1. SYNOPSIS

The Master of Applied Epidemiology (MAE) Program at the National Centre for Epidemiology and Population Health is Australia’s only Masters level field epidemiology training program. The Program combines theoretical knowledge with extensive hands-on experience allowing students to critically evaluate the process and outcomes of their day-to-day work.

MAE students are based in government health departments and research institutes for 18 months of the 21 month course. Guided by an ANU-based academic supervisor and an experienced field-supervisor, students “learn by doing” and contribute substantially to the workplace and development of public health policy and practice. In 2007/08, students published 57 papers or official reports and presented 31 conference papers based on their project work.

The integration of academic study, workforce output, formal and informal learning and social interaction enables the balance of excellence in science with relevance for public health. Students’ immersion in public health practice promotes strong relationship building between the student and public health practitioners. With the academic supervisor, this support framework provides students with the confidence to undertake diverse projects with immediate public health impact. Students and staff provide important surge capacity within the Australian health system and internationally, most noticeably during major epidemics, including significant contributions to the swine influenza pandemic response.

The practical and applied component of the course is enhanced by flexible curriculum tailored to student needs and delivered over four intensive courseblocks. Second year students build their communication, team-work and problem-solving skills by leading regular teleconference sessions for their student peers, and by delivering team teaching sessions to first year students.

The MAE Program provides:

- the skills and confidence for graduates to make substantial contributions to infectious diseases surveillance and control at state and Commonwealth levels in Australia;
- a competitive advantage to graduates pursuing high level employment in Australia and overseas;
- opportunities for Indigenous people to enhance health in their communities. (Source, 2009 Alumni survey)

Many of the 153 MAE graduates are now leaders in the field. Many remain closely linked to the program, as field supervisors, lecturers, external examiners or members of the MAE Advisory Committee.

The ongoing contribution of MAE Alumni in the public health field in Australia and internationally ensures the MAE program maintains its recognised standing as a world leader in epidemiology training.

The Master of Applied Epidemiology program has been awarded an ANU Vice-Chancellor’s Excellence in Education Award, 2008, in the category of Awards for Programs that Enhance Learning.

2. SELECTION CRITERIA

1. Distinctiveness, coherence and clarity of purpose

The Master of Applied Epidemiology (MAE) Program has operated at the Australian National University since 1991 and remains the only field-based epidemiology training program leading to a Masters level qualification in Australia. Collectively, students and their academic and field based supervisors make major contributions to enhancing communicable and non-communicable disease surveillance and control.
Program objectives

The MAE Program aims to improve health and well-being in indigenous and non-indigenous communities across Australia by means of five (5) overarching objectives -

1. Strengthen national and regional public health capacity to respond to emerging and current disease threats;
2. Maintain and enhance rigour in surveillance and outbreak investigation to invigorate disease control systems;
3. Develop sustainable and flexible communication and networking capacity in disease control practice;
4. Contribute to local and national health policy development; and
5. Develop a national capacity to investigate and to report upon disease related to environmental factors.

The MAE Program produces confident graduates with sound theoretical and practical epidemiological knowledge who are immediately ready to contribute to the public health workforce in Australia and internationally. The MAE specifically addresses the needs of Australia’s indigenous population by recruiting and training members of the Indigenous community, and by developing appropriate skills in all its graduates. MAE graduates have cultural respect and understanding of the indigenous holistic approach to health and the ability to teach and mentor the next generation in their workplace.

There is strong evidence that the MAE Program is achieving its objectives. The majority of MAE graduates enter the public health system and work in epidemiology and policy areas. In addition, a small but important group contribute to regional disease control, mainly through the World Health Organisation (objective 1). The results and analysis of student-led projects is available in the public domain. For example, in 2007/08, students published 57 papers or official reports (including 21 peer reviewed journal articles) and presented 31 conference papers based on their MAE project work. This attests to the rigorous standard of the student projects and their reporting (objective 2). The network of MAE graduates and their supervisors is built during the course, is highly valued and is enduring. In the 2009 alumni survey, 85% of graduates report continued involvement with the course, supervisors or other alumni. This network is particularly valuable in times of crisis, for example during SARS and now during the “swine flu” response (objective 3). MAE student work continues to contribute to local, national and international policy development (objective 4, see several examples in the text below, and in the publications list in the supporting document). All MAE students investigate outbreaks of communicable diseases during their course, and many of these require an understanding of environmental factors (objective 5).

