Improving Texas Home Healthcare Waste Management Policies and Practices: The Role of the Environmental Toxicologist

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Abstract

Many healthcare related debates often overlook the fact that a considerable amount of waste is being produced daily and on a global scale in the home healthcare industry. While health care facilities may have strict measures for proper management and disposal of biomedical waste, private homes of patients receiving in-home medical care pose a greater challenge with regard to these established measures (Oyewole, Sapp, Wilson, & Oyewole, 2014a). This is primarily due to the fact that it is very difficult logistically to ensure complete compliance in a patient's home and many policy decisions may miss the unnoticeable toxicological impacts associated with this point source (Kangasniemi, Kallio, & Pietilä, 2014). More consideration needs to be given to the inclusion of Environmental toxicologists in these debates. He/she can support efforts to improve weak waste management policies in Texas home healthcare to protect the public and the environment.

Keywords: home healthcare waste, environmental toxicologist, pollution, municipal solid waste, environmental health, landfill, environmental policy.

Home Healthcare: Definition and Importance

Home healthcare incorporates various health and social programs intended to alleviate many problems plaguing the healthcare industry. It is also a valuable tool, which provides an outstanding amount of aid to many disabled patients. Home healthcare is usually less costly, more convenient, and comparable to the care one would receive in a hospital or skilled nursing facility (SNF). Participants are homebound and unable to care for themselves so agencies are required to provide services 24 hours a day (Rest & Hirsch, 2015; Park-Lee & Decker, 2010; Linekin, 2003). Many such patients have no other means of receiving the care they need in order to make complete recovery from their illnesses. From an economic point of view, Home health also fills some of the gaps in a very troubled health care system, which in the near future may see, more hospital closures, and downsizing (Kendra, 2002). These agencies utilize a wide variety of medical professionals such as nurses, social workers, physical therapists and home health aides, in order to provide short- and long-term services to patients who are elderly, disabled, or too ill to care for themselves (Kendra, 2002; Diane, 2016). This type of patient care is often the difference between institutionalizing sick loved ones and allowing them to continue to live in their own home while they convalesce. Therefore, Home health agencies are structured to help build a two-way relationship between patients and their physicians. Subsequently, patients and their families are able to maintain control over their treatment and patients can recover in familiar surroundings (Rest & Hirsch, 2015; Ikeda, 2014).

As the industry in Texas grows providers numbers have also grown. Home health aides, for instance, which held about 913,500 jobs in 2014 according to the US Department of Labor, have become quite a considerable group and many only receive short-term on-the-job training in most cases. They are not required to even have formal educational credentials for employment (Kendra, 2002; United States Department of Labor, 2015). These workers perform many of the in-home, non-skilled, technical procedures with little or no onsite supervision in a patients' home. As the population ages and recovery time in the hospital declines, Texas home health agencies will continue to fill the gap by providing chronic healthcare (Kendra, 2002; Diane, 2016).

The United States Department of Health and Human Services Centers for Disease Control and Prevention National Center for Health Statistics conducted a study on national estimates of the organizational characteristics of home health and hospice in 2007. This report determined that there were 14, 500 home health and hospice care agencies in the United States alone, an increase from 11, 400 in 2000, of which home health only agencies accounted for about 75% of this number (Park-Lee & Decker, 2010). It should be noted that patient numbers do vary from company to company and the needs of each patient does vary as well. As a result of this significant growth, home healthcare has become an integral part of patient care over the last few years and ensuring uniform, effective environmental protection from hazardous waste it generates is of vital importance for adequate environmental and public health protection (Kendra, 2002).

Home Health and the Environment

Despite the irrefutably important services home healthcare provides, the fact still remains that, for far too long it has not been under the same type of scrutiny that many other industries have been subjected to. This industry has not been given much of a second look because many policy makers fail to see it as a generator of potentially hazardous medical waste. There is already a large body of evidence that public health and environmental risks are linked to improper management and disposal of medical waste (Abahussain & Ball, 2007; Alvim-Ferraz & Afonso, 2003; Graham, et al., 2011; Howard & Muir, 2011; McDiarmid & Gehle, 2006). The term medical waste is defined in Title 30 Texas Administrative Code (30 TAC), Chapter 326, §326.3(23).

