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**ASSIGNMENT NUMBER FOUR**

**COURSE: D002 DIPLOMA IN WASH**

**SUPERVISOR’S: MODERATORS**

**ASSIGNMENTS FOUR**

* 1. **Explain what municipal solid waste (MSW) means.**

Municipal Solid Waste (MSW) more commonly known as waste or garbage consists of everyday items we use and then throw away, such as product wrapping, grass trimmings, furniture, clothing, bottles, food scraps, newspapers, appliances, paint, and batteries. This comes from our homes, schools, hospitals, and businesses. A solid waste is any material that is discarded by being:

* **Abandoned**: The term abandoned means thrown away. A material is abandoned if it is disposed of, burned, incinerated, or sham recycled.
* **Inherently Waste-Like**: Some materials pose such a threat to human health and the environment that they are always considered solid wastes; these materials are considered to be inherently waste-like. Examples of inherently waste-like materials include certain dioxin-containing wastes.
* **A Discarded Military Munition**: Military munitions are all ammunition products and components produced for or used by the U.S. Department of Defense (DOD) or U.S. Armed Services for national defense and security. Unused or defective munitions are solid wastes when:
  + abandoned (i.e., disposed of, burned, incinerated) or treated prior to disposal;
  + rendered no recyclable or no usable through deterioration; or
  + Declared a waste by an authorized military official.  
    Used (i.e., fired or detonated) munitions may also be solid wastes if collected for storage, recycling, treatment, or disposal.
* **Recycled in Certain Ways:** A material is recycled if it is used or reused (e.g., as an ingredient in a process), reclaimed, or used in certain ways (used in or on the land in a manner constituting disposal, burned for energy recovery, or accumulated speculatively). Specific exclusions to the definition of solid waste are listed in the Code of Federal Regulations (CFR). Many of these exclusion are related to recycling

1. **Waste Collection Systems**

Waste Collection Systems comprise of household and neighborhood (primary) waste containers, primary and secondary collections vehicles and equipment, and the organization and equipping of collection workers, including the provision of protective clothing. Selection of collection equipment should be based on area-specific data on waste composition and volumes, local waste handling patterns and local costs for equipment procurement and operation and maintenance (labor, fuel, lubricants, tires, etc.).

Regarding the design of local waste collection systems, the most effective results may be obtained through the participation of the concerned communities. Where appropriate, the objectives of material recovery and source separation should be considered. The introduction of source separation must be done in a pragmatic and incremental manner, however, beginning with pilot activities to assess and encourage the interest and willingness of users to participate.

To extend service coverage, especially in low-income areas, the use of low-cost, community managed primary collection systems should be considered. In the interest of lower costs and efficient operation and maintenance, appropriate, standardized and locally available equipment should be selected. Design and procurement should be made with close attention to the requirements of preventive maintenance, repair and spare parts availability. The privatization of Maintenance and repair may be considered as a means of lowering maintenance costs and optimizing equipment utilization.

1. **Transfer Systems**

Transfer systems include temporary waste storage and transfer points, vehicles and equipment for waste transfer, and the procedures for operating and maintaining these facilities and equipment. Design and expansion of transfer facilities and equipment must match the characteristics of local collection systems and the available capacity of environmentally safe disposal facilities.

The size, number and distribution of transfer stations must be carefully designed to facilitate local collection while achieving efficient transfer operations and minimum transport distances and costs. Detailed cost analysis is required to determine the optimal solution.

The technical characteristics and design of transfer points and vehicles must consider the characteristics of local collection systems (hand cart dumping requirements, etc.). Careful attention must be given to the objectives of reducing local pollution and limiting, as far as possible, the access of rats and insects. Transfer points are often a choice location for scavengers ‘activity, and arrangements should be explored for accommodating scavenging without accentuating local pollution problems.

