VOICE FOR CHANGE PARTNERSHIP (V4CP)

FOOD SAFETY IN KENYA: FOCUS ON DAIRY

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WHY THIS NOTE?

Kenyans drink a lot of milk. Various studies estimate that Kenyans consume between 50 and 100 liters of milk per person each year and consumption is growing rapidly.[1] In Nairobi, even poor households consume around a liter per week.[2,3] A large body of research, including several studies based in Kenya, shows that milk consumption improves child growth.[4,5] However, because it is so highly nutritious, milk is also an excellent breeding ground for bacteria and other germs. Moreover, milk can be contaminated from many different sources: foods that the cow eats, chemicals and antibiotics used on the farm or along the supply chain, disease-causing organisms that infect the cow or people who handle the milk, and substances deliberately added to milk. And unfortunately, because milk is associated with goodness and purity and is a favorite food for children, scares about milk safety tend to get a lot of attention, even if not based on facts. This note goes beyond the rumors to summarize the scientific evidence on milk safety, and offers practical recommendations for improving milk safety in Kenya.

Foodborne diseases (FBDs) cause a large share of illness and death worldwide. The Foodborne Disease Burden Epidemiology Reference Group (FERG), a panel of experts convened by the World Health Organization, has estimated that FBDs are responsible for a comparable burden of illness and death (measured in disability - adjusted life years) in Africa as cancer or tuberculosis. (Figure 1).[6]

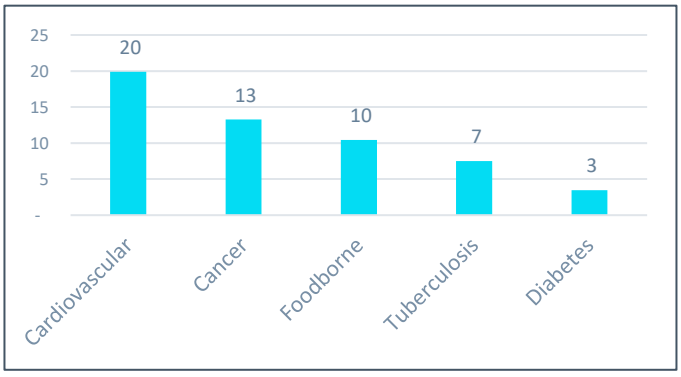

Figure 1. Estimated burden of foodborne disease and other selected illnesses in Africa, millions of disability adjusted life years (DALYs)

As the panel's approach was very conservative, relying mostly on official records, it may under-estimate the actual burden of foodborne disease by a wide margin. This is because treatment for food-borne illness is often not sought, and many treated cases are never reported to health authorities; even if treated, there is usually no laboratory diagnosis or way of telling if an illness came from food or another source. Many foodborne hazards are also present in drinking water and can be transmitted from person to person. The figures shown here include only the share of illness caused specifically by contaminated food, based on the best and most recent estimates of experts.

The burden of FBD is not equally distributed across the globe. According to FERG estimates, the risk of foodborne illness is higher in Africa than any other region (Figure 2). Children under five years of age bear a disproportionate share of the FBD health burden. Although this group constitutes only nine percent of the global population,[7] it suffers from forty percent of the burden of FBD worldwide according to FERG estimates.

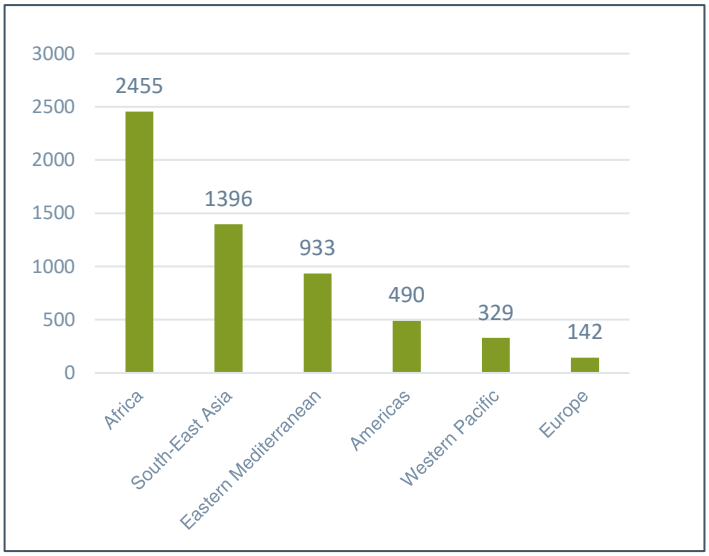

Figure 2. Estimated years of healthy life (DALYs) lost to death or illness per 100,000 population, by region *Error! Bookmark not defined.*

In addition to immediate health outcomes, these diseases can have long term impacts on children's physical and intellectual growth.