So waste from health care-related facilities that are comprised of any of the following: animal waste, bulk blood, bulk human blood, bulk human body fluids, microbiological waste, pathological waste, and sharps is classified as special waste under the afore mentioned code (Texas Commission on Environmental Quality, 2016a). Almost all the waste from home health services mixed in with ordinary household waste streams on a daily basis as long as it does not fall under the previously mention code (Texas Commission on Environmental Quality, 2016a). Concern for the amount of waste generated and its effects on the environment and public health has already been voiced. The general consensus is that more sustainable practices in the home healthcare industry would be beneficial (Moyle, 2013). Most of the solid waste generated in the home will be deposited in landfills and the design of the facility is based on the type of waste it receives. Other factors to be considered are the amount of waste received and stored, processing and storage of waste according to appropriate EPA guidelines, storage time at the facility, sampling and analysis, stored data and recordkeeping (TCEQ Water Permits Division, 2015).

Accordingly, regulators must sooner rather than later, monitor this industry much closer for inaccuracies in waste collection procedures that can affect the transportation and processing of this waste because toxic pollutants frequently ends up in landfills and eventually surface waters (Ohe, Watanabe, & Wakabayashi, 2004; Escher, et al., 2011). The USEPA regularly maintains a list of state and local waste characterization studies but to date, the state of Texas has no data available. This is of great concern because there is no real way of gauging the amount of contaminated waste from Home health services that is freely entering landfills around the state of Texas (Figure 1). There approximately 193 active landfills around the state of Texas as of April 2016 (Texas Commission on Environmental Quality, 2016c).

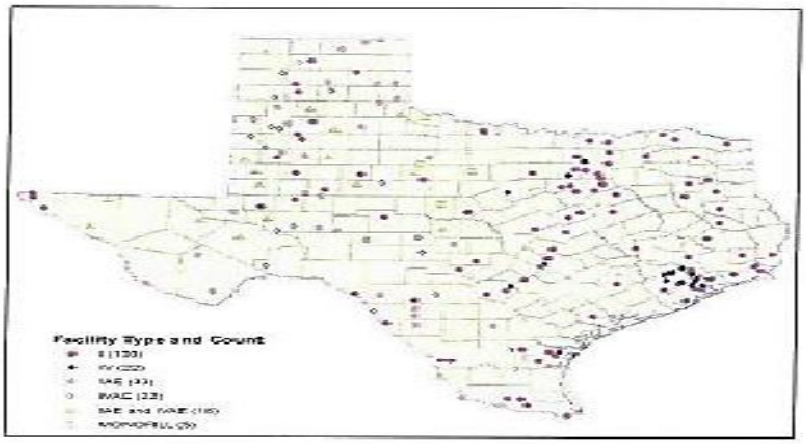

Figure 1: Active Texas Municipal Solid Waste Landfills in 2014 (TCEQ Water Permits Division, 2015)

The Role of the Environmental Toxicologist in Home Health Waste Management Policy

Environmental toxicology is a multidisciplinary science which covers quite a wide range of subject areas including but is not limited to chemistry, pharmacology, genetics, biology, epidemiology, law, and economics (Zakrzewski, 1991). It focuses on the nature, properties, effects, and detection of toxic substances in the environment and in any environmentally exposed species, including humans. The key principles in this science are exposure, dose, and dose-response relationships. It considers hazards which are associated with the occurrence of potentially toxic chemicals in soil, air, and water. Other areas of interest are the availability, and form of toxic chemicals, the exposure to such chemicals and the resultant effects, and lastly, comparative effects and mechanisms of action in a variety of species (Crosby, 1998; Koeman & Strik, 1981; Sullivan, Agardy, & Clark, 2005; Zakrzewski, 1991). Researchers in this field have the skills of the analytical chemist (develop analytical techniques/screening procedures); the life scientist/health professional (assess biological impacts of hazardous chemicals on living tissues); and the environmentalist (concerned with changes in the environment as a result of hazardous chemical releases, and environmental protection) all in one package (Blackman, 1996).

