SEVERE CHILDHOOD MALNUTRITION

nature REVIEWS | DISEASE PRIMERS

→ **Childhood malnutrition is a global health priority and is included in the United Nations Sustainable Development Goals. Severe malnutrition includes kwashiorkor — characterized by diffuse peripheral oedema — and severe wasting — characterized by low body tissue mass.**
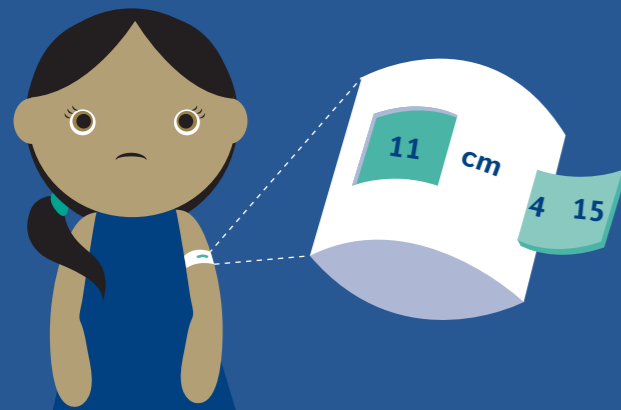
EPIDEMIOLOGY

DIAGNOSIS

Several anthropometric measures are used to diagnose severe malnutrition. For severe wasting, these include a comparison of the weight of a child with suspected malnutrition with the weights of well-nourished children of the same height — the weight-for-height Z-score — or a mid-upper arm circumference (MUAC) of <115 mm for children 6–59 months of age. The presence of bilateral, pitting oedema of the feet is sufficient for the diagnosis of kwashiorkor in children in high-risk populations.

Weight-for-length Z-scores are used for diagnosis in children ≤5 years of age

POVERTY

POOR EDUCATION

CONTAMINATED ENVIRONMENT

LIMITED ACCESS TO HEALTH CARE

FOOD INSECURITY AND LIMITED DIETARY DIVERSITY

Severe malnutrition is rarely caused by a single factor, but develops as a consequence of multiple social, political, economic and biological factors.

SUBOPTIMAL BREASTFEEDING

AREAS WITH HIGH BURDEN OF INFECTIOUS DISEASES
DIARRHOEA HIV TUBERCULOSIS

Severe malnutrition is strongly associated with mortality; in 2013, the cause of death in 7.4% of children <5 years of age was severe wasting.