Semisolid wastes such as mud and nights oil are considered to be the responsibility of liquid waste management systems. While hazardous industrial and medical wastes are, by definition, not components of municipal solid waste, they are normally quite difficult to separate from municipal solid waste, particularly when their sources are small and scattered. MSWM systems should therefore include special measures for preventing hazardous materials from entering the waste stream and to the extent that this cannot be ensured alleviating the serious consequences that arise when they do. Finally, debris from construction and demolition constitute, difficult, categories of waste which also re-quire separate management procedures.

* 1. **Explain the importance of the following MSW properties in solid waste management or treatment**.

Municipal solid waste is defined to include refuse from households, non-hazardous solid waste from industrial, commercial and institutional establishments (including hospitals), market waste, yard waste and street sweepings. Semisolid wastes such as sludge and nights oil are considered to be the responsibility of liquid waste management systems. While hazardous industrial and medical wastes are, by definition, not components of municipal solid waste, they are normally quite difficult to separate from municipal solid waste, particularly when their sources are small and scattered. MSWM systems should therefore include special measures for preventing hazardous materials from entering the waste stream and to the extent that this cannot be ensured, alleviating the serious consequences that arise when they do. Finally, debris from construction and demolition constitute difficult categories of waste which also re-quire separate management procedures.

Management is a cyclical process of setting objectives, establishing long-term plans, programming, budgeting, implementation, operation and maintenance, monitoring and evaluation, cost control, revision of objectives and plans, and so forth. Management of urban infrastructure services is a basic responsibility of the municipal government. It is usually advantageous to execute service provision tasks in partnership with private enterprises (privatization) and/or with the users of services (participation), but the final responsibility remains that of the government. Municipal solid waste management (MSWM) is a major responsibility of local governments, typically consuming between 20% and 50% of municipal budgets in developing countries. It is a complex task which depends as much upon organization and cooperation between households, communities, private enterprises and municipal authorities as it does upon the selection and application of appropriate technical solutions for waste collection, transfer, recycling and disposal. Furthermore, waste management is an essential task which has important consequences for public health and well-being, the quality and sustainability of the urban environment and the efficiency and productivity of the urban economy. In most cities of developing countries, waste management.

* 1. **Outline the advantages and disadvantages of source separation of MSW**

Governments of municipalities in Vietnam experiencing dynamic economic growth and dramatic population increases have been struggling to manage increased amounts of municipal solid waste (MSW). This study aimed to clarify the advantages and disadvantages of the current MSW collection service for citizens of the four central districts in Vietnam, by conducting interviews with 200 households and 200 business entities regarding their satisfaction with the service. The survey results showed that Hanoi city provides an economical collection service with sufficient frequency and at appropriate times for citizens. However, a number of citizens complained about unsanitary conditions in the area surrounding their residence. Business entities had sufficient motivation to sell recyclable waste (RW) to the informal sector, not only to derive revenue from selling RW, but also to reduce the amount of MSW generated, thus reducing the MSW collection fee. Households were not motivated to reduce MSW by selling RW to the informal sector because they paid a fixed collection fee. As a result, an improvement in living standards in the near future is expected to contribute to increasing the amount of MSW generated from households.

**Advantages**

After the incineration process is complete, the total mass of the remaining garbage can be reduced by up to 85 percent, while its volume may shrink by as much as 95 percent. In small countries, or in municipalities where landfills are full and additional space is scarce, this type of mass and volume reduction can be a godsend.  
1- **Elimination of groundwater contamination**

Leachate is thick pea-soup-like slurry of liquid garbage, which is formed every time precipitation falls on landfill. It is this contaminated mixture that can penetrate underground aquifers and [pollute them](https://greentumble.com/the-most-threatening-sources-of-groundwater-pollution/) with unsafe quantities of salts, heavy metals and volatile organic compounds, plus other toxic or corrosive chemicals or substances found in household trash.

**2- Energy generations**

As of 2016, there were approximately 2,200 waste-to-energy power plants in operation around the planet. These facilities burn garbage at a high temperature to boil water and power steam generators, which then [produces electricity](https://greentumble.com/waste-to-energy-how-to-produce-energy-from-garbage/) that can be distributed on the power grid.

