

A public health initiative to reduce the high level of gastro-enteritis in Australian Embassy personnel in Yangon, Myanmar

Paul Gorman

Australian Clinic Yangon

Introduction

Yangon (Rangoon) as the capital of Myanmar (Burma) is a rapidly growing city of 4 million people. Situated on the sandy delta region of the Irrawady River, it has a tropical climate with a distinct dry season (Nov to April) and a monsoon season (April to October) during which it receives over 115 inches (3,000 ml) of rain. Years of neglect and decay have led to a collapse of health and public health infrastructure. There are no centralised sewerage waste systems, no reliably safe water system, low quality food security and more importantly very low levels of public health knowledge in the community. Fresh food is bought in the local market as the few supermarkets provide imported, expensive, aging and usually poor quality foodstuffs. Electricity cuts are common and usually last for hours. As a result, refrigerators and freezers are unreliable. Food storage is always going to be a problem, not just at home, but also in commercial premises.

As with any developing country gastro-enteritis diseases are a common cause of both morbidity and mortality in Myanmar (Myanmar Ministry of Health / WHO 2000). They range from the more serious forms of bacterial infections to the constant presence of parasitical infestations such as nematodes and *Giardia lamblia*. Nematodes are endemic and most local people are chronic carries of *Entamoeba histolytica* and *G. lamblia*.

The Problem



The Australian Embassy in Yangon has 7 Department of Foreign Affairs Officers living with their families in Yangon, a total on average per year of 30 people. Although their lifestyle is far higher than the local inhabitants they are prone to the same gastro intestinal diseases in the outside community (Table 1). Of the 30 Australians (officers and dependants) in the Yangon Embassy our figures show that over the last five years, 12 people a month have a severe enough gastro enteritis disorder to present to the Embassy Health Clinic with most of these severe enough to require treatment (pers. obs.). This is under reported as experienced Officers know their own symptoms and will often self-treat or consider their symptoms too minor to report.

Water supply Australia Club in Yangon

Table 1

1998	Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Total GE Cases		6	8	14	22	12	10	10	12	10	10	10	8
GE Case requiring Treatment*		4	8	10	21	12	10	8	10	8	6	7	7
Medical Evacuation to Bangkok		0	0	1	4	4	0	1	0	0	1	0	0

1999	Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Total GE Cases		5	9	9	23	15	12	9	10	9	7	8	7
GE Case requiring Treatment*		5	7	9	22	13	10	9	10	8	6	5	7
Medical Evacuation to Bangkok		0	0	2	6	2	0	1	0	0	1	0	0

Cases of Gastro enteritis disease in Australian Embassy Staff in Yangon (n=30) (unpublished figures Australian Embassy Health Clinic Yangon)

* Treatment protocol is for gastrointestinal symptoms lasting >2 days and suggestive of bacterial or parasitic disease.

There is a clear seasonal pattern in the number of cases. The end of the long dry period (April) when temperatures are high (average max 37.7 °C) and water supplies are low is the worse time, while things improve with rain.

Over a three year posting it is most likely that each person will be medically evacuated to Bangkok at least once, almost invariably for a gastro enteritis problem. Many adult females at the end of their posting are diagnosed by a reliable source as having tropical sprue (Strickland 1998). Some Officers and their dependants remain unwell several years after their posting (PC 2001).

There is a significant cost both in human and financial terms, so much so that Yangon is one of the few Australian Embassies to have its own Health Clinic staffed by an Australian doctor with some experience in Public Health.

The Cause

Yangon has virtually non-existent public health measures. There is no effective public health agency and the available resources are used to control diseases such as malaria, dengue, TB and now HIV which affect the general population.

There is no reliable safe water supply. Yangon City Development Council (YCDC) the authority responsible for public utilities and public health in Yangon provides a reticulated system for water supply with an aging chlorination plant. However, due to the rapid growth of Yangon, low level investment and many leaks, broken pipes and unauthorised users, YCDC water is not reliably available. All the Embassy houses have tube wells in their compounds. Well water is pumped to an overhead storage tank, and then pressure pumped into the houses. It passes through a UV light filter before coming out the tap.

