increase in landfill levies, there may be an increase in the transport of biohazardous waste from one jurisdiction to another as the landfill costs are cheaper – not necessarily more stringent, to provide greater protection to the environment and human health. These inconsistencies between the States may influence the final destination of waste and thus produce inappropriate environmental outcomes.

Today, many of these rural/regional areas that are allowed to landfill untreated biohazardous waste can establish cost-effective collection systems and/or treatment systems.



**Key change needed to be made to manage Australia’s waste stream in the long term given current trends in the volume and nature of the waste is:**

1. Application of a national ban for the landfilling of untreated biohazardous wastes. This should also be extended to banning and enforcement of the ban for disposal of pharmaceutical wastes to landfill.

**14. Reducing the amount of organic waste sent to landfill has the potential to contribute to reducing greenhouse gas emissions as well as other potential environmental and economic benefits. What are the benefits and opportunities, costs and disadvantage of increased diversion and/or recycling of organic wastes?**

Not applicable to BWI and management of biohazardous waste.

**15. What, if any, changes are needed to the way e-waste is managed?**

Not applicable to BWI and management of biohazardous waste.

**16. The Carbon Pollution Reduction Scheme will apply to emissions from landfill. Are there related approaches that would complement the scheme and thus contribute to meeting the emissions targets and the timeframes set in the Australian Government’s climate change policy? What are the opportunities to reduce water and energy use through the way waste is managed?**

Not applicable.



## Appendix A – Clinical Waste Definitions (Australia)

### Australian Capital Territory

“Clinical waste” means:

- (a) waste consisting of any catheter, hypodermic needle, intravenous set, pipette or scalpel; or
- (b) waste consisting of any other instrument or object that has been used in the taking of blood, the testing, or processing or handling of blood or blood products, the investigation of human or animal diseases or in analysis or research that involves the use of tissue or fluid specimens, whether human or animal; or
- (c) sanitary waste that originates from or has been in contact with a person who has a transmissible notifiable condition within the meaning of the *Public Health Act 1997*; or
- (d) waste arising from the investigation or analysis of tissue or fluid specimens, whether human or animal; or
- (e) biological or chemical waste arising from the investigation of human or animal diseases; or
- (f) waste derived from a prescribed activity, being waste that includes or included human blood, or animal blood in any form other than food waste; or
- (g) human or animal tissue or body fluids, removed during surgery or an autopsy; or
- (h) waste consisting of a cytotoxic substance or waste that is, or is likely to be, contaminated by a cytotoxic substance; or
- (i) waste consisting of anything that has been in contact with waste referred to in the previous paragraph; or
- (j) waste derived from the preparation of a human body for burial or cremation; or
- (k) waste declared by the Minister under section 3 (Declarations of clinical waste and prescribed activity) to be clinical waste; or

but does not include waste the treatment of which has been completed in accordance with the manual.



## **New South Wales**

### NSW Health

Clinical waste is waste which has the potential to cause sharps injury, infection or offence. When packaged and disposed of appropriately, there is virtually no public health significance. Clinical waste contains the following:

- sharps;\*
- human tissue (excluding hair, teeth and nails);
- bulk body fluids and blood;\*\*
- visibly blood stained body fluids and visibly blood stained disposable material and equipment;
- laboratory specimens and cultures;
- animal tissues, carcasses or other waste arising from laboratory investigation or for medical or veterinary research.
- unless treated to standards approved by the Director General of NSW Health.

\*Sharps: Any object capable of inflicting a penetrating injury, which may or may not be contaminated with blood and/or body substances. This includes needles and any other sharp objects or instruments designed to perform penetrating procedures.

\*\* Bulk: Free flowing liquids normally contained within a disposable vessel or tubing, not capable of being safely drained to the sewer.

### Protection of the Environment Operations Act 1997

Clinical waste means any waste resulting from medical, nursing, dental, pharmaceutical, skin penetration or other related clinical activity, being waste that has the potential to cause injury, infection or offence, and includes waste containing any of the following:

- (a) human tissue (other than hair, teeth and nails),
- (b) bulk body fluids or blood,
- (c) visibly blood-stained body fluids, materials or equipment,
- (d) laboratory specimens or cultures,
- (e) animal tissue, carcasses, or other waste, from animals used for medical research,

but does not include any such waste that has been treated by a method approved in writing by the Director-General of the Department of Health.



