1.0 Introduction

A research workshop was held on Friday 10th May 2002 with invited participants from academia, research institutions and various operational and policy areas of Queensland Health (refer to Attachment 1 for list of attendees). The aim of the workshop was to discuss current issues in environmental health research and ideas for future research directions around four themes: sustainability, planning, environmental hazards and system effectiveness. The primary outcome of the workshop is this report which provides a resource for workshop participants regarding opportunities for environmental health related research projects.

2.0 Purpose and scope of workshop

The purpose of the workshop was:

i) to advise Queensland Health on current research needs and priorities in environmental health for Queensland and at the National level

ii) to improve networking amongst Queensland researchers and practitioners

The workshop was designed to generate and exchange ideas and priorities on current and potential environmental health issues in Queensland with a view to encouraging joint projects, commissioned work, student projects and support for grant applications. The workshop participants were advised that Queensland Health would be able to offer only limited financial support. Queensland Health has already identified a range of issues that would benefit from further research. A list of issues and the presentation made during the workshop are included in Attachment 2.

3.0 Areas discussed for each theme

Themes rather than specific subject areas were chosen to provide some focus for group discussion to cater for the diverse backgrounds and interests. Key areas identified by the workshop as listed at the workshop are listed in Attachment 3 (there is no ranking of importance). Other ideas discussed in groups are listed in Attachment 4. The key research questions generated for each theme are presented below.

3.1 Sustainability

• The need for a process to incorporate concepts of sustainability into a framework for policy development both within Queensland Health and across agencies. This would include a set of indicators of sustainability to act as guiding principles.

• An analysis of the impacts of population change (numbers and demographics) on land use, food security and supply and services - eg impacts of population decline in rural areas on services, impacts of aging population and transport policy, impacts of ethnicity on food safety practices

• The impact of environmental changes in promoting increased physical activity

• Evaluation of the health benefits and costs of reuse of organic waste

• Public health impacts of land degradation such as salinity

• Investigation of the role of sustainable housing and its impact on health

• Investigation of the impact of global warming on:
  - Indigenous health
  - Water supply (quantity and quality) and subsequent impacts on health

• Investigation of the impacts of existing farming practices (including antibiotic and pesticide resistance) on health

3.2 Planning

• Development of a mechanism for incorporating Health Impact Assessment (HIA) into local government and state government Environmental Impact Statement (EIS)/Development Assessment processes. Need to research the barriers to integration of HIA into existing processes. This may take a case study approach, which examines the enabling/disabling factors.

• Research the concept of “nuisance” in order to better understand and define it and its impacts on health (particularly in the context of noise and odour)
• Evaluate planning successes from around the world (including Queensland and other Australian States) and identify their associated public health benefits. Linked with: Development of a systematic series of case studies which can be used to illustrate successful planning strategies from a health perspective: eg on the Sunshine Coast: compare Maroochy and Noosa
• Development of an assessment model which allows for integration both organisationally, temporally and geographically
• Develop a method for measuring the social impact of development on communities
• Develop a model for enabling better community participation in decision making

3.3 Environmental Hazards
• Develop a scenario modelling approach to analyse impacts of environmental health policy (past and current) on burden of disease etc
• Development of methods of detection for pathogens
• Development of biomarkers of immunotoxicity
• Investigate the role of geographical information systems (GIS) in the assessment of environmental health issues
• Development of a hazard inventory for enabling better health risk assessment
• Development of exposure indices
• Investigation of the application of the precautionary principle (eg. with EMR) and risk communication
• Mapping of environmental health issues/practices in biotechnology
• Investigation of the links between biotechnology, agricultural practices and human health
• Investigation of the biological impacts of electromagnetic radiation on human health

3.4 System Effectiveness
• Development of systems that maintain corporate memory
• Investigation of environmental health workforce capacity to determine adequacy of current skills and knowledge
• Development of systems for updating and tracking skills in the environmental health workforce
• Development of systems/tools to incorporate and present the effectiveness of ‘prevention’
• Development of systems that encourage and incorporate innovation into organisational structures – current and future
• Development of a method to evaluate the effectiveness of regulatory systems to health outcome, including the development of performance indicators
• Development of mechanisms for the evaluation of impacts of public health responses to emergencies
• Development of a process of linking agencies with regards to disasters/emergencies
• Development of a process for economic evaluations of long term environmental health issues
• Development of a system that requires/facilitates data linkage on a routine basis
• Development of a system for capturing non-mortality data such as low grade health effects, sentinel events
• Investigate the barriers/enablers to public health involvement in emergency management and community awareness/preparedness
• Research the impacts of catastrophes: eg power, water, fuel supply issues
• Evaluation of the effectiveness of the current system by auditing people: stress, communication, information etc.

