



## Institute of National Affairs

### **Addressing Child Malnutrition – Part 1. What is it and how it's measured?**

*After recent discussion and some apparent confusion in the PNG social media over terms and concepts related to nutrition, health and poverty, the INA invited Peter Heywood, former Deputy Director of the PNG Institute of Medical Research, to write some feature articles addressing malnutrition in children, how it is measured, and the use of malnutrition rates as a way of measuring poverty and targeting development programs. Dr Heywood was with PNGIMR between 1999 and 1988 and Professor of Nutrition at the University of Queensland from 1988 to 1994 before working as a nutrition and health expert for the World Bank. He is currently Honorary Professor of International Health at the University of Sydney and a Research Associate of the ANU Crawford School of Economics and Government. This first article focuses on the concepts, terms and measurement, with Dr Heywood's next article considering how malnutrition can be addressed in suitable interventions and development programs.*

Just think back to the last party you went to. Or the last meeting you attended. Or even the last family gathering you were at. The last time I went to one of these gatherings, one of the things that struck me most was the diversity of the people – height (short to tall), weight (thin to fat), body shape (beanstalk to water melon), hair style (waves to tight curls), and so on. So what's going on here? Why are we not all the same height or weight or shape? Take height as an example. It is not uncommon for there to be adults at a gathering whose height ranges from maybe 150 cm to 200 cm. The factors that get mentioned most often for determining height are sex (on average, women are shorter than men), genetics, nutrition (maybe the person did not get enough to eat when they were still growing in height), disease (perhaps they were sick for a long period of time when they were growing). These are all true and there is good scientific evidence from studies in many countries, including PNG, to support these conclusions. And these reasons account for much of the variation in height that we see when we walk into a gathering.

So what happens if we control for some of these factors. For example, if we think about the height of only one gender at a time, of people whom we know had good nutrition most of the time when they were growing, were immunized when they were infants and taken to the health services when sick. Even if we control for these factors we can still see a lot of variation in height, not quite as much as before but still enough to make us wonder. We are all familiar with some families whose members are mostly taller and other families who are the opposite, they are mostly shorter. Good scientific studies show that genetic factors can account for most of this variation. But genetic influences can also occasionally result in some people from tall families being short, or the reverse.

So how to tell if this variation in height is due to nutrition or genetics, or sex or frequent illness? It turns out that it is quite difficult to determine the effect of genetics for any individual person. But what we do know is that, even in well-nourished populations (large groups of individuals) who

receive good health care, there is variation. Some variation is normal. In fact, even under the best of circumstances, where people could achieve their full potential height, there will be variation. It's just that *we do not know what is the right height for any individual*. But we do know how much variation in height there is in well-nourished populations that receive good health care. As children grow, at any given age there is a range of heights (and weights) that is regarded as "normal" – this is the path to good growth. The path for weight is shown on the attached graph. There are similar tracks for growth in height as the infant or child gets older. Very few children who are growing normally are above (about 2%) or below (about 2%) this track. These are referred to as weight-for-age and height-for-age charts. We also know that if a child does not get enough to eat, is often sick and does not get enough good health care when ill, they grow more slowly and are unlikely to reach their height potential – they will be in the bottom half of the track or even below it. When a lot of individuals in a population receive too little food when they are young, and there is a lot of illness among the young children, then the whole group tends to be a bit shorter, the average is a bit less, and instead of about 2% being below the bottom of the track they may be 10% or 20%. In more extreme situations 50% or 60% may be below the bottom line; - it is this figure that is referred to as the malnutrition rate, the percentage of children at any age who fall below the bottom of the growth track. The term used when children are shorter than expected is stunting; when children are lighter than expected the term most often used is underweight, but sometimes the more general term, malnourished, is used.

Scientists have studied populations all around the world in an effort to understand what is normal, how to assess whether the height or weight of a population (NOT an individual) is about what it should be, and what happens when it is not. In general, we know that most populations have the same overall height (and weight) potential and this is determined by genetic factors. The reason we concentrate on infants and children in studies of nutritional status is that similar studies show that the effects of having too little food or having a lot of illness is greatest in the first 5 years of life. We also know that the further a population is below their potential the more likely they are, overall, to have higher infant and child mortality rates; – malnourished children are more likely to get sick and, if they get sick, to die. Nevertheless, some of the short children survive and are often short, normal adults.

This information can be used in a number of different ways. Perhaps the most familiar is the growth chart used in family health clinics to check whether a child is growing OK. Here weight (not height) is usually measured, but the principles are the same as for height. The attached chart shows what weight most children should be at the age they have reached when they attend the clinic. And these days, apart from children whose weight is below the bottom line, there are some children whose weight is too high for their age – they are referred to as over-nourished. There are now studies that show they have a greater chance of being overweight and obese when they are adults. Their chance of suffering diabetes, high blood pressure and heart disease as adults is much higher than those who were within the normal range as children and remain in the normal range as adults.

So where does poverty (too little income in cash or in kind, the cash value of foods and other items produced) fit in all of this. Detailed studies around the world, again including in PNG, show that populations which have less income are more likely to have higher rates of malnutrition. In general, those who are malnourished come from two groups. First, rural people whose income is low, or whose agricultural production is too low for the number of people (including children) in the family,

and whose access to health services is also low. Second, those people living in urban areas who are unemployed or have low incomes and low access to food and health services.

So, why not just measure poverty and then we would know who is likely to be malnourished. The main problem is that accurate measurement of income (both cash and in kind) is difficult. So, governments and agencies look for other ways to measure poverty. The most common way to do that is to find other features of the population that are closely related to poverty and are also easier to measure. The rate of malnutrition is one of these features which in most situations increases as poverty increases and is used as an indirect way (a proxy) of assessing poverty.