## Northern Territory

### Medical Waste

Medical waste means waste consisting of:

- sharps;
- human tissue, bone, organ, body part or foetus;
- a vessel, bag or tube containing a liquid body substance;
- an animal carcass discarded in the course of veterinary research or medical practice or research;
- a specimen or culture discarded in the course of medical, dental or veterinary practice or research and any material that has come into contact with such a specimen or culture;
- heavily bloodstained bandages and dressings and those from infectious sources;
- cytotoxic waste;
- pharmaceuticals, and
- any other article or matter that is discarded in the course of medical, dental or veterinary practice or research and that poses a significant risk to the health of a person who comes into contact with it.

### Sharps

Sharps are a form of medical waste consisting of objects or devices having acute rigid corners, edges, points or protuberances capable of cutting or penetrating the skin. This includes a needle, syringe with needle, surgical instrument or other article that is discarded in the course of medical, dental or veterinary practice or research and has a sharp edge or point capable of inflicting a penetrating injury on a person coming into contact with it

## Queensland

“clinical waste” means waste that has the potential to cause disease, including, for example, the following-

- (a) animal waste:
- (b) discarded sharps
- (c) human tissue waste;
- (d) laboratory waste.

These are further defined.



## South Australia

“medical waste” means waste consisting of:

- (a) a needle, syringe with needle, surgical instrument or other article that is discarded in the course of medical, dental or veterinary practice or research and has a sharp edge or point capable of inflicting a penetrating injury on contact; or
- (b) human tissue, bone, organ, body part or foetus; or
- (c) a vessel, bag or tube containing a liquid body substance; or
- (d) an animal carcass discarded in the course of veterinary research or medical practice or research; or
- (e) a specimen or culture discarded in the course of medical, dental or veterinary practice or research and any material that has come into contact with such a specimen or culture; or
- (f) any other article or matter that is discarded in the course of medical, dental or veterinary practice or research and that poses a significant risk to the health of a person who comes into contact with it.

## Tasmania

Clinical and related waste is defined as a “controlled waste” under the *Environmental Management and Pollution Control Act 1994*.

### Draft: Approved Management Method for Clinical and Related Waste

“Clinical and Related waste” is a collective term applied to materials generated by the health care industry and other clinical settings, and which have the potential to cause infection injury or public offence.

“Clinical Waste” includes:

Infectious or potentially infectious waste further categorised as:

- pathology and sampling waste;
- anatomical waste and body fluids;
- animal tissue and carcasses; and
- other infectious waste



## Victoria

Clinical waste is waste generated in a clinical setting that has the potential to cause disease, injury, or public offence, and includes:

1. A sharp discarded object of equipment for medical, dental, veterinary, nursing or similar applications
2. A clinical specimen wastes other than urine or faeces
3. A specimen of urine or faeces taken for laboratory testing.
4. A laboratory culture.
5. Human tissue.
6. Human blood or body fluids other than urine or faeces.
7. Tissue, carcasses or other waste arising from animals used for laboratory investigation or for medical or veterinary research.
8. Materials or equipment containing human blood or body fluids other than urine or faeces
9. Urine or faeces, or materials or equipment containing urine or faeces, where there is visible blood
10. Waste from patients known to have, or suspected of having a communicable disease.

Related waste is waste similar to clinical wastes generated in other specified settings, and waste that constitutes, or is contaminated with chemicals, cytotoxic drugs and pharmaceutical products.

## Western Australia

clinical waste: means waste generated by medical, nursing, dental, veterinary, pharmaceutical or other related activity which is

- (a) poisonous or infectious;
- (b) likely to cause injury to public health; or
- (c) contains human tissue or body parts;



## Appendix B – BWI Draft Biohazardous Waste Definition

Biohazardous waste arises from, but is not limited to, medical, nursing, home healthcare, dental, veterinary, laboratory, pharmaceutical, teaching, podiatry, tattooing, body piercing, brothels, emergency services, blood banks, mortuary, crime/trauma scene remediation and other similar practices and/or any activity prescribed by a relevant regulatory authority. It also includes commercial practices/activities that manage what would be considered biohazardous waste as described below.

Types of biohazardous waste include:

- a. Human blood or body fluids, other than urine or faeces (except from hospital /nursing home patients); or
- b. Human tissue; or
- c. Sharp discarded objects or devices capable of cutting or penetrating the skin (“sharps”), or the container in which they are packaged; or
- d. A diagnostic specimen; or
- e. A laboratory culture; or
- f. Tissue, carcasses or other waste arising from animals used for laboratory investigation or for medical or veterinary research other than psychological testing; or
- g. Materials or equipment containing, or reasonably suspected of containing human blood or body fluids other than urine or faeces (unless there is visible blood and/or faecal waste is from hospital/nursing home patients); or
- h. Faecal contaminated materials from hospital patients or nursing home residents (or similar), but excluding nappies from newborn or infant patients; or
- i. Sanitary waste except from a domestic premise unless the generator is known to have, or suspected of having a communicable disease
- j. Waste from patients known to have, or suspected of having a communicable disease; or
- k. Waste derived from a prescribed activity.