These scientific experts have different roles when it comes to the part the play in shaping environmental policy. These roles dependent on the nature of the problem, the principles held by the individual and the type of information he or she can contribute or bring to the table (Spruijt, et al., 2014). While not necessarily a policy maker, the job of the environmental toxicologist also involves communicating risk and he/she generally has a good command of current environmental regulations as it pertains to use and release of toxic chemicals into the environment (Zakrzewski, 1991). Some tend to seek to protect the environment through advocacy, activism, and education and of course development of effective regulations (Blackman, 1996). Bearing this in mind, the environmental toxicologist can now play an important role in communication strategies developed and used to provide information to the public concerning the threat that hazardous chemicals pose to them and the environment. This individual can also support efforts to safeguard the confidence of the public by articulating all the efforts being made to ensure environmental quality (Smith, et al., 2008). With environmental protection being a core goal or the foundation of these efforts, constant communication with the public becomes a necessity. In addition to being an asset to the general public, the toxicologist could also be an indispensable asset in educating healthcare workers how improper disposal of waste can affect their health and their communities. While this type interaction between the scientist, policymakers and the public is not a new concept, it could beneficial to the process (Wesselink, Buchanan, Georgiadou, & Turnhout, 2013; De Rosa, Stevens, & Johnson, 1998; Field, 2007; Koeman & Strik, 1981; Silbergeld, 2005).

Researchers have also focused on toxicology as a tool for the advancement of preventative policies and these policies in general, are geared towards environmental protection. In other words, these policies are designed to minimize human impacts on our environment. To this end, implementation of certain measures to prevent pollution or control deliberate acts of pollution can culminate in good environmental quality (Silbergeld, 2005; Field, 2007). However, current home healthcare policy in Texas does not take into account the large volume of solid waste and chemical waste generated daily from these facilities. Due to the absence of adequate environmental policies for Texas home health, unregulated hazardous pollutants enter landfills on a daily basis combined the household garbage. Texas Administrative Code (30 TAC) §330, Subchapter D, provides detailed information on state requirements for handling residential and other solid waste. Nevertheless, landfill operators, on a daily basis, unknowingly expose their facilities and their employees to additional hazardous material mixed in with home health garbage. Operators are already required to check effluents for oil and grease, total petroleum hydrocarbons (TPH) and pH. Nonetheless, these effluents may contain more unknown hazards prior to environmental release (Texas Commission on Environmental Quality, 2006).

For that reason, having an individual trained in this area can provide basic information for individual home health agencies in Texas to train their employees on proper disposal practices of toxic chemicals and solid waste used in-home patient care. This benefit the collectors of such waste with costs associated with sorting and possible illness related to accidental exposures. Governmental agencies like the Department of Health and Human Services (DADS) which licenses, certifies and surveys home health facilities for compliance with state and federal laws and regulations; would also benefit from this information by improving standards for facilities to help prevent and mitigate pollution episodes which harm the environment and thereby reduce the economic impact of potential damages (Texas Department of Aging and Disability Services, 2015b; Texas Department of Aging and Disability Services, 2015a; Sullivan, Agardy, & Clark, 2005).

Of the total amount of waste generated by health-care activities, about 15% is considered hazardous material that may be infectious, toxic or radioactive (World Health Organization, 2015). So unregulated home healthcare waste generated in residential homes are disposed of in municipal solid waste landfills (MSWLFs) at an already troublesome rate and future projections see this rate increasing annually with an aging population (United States Environmental Protection Agency, 2016c; United States Environmental Protection Agency, 2016b). As a result, there is an urgent need for effective regulation of home healthcare waste as a potential source of environmental pollution because many consumables used in the administration of home care contain substances that persist and bioaccumulate in the environment and can eventually pollute already meager groundwater supplies (Pedersen, Mary, & Suffet, 2005; Jenke & Poss, 2006; Graham, et al., 2011). If outdated regulatory policies and practices persist we run the risk of worsening the pollution problem even further.

