PRACTICE Greenhealth

## EPA Pharmaceutical Grant at Albany Medical Center

A typical hospital formulary may contain approximately 2,700 medication, about 4.4% of which is hazardous and about 5% controlled substances. Albany Medical Center received an EPA grant to identify best management practices around the complexities of pharmaceutical waste management in the health care setting. While there are laws in place to segregate medication, some hospitals are going beyond compliance to prevent pharmaceuticals from ending up in drinking water through sewer or drain disposal. Albany Medical Center and Albany Medical College segregate ***all*** of their medication waste. No wastes are flushed, poured, drained or placed into regular waste containers.

The grant was a pilot that was started at the south campus, a 20 bed day facility, and rolled out to the main facility. Albany Medical Center felt that the nurses should not have to identify the proper bin for the various types of pharmaceuticals so they simply segregate all of them into one blue container, located in soiled utility rooms and other convenient locations. These 200+ satellite accumulation areas are serviced three days a week by a vendor partner and segregated after pick up by the vendor into RCRA hazardous and non-RCRA hazardous waste on site. The RCRA waste drugs are removed by a hazardous waste hauler for hazardous waste incineration. This is a very small amount of waste. The nurses are a driving force behind the initiative, due to their deep concern about pharmaceutical impact on the environment. If there are segregation concerns, the partnering vendor helps with ongoing auditing, feedback and education.

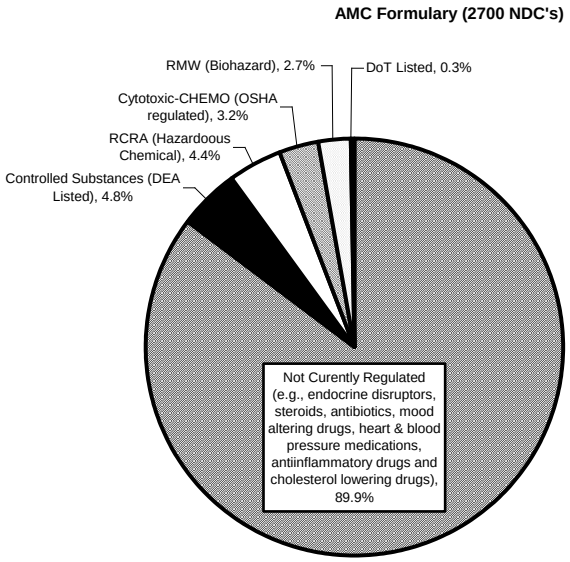
Controlled substances, which are narcotics that the state and federal government have listed as drugs of abuse and able to cause addiction, are a much more significant portion of the waste. The most common method of controlled substances disposal in the sector is witnessed sewer disposal. To move away from this approach, Albany Medical worked with the DEA and the New York State Bureau of Narcotic Enforcement to develop an environmentally responsible method of destroying narcotics. While there are conflicts between the federal and state laws, Albany has managed to get approval from both agencies to “waste” their controlled substances into a sticky material, which is considered unrecoverable and unrecognizable and this makes the material “destroyed.” The agencies are working hard to change the rules so that environmentally responsible destruction is possible without the current practice of wasting directly into the sewer or drain, where it ends up in the drinking water. After the material is “destroyed” in the absorbent material, it is removed for incineration at a regulated medical waste facility. Another added challenge of discarding controlled substances is the requirement to have the event witnessed by another.

The nonhazardous pharmaceuticals, like antibiotics, which are often drained into sinks or discarded in the regular waste, are also an environmental problem. Many of the drugs discarded this way are persistent in the environment and accumulate in the biosphere. Dumping antibiotics into the water supply introduces the antibiotics into the sewage and provides an opportunity for antibiotic resistant bacteria to be selected and enhance the frequency of MRSA and antibiotic resistance in the community. Russ Mankes, Phd., Assistant Professor of Neuropharmacology and Neuroscience; and Immunology and Microbial Disease at Albany Medical College, believes that the burning of pharmaceuticals at high

