

Pacific Island Environmental Conference — Guam, 20–24 June 2005

The Pacific Island Environmental Conference (PIEC) was an interesting meeting with unique opportunities to share knowledge and skills in a multi-sectoral professional environment.

The pre-conference activities included field trips and tours to study Guam's coastal management, solid waste management facilities and infrastructure (energy and water facilities). The field trips followed parallel sessions on environmental education, waste water, water, regional recycling, alternative energy, practical solutions for island sustainability, and remote sensing by high-resolution satellite imagery for coastal degradation. The next day there was an invitation-only session on petroleum hydrocarbons in ground water and considerations for successful assessment and remediation. Other sessions included regional recycling, island community recycling, a tropical sea urchin toxicity test demonstration, effects of dredging on coral reefs, and animal waste management strategies for Pacific Island environments.

The conference proper was officially opened by the governor of Guam, Felix Camacho. The keynote address was on the state of the Pacific. The second session of the day had one of the most interesting papers, by Dr Tyrone Hayes on the topic of frogs, pesticides, hermaphroditism and water pollution. He spoke on assessing the impact of endocrine disruptors on environmental and public health and hermaphroditic frogs exposed to the herbicide atrazine at ecologically relevant doses. He clearly demonstrated the impact of pesticides on frogs. Following this there was a paper called "Pursuing green growth in Asia and the Pacific" by Olivia la O'Castillo, emphasising the need to develop new models for green economic growth that can improve environmental sustainability and ecological efficiency. She emphasised that the region has limited ecological carrying capacity and will need to improve its ecological efficiency in order to support a growing population and continued economic development to reduce poverty.

The second day of the conference was even more interesting, involving multi-sectoral professional groupings on public health issues. The groups focused largely on communicable disease challenges, especially leptospirosis and dengue fever as regional public health problems. In the same session, a dry litter animal waste management strategy for preventing contamination of ground water or run-offs was presented as a possible means of addressing leptospira contamination of water sources, drains and streams. There were special sessions on climate change and a movie related to this called *The Great Warming* was shown. In addition there were sessions on adapting to climate change and economic impacts.

The last day of the conference covered the topics of Guam landfill, CNMI solid waste management progress, and environmental and community activities related to solid wastes. The SPC Communicable Disease Surveillance Specialist presented on the challenges posed by epidemic diseases in the region and PPHSN's response to addressing them. He emphasised the function of the three PPHSN services, PacNet, LabNet and EpiNet, and how these services assist the region in addressing outbreaks. Examples of leptospirosis and dengue outbreaks were used to demonstrate how the services function. Leptospirosis in the American-affiliated Pacific Islands was also a focus, and the following data/information was presented.

Leptospirosis was described as a worldwide zoonotic disease with a changing epidemiology. Most cases of the disease are asymptomatic or subclinical. About 10% develop severe disease. Cases of leptospirosis mostly present with headaches, fever, myalgia and conjunctivitis. Approximately 10–15% may die from the disease, largely due to hepato-renal failure or renal failure alone.

In the Pacific, leptospirosis was described as having an epidemoendemic profile. The disease is transmitted to humans via bruises or cuts or mucosal membranes coming in contact with infected animal urine, either directly or from wash-off or puddles. The details of a series of outbreaks (recognised and reported) that have occurred in the region in the last 15 years were briefly presented.

Outbreaks of leptospirosis reported in the region, 1982–2004

Country	Outbreak Year	Comments
French Polynesia	1982	Small outbreak, 60+ cases
Kiribati	1989	Small outbreak, 1 confirmed case
Vanuatu	1992	Small outbreak, 3 confirmed cases
Vanuatu	1997	Small outbreak, 8 confirmed cases
Fiji Islands	1998–99 to 2000	Large outbreak, 141 cases, 42 deaths
New Caledonia	1999	Large outbreak, 78 cases from one basin, 144 total
FSM–Kosrae	2000 (April–May)	Small outbreak, 10 cases
Palau	2000 (April)	Small outbreak, 3 confirmed cases
CNMI	2000–2001	Small outbreak, 3 confirmed cases
Guam	2002	Large outbreak, 21 out of 105 cases through recreational sport
Fiji Islands	2003	Small outbreak
Wallis & Futuna	2004	Small outbreak

Leptospirosis on Guam¹ was described and discussed in slightly more detail in light of possible sources of infection.

1973	47-year-old Caucasian male — family dog
1996	Case associated with clearing rodent-infested warehouse
1997	Case associated with travel to Thailand
1998	Biologist studying water buffalo in Fena Reservoir watershed area
2000	Adventure race — Fena Reservoir
2001	Chamoro male picking betel nut
2002	1 case — swam in stream in Saipan

In addition, possible sites on Guam that have been identified as high-risk areas were presented. The findings on animal studies were also discussed. It was noted that the carabao was not tested in the recent study by veterinarians in the Animal Health Survey (ADAP Project 1999).

1974	Dog pound — <i>L. icterohaemorrhagiae</i> , <i>L. canicola</i>
1981	<i>L. hardjo</i> , <i>L. copenhageni</i> , <i>L. pyrogenes</i>
1999	Swines (52) tested – no leptospirosis detected Dogs tested positive

For the transmission of leptospirosis certain occupational groups and recreational activities are considered high risk. Occupational groups that fall into this high-risk category include farmers (rice, banana, dairy and livestock), sewer workers, miners, vets, abattoir workers, military and fishermen. Among the recreational activities that increase the risk of leptospirosis are sports such as mud rugby; swimming in rivers, streams, canals or lakes; and domestic pets and animals.

In the same session, a study of leptospirosis in American Samoa was presented by Dr Thomas Clark ². The objective of the study was to assess environment and animal reservoirs, determine the prevalence of past infection and identify risk factors for leptospirosis in American Samoa.

Of the 341 individuals who participated in the study, the median age was 40 years, average duration of stay on the island was 23 years, duration in the village was about 21 years and years of stay in the same home 20 years. Of those included in the study, 93% were Samoan and 45% were male.

The results showed that using MAT 17% of the individuals were found to be positive (past exposure) with a titre of >100.

The following serovars were detected in the individuals who tested positive:

Serovar	Percentage
<i>bratislava</i>	71
<i>icterohaemorrhagiae</i>	7
<i>pyrogenes</i>	5
<i>pomona</i>	2
other (combined)	7
multiple serovars	8

The corresponding serovar patterns in the different animals were (from animal studies and literature)²:

Serogroup/Serovar		Pigs	Rodents	Dogs	Cattle
<i>bratislava</i>	(71%)	+++	+	+	
<i>ictero</i>	(7%)	++	+++	++	
<i>pomona</i>	(2%)	++	+		++
<i>hardjo</i>	(0%)		+		+++
<i>canicola</i>	(0%)	++		++	
<i>ballum</i>	(0%)	+++			

Although the animal studies were not conducted at the same time as the human studies, it appears that *bratislava* is the commonest serovar infecting people and it comes from pigs. This certainly makes the control of leptospirosis face some unique challenges in American Samoa. Dr Thomas described the range of activities already undertaken there to decrease the burden of human leptospirosis, but also alluded to the challenges that lie ahead and the cooperation of people that is needed.

Opportunity was also taken to describe the multicentre leptospirosis study during discussion. EPA has expressed a willingness to join forces with SPC/CDC to address the problem in American Samoa, and the SPC Communicable Disease Surveillance Specialist welcomed the collaboration.

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2. Clark, T. 2005. Leptospirosis in American Samoa. CDC presentation. Pacific Island Environmental Conference, Guam, June 2005