

HELENA

Hi, my name is Helena Nordenstedt, and I am a medical doctor and an assistant professor of global health here at Karolinska Institute. No matter what your area of interest is, you need to know how to evaluate your subject, how to measure it. Global health, that is how healthy people are in the country or in different groups within the country, is measured using something we call health indicators.

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As a doctor, when I am working in the emergency room, the most important thing when I have a new patient is to as soon as possible get the patient's vital parameters, like blood pressure, heart rate, temperature, and so on. As soon as I have those, I can get an overall understanding of how the patient is doing. If she needs to be carefully examined straight away, taken to the intensive care unit, or if I can take it a little bit slowly and take care of another patient first.

Health indicators, they do exactly the same for a population, that is for a group of people. To understand how a population in a country, or in a region, or even a part of a city is doing, you need to know its health indicators.

How long do people live in this country? How many children die before they reach their fifth birthday in this city? What is the weight of children and adults in the northern part of the country? How many women die in childbirth in the country?

Once you have looked at these numbers and compared them with other populations, you can make sense of the health situation of a population. Most important is to know what is the global average. What is the average and the range for countries on the same economic level as the country I'm looking up.

If you want to look up your own country's life expectancy, do you know where to find it? Health indicators for a country can, in many cases, be found at the website of the Ministry of Health or the National Statistics Office, like on this picture where you can see Bangladesh Bureau Statistics' excellent website. There, you can also often find regional and district data, so-called sub-national data.

But there are some excellent websites where you can find data on the most important health indicators listed for all countries, like the Global Health Observatory of WHO, the World Bank website, the UNICEF website, which also has the important site childmortality.org. And of

course Hans Rosling's own Gapminder.

Finally, to find out what people die of in different parts of the world, or what makes them sick, the Global Burden of Disease website by the Institute for Health Metrics and Evaluation at Washington University is a fantastic resource, because they offer such good interactive visualizations. Many of these data sources and visualizations will be used during this course.

Today, we will take a closer look at three important health indicators-- life expectancy, under five mortality rate, and maternal mortality ratio. Let's start with life expectancy. It is an indicator that is quite easy to understand. It means more or less the length of life, yet it is complicated at the same time. At first glance, it seems like it means how long will a person, on average, live in this country.

If we take Tanzania, for example, where the life expectancy is 61 years according to the latest data, what is the life expectancy for someone aged 59 in Tanzania? Will they die in two years? Or the life expectancy of someone who is already 75 years old. Or what is the life expectancy of a seven-year-old in Tanzania who already survived the dangerous infant years of malaria and diarrhea?

There we have to make our first limitation of this health indicator. Life expectancy means to what age will a newborn baby live on average if conditions in the country will remain the same throughout life. What if, in the next few years, a very effective vaccine against malaria is developed?

Malaria that causes 7% of all deaths in Tanzania. Will life expectancy for a baby remain the same? No, of course not. If the risk of dying from malaria is eliminated, life expectancy for it will go up. So average length of life of a newborn infant, if the risk of dying from different causes stays the same, is how we define life expectancy.

That takes us to the next part of the definition of life expectancy. It is the average length the life of a newborn infant if the risk of dying from different causes stays the same. Which, of course, they never do. New diseases like HIV and Ebola can suddenly pop up and shorten life expectancy, and vaccines and drugs are developed continuously that might increase life expectancy. Not to mention maybe the most important of all-- economic growth and improved living conditions that will improve life expectancy slowly but steadily.

So by now you understand that as soon as a baby has survived the diseases of the first month

of life in Tanzania, its life expectancy will be several years higher than 61. I bet quite a few of you never thought of that. In summary, the health indicator life expectancy cannot tell how long for certain a newborn will live. Instead, what it does do is that gives a good understanding of the health situation in the country where you measure it and how the health situation is changing over time.

Let's take the next indicator-- under five mortality rate. First of all, as you hear, it is a rate, which means that there has to be a denominator. It has to be per something. So the definition of under five mortality rate is number of children dying before reaching age five per 1,000 live births.