Collated results for MAE graduates have been compared with other post-graduate epidemiology courses for the period 2004-08 in the Independent Australian Graduate Survey (see supporting document, page 10). The MAE scored significantly higher than comparative Australian courses in all areas, and in particular in those related to the domains of skills development (94% versus 64% satisfaction rating), graduate qualities (92% versus 77%) and intellectual stimulation (95% versus 86%).

Systematic approaches to co-ordination and implementation toward program objectives

The MAE program is modeled on the highly successful Epidemiology Intelligence Service run by the Centers for Disease Control (CDC) in the USA. However, in order to effectively address the unique range of issues in Australia, the MAE program has been adapted in collaboration with representatives from the public health system, including those from state and national government, research institutions and non-government organisations. The MAE Program continues to benefit from this dynamic collaboration, receiving advice, support and direction by working closely with field supervisors and an Advisory Committee (Table 1).

The Advisory Committee is comprised of indigenous and non-indigenous representatives, including senior officials from government departments, as well as academia and non-government agencies. The committee provides advice, support and direction to the MAE Director in relation to national and regional workforce needs, student recruitment and retention, curriculum development and strategic planning.
<table>
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<tr>
<th>Committee member</th>
<th>Involvement with MAE</th>
<th>Current employment position</th>
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<tr>
<td>Anna Reynolds</td>
<td>Current student</td>
<td>Australian Government Department of Health &amp; Ageing (DOHA)</td>
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<tr>
<td>Ross Andrews</td>
<td>MAE alumnus and field supervisor</td>
<td>Menzies School of Health Research – Indigenous Health research institute</td>
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<tr>
<td>Sandra Gabbie</td>
<td>Field supervisor and key employer of MAE Graduates</td>
<td>DOHA, Office of Health Protection</td>
</tr>
<tr>
<td>Carmel Martin</td>
<td>PHERP Contract manager (Funding agency)</td>
<td>DOHA, Population Health Division</td>
</tr>
<tr>
<td>Deb Reid</td>
<td>Assisted in development of the MAE Program. Lectures on course.</td>
<td>DOHA, Office of Aboriginal &amp; Torres Strait Islander Health</td>
</tr>
<tr>
<td>Charles Guest</td>
<td>Assisted in the development of the MAE Program, previous MAE staff member &amp; current field supervisor.</td>
<td>Chief Health Officer - ACT Health</td>
</tr>
<tr>
<td>Cathy Bennett</td>
<td>MAE alumnus. ANAPHI executive member</td>
<td>University of Melbourne</td>
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<tr>
<td>Jeremy McNulty</td>
<td>Graduate of the EIS program. CDC Atlanta, USA. Key employer of MAE graduates.</td>
<td>NSW Health, Deputy Chair of the Communicable Diseases Network of Australia (CDNA)</td>
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<tr>
<td>Paul Kelly (Chair)</td>
<td>MAE Program Director</td>
<td>ANU</td>
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Table 1: MAE Advisory Committee Members

In a typical year the MAE Program has eighteen students placed in Commonwealth, State and Territory health departments, public health units, non-government organisations or major Australian research institutes. A core requirement of their placement is that students apply epidemiological theory to their workplace activities, while building new professional knowledge. Across all settings students provide real-time capacity in the health system and are able to make major impacts on health policy while still scholars within the program (objectives 1, 2 and 4). A select few examples of this are detailed in below.