Children with repeated cases of diarrhea during the first 24 months of life tend to be shorter at 24 months of age.[8] Stunting and intestinal parasites (often transmitted by food) in early childhood have been linked to lower mental function later in life.[9]

WHICH HAZARDS CAUSE FOODBORNE DISEASE? ARE THEY FOUND IN MILK?

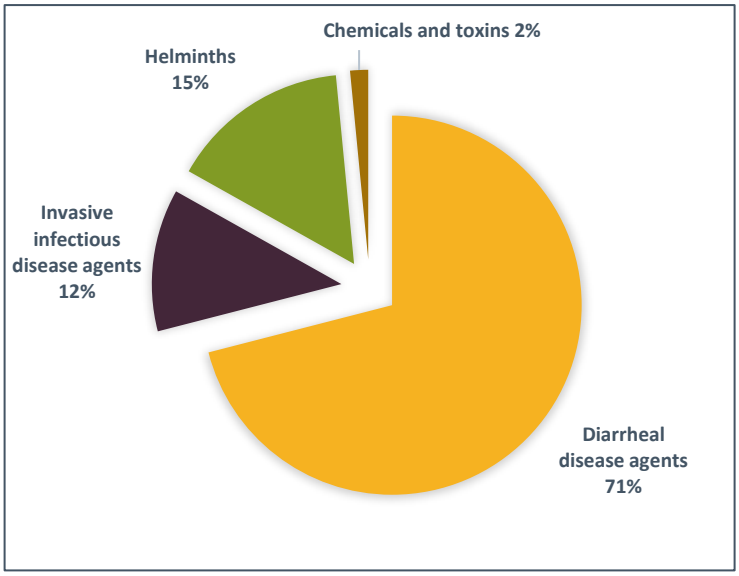

Figure 3. Estimated burden of foodborne disease (DALYS per 100 000 population) in sub-Saharan Africa by hazard groups Error! Bookmark not defined.

The WHO's assessment of foodborne disease found that there were only 31 hazards for which there was good enough evidence to assess the health burden. Hypothesized but unproven impacts, such as the suspected link between aflatoxin and stunting in children, were not included. However, we can be confident that these hazards include most of the important ones that cause sickness and death. When we look at the hazards by category, we can see that most known disease is caused by microbes (for example, viruses and bacteria), followed by worms (e.g. pig tapeworm), and finally toxins such as aflatoxins. According to the FERG study, almost three quarters of foodborne DALYs in sub-Saharan Africa are caused by diarrheal disease agents while the remainder are attributable to invasive infectious disease agents, helminths (worms), and chemicals and toxins (Figure 3).

Microbial contamination of milk is common; some of these microbes come from the cow and some from the environment or from people who handle the milk.[10,11,12,13] Aflatoxins are often found in milk in Kenya, although in far lower concentrations than observed in maize,[14,15] and their impact on health is not well established. Antimicrobial residues are also commonly found in Kenyan milk;[16,17] while there is little evidence that these chemicals cause significant direct harm to human health, giving antibiotics to cattle can increase the likelihood of antibiotic resistant infections in people. Worms are not so much of a problem in milk.

HOW MUCH ILLNESS COMES FROM MILK?

Data on the actual burden of illness attributable to milk consumption in Kenya are limited, though based on official reports, milk and dairy products are some of the foods most frequently implicated in foodborne disease occurrence.[18] One study estimated that two to three cases of diarrheal disease caused by a common toxin-producing bacterium (*Escherichia coli*) occur for every 10,000 servings of unpasteurized milk consumed in Kenya.[19] This finding of a relatively low risk of infection was due to the fact that the vast majority of consumers (97%) boil milk prior to consumption, a highly effective way of addressing microbial contamination that was assumed to kill any E. coli present. However, more evidence is needed on household boiling and consumption practices, as milk may not be boiled for long enough to kill all organisms, and may become re-contaminated if improperly handled and consumed some time after boiling. Sources of evidence from other settings provide additional clues on the role of milk in foodborne illness:

- In high-income countries, nearly all milk is pasteurized and standards for dairy products are well maintained. As a result, occurrence of milk-borne disease is relatively rare; milk is thought to be responsible for 1-10% of all reported foodborne diseases in high-income countries.[20,21,22,23]
- In the United States of America, before widespread pasteurization and disease eradication schemes (especially addressing tuberculosis, brucellosis, typhoid, paratyphoid and food poisoning) were implemented, around 25% of foodborne illnesses were attributed to dairy products[24]
- A study in India similarly found that milk and dairy products were responsible for 25% of self-reported illnesses.[25] In India, people do not often drink milk raw but, as is the case in Kenya, mainly boil or ferment it.

