Scenario

An outbreak of gastroenteritis occurred in Bandar Tun Razak, a suburban neighborhood, on the evening of April 28. A total of 89 people went to the emergency departments of the three local hospitals during that evening. No more cases were reported afterward.

The patients complained of headache, fever, nausea, vomiting and diarrhea. The disease was severe enough in 19 patients to require hospitalization for rehydration.

The local health department was immediately notified of a potential food-borne outbreak of gastroenteritis in Bandar Tun Razak.

Exercise 1

1. Define epidemic, endemic and pandemic.

2. Describe the gastroenteritis outbreak according to disease transmission and epidemiological triad.

3. What are the possible causes of the outbreak?

4. List and discuss steps that should be taken in outbreak investigations

5. What further information needed?

Exercise 2

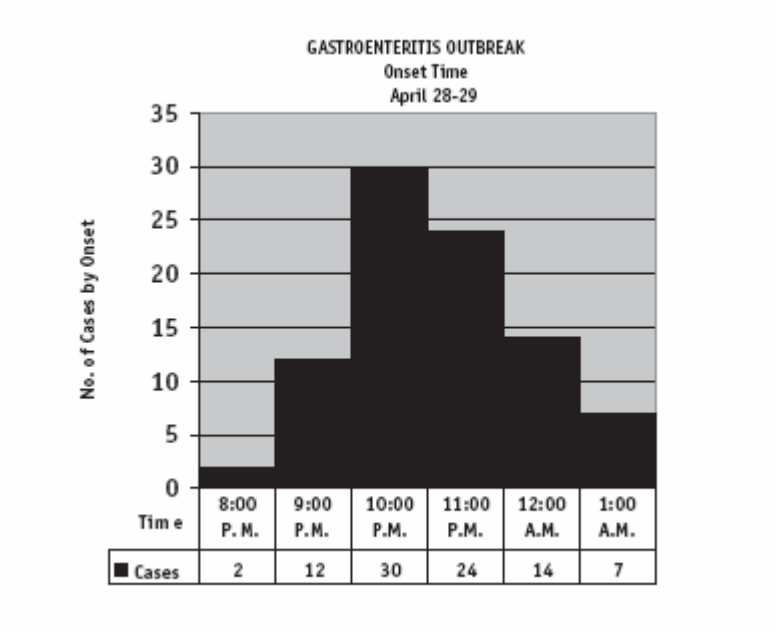
The epidemic team, including a medical epidemiologist (public health physician – Health Officer), health inspectors and a nurse, visited the local hospitals to interview the attending physicians, the patients and some of their relatives. Some stool samples were obtained from patients for microbiologic identification of the causative agent.

The distribution of the disease by person (age and gender) was found as follows:

Gastroenteritis Outbreak Findings by Person, Case Distribution by Age and Gender

	Female		Male		Total by age	
Age group	No	%Females	No	%Male	No	%
0 - 5 yr	1		1			
6 - 10 yr	38		37			
11 yr and older	10		2			
Total by gender						

Please calculate the totals for each column and row and their corresponding percentages to try to determine if there are any important differences by age or by gender. Interpret your findings.



Discuss the epidemic curve above

Exercise 3

Therefore the epidemic team investigated the places where affected persons, their relatives and neighbors ate that day (April 28). The following table shows the team's findings:

Gastroenteritis Outbreak Findings by Place

Place	People who attended	Ill people	Attack rate	People who did not attend	Ill people	Attack rate	Relative risk
Cafeteria LRT	207	61		157	47		
Kedai Makan Ali	246	25		122	13		
Restaurant ABC	475	68		189	29		
Elementary school cafeteria	239	67		495	22		

Please calculate the attack rates per 100 (incidence rates per 100) by place to try to determine where the contaminated meal was served. For each place compare attack rates (AR) for those who attended with attack rates for those who did not, by using the relative risk (i.e., RR = AR in attendees/AR in non attendees). Interpret your findings.

Exercise 4

Once the implicated place was determined, the investigation centered on the food. The following table includes the food items served in that place on April 28:

Gastroenteritis Outbreak Findings by Person							
Food Item	Ate the food item			Did not eat the food item			
	No. people	Ill people	Attack rate	No. people	Ill people	Attack rate	Relative risk
Beef rendang	276	28		266	27		
Burger	218	21		131	14		
Salad	105	49		297	15		
Baked potato	139	11		213	31		
Fruit cocktail	88	48		279	25		
Ice cream	175	18		203	49		

Important note: None of the kitchen personnel were ill. The names of the kitchen personnel and their participation in the food preparation are as follows: Ms Mary prepared the beef rendang and the potatoes, Johan prepared the salad and the fruit, Salmah served all dishes except the ice cream, and Jamilah prepared the burgers and served the ice cream. The ice cream was a commercial brand and was bought at a nearby supermarket.

Please calculate the attack rates per 100 (incidence rates per 100) by food item to try to determine the one that was probably contaminated. Compare attack rates (AR) for those who ate the food item with attack rates for those who did not eat the food item, by using the relative risk (i.e., RR = AR in those who ate the food/AR in those who did not eat the food).

Interpret your findings.

Exercise 5

Given that the epidemic team worked fast enough and the implicated meal(s) was (were) identified before all food leftovers were discarded, food samples from some meal leftovers were taken to the laboratory. In addition, stool samples were taken from the kitchen personnel who prepared or handled each different food item.

The laboratory confirmed that *Salmonella* toxin was present in some of the food samples and that one of the kitchen personnel of that place had the same *Salmonella* species. Furthermore, the *Salmonella* species found in the food and the kitchen worker was the same species found in stool samples of the patients.

Please discuss these findings and identify the kitchen worker possibly responsible for the outbreak.

Discuss the general principle of prevention and control of gastroenteritis outbreak.