In 2008, the Communicable Diseases Network of Australia (CDNA) identified a lack of a national evaluation strategy to assess the impact of human papillomavirus (HPV) vaccination in Australia. One MAE scholar worked with a subcommittee of CDNA to successfully develop a policy document that met this need, at the same time fulfilling one of their MAE required projects. This evaluation strategy has now been adopted as national policy by CDNA. Each year, MAE staff, scholars and field supervisors are also involved in investigating major outbreaks, including those related to emerging infectious diseases (objectives 1, 2 and 5). Recently, students have been involved in the Hendra virus outbreak in Brisbane, foodborne outbreaks in city restaurants and boarding schools and the Equine Influenza outbreak in Queensland. All students are currently involved, as part of their field experience, in the national response to H1N1 Influenza 09 (Human Swine Influenza). Students co-author peer-reviewed journal articles, national and international health guidelines and assist in the development of surveillance and response systems that are immediately relevant to local populations. One recent project involved the student working as a consultant for the World Health Organisation (WHO) to evaluate the Lymphatic Filariasis elimination program in the Pacific. The work has informed the future development of the global elimination program and has resulted in three co-authored peer-reviewed journal publications (see supporting document).

This on-the-job training is interspersed with learning about current issues of public health interest through intensive residential courseblocks at ANU (objective 2). Courseblocks provide students with the opportunity and support to reflect and build on their field experiences through interactive sessions with academic supervisors and other experienced epidemiologists who are invited to present lectures and lead tutorials. The focus for MAE students is always on enquiry based learning using collaborative problem solving techniques and real life examples. The emphasis in all such sessions is working through feasible strategies that lead to practical outcomes. Recently students learnt about Hendra and Nipah virus from field epidemiologists who were involved in several outbreaks of these viruses, as well as a current MAE student who was working on an outbreak in the field. Students unanimously and consistently rate case study seminar learning from field epidemiologists as 5/5 on their student feedback reports. At the next courseblock, the focus will be clearly on “swine flu”, and will include active reflection on students’ own lessons learnt from their recent field experience. This exercise will
be enriched by the fact that to date, almost the entire cohort of students has contributed either at state or national level to Australia’s Human Swine Influenza response. The role of students has ranged across active surveillance, outbreak response, support to the public and health practitioners, to leading surveillance teams at national level. Throughout these activities, the students have been supported by their placement and academic supervisors.

MAE students are provided with active social and professional opportunities to strengthen peer and mentor networks (objective 3). They are required to present at at least one national or international conference during the course. In 2008, two students presented their work at the International scientific conference of the Training Programs in Epidemiology and Public Health Interventions Network Inc (TEPHINET). Both speakers were awarded prizes (5 awarded in total) for excellence in oral presentation, a key competency of the MAE course. In the past two years, an MAE student has been selected to speak at the International CDC Epidemic Intelligence Service (EIS) Conference. In 2009, the MAE student who presented at that event was awarded the prestigious Foege Prize for the best presentation. Selection for presentation, and in particular the consistent prize winning by students at these international meetings, is a strong indicator of the quality of the MAE course against international benchmarks.

The success of the MAE Program centres on the concept of a feedback loop between the student, their field supervisor working in population health practice and their academic supervisor working at the ANU. This framework effectively links training in the MAE Program with service to improve communicable disease control. This is achieved through academic staff and field supervisors working in close collaboration to provide advice to students, and continually monitoring their progress (Figure 1).

Figure 1: Feedback loop supports students and builds capacity and stakeholder relations amongst field epidemiologists, governments and academic institutions.

With the emphasis on learning in the field, MAE students develop a pragmatic approach that recognises the art and science of balancing public health policy and practice demands with the need for scholarly and scientific rigor. This framework has proven highly successful in supporting students to achieve results that have real impact on public health policy and practice. It is also a key factor in building professional and productive working relationships between MAE Staff, government agencies and other research institutions. MAE students have been placed in every jurisdictional health department in Australia as well as several of the leading public health research institutes. Many graduates are employed in these same organisations in Australia as well as internationally.

Graduates of the MAE program demonstrate a commitment to continued learning in the public health field. They actively maintain their peer learning links established within the program, which provides opportunities for ongoing peer support and exchange of ideas and experiences (objectives 2 & 3). Many graduates are also encouraged to provide continued
support to the program through acting as lecturers, taking on the role of field supervisor, examiner and/or being a member of the Advisory Committee. A survey of MAE alumni conducted in early 2009 found that 95% of respondents have maintained contact with MAE Program through at least one of these avenues (Figure 2).