Anticipation of adverse events and having a degree of foresight is a fundamental skill inherent in the field of environmental toxicology (Sullivan, Agardy, & Clark, 2005; Oyewole, Thomas, Conley, & Wilson, 2014b). His/her mission is investigative i.e. fact-finding after an event can sometimes be instigative i.e. taking preventative steps on issues that may pose risks to the environment based on the very nature of the chemical even when the dangers have not yet been realized. In the case of Vanadium, (7440-62-2 CAS Number), a trace element with multiple oxidation states being placed on the USEPA Draft Contaminant Candidate List 4-CCL 4 for 2015 (United States Environmental Protection Agency, 2015). Many scientists have long advocated for regulation of this contaminant here in the United States due to possible toxic effects of some forms of the metal intensified by its complex chemistry. Now, it is finally being considered for Federal regulation (Stochs & Bagchi, 1995; Crans, Amin, & Keramidas, 1998; Oyewole, Thomas, Conley, & Wilson, 2014b).

Conclusion

Many medical professionals recognize the potential for negative impacts on the environment by the very nature of their occupations. Some are also aware that environmental responsibility protects people, our ecosystem and so forth (Kangasniemi, Kallio, & Pietilä, 2014). However, not having the appropriate guidelines in place renders many helpless in this area. So despite public awareness of the presence of pollutants in the environment, much still needs to be done in the regulation hazardous waste generated from home health. The environment can sustain life and simultaneously be a reservoir for pollutants, which cause adverse health effects. Increasing industrialization, technological advances; economic growth, a growing and aging global population have radically changed, and are still changing the environment (Yu, 2001).

Hence, sound environmentally-friendly policy changes as far as handling and disposal of wasted generated in home health are urgently needed. The expertise an environmental toxicologist can offer would be invaluable in any effort to both protect the environment and reduce costs resulting from environmental damage from Texas home health sources. The work of the Environmental toxicologist in the home health industry would be largely based on precaution and prevention. He/she can also aid in the implementation of new pollution prevention policies in Texas home health to effectively manage disposal of hazardous materials it generates. Such courses of action would be designed to minimize undesirable public health and environmental effects within existing economic limits (Koeman & Strik, 1981; Silbergeld, 2005; Sullivan, Agardy, & Clark, 2005).

As the volume of patients in need of these services increases, agencies can quickly become overwhelmed. So the lack of training in handling and disposing of waste produced in home health and the absence of proper guidelines for workers and patients pose even greater danger to the environment. So the educational training programs for providers needs to be updated to include handling, sorting and disposal of potentially hazardous waste they encounter when caring for their patients. As facilities which handle infectious waste are required to register and obtain permits from the TCEQ and their employees receive necessary training, in a similar fashion Texas home health could use this model (Texas Commission on Environmental Quality, 2016b). Providers do often handle various toxic chemicals so the industry should be required to develop waste management policies, plans and training programs to protect patients, providers and the environment. During training sessions employees should be made aware of the chemical waste management plan and updated on changes in these plans frequently (Blackman, 1996). Finally, the environmental toxicologist can play an advisory role in the Texas home heath industry. In this capacity he/she can assist in assessing, characterizing, managing risks posed by chemicals used in the home health trade, identify hazards and communicate with providers and the public (De Rosa, Stevens, & Johnson, 1998; Spruijt, et al., 2014; Wesselink, Buchanan, Georgiadou, & Turnhout, 2013).

His/her skills are also valuable in helping the industry to transform its image as an environmentally responsible one by helping to develop easily understood and enforceable regulations (Blackman, 1996). This would protect the environment and the people who live in it. The implementation of adequate pollution prevention strategies and policies is a fundamental expectation of all citizens (Laustsen, 2007). Therefore, it is then reasonable to assume that pollution without careful monitoring and control in the Texas home health industry is contrary to this expectation.

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