

# Weaning-food hygiene in a Guatemalan town

by Sandra Saenz de Tejada and Floridalma Cano

**Food contaminated through poor handling, preparation, or storage can lead to diarrhoea. Can researchers target the everyday practices ripe for modification?**

FOOD-BORNE DIARRHOEAS account for a considerable proportion of all diarrhoeas. One way or another, pathogens can contaminate food and multiply in it and, if ingested in large-enough quantities, they can cause illness. Using a combination of anthropological and microbiological methods, a team from the Institute of Nutrition of Central America and Panama (INCAP) investigated the common domestic-hygiene practices — with special reference to weaning foods — in the Guatemalan town of Ciudad Vieja, in Sacatepéquez province, about 50kms west of Guatemala City.

The researchers' main objective was to identify which specific activities contribute to the bacterial contamination of weaning foods; with the ultimate aim of changing them through an education intervention. Researchers

used several methods: they observed families at close range; they carried out interviews with a few households; a survey was made; and specific hygiene recommendations were tested in the home environment.

The community of Ciudad Vieja has around 20 000 inhabitants, all Spanish-speaking *Mestizos*. Living conditions are precarious: most houses are made of reeds and thatch, few streets have been paved, and only a few households are connected to the sewage network. Most homes, however, do have indoor piped water, latrines, and electricity. The water supply is relatively reliable, but its quality varies greatly, from no coliforms to unacceptably large numbers of coliforms.

## Research methods

The initial task of the INCAP researchers was to gather relevant information.

Their first method involved direct, open-ended observations of ten households, all of which included weaning-age children (12 to 23 months old). Each household was observed at least four times for a total, on average, of 18 hours. Towards the end of the second visit, the researchers collected several water and food samples, together with swabs from the family's cooking utensils, and the children's hands (taken just before eating). These were then analysed for faecal contamination.

The study team's second method consisted of open interviews with a larger group of mothers, to find out if the behaviour observed in the initial ten households was prevalent in the wider community. Families with children aged between 12 and 23 months were identified through municipal records, and 100 were selected at random. It was difficult to conduct wholly accurate observations of the families' normal habits: partly because they changed their behaviour when they knew they were being observed, and partly because the activities of particular interest (such as handwashing and

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food reheating) occurred only at certain times, usually when visitors were not expected!

One hundred mothers were interviewed by an anthropologist and three fieldworkers. The survey included open questions on water use, food handling and reheating, and maternal education. The team also closely observed the common methods of storing water, mothers' handwashing prior to food handling, children's handwashing, and the type of water used for washing vegetables and for preparing cold drinks. This method allows people to respond with full explanations; instead of asking 'Did you eat beans this morning?' the team asked 'What did you eat today for breakfast?'

The last three activities listed are classed as 'prompted behaviour', as the interviewers asked the mothers to carry out specific tasks. The women were requested to prepare a salad or a sweet drink — with ingredients provided by the research team — while the researchers measured all the ingredients carefully, pretending to be interested in traditional seasoning. As most of the interviews took place in the morning, the researchers told the women that they would like to contribute towards lunch — the family's main meal — and that they were interested to see how much sugar (or salt and lime) the family usually used in their drinks or salads; this diverted the mother's attention away from hygiene.

## Handling water

To see how children's hands were washed, the team asked each mother at the end of the interview to wash one of her children's hands in order to leave a 'souvenir' from the visit: an imprint of the child's hand on some card. While this 'display' for the visitors might still reflect ideal behaviour, the notes recorded during the visit did provide useful information on the family's hygiene practices.

Each family in Ciudad Vieja used three distinct categories of water: water kept in a cement basin outside; running tap water; and water kept in containers inside the kitchen. Although the quality of the piped water was relatively good, the stored water was noticeably dirty, and microbiological analysis revealed high concentrations of faecal coliforms.

Water from the basin was used for washing dishes, clothes, *nixtamal*, (maize cooked in lime from which the staple, *tortillas*, are made), most vegetables, and for personal hygiene purposes. The families drank water from the tap, and, because of the distance



*A Ciudad Vieja mother washes nixtamal at the cement basin.*

between the kitchen and the cement basin, food was prepared with the unsafe water stored in the kitchen containers. When they were requested to prepare the salad, almost a third of the mothers washed the radishes with water from the basin, another third used tap-water, and the remaining women did not wash them.