![Figure 2: Ways in which MAE Alumnus survey respondents have maintained links and provide continued support to the MAE Program (MAE Alumnus Survey, 2009).](image)

**Systematic approaches to Program evaluation**

The MAE Program is evaluated on an ongoing basis, internally by students and externally by the Australian Government. Students evaluate each residential courseblock and where appropriate suggested changes are incorporated into successive courseblocks. The average score across 83 sessions in the past 2 years is 3.5 on a 5 point scale. Only 3 sessions have scored less than of 3 out of 5, and each of these has been fully revised. Students also provide feedback on their academic and field supervision and provide written evaluation of their field placement through bi-annual work reviews. Graduating MAE students complete an exit survey, which allows them to reflect and report on the program in its entirety and provides feedback and advice on the strategic direction for improved student learning.

> 'Whilst a student within the MAE program, I was impressed by the extent of the invitations for student feedback on program design and delivery. The responsiveness to student and field supervisor input through short term adaptations to curriculum and continuing development of the program were evident and impressive, and contributed to the diversity of the students and the projects undertaken. As a graduate who is now an educationalist, I can appreciate how adaptive the MAE program is and how important this is in maintaining the contemporary relevance of the knowledge and skills developed and a focus on the most important health issues of the time.'

**Dr Catherine Bennett, Director of Teaching & Learning, School of Population Health, University of Melbourne & MAE Alumnus**

The Program has also been externally evaluated each annual reporting cycle by the Australian Government’s Public Health Education and Research Program (PERP). The primary aim of PERP is to improve public health capacity in Australia, through funding Universities to produce workplace-ready public health practitioners. The last comprehensive PERP review in 2005 highlighted that the MAE Program demonstrates 'linkages between universities and the various levels of government,' and that 'the immediate benefit is mutual and the outcome leads to better public health training.'

One employer, who has employed five MAE graduates in his organisation, commented in a presentation at the 2009 MAE Showcase Conference held at ANU that he employs MAE graduates for three reasons – 'they are confident, workplace savvy and they have practical knowledge of epidemiology.'

2. Influence on student learning and student engagement

Health system needs

The program was introduced to address an identified shortfall in highly trained epidemiologists within the Australian Public Health workforce. Up to nine students are accepted into the program each year and requests for students are received from up to fifteen potential placement sites. As adult learners and professionals from a variety of backgrounds students are able to identify their own area of interest from the placements on offer and the program is designed to support them to do this. The competition for MAE students demonstrates the established reputation of the program and the continuing demand in Australia for a workforce trained in epidemiological research, analysis and application. The competition also ensures the best resources, learning environments and training opportunities are made available to our students.

Enhances student learning

With an emphasis on rigour, innovation and development of academic and intellectual skills, the program has a reputation for being extremely challenging and highly practical. Field epidemiology often calls for responses to unexpected public health problems for which the epidemiologist has to solve the problem on-the-ground. In particular, the rapid outbreak response (one component of the course) requires quick decision making and compromises between academic rigour and the need for timely input towards public health decision making. The investigations often require environmental investigation, surveying of affected individuals and liaison with public health laboratories. In this context, MAE students are currently contributing to rapid public health responses to outbreaks of ‘swine flu’, including those connected to the Pacific Dawn cruise ship. Outbreak investigations, whilst being stressful events, are consistently rated highly by MAE students in terms of lessons learnt.

This training, based on the principle of ‘learning-by-doing’, exemplifies the Confucian proverb: ‘I hear and I forget, I see and I remember, I do and I understand’. Hence, the actual public health workplace itself and the outbreak or disease settings encountered become the student’s classroom. During the 21-month MAE Program students complete four major projects which are of immediate relevance to public health: an outbreak investigation; data analysis and written report; evaluation, design or implementation of a surveillance system; and an epidemiological research project with recommendations. A typical timeframe for projects is summarised in Figure 3.