## On average, one such facility can burn up to 300 million tons of garbage per year, converting it into power that reduces the load on coal-fired power plants, which of course are a [disaster for the environment.](https://greentumble.com/pros-and-cons-of-fossil-fuels/#climate)

## Disadvantages

**1- High expense**

Incineration facilities accrue significant costs for site studies, permits, construction materials, labor, and local infrastructure modification (providing water, power, road access, etc.).In the long run, they may save cities, counties or societies money by reducing the need for landfills and by helping reduce the environmental impact of garbage disposal. But that is small consolation for local or state governments with tight budgets or for the taxpayers who that are expected to foot the bill for all new waste incinerator facilities costs.

### 2-Opportunity costs

Perhaps the most important objection to incineration of solid waste arises from the concept of opportunity costs—that is, the idea that the actions we take automatically preclude other actions, which might be more effective if we gave them the chance. Some critics of incineration claim that incineration ultimately encourages more waste production because incinerators require large volumes of waste to keep the fires burning, and local authorities may opt for incineration over recycling and waste reduction program.

* 1. **Discuss the challenges faced in disease surveillance.**

When it comes to foodborne disease surveillance, detection, investigation and response, there often is a lack of clarity over roles and responsibilities and decision-making authority. Staff qualifications and training levels vary and staffing levels have been declining.

Staffs who conduct these investigations usually have many responsibilities in addition to foodborne disease. Epidemiologists are conducting surveillance for many diseases and often have multiple investigations they are juggling at the same time, nurses who interview illness cases may also be providing immunization clinics and visiting homebound patients. Regulatory staffs have inspection quotas to meet. Federal or state epidemiologists may need a follow-up interview on a sporadic case of illness that is a PFGE match to other sporadic cases around the country. Local nurses may have to juggle that request with their need to visit patients and conduct clinics. Think back to the confusion during the government response to Hurricane Katrina. In multi-state foodborne outbreak investigations, government agencies at multiple levels are trying to work in a coordinated way with people they will never meet and over multiple time zones.  The scale of such outbreak investigations is not as large as the hurricane response, but the coordination challenges can be similar. Some of the smaller agencies that do not conduct many foodborne disease outbreak investigations suddenly find themselves thrust into a situation they are inadequately staffed or prepared for.

Government at all levels is facing serious challenges with the loss of funding that translates into vacancies not being filled, supplies/equipment not being purchased or replaced, staff salaries and benefits being cut and travel being restricted. Experienced staff is leaving for retirement before benefits are lost or to take better paying jobs elsewhere. New staff may not come with sufficient education/training for their functions and there is little or no funding to train them once they are on the job. Cuts in training, salary and benefits for new government hires will result in a different workforce in the future. We cannot predict what impacts this different workforce will have on government foodborne disease activities. A discussion about government foodborne outbreak investigation challenges would not be complete without mentioning information/data sharing.

All parties involved in outbreak investigations are prohibited from sharing patient identifiers, regulatory agencies are sometimes prohibited from sharing commercial confidential or proprietary information (processing methods, customer lists) as well as investigational findings that might be used in any future enforcement actions. Some agencies have more institutional resistance to sharing information than others. These laws, regulations and policies can slow down investigations and lead to friction between investigation and response organizations over access to information. Similarly, the food industry is looking for information about what is going on to help them inform government investigations, focus and speed up recalls and to rapidly put in place interventions to prevent future outbreaks. Consumer groups and the public want actionable information quickly to protect themselves and their families. Government agencies are looking for ways to be more transparent, but progress has been slow so far.

**Epidemiology Challenges**

Typical foodborne disease outbreak epidemiological investigations involve analytic studies to determine statistically significant associations between certain food exposures and illness. This is an iterative process, because the contaminated food is not known at the beginning of the investigation and may not be identified by the initial epidemiological studies. Further, initial laboratory and environmental information may not be sufficient to help identify the vehicle. The investigations move as quickly as possible to identify the food and thereafter prevent additional exposures and illnesses. These investigations usually do identify the correct food, but mistakes have been made. Every investigation faces the same dilemma of needing to be fast to prevent additional illness and needing to be right to prevent identifying the incorrect food.