The global average for under five mortality is 43, according to the WHO. That means that out of 1,000 children who have survived birth in the world, 957 of them will live until their fifth birthday, and 43 will have died before the age of five. That's a lot, but in the 1990s, the global average was actually more than double, with 91 children dying before their fifth birthday per 1,000 live births.

The difference worldwide are huge. In high income countries, the under five mortality rate is seven per 1,000 live birth, while in low income countries it's seven to 76-- 10 times as high. So how do you measure child mortality?

In countries where vital statistics like births and deaths are registered, it's quite easy. But in countries without complete national registration of births and deaths, which would actually be most of the countries, child mortality is estimated from household surveys. And in household surveys, teams of interviewers go from selected household to household and basically ask the parents how many children have been born and how many have died. Many of these household surveys are done within the UNICEF-supported Multiple Indicator Cluster Surveys, the MICS, the USAID-supported Demographic and Health Surveys, DHS.

So how do you select the households? Well, you'd use census data, and from the census data, you'd choose a representative samples with several thousand of women in fertile age, and you interview them. And they are asked how many children they have given birth to during the last year and how many of them have died. Censuses, in turn, are carried out about every 10th year in many countries, and they do it quite seldom because it's a huge thing.

A large number of teams set out, knock on doors, and count every person in the country. Censuses are a fantastic source of population data.

What can you actually get out from the under five mortality indicator once you have collected the data? What does it mean that it is 130 in Nigeria and 11 in China? Since saving children's lives after they have survived the first month of life is not that technically difficult and not that expensive, it gives a good picture of how basic public health strategies in a country are succeeding.

For example, with vaccination only, under five mortality can drop 40% in a country. And this means that when a country gets richer and uses these resources to provide basic health services, one of the first indicators to improve is under five mortality. Some other important drivers behind decreasing child mortality is maybe a bit surprising. Improved education of women, access to electric light in homes, and better water and sanitation.

So under five mortality rate is one indicator measuring child mortality, but there are other indicators to measure child mortality. We have neonatal mortality, measuring mortality in newborns within their first month of life, and infant mortality, which measures mortality in infants in the first year of life. And as you can see, neonatal mortality is part of infant mortality, which in turn is part of under five mortality. However, neonatal mortality, for instance, is usually one of the last indicators to improve as the country gets richer, since it takes access to more advanced health care to save pre-term babies, and access to Cesarean sections when normal birth is not possible.

In countries with very high child mortality, the deaths during the first month make up about 1/4 of the deaths, like in this picture. But when child mortality has fallen down to below 100 per 1,000 live born, the deaths during the first month make up around half of the deaths in children.

Thirdly, let's have a look at the last health indicator for today-- maternal mortality ratio. A ratio, it's a type of rate. So again, we need to have a denominator, which means calculating the deaths in pregnancy and childbirth per something.

The definition of maternal mortality ratio is number of women dying of pregnancy-related causes or within 42 days of giving birth per 100,000 live births. Saving a mom is one of the best things you can do with resources, but it is quite complicated. Today, maternal mortality ratio in the world is about 200 maternal deaths per 100,000 live births. In 1900, it was almost twice as high.

Maternal mortality ratio is actually a good indicator of how a whole health system works, because to reduce it, there needs to be a functioning primary health care to take care of the antenatal care of expecting mothers. There also needs to be access to skilled care during birth, midwives that can identify complications early and refer the women to hospital for more advanced care when necessary, and possibly a Cesarean section. So for maternal mortality ratio to go down, the health system needs to provide both primary health care reaching all women, but also access to more advanced health services with skilled staff during birth, transfers to hospital with the capability for surgery, blood transfusions, and other advanced interventions.

So all these three indicators. We have, again, life expectancy, under five mortality rate, and maternal mortality ratio. They have in common that they do not primarily measure what one might think at first glance. Instead, they are good indicators of how well different parts of the health systems is functioning.

Now it's time for you to go to the WHO Global Health Observatory Data Repository website and look up life expectancy, under five mortality rate, and maternal mortality ratio in your own country and compare it to the global average. Good luck.