MILK SAFETY IN ECONOMIC CONTEXT

The government of Kenya estimates that 80% of the milk consumed in the country is purchased form very small-scale vendors in informal markets.[26] Informal markets are often preferred by consumers for a number of reasons: milk is 20-50% cheaper than in the formal sector,[16] there is more flexibility in the quantity sold, outlets are closer to the consumers' homes, and some vendors even deliver to the doorstep. The lower price of informal sector milk is especially important to poor consumers. A recent study in Nairobi found that poor households spend 38% of their total food expenditure on livestock products and fish, of which 37% is spent on milk and dairy products. In this context, increasing the price of milk could have adverse effects on nutrition.[1] Efforts to improve milk safety should therefore avoid increasing milk prices.

POLICIES TO IMPROVE MILK SAFETY

Since the early 1990s, global best practice in food safety has evolved from an approach in which the government monitored hazards and punished firms for violating regulatory standards, to a greater emphasis on building the capacity of the private sector to prevent foodborne illness.[27] Prevention-based approaches are particularly well-suited to contexts in which the public sector has limited capacity to perform inspections and tests.

One preventive intervention that has proven effective at improving milk safety in Kenya and is among the measures recommended in the 2013 National Dairy Development Policy is to educate and certify small-scale raw milk vendors on safe handling practices.[28] A 2006 pilot training and certification program in informal settlements outside Nairobi led to improvements in hygiene practices and microbiological quality.[29] 45% of milk sold by traders who had been trained and used plastic containers met the national microbiological quality standard, compared to just 29% of the milk sold by those who had not been trained (the impact was smaller among those using metal containers, whose milk was more likely to meet the standard even without training). Milk vendors reported that a certificate indicating completion of the training program made it easier to obtain operating licenses from the government, creating an incentive to participate.[30] An ongoing ILRI study based on this model will test the impact of milk vendor training, certification and marketing on child health outcomes, and could provide a starting point for scaling up such efforts in Kenya.[31]

Other measures to improve milk safety proposed under the National Dairy Development Policy include the development and adoption of low cost technology for small scale dairy investors; public education campaigns on the merits of consuming properly handled (boiled) milk; provision of incentives for procurement and installation of milk testing equipment; stakeholder sensitization on the importance of safe use of antibiotics and other veterinary drugs; and training on milk testing. One simple technology that can improve milk safety and quality is the Mazzican, a wide-necked, easy to clean milk container.[32]

In addition, Kenya's National Food Safety Policy of 2013 recommends a broad set of policy interventions to improve food safety in the country. These include the establishment of a National Food Safety Law and a national Food Safety Authority through which to coordinate government activities related to food safety; investment in training of stakeholders, especially small and medium enterprises (SMEs), on food safety and regulatory compliance; the provision of guidelines and technology to support traceability of food from farm to fork; improved analytical capacity through the accreditation of additional food safety laboratories and maintenance of an inventory of the same; and development of systems for food safety validation, inspection, certification and self-assessment as well as an early warning system to prevent outbreaks.

The interventions proposed under both the National Dairy Development Policy and the National Food Safety Policy have the potential to greatly improve food safety in Kenya, however few if any of these have been fully implemented. While moving forward with the food safety agenda at the national level remains important, counties can and should adopt many of the recommendations contained in these documents within their own jurisdictions in the meantime.

CONCLUSIONS AND RECOMMENDATIONS

- Consumption of dairy products is important for child development and has life-long health and cognitive benefits.
- Contaminated milk is an important conduit of foodborne disease, which represents a significant share of the global burden of disease, particularly in Africa. Improving the safety of dairy products and increasing their consumption are both important for improving population health in Kenya.
- Most foodborne disease, including that transmitted through milk, is caused by microbes; addressing microbial hazards should be prioritized.
- Consumers should be strongly encouraged to boil milk, as this kills most microbes. To keep milk safe after boiling, it should immediately be tightly covered, kept in as cool an environment as possible, and consumed within a few hours.
- Simple technologies that improve milk safety, such as easy to clean, wide-necked containers, should be promoted and made available at reasonable cost.
- Food safety policies that increase milk prices could have negative impacts on the nutrition of vulnerable populations and should be avoided.
- Globally, food safety policy increasingly focuses on prevention of foodborne illness through capacity building in the private sector; this approach is especially relevant for Kenya given the limited resources for regulatory enforcement.
- Training and certification of informal raw milk vendors has been shown to improve milk safety. This approach could potentially be scaled to the estimated 80% of Kenyan milk that is sold through informal channels.
- The Government of Kenya has proposed a number of measures to improve food safety in the National Diary Development Policy and the 2013 National Food Safety Policy, but most of these have yet to be implemented. Many of these interventions could be taken up by county governments.

ACKNOWLEDGEMENTS

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