One of the key jobs of an epidemiologist is to collect and analyze disease data. The data needs to be accurate if the conclusions drawn from it are to be accurate. Much of epidemiologists’ time, therefore, is spent trying to improve the quality of the data they collect and trying to find ways to get more and better data. The skills to perform these tasks are most likely gained with a graduate degree in epidemiology and yet many epidemiology offices have few if any staff trained at this level. Most epidemiologist’s, and public health laboratory staff, who conduct foodborne disease surveillance at the state and local level are funded by CDC grants, not the state or local agency they work for. That funding has been shrinking.

This loss of disease surveillance capacity could pose a longer-term dilemma along with the obvious loss of immediate outbreak detection capacity. The impact of the 2011 Food Safety Modernization Act on food safety will not be measurable if state and local agencies do not have the capacity to detect any changes in disease incidence and prevalence resulting from implementation of the act. Would any hoped for reduction in reported sporadic cases of illness and outbreaks mean that food is safer or that surveillance is less robust?

**Food Regulatory Challenges**

This part of the foodborne disease outbreak system is all about what are we going to do about the outbreak / contamination? A bad thing has happened; food may have made people sick. Who did this and what are we going to do about it? Are our objectives, to prevent more illnesses or to take some kind of regulatory or punitive action against the wrong doer? Can we have it both ways? The historical approach to environmental health/food regulatory investigations in response to food outbreaks has been to conduct regulatory inspections at locations implicated:  food service, retail, manufacturing and production and to take regulatory action of some sort to “remedy” the problem and punish a responsible party.

Regulatory actions might include food seizures, citations for violations of regulations, recalls of food, public alerts and even closure of a firm. Investigators are expected to get all of this done quickly and because they are regulators to do so following the appropriate procedures and legal restrictions on how they conduct their activities. Firm operators are expected to cooperate with the regulatory investigations in the face of allegations that they have made customers ill, that they likely will face bad publicity, loss of money, possible government and or private legal action and loss of reputation.

* 1. **Explain 5 diseases that can be prevented by observing proper sanitation.**

Faecal-oral infections are transmitted directly through faecally contaminated hands, food, water or soil. The pathogen must be ingested to cause infection.

1-Schistosomiasis needs to develop in a freshwater snail before it can infect people. The pathogen infects people by penetrating skin which is in contact with infected surface water. Water-based helminthes with two intermediate hosts (e.g. fasciolopsiasis, clonorchiasis) need to develop in two freshwater intermediate hosts before they become infectious to people. Transmission occurs when the second intermediate host is eaten without being properly cooked

2-Soil-transmitted helminthes (e.g. hookworm disease and roundworm infection) have to develop in soil before they can infect people. Some of these helminthes infect people by penetrating their Skin when they are in contact with contaminated soil; others infect people when ingested. Beef tapeworm and pork tapeworm have to be ingested by cattle or pigs and development in them. People are infected by eating poorly cooked beef or pork.

3-Cysticercosis, a complication of pork tapeworm, is transmitted like a faecal-oral infection from person to person.

4-Leptospirosis is mainly transmitted through direct skin contact with water or material Contaminated with the urine of infected rats.

5-Vectors which benefit from inadequate sanitation include domestic flies, cock-roaches, and Culex mosquitoes. Domestic flies, which can transmit several faecal-oral infections including conjunctivitis, Trachoma, and yaws, can breed in, and feed on, excreta Cockroaches, which have the potential to transmit several faecal-oral infections, can feed on excreta and hide in sanitary structures. The mosquito Culex quinquefasciatus, a vector of filariasis and several arboreal infections, can breed in the polluted liquids in latrines and cesspits or septic tanks

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