Water-Based Sanitation and Negative Effect on Flora Balance
Keith Bell, Sanitation Circle
Lake Worth, Florida USA

Abstract: The single largest source of microbial and hormonal pollution in the world is wastewater and sludge biosolids. We concentrate efforts on chemical pollution, neglecting biological causes of major diseases, including epidemic physical and mental illness. Current environmental law is obsolete based on modern research implicating intestinal health as a crucial component of general health.

Hypothesis: Poor sanitation alters intestinal flora population balance, a phenomenon that has strong associations with chronic, non-communicable disease (NCD) such as diabetes, autism, heart and lung disease, Alzheimer’s, obesity, anorexia, epilepsy, Celiac disease, multiple sclerosis, mental illness and cancer. Modern sanitation, including flushing toilets and activated sludge processing of human waste, currently involves deposition of sewage biosolids on land. Inadequately treated effluent and raw sewage is released in rivers, lakes and oceans. Rain causes antiquated sewage systems to overflow into bodies of water in cities throughout the world. How this pollution affects mammalian and plant microbiomes is overlooked, partially thanks to obsolete law. Recent studies have confirmed crucial role of intestinal flora balance in overall health. (1-61)

Background: EPA Pathogen Reduction Requirements for biosolids include only three pathogens: salmonella, enteric viruses and viable helminth ova. Grievously missing are protozoans of any type. Of particular concern are ciliates, perhaps most successful of the four groups of protists, known in the wastewater treatment industry as “free-swimmers.” These microbes are purposely multiplied in activated sludge to lower bacterial counts, making sludge and effluent legal for disposal. Oxygen is pumped into sewage to multiply microorganisms to break down organic waste; then released to water and soil unregulated. Other of great concern are chloridium species and gram-negative bacteria difficult to reduce under current technology. Activated sludge is now 100 years old with beginnings in Manchester, UK, 1913. (62-79)

Humans are superorganisms relying on symbiotic relationship we have with microbes. If your body were a democracy it would be ousted by microbial DNA, most of which resides in the gut. Once gut flora is damaged, such as low bacteria, it is open to yeast overgrowth and viruses. Yeast overgrowth is hallmark of every major disease, even in diabetes, Alzheimer’s and cancer. Other common denominators of diseases due to damaged gut flora, also called gut dysbiosis, include insulin sensitivity, arthritis, high and low cholesterol, enzyme deficiency and psoriatic acid reflux. The gut-brain connection is a holistic new science barely understood while we see dramatic rise in mental illness. (80-81)

Consequences/Discussion: Damaged gut flora leads to poor microbial biodioposition, a factor which should be considered as important as genetic predisposition. Compromised gut flora is passed to our children including placental transmission, yet modern science states the fetus gastrointestinal tract is sterile without evidence. A recent study from South Korea states one in 38 children are now born autistic. Utah leads the USA with a staggering autism figure of one in 25 Caucasian boys. Sanitation-challenged India where 55% practice open defecation, suffers 60% of the world’s heart disease according to World Health Organization (WHO). Four percent of India’s population carry genetic mutation causing heart disease, possibly the result of gene-microbe interaction. The new science of transgenerational epigenetics is revealing how environmental pollutants such as chemicals and microbes alter genetic settings in future generations not exposed to the original factors. Projection for diabetes in the US is one-third of the population by 2050, said to be enough to cripple our healthcare. Another concern is potential extinction of ancestral gut microbes such as H. pylori, known to cause ulcers, but recently discovered beneficial. Increasing food recalls, especially green leafy vegetables tainted with bacteria and protozoans may be associated with such biosolids applied to farms. Bacterial culprits such as Citrobacter and salmonella are limited to thrive within protozoans, protected and recolonized. Recent multi-state illness has been linked to food products containing cyclospora, a protozoa-like parasite known to be in sludge biosolids. Lastly, we are witnessing catastrophic decline, gender-bending and mysterious mass deaths in sea creatures at record levels globally. Insulin resistance and fungal infection in dolphins is studied. Massive algae blooms (including cyanobacteria) have been associated to nutrient input including raw sewage. The shift in bodies of water interrupts the food chain leading to vitamin deprived ecosystems. Microbial overgrowth in water raises proportions of lower pH (ocean acidification) and is a significant source of carbon dioxide, speeding global warming. These shifts in bodies of water caused by poor sanitation are not unlike changes seen in our own bodies such as metabolic acidosis associated with many disease states, physical and mental illness. (82-90)

Potential solutions: One solution not yet adopted by half the world without adequate sanitation, 2.6 billion people, is the dry compost toilet which produces needed fertilizer. This will help us reach UN Millennium Development Goal MDG-7 (water and sanitation), now nearly 300 years behind schedule. Safe sanitation solutions is not just a matter of health but human dignity. Dry compost toilet technology should also be promoted in the developed world to replace water-based sanitation. Additional areas where microbial challenges become priority include vaccination programs, antibiotic abuse and agricultural practice where chemicals damage soil microbiology and livestock waste significantly pollutes water. (90-96)