

## Safeguarding public health, the core reason for solid waste management

A casual review of both the technical literature and news reports pertaining to solid waste management in the twenty-first century suggests that academia and society at large often take for granted the basic mission of our field: The improvement of sanitation as a means of protecting public health.

Most technical papers in recent years address ways to fine-tune the removal of contaminants from waste streams, isolate or stabilize pollutants to reduce emissions to the environment, recover energy/materials for reuse or recycling, and/or improve the efficiency and/or reduce the cost of waste handling operations. Moreover, most public media articles about waste address collection service issues, recycling practices, user fees, and odour emissions and other nuisances associated with movement and deposit of rubbish. Yet the core objective of all solid waste management programmes, the protection of public health, is rarely cited.

In one respect, this is a good thing, suggesting that solid waste professionals and practitioners have done and continue to do a good job preventing the harbourage of disease agents and the spread of pathogens, at least in the world's urban centres where about half the Earth's population now resides (projected to increase to 60% by 2030). For instance, the American Society of Civil Engineers (ASCE) considers the solid waste management infrastructure in the USA to be in the best shape of the 15 sectors it evaluates, better than airports, roads, drinking water, wastewater, and schools (America's Infrastructure, Report Card 2009 Grades: <http://apps.asce.org/reportcard/2009/grades.cfm>).

Indeed, there have been few significant instances of widespread infectious diseases in the world linked to poor solid waste management practices, certainly in comparison with the relatively frequent outbreaks of plague, typhoid fever, and other pathogen-borne epidemics that were all too common before the modern era.

To paraphrase Chaz Miller's article, 'Garbage and Health' (*Waste Age Magazine*, 1 July 2003), we in developed countries essentially won the public health battle on garbage many years ago. Once common open burning dumps are now outlawed in the USA, Europe and other developed countries, surviving only in photos depicting columns of black smoke, rats foraging on exposed rubbish, and fly larva wriggling in rotting apple cores. The days of unregulated and uncontrolled incinerators spewing half-baked rubbish into the sky are over. Rubbish is now managed quietly and effectively, at least in the developed countries.

It was not always this way. Our understanding of the relationship between trash and disease is not yet 200 years old. Back in the 1840s in Great Britain, the Chadwick Commission reported a link between bad environmental conditions and disease. The report was pioneering, but it took another two decades, with discoveries by Louis Pasteur and subsequent bacteriologists, before it was understood how improperly controlled rubbish can become the home to disease-carrying vectors.

It is because we in developed countries have been so successful at winning the public health battle with rubbish that we are able to turn our attention to finding ways to reduce, reuse, recycle, and/or extract energy from our rubbish instead of sending it all to landfills. In fact, since the early 1970s, citizens in Europe and North America have been demanding that their elected officials make funds available for waste-reduction measures that go well beyond the basic public health protection objectives. So, in effect, mission statements for solid waste agencies now include much more than the once basic 'protection of public health'. Indeed, some waste agencies in the USA have changed their names to include words like 'resource management' and have dropped the word 'waste' altogether. Hence, solid waste professionals today typically must apply a much broader range of knowledge than any one degree course can impart, encompassing subjects such as materials handling, commodity and energy pricing, life-cycle cost assessment, public relations, contract negotiations, politics, and governmental affairs, in addition to traditional mathematics and applied sciences.

Despite the successes, solid waste professionals need not fear that they have worked themselves out of a job. Substantial solid waste management challenges are still present, particularly in developing countries, but also in developed countries. For example, the ASCE report card cites a 'C+' grade to the USA's solid waste infrastructure, leaving plenty of room for improvement there.

Furthermore, both chronic and transient instances of improper solid waste management situations exist or periodically arise all over the world, usually due to conditions outside the control of waste managers. Work stoppages by collectors and other factors have resulted in the protracted accumulation of rubbish piles in Naples, Italy (2003 and 2007), Palermo, Italy (2011), New York City (1911, 1975, 1990 and 2006), Monrovia, Liberia (2007), Doula, Cameroon (2010–11), Toronto, Canada (2009), and

Memphis, Tennessee (1968), some of which are known or suspected to have negatively impacted public health in the vicinity, at least in the short-term. An outbreak of plague in India in 1994 was attributed to flea-bearing rats seeking food from rubbish containers situated near a housing complex following the closure of a nearby dump. (Waste professionals typically specify a rat extermination programme as part of a dump closure programme to preclude this situation.)

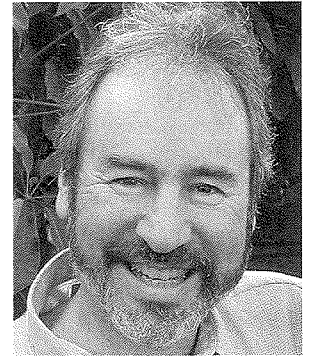
Moreover, today's practice of collecting and flaring biogas from landfills is considered mainly as a means of reducing the emission of greenhouse gases into atmosphere. But even more basic, landfill gas control measures were first implemented to preclude the movement of landfill gas through soil and into occupied spaces, causing explosion hazards (in essence an acute public health threat). For instance, in 1991 at Skellingsted in Denmark two people died from an explosion inside their house due to gas migrating from a neighbouring landfill. Many other similar instances dating back decades are on record throughout the world.

Furthermore, the informal sector is still an integral part of the solid waste management system in the urban centres of most developing countries. Thousands of self-employed scavengers, comprised of entire families including young children, live and work on dumps, exposing themselves to many hazards and diseases. If nothing else, improved waste management programmes along with steps to provide alternative employment for scavengers can immediately enhance the public health of this sector of society.

Understandably, developing countries normally invest their scarce resources first for roads and to improve the supply and quality of their drinking water. The next priority is typically wastewater collection and treatment facilities.

Solid waste management infrastructure improvements come in third (because they are relatively costly and citizens are not accustomed to paying sufficient user fees for a service that has long been considered 'free'). Hence, there are many urban and rural areas in developing countries where solid waste collection, processing, and disposal practices are still under-managed and thus rudimentary at best. In these situations solid waste professionals can apply their special expertise to most directly get back to the roots of public health protection by developing appropriate and affordable waste management approaches.

Many urban dwellers do not know where their water comes from, where their wastewater goes, or how their rubbish is handled after the collection truck drives away. But environmental professionals, particularly those who practice in the field of solid waste, stand ready to remind their fellow citizens that protection of public health is still job number one.



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