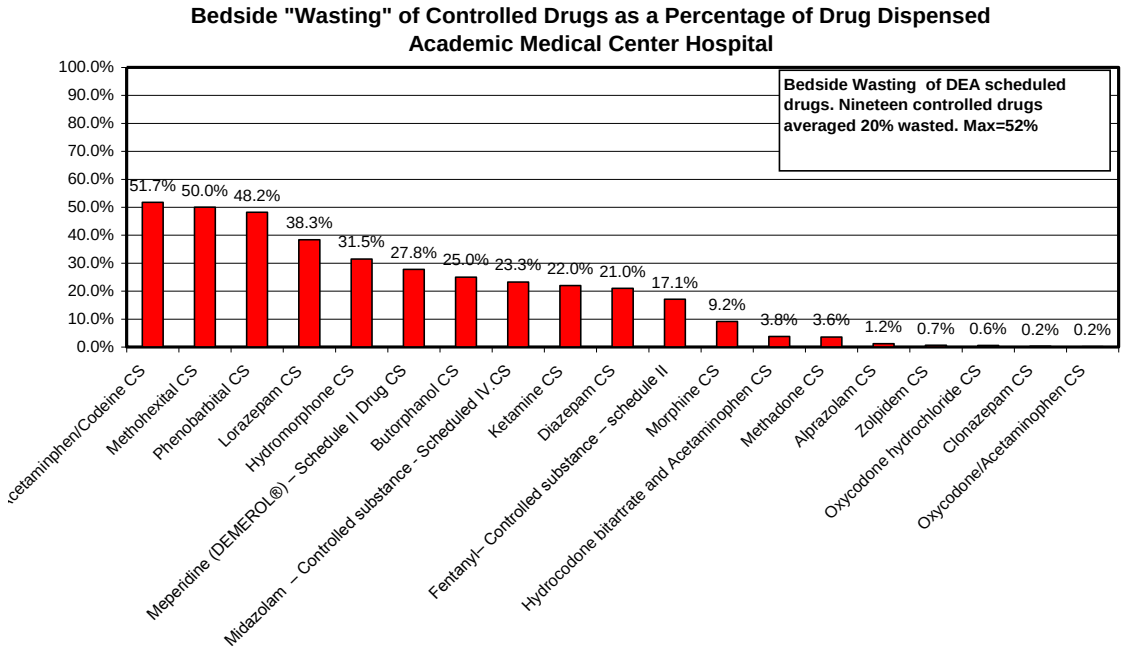
temperature in an approved incinerator prevents them from entering the environment and drinking water. So these medications are removed and incinerated with the regulated medical waste or *red bag wastes.*

***Albany Medical Center (AMC) Formulary Pie Chart showing % of drugs in each classification:***

*May be more than 100% as many formulations* may have multiple hazards
(e.g., RCRA and Chemo, RCRA and RMW, etc).




Bedside wasting of controlled drugs. As depicted in the graph below, 19 of the controlled drugs dispensed at AMCH were recorded as wasted averaging 20%. The wasting was highly variable, ranging from 52% for acetaminophen/codeine to 0.2% for oxycodone/acetaminophen and was primarily associated with liquid drug formulations. Tablets or capsules were rarely recorded as wasted. The average PBT ranking for these 17 CS was 5.4/9 with one drug (fentanyl – 17.1% wasted in the highest (7/9) ranking. Ten were not rated, three were blank for PBT. The environmental risk ratio for these 19 was minimal with 10 drugs Not rated, 3 Insignificant and 6 Cannot be excluded. Ten had basic ecotoxicity data provided by the MSDS. Only fentanyl was noted as ”acutely toxic to zebra fish”. Most (18/19 or 13/19) were metabolized in vivo or excreted unchanged. Only 5/19 produced pharmacologically active metabolites.



For the surgical care center (SCC), only five of the 18 controlled substances (CS) dispensed from automated dispensing machines (Pyxis®) were recorded as wasted. As depicted in the graph below wasting averaged 27% of the drug dispensed and varied from a maximum of 49.9% (acetaminophen/codeine) to 1.0% for hydrocodone/acetaminophen. The average PBT ranking for these 5 CS was 4.5/9. Two were not rated, one was blank for PBT. The environmental risk ratio for these 5 was minimal with 2 drugs Not rated, 2 Insignificant and 1 Cannot be excluded. Three had basic ecotoxicity data provided by the MSDS. Five of five or 4/5 were metabolized in vivo or excreted unchanged and no drug was known to produce pharmacologically active metabolites.

**Bedside "Wasting" of Controlled Substances as a Percentage of Drug Dispensed at a Surgical Care Center**