At least one scientific manuscript is submitted by each student to a peer reviewed journal during the course. This provides students with the experience of co-authorship and publishing. A two-day group teaching session is also delivered by second year students to first year students to build skills in teaching and mentorship. This session is always highly appreciated by the first year students, often rated as the best component of the introductory courseblock.

MAE scholars submit a Bound Volume (BV) of their work at the conclusion of the course. The BV is expected to demonstrate mastery of the applications of epidemiology, and the capability for independent activity, responsibility and professionalism in the field. Students are almost universally adjudged as having reached, and in many cases exceeded, Masters level competency by external examiners. With high quality field placements and projects and with expert supervision students have increased peer reviewed output in recent years, enhancing the quality of BVs and oral examinations. In the past 2 years, MAE students have co-authored 21 peer reviewed papers, a remarkable achievement for such a small cohort of Masters by coursework students. The BV also serves as a valuable resource for field placements, and succeeding MAE students, by documenting important projects, methods and findings. In response to student and field placement requests, from 2009 MAE students will have access to BVs and other past MAE student publications through a web interface which allows them to search past student projects.
Figure 3: Project timeline for the 21 month program.

In a recently completed survey of alumni, 95% of graduates viewed the MAE as a highly valuable, often career (even life) changing event. For most, it has provided important career opportunities, valuable skills and inclusion in important networks.

"The MAE program gave me epidemiology and research skills and much more. It provided me with a supervisor who mentored my research skills in creating partnerships with other agencies and influencing policy and planning areas. She remains an important mentor to this day. Through the program I had the opportunity to work with a number of agencies such as BreastScreen Victoria, communicable disease departments, research centres and Aboriginal health services. This greatly broadened my understanding of public health management and evaluation. I met an array of leaders in different fields associated with NCEPH who provided global and national viewpoints on epidemiology and public health. The research I completed as part of the Masters course was published in peer review journals and one of my MAE research projects became the basis of the methodology for my PhD. I often come across other Indigenous MAE Alumni and all have taken on leadership roles in research and policy areas. In my view the program has made a significant contribution in this area."

Dr Karen Adams, Research Fellow, Victoria University
& MAE Indigenous Health Alumnus

Provides student learning support

Applicants to the program come from very diverse backgrounds, previously working as nurses, physiotherapists, social workers, Aboriginal health workers, psychologists, physicians, microbiologists, physiotherapists, environmental health officers and more. Students start the course with a four-week residential period, and return to the ANU at six monthly intervals for three week periods of collaborative learning. Intensive courseblocks involve interaction with supervisors, guest speakers and peers, and are a vital component of the course. They are valued for the opportunity to build relationships amongst the student cohort and with ANU-based supervisors, and for providing the building blocks for field project work.

"It has been a fantastic experience, it has equipped me with knowledge to start the MAE! Staff are amazing, supportive and generally interested. I feel like we have become part of a great family."

1st year student during 1st courseblock evaluation, 2009
While the students are in their field placement, teleconferences with each individual student and their field and academic supervisor are scheduled at fortnightly intervals for the first 3 months and monthly thereafter. The objective is to support and assess the student’s immediate plans and to continually evaluate ongoing projects. The academic supervisor makes at least one field visit per year to assess progress and to meet field supervisors and support staff within the student’s workplace.

A formal written appraisal of performance against the educational objectives is conducted by field and academic supervisors, together with the student, half-way through the course. This is to ensure that the support system is meeting the needs of the student, and is challenging their potential. Appropriate corrections for training and support are made and monitored.

Lessons from the field are virtual ‘classes’ prepared by students, and conducted by group teleconference at regular intervals. Each student takes a turn preparing a session, based on a challenging issue encountered in the work environment, and emails it to their student colleagues. The latter return individually written answers which are debated at the teleconference. This exercise builds skills in articulating and distilling important experiences and lessons to colleagues, and in managing teleconferences, both important skills in Australia’s public health system. The regular group teleconferences also provide an opportunity for continual networking amongst the student cohort who are geographically dispersed for most of their program experience. Examples of teleconference topics have included estimating the incidence of Hepatitis C from surveillance data, resolving methodological difficulties in designing a study protocol and working with qualitative data.