SCREENING

A promising approach for screening is to give parents a tape to measure the MUAC of their child. This technique can be taught rapidly and could enable malnutrition to be detected early and before the onset of complications.
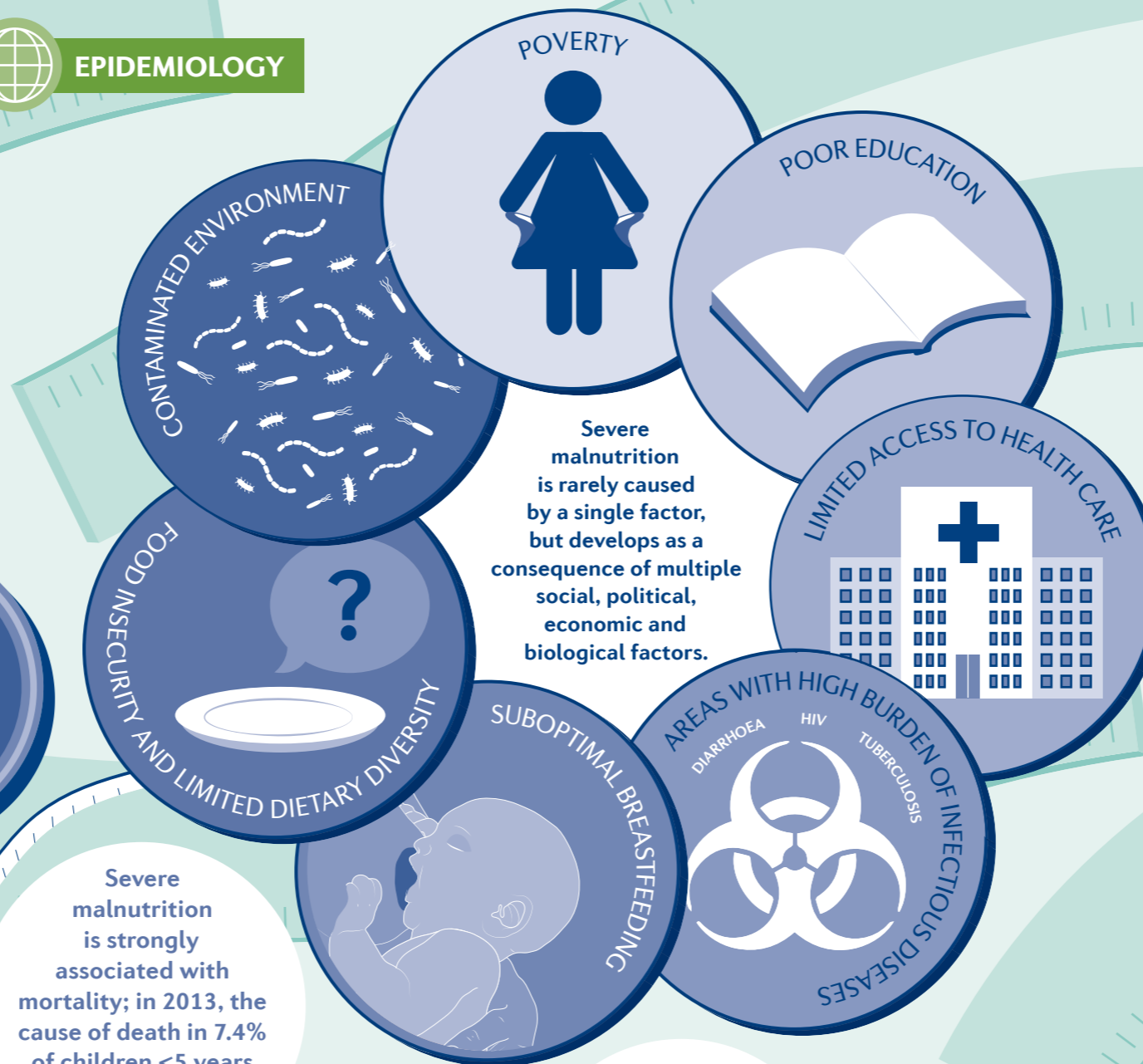
11 cm
4 15

PREVENTION

No single intervention has reduced the rates of severe malnutrition. Public health approaches are needed for prevention, including improved access to clean water,

sanitation and hygiene; improved agriculture; universal access to health facilities; and access to treatment of acute

In 2016, 17 million children <5 years of age had severe wasting. The global burden of kwashiorkor is uncertain.

illnesses. The use of appropriate prevention and management interventions could prevent 61% of cases of wasting and ~350,000 child deaths annually.

MECHANISMS

Distinct mechanisms underlie severe wasting and kwashiorkor; severe wasting is associated with a starvation-induced response of fat loss and muscle wasting, whereas kwashiorkor is associated with a maladaptive metabolic response. Consequences of severe malnutrition include increased susceptibility to infectious diseases, which is worsened by malnutrition-associated immunodeficiency. Underlying enteropathy is also a major feature and risk factor for malnutrition, caused by intestinal infections and marked by inflammation, poor nutrient absorption and alterations in the microbiota.

The aetiology of oedema in children with kwashiorkor is unknown.

MANAGEMENT Rx

The mainstay of treatment for children with severe malnutrition is therapeutic refeeding, antibiotics and deworming. Therapeutic foods were designed to address the anticipated caloric needs; provide appropriate protein, electrolyte and micronutrient levels; and to limit exposure to potentially harmful nutrients (such as sodium or iron for metabolically unstable children) in children with severe malnutrition. Several forms are available, including F-75 and F-100, which are milk-based foods, and ready-to-use therapeutic food, which can be administered in the home environment.

Children with uncomplicated malnutrition (that is, those who are clinically stable and still have an appetite) do not require hospitalization