## Concepts of hygiene

The research team found that the women of Ciudad Vieja did believe that there was a relationship between diarrhoea and food hygiene. This idea of hygiene, however, seemed to refer mostly to dirt associated with domestic animals, flies, and dust, and with insufficiently cooked food, rather than to their personal-hygiene practices. Their notion of cleanliness was tied to outward appearance: mothers were often observed wiping children with a dirty rag.

Although the mothers were already aware of the benefits of handwashing, they rarely practised it. Even when readily available in the cement basin, soap was seldom used. Their handwashing method consisted of rinsing and lightly scrubbing their hands in a plastic bowl filled with water from the basin; drying them — usually in an apron — and only occasionally (but routinely if an observer was present) with a clean cloth. The team's findings showed that, when asked to wash a child's hands, only 15 per cent of carers used soap, almost half scrubbed their hands, 13 per cent rinsed their hands in clean water, and 53 per cent dried them in a clean cloth. When asked to prepare the salad or drink, 11 per cent of mothers rinsed their hands, and none used soap. Mothers thought their hands were kept clean as a result of frequent contact with water, either by washing dishes or clothes. They tended to wash their hands only if they were visibly soiled.



*A fieldworker demonstrates the easy-to-use hose for handwashing.*

## Preparing food

In most Ciudad Vieja families, the mother is responsible for preparing and serving food, and for feeding her children. Babies are introduced to solids — food from the family pot — when they are about seven months old. Almost 60 per cent of all children aged between 12 and 23 months were found to be breast-fed to some extent.

The child's diet is rather monotonous and, as in other poor rural Guatemalan households, it was found that eight food items (sugared coffee, *tortillas*, rice, black beans, eggs, noodles, bread, and bananas) provided almost 80 per cent of the total calorie intake. For breakfast, young children usually eat bread and coffee; lunch is freshly made vegetable soup, or stew and *tortillas*; and, for dinner, they eat black beans, *tortillas*, and the leftovers from lunch. Only half of the children observed ate more than three meals

a day; snacks, consisting of fruit, *tortillas*, bread, and coffee.

The family's meals were, almost exclusively, cooked; only a few raw items were consumed. Most households cooked *tortillas* once a day but, because of the high cost of fuel, some could only afford to do it every 36 to 48 hours. Several different sources of contamination were found in the *tortilla* preparation: on the grinding stones, in the water, and in the dough. Microbiological analysis revealed, however, that despite being prepared unhygienically, the freshly made *tortillas* were not contaminated. Black beans were cooked two to three times a week, each batch lasting about three days. When the beans were freshly cooked and still whole, young children were given broth as an alternative, as mothers believed that their immature stomachs could not cope. The next day, the beans were usually fried and puréed before being given to children.

## Storing food

The bulk of the family's food was consumed soon after being cooked, but black beans and *tortillas* were often stored for over 24 hours. Mothers said that they preferred to eat only freshly prepared foods, but it was observed that, besides the staple foods, some other items (particularly rice, noodles, and soups) were deliberately cooked in quantities adequate for two meals.

The women were already aware that inadequate storage led to food spoilage. They defined spoiled food as anything that was clearly acidic, slimy, or mouldy. The families had no concept of germ contamination or proliferation, and the idea that food could be contaminated and still taste good was totally unfamiliar. Mothers did associate rising temperature with decay, the onset of which they said they tried to allay, by storing food away from the hearth. Observation showed, however, that in practice, they regularly failed to do this.

*Tortillas* are often kept in a basket, away from direct heat. Mothers understand that the moisture content of *tortillas* encourages their decay, so they air-dry them before storage. Children are not always given reheated *tortillas*: a third of the mothers interviewed considered them to be too hard for children to digest.

Different storage methods apply to the refried beans and to the boiled, whole version. The whole beans are considered to be more vulnerable to spoilage, requiring thorough reheating before being consumed. Traditionally, they were refried within 24 hours, but this was often neglected because of the high price of cooking oil. Because of their fat content, the women thought that refried beans were less likely to spoil, and would last up to three days.

The decision about where to store food seemed to be more closely related to how soon it was going to be eaten, than to any cognitive concept about food spoilage: foods to be eaten at the next meal tended to be stored near the hearth, whereas those to be stored for a longer period were kept in a cupboard or on a table, away from the heat.