"Having worked as a nurse for more than 20 years I came to the MAE program looking for new challenges. I had recently completed a two year clinical placement in a developing country where I first tentatively approached epidemiology. I returned to Australia inspired to learn the skills I had touched on and I learned more than I ever imagined possible through the MAE program. I am now using those skills in my new role at the Australian Institute of Health and Welfare where I lead a team that produces national cancer statistics to inform policy makers, researchers and clinicians. It is a challenging and satisfying role made possible by the epidemiological knowledge, skills and most importantly experience gained through the MAE."

Christine Sturrock, Head of the Health Registers and Cancer Monitoring Unit, Australian Institute of Health and Welfare & MAE Alumnus

Continual improvement

While the program maintains its recognised standing as a leading epidemiology training program and continues to meet its objectives in Australia, MAE staff continue to develop and adapt the curriculum to improve effectiveness and refine educational objectives. The curriculum and specific courseblock sessions are adapted in response to changing student needs, special topics and student feedback.

"I really enjoyed this courseblock and found it useful. I also appreciated that feedback from last courseblock was taken into consideration."

1st year student during 2nd courseblock evaluation, 2008

As active members of the Australian Network of Public Health Institutions (ANAPHI) MAE staff share insights into public health teaching and learning with other universities. The "learning-by-doing" model of workplace-based field work is a unique MAE approach in public health education, and elements are being considered for adoption by other public health courses in Australia.

3. Breadth of impact

Benefits to students, staff and other public health institutions

MAE students, graduates and staff constitute a collegial network in public health and health services response in Australia and the region. Since 1991 students and staff have lead or participated in over 200 outbreak responses locally, nationally or internationally. This has often included investigations of new and emerging diseases and infections, including endemic Mycobacterium ulcerans in Victoria and acute post-streptococcal glomerulonephritis and melioidosis in several jurisdictions.
During the outbreaks of Severe Acute Respiratory Syndrome (SARS) (2003) and avian influenza (1997) significant contributions were made by MAE students and graduates to strengthen surveillance and response in South East Asia. The work led to the development of the World Health Organisation global rumour surveillance system, a major development for fighting emerging infectious diseases. In recent years, MAE students have also established national Hepatitis C and Chlamydia surveillance systems; and were involved in the development of a network to enhance national surveillance of foodborne diseases. Students have also contributed to the development of guidelines for control of childcare infections, measles, meningococcal, pertussis and pandemic influenza.

In 2008 several MAE students were deployed to boost the public health workforce in Sydney for World Youth Day. Students led the development of an internet based data collection system for real-time public health surveillance and planning prior to the World Youth Day Event, and assisted in response to an outbreak of influenza amongst World Youth Day pilgrims. A representative from the NSW Department of Health reported that the MAE students were outstanding in these roles and all students found the experience enormously rewarding. Similar experiences are occurring in 2009 in relation to the "swine flu" pandemic response.

MAE scholars have lead roles in design and implementation of screening and intervention programs, including for vulnerable groups such as people living in remote indigenous communities, and newly arrived refugees. Many students have worked internationally and MAE academics have supervised student research projects in Fiji, Timor Leste, Indonesia, India, China, Malaysia and the Pacific. Many projects are only able to be achieved because of the public health 'surge-capacity' which MAE Staff and scholars provide.

In a 2009 Exit Interview of 2008 and 2009 graduating students, 50% of students surveyed considered that 'field research' or 'field experience' was the most beneficial aspect of the MAE course. Others (20%) considered the 'connections made with MAE cohort' to be the most beneficial aspect. 'Guidance from supervisors' and 'development of communication skills' were also nominated as most beneficial.

The MAE has 153 graduates, comprising 122 non-indigenous and 26 indigenous Australians and 5 international graduates. Whilst students come from diverse backgrounds, graduates of the program have moved rapidly to take on senior administrative and academic posts as epidemiologists or research academics (Figure 4). They continually demonstrate well developed critical thinking and applied professional epidemiologic skills relevant to the needs of the public health system in Australia, in our region and indeed globally.