Note: Faecal waste disposed of via an approved sewage system is not classified as a biohazardous waste.



## Appendix C – Newspaper Abstracts

### Study takes on lethal superbug

Sunday Age, The (Melbourne, Australia) - Sunday, May 3, 2009

Author: STEPHEN CAUCHI

A LETHAL superbug responsible for the deaths of dozens of children and teenagers overseas will be targeted in a \$900,000 Melbourne-based study.

Victorian health authorities fear a major outbreak of the bacterial infection, a drug-resistant variant of staphylococcus aureus - or golden staph - could occur in Australia unless its spread is better understood.

The bug, known as **MRSA**, for methicillin resistant staphylococcus aureus, has been linked to several deaths in Australia.

Many people who die in hospital are found to be infected with the bacteria, but it is unclear how many deaths have been directly caused by it.

What health experts are most concerned about is that the bug's most toxic strain, known as community-acquired **MRSA**, is being spread in public places, such as schools, playgrounds and shopping centres, making it virtually impossible to contain.

Clusters of community-acquired **MRSA** have broken out in Victoria, Queensland and Western Australia in recent years.

"We're increasingly worried about it," said Paul Johnson, of the Austin Hospital's infectious diseases department.

"Very quickly over a very short time, the standard staph infection has changed from being always susceptible to antibiotics to half not being susceptible.

"It seems to have spread rapidly from coast to coast in America, but we haven't seen anything like that here."

Symptoms include skin boils and welts, but the condition can quickly deteriorate to include vomiting and organ failure, which can lead to death.

Dr Johnson said the study - being conducted by the Melbourne School of Population Health in conjunction with the Austin Hospital - aimed to enlighten doctors about the way the infection spread.

About 300 Melburnians who have shown symptoms of community-acquired **MRSA**, such as skin boils, will take part in the study, funded by the National Health and Medical Research Council. About one-third of the population carries staph at any one time, but most do not become infected from it. About 7 per cent of staph carriers in Australia have community-acquired



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## **MRSA .**

Dr Johnson said that despite the cluster outbreaks in Australia, "we're still way behind the US situation and it hasn't emerged in quite the same way".

"GPs and emergency doctors and infectious diseases physicians not uncommonly now see families that have got outbreaks of these skin boils," he said.

Catherine Bennett, head of the Melbourne school of population health at Melbourne University, said the study, to be done over a couple of years, would examine how staph spread between carriers and their housemates and family.

"We hope to recruit 300 people who have had community-onset infection and visit them at their homes to see if they're still carrying staph harmlessly in their skin and nose or whether people in the same house tend to share their staph," Professor Bennett said.

"We'll be in a better position to see how staph is spread."



## Scientists warn of fatal superbug 'epidemic' - HEALTH

Age, The (Melbourne, Australia) - Monday, September 8, 2008

Author: Jill Stark, Health Reporter

AUSTRALIA is facing an epidemic of a drug-resistant superbug that attacks healthy teenagers and can be fatal, leading scientists have warned.

A summit of 350 international microbiologists will converge on Cairns today to discuss the global health threat posed by resistant staphylococcal infections - also known as **MRSA** superbugs.

Of particular concern is a new virulent form of the flesh-eating bug that can lead to a severe form of pneumonia that causes death in up to 50% of cases. Unlike hospital-acquired **MRSA**, which affects mostly elderly patients, the community strain of the bug carries far more toxic genes and can be picked up in communal settings.

Similar bugs in the US have led to the deaths of several teenagers and schools being shut and disinfected.

Experts at the conference say the bug is on the rise in Australia and patients are presenting to emergency departments with infected boils that can lead to abscesses and gaping wounds.

Associate Professor Keryn Christiansen, director of microbiology at Royal Perth Hospital and co-ordinator of the conference, said antibiotics seemed to have no effect. "We're looking at a major epidemic. These are much more virulent strains of these bugs . . . We're seeing more people coming to our emergency departments, more people admitted with more severe infections and we're seeing people die. It's happening right across Australia," she said.