## Reheating

Food was reheated for two main reasons: to make it more appetizing, and to counteract its decay. The women used four methods: warming through, reheating thoroughly, boiling, and frying. They said that they usually reheated beans and *tortillas* and, to a lesser extent, broth and rice, but, they admitted, they were not doing it for

long enough, or at a high-enough temperature (64 per cent of the food could be said to have been warmed).

The families always reheated *tortillas* (cold *tortillas* were considered inedible), either by placing them directly on cinders or, more frequently, on a tin or earthen slab (*comal*). They were heated briefly, and rarely reached 70°C, the temperature at which most pathogens are destroyed. Forty per cent of the reheated *tortillas* showed faecal contamination.

Beans were heated in several ways: they were boiled, heated until warm, or placed cold between hot *tortillas*. Insufficient reheating was common, despite the well-known and accepted fact that beans spoil easily if they are not heated thoroughly. Cold puréed beans were often given as a snack to appease a hungry child, even by those mothers who would normally boil their beans for other meals. Over 60 per cent of all stored beans showed faecal contamination and, even after reheating, 40 per cent were found to be contaminated.

## Targeting

As a result of observing and interviewing over one hundred mothers, and after conducting behavioural and microbiological analyses, the research team decided that handwashing, and the

reheating of staple foods, were the hygiene practices that needed changing/improving most in Ciudad Vieja. Handwashing was emphasized because children eat with their hands; there can be no reduction in the levels of contamination while people's hands continue to be significant vehicles of contamination.

While the mothers knew that the combination of poor hygiene and ingestion of decayed food caused diarrhoea, they did not perceive a clear cause and effect relationship. This is because infection is complex and it is not always manifested by illness. It depends on both the amount of pathogens ingested, and on the immunological status of the host. Mothers also knew about the benefits of handwashing but, overall, there was a great gap between what they knew to be correct behaviour, and everyday practices. This can be explained partly by their lack of specific skills, and also because they had only limited knowledge about the consequences. For example, the advantages of running water were unknown: mothers were surprised to find out that washing hands in a bowl of water was ineffective, and that drying them in a dirty rag would contaminate them again.

## Demonstration

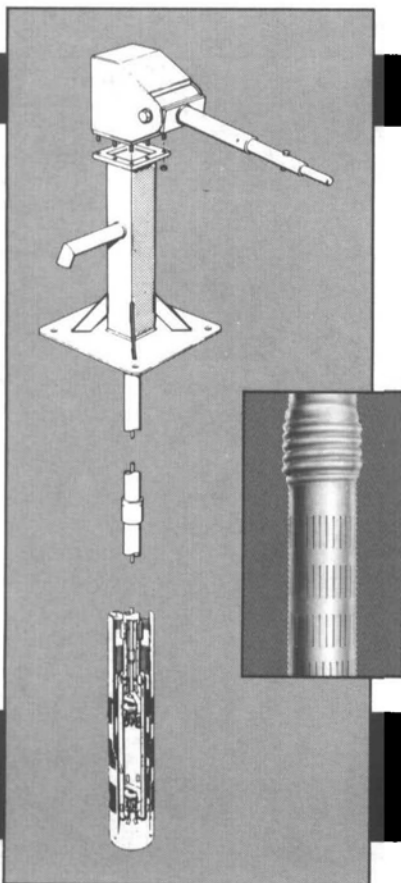
After the 'key behaviours' were selected (in this case, washing children's

hands before they ate, and thorough reheating of staple foods), the next step was to 'translate' them to mothers as messages that would be understood easily. By spending time with mothers in their kitchens while they cooked normal meals, the researchers were able to demonstrate how the staples should be reheated.

Twenty-five mothers were involved in testing these recommendations in their homes over one week. Handwashing was adopted enthusiastically; especially after the project introduced a small hose which was connected to the cement basin (pictured on previous page). The families perceived this as a simple, easy-to-use device; soap use also increased. When it came to changing food-reheating practices, it proved easier for beans than for *tortillas*. In the two-week trial, 14 out of 15 households adopted the reheating recommendations for beans, and 11 out of 15 adopted the suggestions for *tortillas*. ●

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