"The MAE provided me with the necessary epidemiological tools to acquire knowledge about communicable diseases and to conduct projects pertaining to a variety of public health issues in Australia and South-East Asia. As a student, I was fortunate to contribute to Australia's response to the global outbreak of SARS, to undertake a major project at an Australian refugee health service and to support the WHO's response to the avian influenza outbreaks by establishing a regional rumor surveillance system. These projects were innovative and of public health importance. I successfully shared the findings from these experiences through international publications and scientific conferences. As an MAE graduate, I continue to contribute to global health as a field epidemiologist at the WHO."

Gina Samaan, Epidemiologist, WHO Indonesia & MAE Alumnus

MAE Alumni Professors Raina MacIntyre (UNSW) and Phil Wittenstein (UQ) head Public Health Schools at the Group of 8 Universities, Dr Angela Marianos, Ms Gina Samaan, Dr Irwin Law, Dr Chris Oxenford and Mr Alex Rosewell are contributing to global health initiatives within the World Health Organisation. Mr Traven Lea is the Aboriginal and Torres Strait Islander Program Manager at the National Heart Foundation. Several graduates also hold key positions in state and national health departments.

"Through my placement at state level during the MAE, and networking with other jurisdictions, I am well-positioned to contribute meaningfully to national health policy development around vaccine-preventable diseases and immunisation. An important part of my job is the ongoing surveillance of communicable diseases. The MAE has given me the capacity to analyse data appropriately and assess its importance in guiding policy development."

Katrina Roper, Department of Health and Ageing, Office of Health Protection & MAE Alumnus
When asked where their greatest one or two contributions to public health had been since graduating from MAE, 64% cited Communicable Disease and 27% cited Indigenous Health (Figure 5).

Figure 4: MAE Alumnus respondents' job descriptions prior to commencing the MAE Program and immediately after graduation (MAE Alumnus Survey 2009).

Figure 5: Public health areas where MAE graduates consider that they have made the greatest professional contribution (MAE Alumnus Survey, 2009).

Benefits to the ANU and other Australian universities

The MAE Programs leads the field in development of the 'learning-by-doing' approach to training, and is therefore of great interest to educators in other Australian Public Health programs, which are not as well developed in this area. Some MAE students undertake the MAE course after completing a Master of Public Health degree in order that they might be guided through the application of theory into practice. Within the ANU, the MAE Program has provided a model for engaging students in 'hands-on' industry-based learning, and this model has been adapted by the medical school program. Ongoing teacher interaction between MAE and other Public Health teachers at NCEPH provides a stimulating environment for shared teaching insights and enhancement of curriculum. MAE Program and Medical School Staff exchange resources
and teaching time. Recently, MAE staff have been involved in the development of an Epidemiology short course with staff from NCEPH.

Further afield, both the University of NSW and Monash University are proposing introduction of parts of the MAE curriculum and processes for new state-based courses commencing in 2009. MAE staff have shared their insights and experiences and curriculum development documents with these universities.

**Benefits to International networks and training programs**

The MAE Program at ANU was a co-founding member of the Training Programs in Epidemiology and Public Health Interventions Network Inc (TEPHINET), which now has over 40 international member programs on six continents. TEPHINET is dedicated to strengthening global public health capacity by enhancing competencies in epidemiology and public health practice. MAE students are regularly selected to present papers at the biennial TEPHINET Scientific Conference. In 2008, two students received prizes for their presentations in this international forum.

In the region, MAE staff have contributed to the establishment or strengthening of field epidemiology programs in several countries. In the past 2 years, staff have assisted with the development of a Field Epidemiology Training Program in Indonesia, which saw the first intake of twenty students in September 2008. It is anticipated that further collaborations will enable Indonesian students to enrol in the MAE Program to further assist disease response capacity in their country.

### 4. Concern for equity and diversity

Students, staff and field supervisors involved with the MAE Program come from diverse backgrounds and cultures. This has benefited the program by assisting students and staff to work in remote, regional and urban communities and in international settings.