There is no sewerage waste disposal system in Yangon. All staff houses have a system of septic tanks. This works reasonably well since the soil is sandy. However, almost invariably the septic tank is within 30 meters of the tube well!

All Embassy families have a domestic cook who purchase, prepare and store meals for the families. These cooks have often been in the service of Australian families for years and know our standards. They have no formal health education and have no regular health screening.

Electricity supply is variable with complete loss of power for hours at a time or more commonly "brownouts". Refrigeration is thus not reliable.

There are a handful of modern hotels and restaurants that the diplomatic community frequent. Because of low turnover, staff unfamiliar with western foods and poor water supplies to wash dishes, these have been a source of food poisoning.

There are no reliable diagnostic pathology laboratories in Yangon and medication is often difficult to come by. It is difficult to accurately diagnose and treat gastroenteritis problems precisely.

Diseases such as *Shigella*, Typhoid, *Escherichia coli* and on one occasion upcountry, cholera exists in this country. We see unusual parasites like *Strongyloides* even *Isospora belli*. Multiple drug resistance is common due to the availability and indiscriminate use of antibiotics

The Solution

This is a multi task procedure to determine the cause, prevention and appropriate treatment for food related illness. The Australian Embassy Health Clinic undertook a major project starting in November 1999 to reduce the incidence of, improve the diagnosis and apply the best therapeutic measures to gastroenteritis disease.

Prevention

Prevention was the most effective method to employ. We looked at several areas:

Water Quality

We undertook a water quality survey of each of our seven compounds (Table 2). We used the National Health Laboratory in Yangon as our reference lab. They could provide only a basic analysis, but this helped to define our problem. The water samples were taken from the kitchen tap after passing through the UV filter. We know that UV sterilisation is not effective if the iron content is high, as the light will not pass through the turbid water.

We also know that Coliforms are not always an indicator of contamination but as we have no way of measuring other bacteria we used it as an indicator.

Table 2

November 1999	House	1	2	3	4	5	6	7	Standard*
Coliform Colonies organism on agar at 37 °C		180+	5.1	140+	74	0	0	0	0
<i>E. Coli</i> in MPM Colonies		23	0	6	9.2	0	0	0	0
Iron		0.35	0.03	0.00	0.01	0.008	0.01	0.01	<0.3
Ph		6.75	6.88	5.65	6.78	6.12	6.40	6.63	6.5-8.5

Results of water quality tests in Australian Embassy Houses in Yangon (unpublished data Australian Embassy Health Clinic Yangon / National Health Laboratory Yangon)

* NHMRC 1996

These results caused some alarm particularly in houses 1, 3, 4 and we issued the following recommendations in response.

House 1

- Drink only bottled water available from a reliable supplier in 40 L containers.
- Clean overhead tanks.
- 24 hours of chlorination at high concentration to remove any organic growths from pipes or tanks (hyperchlorinate).
- All water from tap to be boiled for 10 minutes and store in earthenware container.
- Replace UV filter light.
- Consider moving tube well since it was 10 meters from septic tank.

House 2

- Drink bottled water only.
- Clean overhead tanks and hyperchlorinate for 24 hours.
- All tap water boiled for 10 minutes.
- Replace UV filter light (note high iron content).

House 3

- Drink bottled water only.
- Clean overhead tanks and hyperchlorinate.
- Check UV filter (note low iron content).
- Check in month.
- Boil water for 10 minutes and store in earthward container.
- Consider relocating tube well.

House 4

- Drink bottled water only.
- Clean overhead tanks and hyperchlorinate for 24 hours.
- All tap water boiled for 10 minutes.
- Replace UV filter light (note high iron content).

Houses 5,6,7

- Drink bottled water only.
- Clean overhead tanks and hyperchlorinate for 24 hours.
- All tap water boiled for 10 minutes.
- Replace UV filter light (note low iron content).