4.0 Workshop outcomes

4.1 Workshop discussions
At the conclusion of the workshop, ideas for moving forward were discussed. Some of the areas discussed were:
- discussions with other agencies in order to develop proposals for large collaborative projects
- generation of some lists targeted to honours, masters and PhD topics
- the need for practitioners at a local government level to provide feedback on the sorts of research in Environmental Health that would assist them
4.2 Workshop report
This report is designed to provide a resource for Queensland Health for future use in the Public Health Services research position statement, the Environmental Health Unit business plan, the environmental health Outcome Area Plan and to facilitate Queensland Health supervision of research projects by university students.
Attachment 1. Attendees

- Mr Peter Davey, Senior Lecturer, School of Public Health, Griffith University
- Dr Cordia Chu, Senior Lecturer, School of Public Health, Griffith University
- Dr Melissa Stoneham, Lecturer, School of Public Health, Queensland University of Technology
- Dr Michael Donaghue, Senior Lecturer, School of Public Health, Queensland University of Technology
- Dr Michael Dunne, School of Public Health, Queensland University of Technology
- Dr Anne Neller, Lecturer, Faculty of Science, University of the Sunshine Coast
- Professor Brian Thomas, Director, Research Centre for Medical, Health and Environmental Sciences, Queensland University of Technology
- Professor Barry Noller, Deputy Director, National Research Centre for Environmental Toxicology
- Professor Michael Moore, Director, National Research Centre for Environmental Toxicology
- Dr Ross Sadler, Scientific Adviser-Chemistry, Queensland Health Scientific Services
- Dan Wruck, Supervising Technical Officer, Queensland Health Scientific Services
- Professor Tord Kjellstrom, Australian Centre for Epidemiology and Population Health, ANU
- Sophie Dwyer, Manager, Environmental Health Unit, Queensland Health
- Dr Tom Tenkate, Senior Project Officer, Central Public Health Unit, Queensland Health
- Dr Andrew Langley, Public Health Medical Officer, Sunshine Coast Public Health Unit, Queensland Health
- Dr Roscoe Taylor, Public Health Medical Officer, Central Public Health Unit, Queensland Health
- Fran McFadzen, Director of Health Promotion, Central Zone Public Health Unit, Queensland Health
- Shannon Rutherford, Scientific Adviser, Environmental Health Unit, Queensland Health
- Steven Begg, Scientific Officer, Environmental Health Unit, Queensland Health
- Paul Florian, Senior Environmental Health Officer, Environmental Health Unit, Queensland Health
- Kerry Bell, Principal Adviser, Foods, Environmental Health Unit, Queensland Health
- Peter Dyer, A/Assistant Director, Drugs and Poisons, Environmental Health Unit, Queensland Health
- Uma Rajappa, Assistant Director, Radiation Health, Environmental Health Unit, Queensland Health
- Simon Critchley, Director, Radiation Health, Environmental Health Unit, Queensland Health
- Clare Bailey, Director, Environmental Health Services, Rockhampton, Queensland Health
- Stuart Heggie, Director, Environmental Health Services, Cairns, Queensland Health
- Sharon Jurd, Director, Environmental Health Services, Southcoast, Queensland Health
- George Hapgood, Assistant Director, Communicable Diseases Unit, Queensland Health
attachment 2. presentation made at the workshop and current queensland health research projects and planned research projects

environmental health research workshop

purpose

• to advise queensland health on current research needs and priorities in environmental health
  • for queensland
  • at the national level
• to improve networking amongst queensland researchers, and practitioners

output: workshop report

context

• public health services
  • outcome areas
    • environmental health (general)
      • toxicology, environmental health planning, health impact assessment, risk assessment, radiation health, water, waste
    • food safety and standards
    • research position statement
  • national environmental health strategy

opportunities

• joint projects
• commissioned work
• student projects
• support for grant applications

workshop themes

• sustainability
  • impact of climate change, ecological sustainability
• planning
  • land use planning, planning schemes, health impact assessment of major developments
• environmental hazards
  • risk assessment processes
  • specific hazards
• system effectiveness
  • workforce development, legislative models, social change processes, monitoring frameworks, indicators

issues already identified - example: greenhouse

• patterns of extreme heat events and associated impacts of heat stress
• monitoring of vector borne diseases
• health impacts of changing air pollution patterns
• changing patterns in water borne diseases in recreational and drinking water supplies
• increased capacity in environmental epidemiology
• changing impacts of uv radiation on human health.
Issues currently being investigated or planned for investigation include:

- Antibiotic resistance – monitoring post production
- Safety of kup marie (a form of underground cooking) at the biennial Torres Strait Cultural Festival (Thursday Island)
- Investigation of labelling, scheduled substances and metal contamination of Traditional Chinese Medicines for sale in Queensland
- Investigation of pethidine prescribing and reporting practices in Queensland
- Survey of coloured imported crockery (dinnerware) sold by low price and cut price stores for leachable heavy metals
- Public health risks associated with intensive animal farming – state of knowledge and existing management practices
- Issues relating to global warming and public health
- Food safety risk associated with various food production processes eg food irradiation
- Evaluation of smoke detectors: efficiency, quality, integrity and longevity under harsh operating conditions and fate when consumed in house or industrial fires
- A retrospective evaluation of suppressed carbon 14 in environmental samples (tree rings) to estimate changes in greenhouse gas and pollution in the air at various regional centres.
- To assess air quality, vegetation, trees, leaf litter and surface soils in the vicinity of an incinerator; determine the critical group dose; and evaluate detection systems / procedures at the entrance of incinerator facilities.
- A literature study is proposed to determine the effect of solar modulation on a thermoluminescent dosimetry system.
- To characterise the uranium content of fertilizers / fertilizer blends and the radioactive pathways and outputs during manufacture.
- To improve the accuracy of dosimetry systems it is proposed to characterise the photon energy environment in radiation work places.
Attachment 3. Summary of ideas around each theme as listed at the research workshop

Sustainability
- waste management
- rainwater tanks
- physical activity
- population policy and land use (particularly salinity)
- population change and increase and impacts on food security and supply
- need for a process: sustainability framework for policy development (within Queensland Health and across agencies)

Planning
- mechanism for incorporating HIA into local government and state government EIS/Development Assessment processes
- Housing construction
- Public transport linkages
- IPA
- Upskilling of workforce – HIA
- Buffer zones – eg odour
- Social impact of development on communities
- Integration – both geographically and temporally (collaborative)
- Review “global knowledge” – case studies illustrating successful and unsuccessful planning
- Community participation

Environmental Hazards
- Methods of detection – pathogens
- Water quality
- Perceived or real hazard
- Better hazard inventory – industry based?
- Use of GIS as an assessment tool
- Improved auditing
- Upskilling workforce (other than Queensland Health)
- National and community priorities
- Recognising/analysing impacts of past regulation
- Scenario modelling
- Biotechnology → agriculture → health (health risk assessment – ethical research)
- Better integration of epidemiology and toxicology
- Exposure indices
- Biological impacts of EMR
- UV exposure and impacts on immune response
- gene technology in food and impacts on allergy

System Effectiveness
- maintain corporate memory
- workforce capacity – number, needs and skills
- systems for updating skills
- regular audits – need to find a way to present the effectiveness of ‘prevention’
- systems that build in innovation into the structure – current and future
- needs assessment – current and future workforce
- regulation linkage to health outcome – how to evaluate? Surveillance, development of indicators
• better evaluation of impacts of emergency
• process of linking agencies with respect to disasters/emergencies
• economic evaluation of long term environmental health issues
• data linkage – routine basis
• systems for capturing non-mortality data
• strengthen evidence for systems – effectiveness and efficiency
• future interactions – other agencies, community
Attachment 4. Summary of lists of ideas generated across work groups at the research workshop

Sustainability

Group 1
• monitoring and evaluation rather than research
• human health component of waste management
• impact of climate change on food/water/ vector borne diseases
• development of alternative energy sources
• explore relationships between social, economic, environmental and cultural values
• sustainable housing – appropriate and affordable

Group 2
• effluent re-use
• potable water – water reuse disease concerns
• population policy? – impacts of declining population/ services in rural areas on environmental health
• salinity – what is being done in Queensland
• impacts of poor farming practices on health
• role of local government in land use planning – current and future practices
• alternative transport systems, fuels
• production and consumption patterns
• utilisation of genetically modified organisms
• antibiotic and pesticide resistance and impacts on public health
• need for a process to address the integration of the issues
• impact of ethnic practice on food safety
• sustainable trade systems that recognise the public health risks: “political” vs “ecological” boundaries
• need for a set of indicators of sustainability (guiding principles)
• impact of global warming on indigenous health in Queensland
• impacts of global warming on water supply (increase in blue green algae etc)