While strict hand-washing policies have helped to reduce the number of hospital-acquired **MRSA** cases, infection still occurs in Victoria.

Professor Christiansen said an outbreak of the new community-acquired version combined with the hospital variety could be catastrophic.

Potential strategies to fight the bug include a "search and destroy" policy as adopted in Western Australia where every case of **MRSA** must be reported to the state's health department.

Scientists then screen people who have had contact with the infected patient and attempt to eradicate the bug. Experts at the summit will also call for better monitoring of superbugs and Federal Government funding to educate GPs on spotting them.

The bugs are usually transmitted through contact with an open wound and can be passed from person to person or by making contact with contaminated surfaces.



## **Doctor warns of new strain of golden staph Germ alarm `ignored'**

Geelong Advertiser (Australia) - Tuesday, April 18, 2006

Author: JO PRICHARD

FEDERAL health authorities have been ``unreceptive" to concerns about an evolving epidemic of new strains of golden staph, a senior public health official says.

Dr Keryn Christiansen, of Royal Perth Hospital, says community acquired methicillin resistant staphylococcus aureus, or **CA - MRSA** , is increasing for unknown reasons in some parts of Australia and particularly Western Australia.

Dr Christiansen and co-authors of a study published in this month's Australian Medical Journal, surveyed 2600 golden staph isolates (germs) collected from around Australia.

Nationally, the appearance of the **CA - MRSA** strain rose from 4.7 per cent to 7.3 per cent of the sample, compared with similar surveys in 2000 and 2002.

WA had a quarter of all national cases of **CA - MRSA** , between July, 2004, and February, 2005.

The article refers to the issue as an ``evolving epidemic".

But Dr Christiansen, head of microbiology and infectious diseases at RPH, says she has had trouble drawing the issue to the attention of federal authorities.

``Unfortunately we've been unable to engage the Federal Government in this," she said.

``They've got other things on their agenda like pandemic flu and bio-terrorism and they're really putting a lot of money into that and not looking at this."

Methicillin-resistant Staphylococcus ( **MRSA** ), or Golden Staph, has long plagued hospital patients but other virulent related strains are now infecting people who have had no hospital contact.

``In the past when we've seen the resistant strains, we've seen them in hospitals and they've been resistant to many, many antibiotics," Dr Christiansen said. ``What we're seeing now is something completely different."

A federal Health Department spokeswoman said the department had met Dr Christiansen and there was ongoing discussion with expert committees on the best way to address community-acquired infections.



## **Hospital superbug workings uncovered**

**AM - Monday, 2 March , 2009 08:12:00**

### **Reporter: Rachael Brown**

TONY EASTLEY: Researchers at Melbourne's Monash University have unlocked the workings of a hospital superbug that kills thousands of elderly patients worldwide.

A report in the science journal Nature identifies the toxic protein in the bacterium, *Clostridium difficile*, which causes infectious diarrhoea, extended illness and death.

It's believed to have contributed to more than 8,000 deaths in Britain in 2007, and even more in the United States.

AM's Rachael Brown spoke with the report's lead author, microbiologist Dr Dena Lyras.

DENA LYRAS: *Clostridium difficile* grows in the gut, when people are taking antibiotics for another illness, all the good bugs are wiped out, from their gut and this bug can take then over and cause disease. Particularly elderly people in hospitals, they really can't defend themselves and a lot of them die from it.

RACHAEL BROWN: What is the casualty rate?

DENA LYRAS: In Australia we don't really have figures, because it's not really monitored or recorded in any way. But the cost to each Australian hospital in 1995 dollars was estimated to be \$1.25 million per year. Overseas, a superbug version of this bacterium has emerged and estimates in the United States suggests that it costs their health care system \$3.2 billion a year.

It causes such severe disease, even when people recover, they're in hospital for a lot longer, treatment has to go on a lot longer and they often relapse with this bug.

RACHAEL BROWN: Are there any areas where it's more prolific - either locally or overseas?

DENA LYRAS: In Australia it's an ongoing chronic problem, but we don't have the superbug version of this bacterium in our hospitals. Overseas this problem has just shot up over the last five years.

Because these bugs make a very resistant spore form, which is very difficult to get rid of in hospitals, it's not difficult to see how the superbug version can travel here from overseas. People who are sick and have the infection continue to shed this bug.

And so you can imagine now in these days of very easy travel, someone who might have had an infection gets on a plane, comes over here, goes into hospital and there we have it - the superbug is here. We've not detected it yet but it's only a matter of time before it gets here.