After the follow-up, we noted a big improvement in bacterial count (Table 3). We now have a regular UV light maintenance program and every one is drinking bottled water.

Table 3

January 2000	House	1	2	3	4	5	6	7
Coliform Colonies organism on agar at 37C		20	0	25	0	0	0	0
E Coli in MPM Colonies		0	0	0	0	0	0	0
Iron		0.33	0.03	0.00	0.01	0.006	0.01	0.01
Ph		6.05	6.53	5.98	6.78	6.12	6.40	6.63

Results of Follow Up Water Quality Survey Australian Embassy Houses Yangon (unpublished data Australian Embassy Health Clinic Yangon)

Food Security

Food Handlers Course

The Clinic organised a course for all people involved in domestic food handling. A Safe Food Handlers guide from a local council in Sydney was modified and translated into the Myanmar language. A 4 hr training program was developed based on this guide and a rather grand certificate of attendance was produced. To our surprise over 60 participants enrolled. These were the domestic staff of most of the Embassies in Yangon. We ran the course three times to satisfy demand.

The course concentrated on the basics of safe food handling like washing hands, appropriate surfaces and implements for food preparation, hot food hot and cold food cold principal and proper disinfectant techniques.

Food Handlers Health Screen

All domestic staff had a basic health screen at the Yangon University Health Clinic. To keep costs down we were only able to do the basic screening and this was not very specific but indicates a point. The results were a bit alarming

Table 4

	TB chest X-ray (lung shadow)	Hepatitis B surface antigen	Hepatitis A antibody	Nematode ova on faecal smear	Amoeba and or <i>Giardia</i> cysts
Initial screen	5 (21%)	8 (35 %)	4 (17%)	23 (100%)	15 (65%)
After treatment	n/a	n/a	n/a	0 (0%)	1 (5%)

Number of positive results in the basic health screen of Australian Embassy Yangon domestic staff (N=23) (unpublished data Australian Embassy Health Clinic Yangon Mar 2000)

Treatment for positive cases consisted of 400 mg Albendazole tablets given at night stat dose and 500 mg Tinidazole (Fasigyn) given as 2 grams over 24 hours. There were no pregnant and breastfeeding mothers to be excluded. Suspect chest X-rays were referred to a TB clinic for investigation.

This screening will be continued on an annual basis. I argued for a 3 monthly repeat but the administration decided on 12 months

Electricity supply

Fortunately every home had an electricity generator that would switch on automatically in the event of a power cut off. There was ample generator power to power the whole house although in some cases (3 houses) we found that only certain "emergency circuits" were connected. In one house this did not include the refrigerator. Action was taken to ensure all the houses were fully powered during any blackouts. All refrigerators were put on a surge protection unit. A list of instructions was issued in case the generator failed to work. Such things as keeping the door closed, cooking food immediately after a black out and throwing out anything doubtful were included.

Commercial Food Outlets

We had discussions with the managers of most popular outlets in town and were satisfied that they followed "Good Food Techniques". We were freely able to inspect most kitchens and were usually impressed with there condition. A couple of exceptions were grateful for our advice. Two hotels

requested us to run our Food Handlers Course. I did not feel this was appropriate since this was a domestic, not a commercial program. I wanted to introduce a “certificate of recommendation” for outlets that I felt met satisfactory standards, however, local health authorities, who felt I was invading their territory, prevented this from happening. The Australian Embassy was relieved since they were concerned that the certificate might have placed them under some liability. Despite this I regularly publish a list of recommended safe restaurants (with a disclaimer now) in my monthly newsletter.