**Aboriginal and Torres Strait Islander students and capacity building**

The MAE is proud of its achievements in indigenous education and has one of the highest number of indigenous graduates of a Masters level health program in Australia. Over 30% of the 26 Indigenous graduates of the MAE Program have progressed to PhD level, a rare achievement in the health sector.

The program has always strived to provide additional support where required for indigenous students and Aboriginal and Torres Strait Islander people have been involved with the program from its inception. Currently, the MAE program has a specific role for an Indigenous Research fellow. She has a mentorship role with the Indigenous students and is establishing contact with the indigenous alumni to encourage a more active involvement with the program. She is also contributing to MAE teaching at course blocks and to student supervision and project development. One field supervisor of an Indigenous student is also Indigenous. MAE staff are active members of the Indigenous Health Interest Group at the ANU.

> "Since my qualification in the MAE, I have been working as a researcher in Indigenous communities. For the last four years I have been working in a team developing the CCRE Certificate 4 in Indigenous Research Capacity Building. I could not have participated in this project without the knowledge and the qualification of the MAE. I am a person of Indigenous heritage and feel privileged to be able to work in Indigenous communities as a researcher."

**Christine Franks,**

**Department of Health, South Australia**

The annual Indigenous Health Forum is the centrepiece of instruction on Indigenous Health for the MAE students. The MAE program has opened up this session to a wider audience in the past two years, including invited representatives from key Aboriginal centres in the ANU and Aboriginal organisations based in Canberra. The Forum involves presentations and discussions with prominent Aboriginal and non-Aboriginal researchers, who use epidemiology to support their work in Indigenous health research. Indigenous students in the MAE Program chair sessions at the Forum, and often report that this experience is empowering.
During course blocks Indigenous people with a long involvement with the MAE Program are invited as guest lecturers to share both their expertise on Indigenous health, and their personal experiences with Indigenous health issues in Australia. In this way attention to Aboriginal health is integrated into all aspects of the curriculum.

The MAE not only provides opportunities for a diverse range of students, the program also provides opportunities for students to work with diverse population groups. The MAE actively supports Indigenous students and has a marvellous track record of achievement in this area. The program also plays an important role in providing opportunities for students (Indigenous and non-Indigenous) to work with Aboriginal and Torres Strait Islander peoples — we have had two students working in remote Aboriginal communities in collaboration with the Menzies School of Health Research.

Associate Professor Ross Andrews, Epidemiologist, Menzies School of Health Research, Northern Territory & MAE Alumnus

In 2007 and 2008, specific strategies were introduced to attract more Aboriginal and Torres Strait Islander candidates. This was in response to the disappointing number of indigenous applicants for the 2007 Intake compared to previous years, and to the sustained high rate of non-indigenous applicants. These strategies included raising the profile of MAE Indigenous health research projects, and utilising informal networks of communication. In 2008 the MAE Program received seven applications from prospective indigenous students for the 2009 intake, three of whom were offered places on the program; this is a promising trend.

International diversity and capacity building

In the future the MAE Program aims to recruit more students from the Asia-Pacific region who will work in their home countries and travel to the ANU for course blocks, strengthening both the MAE program and Australia’s public health links throughout the region. One externally funded student from New Zealand has joined the program in 2009. MAE staff are looking to further diversify funding sources and the program’s student body, in close consultation with regional health departments.

In 2009 MAE staff will investigate avenues for epidemiological studies on cross-border health issues in the Torres Strait. It is anticipated that this may involve an Aboriginal or Torres Strait Islander student with a work placement within Australia and a Papua New Guinea (PNG) student placed in a research institute or agency in PNG. This will enable students to work on these issues in their communities from both sides of the border.

Promoting gender diversity

With regard to gender diversity, the majority of applicants for and scholars in the MAE Program are women. 63% of graduates of the program are female, many of whom go on to high level positions within the public sector or academia and are continuing to play an important role in public health in Australia and internationally. Fifty percent (50%) of the academic staff, 59% of field supervisors, 55% of the advisory board and 100% of the administrative staff are women.