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RACHAEL BROWN: This breakthrough will allow you to come up with new ways to control and prevent the disease, are you aware of any timelines yet?

DENA LYRAS: I would say probably five to 10 years away. There are antibiotics that can be used to treat this bug. The problem with this bug as with many bugs we know now is that they develop resistance to antibiotics; and so they're very difficult to treat once they've developed resistance.

So it would be a great idea to have treatments available that don't rely on antibiotics, but I think they're a little bit five to 10 years away.

TONY EASTLEY: Monash University Microbiologist, Dr Dena Lyras, speaking there with Rachael Brown.



## **References**

Australian & New Zealand Clinical Waste Management Industry Group, (2007), Industry Code of Practice for the Management of Clinical and Related Wastes, 5<sup>th</sup> Edition.

Brunner, (1988), Hospital waste disposal by incineration, Journal Air Pollution Control of America, Vol. 38, No. 10, pp 1297-1308.

Clarey, P.R., Thornton, T.J., (1994), The Status, Classification And Amount Of Biomedical Waste Generated In Australia, Medical Industry Association of Australia.

Cys, J., (2003), Proper waste disposal is everyone's responsibility, Materials Management in Health Care, May, pp 23-26.

Daschner, F., D., Dettenkofer, M., (1997), Protecting the patient and the environment--new aspects and challenges in hospital infection control, Journal of Hospital Infection, Issue 36, No. 1 pp 7-15.

Doyle, B., W., (1985), The smoldering question of hospital wastes, Pollution Engineering, July, pp 35-39.

Environment Protection Authority of Victoria (EPAV), (1991b), Waste Generation and Disposal in Victorian Hospitals Draft Report.

Environment Protection Authority, (2009), *Draft Environment Protection (Industrial Waste Resource) Regulations 2009*.

Environment Protection & Heritage Council (2003), Clinical Waste Scoping Study, Commonwealth Government.

Hagen D., L., (2001), Infectious waste surveys in a Saudi Arabian hospital: and important quality improvement tool, American Journal of Infection Control, Vol. 29, No. 3, pp198-202.

Jacobsohn, A., (2005), Seeking a remedy, Waste Management World, July-August, pp 137-141.

Kaiser, B., *et al*, (2001), Solutions to health care waste: life cycle thinking and green purchasing, Environmental Health Perspectives, Vol. 109, No. 3, pp 205-207.

Lee, B., *et al*, (2004), Alternatives for treatment and disposal cost reduction of regulated medical wastes, Waste Management, Vol. 24, pp143-151.

Liberti, L., *et al*, (1994), Optimization of infectious hospital waste management in Italy: part I - wastes production and characterization study, Waste Management & Research, Vol. 12, No. 5, pp. 373-385.

Lumsdon K., (1993), Proper waste sorting begins with good definitions, Hospitals, January 5, pp 18-19.



Marinkovic, N., *et al*, (2005), Hazardous waste management as a public health issue, *Archiv za Higijenu Rada i Toksikologiju*, Vo. 56, Issue 1, pp 21-32.

National Health and Medical Research Council, (1999), *National Guidelines for Waste Management in the Health Care Industry*, Australian Government Publishing Service, 2<sup>nd</sup> edition.

Northern Ireland Government, (2008), *The management of clinical waste in the delivery of health and social care in the community*, Estate Policy Directorate.

Reinhardt P.A., Gordon J.G., (1991), *Infectious and Medical Waste Management*, Lewis Publishers.

Rutala, W. A., *et al* (1989), Management of infectious waste by US hospitals, *Journal of American Medical Association*, Vol. 262, No. 12, pp 1635-1640.

Thornton, T. J., (1996), *Green Health Care: Environmental Assessment Manual*, Australian Hospitals Association.

Thornton, T. J., (2007), *Clinical waste management in Victorian Hospitals*, Doctor of Technology Thesis, Deakin University.

United Kingdom Department of Health/Finance and Investment Directorate/Estates and Facilities Division, (2006), *Environment and sustainability: Health Technical Memorandum 07-01: Safe management of healthcare waste*.

Victorian Hospital's Association ((VHA), (1989), *VHA and the Environment: The Challenge for Hospitals*, VHA Report No. 53.

Weir, E. (2002), *Hospitals and the environment.*, *Canadian Medical Association Journal*; Vol. 166, Issue 3, p354, 1p.

World Health Organization, (2003a), *Wastes from Health Care Activities*. *Journal of Environmental Health*; Vol. 66, No. 1 pp 40-41.