Diagnosis

Pathology technician training program by the US State Department

Accurate diagnosis is important in the prevention and treatment of gastro enteritis diseases. I am fortunate my predecessor had obtained an excellent microscope and laboratory reference materials to do simple faecal smears. With assistance from the regional medical technologist, from the American State Department, we ran an excellent training program for the staff of two local pathology companies here in Yangon. This was a one-week training program and was of an excellent interactive format with live cultures and faecal smears. The State Department provided some rather amazing educational resources. At the end of that week I now have confidence that these two laboratories can do reliable faecal smears and cultures. As equally important after their course I felt I could interpret the results more accurately

Treatment

The treatment of gastro intestinal diseases is different in Myanmar than in Australia. The bacteria are different, there is multiple drug resistance and dehydration is a very significant factor. After a long discussion with the Professor of Microbiology and the Professor of Infectious Diseases at Yangon University we modified our treatment protocols as follows:

- More frequent faecal and blood cultures (pers. exp.). Since direct faecal smears are very insensitive and will miss 30-50% of infections, simple concentration techniques will be used.
- Greater emphasis on proper oral rehydration replacement using WHO sachets very early and in much greater quantity (WHO recommend 3 L/day even for mild diarrhoea).
- Abandoned the use of anti-diarrheal agents and anti emetics only in severe vomiting (WHO recommendation).
- Albendazole 400 mg at night for 3 nights for nematodes (pers. exp.).
- Fasigyn for *Giardia* (pers. exp.).
- Flagyl 800 mg at night for 7 days plus Diloxamide Furoate (Furamide) 500mg three times a day for 7 days (WHO recommendation).
- More aggressive use of antibiotics such as ciprofloxacin. Occasional use of IV (pers. exp.).

Evaluation

The low sample size (n=30) prevented statistical analysis at this stage. I am waiting for two years when n= 60 to undertake some analysis of these results. I include my preliminary results but make no recommendations or comments since it is not possible to say if they are significant.

Table 5

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Total GI Cases	3 (5)	3 (9)	5 (9)	13 (23)	12 (15)	9 (12)	6 (9)	8 (10)	8 (9)	6 (7)	9 (8)	7 (7)
GI Case requiring treatment	3 (5)	3 (7)	4 (9)	13 (22)	11 (13)	7 (10)	5 (9)	6 (10)	6 (8)	6 (6)	7 (5)	6 (7)
Medical evacuation to Bangkok	0 (0)	0 (0)	0 (2)	3 (6)	0 (2)	0 (0)	1 (1)	0 (0)	0 (0)	0 (1)	0 (0)	0 (0)

Cases of gastro intestinal diseases in Australian Embassy Yangon staff. 2000 (1999).

Anecdotally (both mine and patient feed back) for what it is worth, there does seem to be a change and worth continuing. I can see many confounders present in this project that should be considered:

- The longer people stay here the more immune and possibly “food smarter” they become.

- I am treating gastro enteritis more aggressively (or appropriately depending on your view point) and reducing my referral rate.
- Patients do not like Flagyl or Fasigyn and may be they avoid coming to see me.
- I am more confident in treating gastro enteritis so my referral rate is less.
- I may be preventing only a certain type of gastro enteritis and not all of them.
- All diseases have cyclical natures and 2000 may just be a low year for gastro enteritis.

I see no adverse ethical considerations in this program and have not put this to any ethical committee, as none is available in Yangon. I am a fulltime employee of the Department of Foreign Affairs and Trade as the Medical Officer to the Australian Yangon Embassy. This program is considered as part of my regular duties and was undertaken during normal working hours.

References

- DFATMU (2001) Personal correspondence Department Foreign Affairs and Trade Medical Unit.
- Myanmar Ministry of Health / WHO (2001) Annual Report, Myanmar Government Press.
- NHMRC (1996) Australian Drinking Water Guidelines – Summary, Cat. No. 9627014. National Water Quality Management Strategy, NHMRC.
<http://www.health.gov.au/nhmrc/publications/pdf/eh20.pdf>
- PC (2001) Personal correspondence Professor Myo Myint FRCP Microbiology Dept, Yangon Institute of Medical Research and Professor Aung Soe Lwin FRACP, FACTM, Head Infectious Diseases Hospital , North Okulapa , Yangon Myanmar.
- Strickland GT (1998) Hunters Tropical Medicine. 9th Edition. WB Saunders & Company, New York.