Group 3
• rainwater tanks
• radioactive waste
• recycling waste water – grey water, potable water
• nutrients and other waste into waterways
• marine and algal toxins
• natural toxins in foods/water
• solar regulated watering system (research into implementation and development)
• waste stream analysis: waste generation/minimisation (environmental accounting) – applied to health sector
• bioavailability of heavy metals in shellfish
• children’s exposures/susceptibilities to ?? (food??)
• incentives for uptake of lower energy choices by consumers
• transforming houses to more sustainable – building design trends in Queensland – policy options
• physical inactivity in children (intervention studies)
• national baseline studies on physical activity in very young children and primary children
• harvesting methane from intensive animal husbandry settings, landfill (research in to barriers/enablers of policy development)
• effects of UV radiation on immune systems
• impact of the aging population on the environment (eg transport policy etc)
• intensive farming and waste disposal
Group 4
- indirect health effects due to climate change
- waste management
- renewable energy
- sustainable building for environmental health
- rainwater tanks / chlorinated water
- health effects of salinity
- need to create a process framework leading to policy
- indicators of sustainability
- need engagement across a range of agencies

Planning

Group 1
- need for an integrated and collaborative approach to planning
- facilitation and supportive processes
- development of a systematic series of case studies eg. on the Sunshine Coast: Maroochy vs Noosa
- Evaluation of health considerations in town planning schemes
- Integration of planning in both time and space
- Evaluation of planning successes and their public health benefits across the world – review global knowledge
- Planning resources should be provided for collaborative project/research rather than outsourcing – that encourages ownership and community participation

Group 2
- Social impact of development (including stress)
- Community’s relationship with Queensland Health – how they see us
- Framework for growth planning

Group 3
- incorporation of EHIA into government processes: research the barriers to integration into EIS (processes research – case studies: enabling and disabling factors
- urban form and sustainability – uptake/implementation at State government levels, barriers/enabling at local government levels, economic drivers
- need to plan for healthy, sustainable communities
- suburban renewal
- better research needed into better understanding and defining nuisance

Group 4
- need for framework for growth planning and implications for environmental health
- need for integration both organisationally and geographically
- review global knowledge

Environmental Hazards

Group 1/2
- cumulative impact of industry
- better auditing in the field
- better hazard inventory – guidance for assessment
- GIS mapping – especially air and water
- Need for epidemiology data
- Health risk assessment and health impact assessment—communication of these tools and their applications to other professionals such as engineers, architects, planners
- impact of past regulation on public health benefit
• predicting the impact of current practices based on past practices
• use of modelling technology to analyse impacts (burden of disease – economic impacts) of policy – scenario modelling
• link of biotechnology, agriculture and health needs to be investigated – how to assess the risk of biotechnology
• health risk assessment of nutraceuticals and emerging food products

**Group 3/4**
• how to integrate knowledge from toxicology and epidemiology into health risk assessment
• interactions between alternative medicines/environmental exposures and prescribed drugs
• interactions between hazards eg. heavy metals and effect on toxicity
• complex mixtures/synergistic effects
• EMR – research into the application of the precautionary principle (eg with EMR) and risk communication
• UV radiation and immune system effects
• Development of biomarkers of immunotoxicity
• Neo-antigens(?) and genetically modified foods – methods to assess allergenicity
• Anti-microbial resistance transfer and the human environment (eg refer to JETACAR), what practices/processes/activities are magnifying the risk
• Link between biotechnology, agriculture and health
• Aseptic environment – what does it do
• Long-term health risks of sustainable practices (eg health risks of practices to ensure safety vs sustainability)
• Ionising radiation in drinking water → long term health effects
• Mapping of EH issues/practices in biotechnology
• Soil micro quality for agriculture

**System Effectiveness**

**Group 1**
• EH indicators / quality of life (social, economic and environmental)
• Publish case studies

**Group 2**
• development of a system to better filter through the information
• needs assessment of workforce capacity – where the gaps are, development
• system/process required for renewal and updating skills
• effectiveness – now? – auditing, people: stress, communication/information
• how to show that prevention works
• retaining organisational memory
• need to develop method of presenting ‘prevention’ (use of scenarios)
• system that guarantees innovation in its structure

**Group 3**
• indicators: social, economic, environmental
• case studies – how well are we doing? – Brisbane/Gold Coast, Gladstone, Townsville/Cairns, Mt Isa, Thursday Island
• Equity
• Process to generate the research priorities
**Group 4**

- emergency management – community awareness and preparedness, barriers/enablers to public health involvement
- research impacts of catastrophes eg power, water, fuel supply issues
- (predictive research to use to develop collaborations with other emergency response agencies)
- environmental health needs to justify its existence by showing that there is a cost benefit in what it does
- regulatory system evaluation – what are the benefits/costs of radiation hazard assessment of equipment
- economic evaluation guidelines - how to incorporate these into practice, what changes are required in information systems in EH that will enable better utilisation of economic evaluation
- EH indicators – data linkage systems (project of Div GPs, EH SIG PHA and ‘doctors of the environment’)
  - ie devising systems for capturing low grade health effects/sentinel events (eg allergies, GI infections and water supply etc)