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UNITED STATES POSTAL SERVICE
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I. SUMMARY

In July 1993, the National Institute for Occupational Safety and Health (NIOSH) received a joint request from representatives of the National Postal Mail Handlers Union, Local 300, and the New York Metro Area Postal Union to evaluate procedures for preventing worker exposures to medical specimens and waste sent through the mail at the United States Postal Service New Jersey International and Bulk Mail Center (NJI & BMC) in Jersey City, New Jersey. On November 3-4, 1993, NIOSH investigators conducted an industrial hygiene and medical survey to look at these issues.

A walk-through survey of the facility was conducted. Written policies and programs for bloodborne pathogens and emergency response procedures were evaluated. Incident reports and medical records were also reviewed. Informal interviews were conducted with management and employees.

The written bloodborne pathogen and emergency response plans for the NJI & BMC facility were found to be in compliance with current Occupational Safety and Health Administration (OSHA) regulations. During the walk-through survey, a torn package (plastic envelope) found in the First Class Mail area contained a blood sample and needle which could easily have fallen out of the package. Several packages labeled as biohazards were also pulled out of the Bulk Mail conveyor stream during the walk-through. Two of the packages had been damaged but the contents remained intact. The log of recorded incidents identified problems with loose needles and sharps containers in the Bulk Mail conveyor system.

Between 1990 and 1993, four exposure incidents related to medical specimens and waste were reported. Three of the four reported exposures involved employees whose fingers were pricked by potentially contaminated hypodermic needles while handling packages. The fourth concerned an incident of skin contact with unidentified fluid that was dripping from a damaged biological waste container. The employees were all treated by health care professionals.

The U.S. Postal Service and the NJI & BMC facility have implemented written policies and procedures that are designed to reduce employee exposures to medical waste and specimens that are shipped through the mail. Even though regulations mandate biohazards be sent by at least First Class Mail, these types of packages are often shipped incorrectly and, as a result, are entering the mechanized Bulk Mail stream, where the packages can be easily damaged. Recommendations for reducing the risk of employee exposures to bloodborne pathogens are given in Section VIII of this report.

KEYWORDS: SIC 4311 (United States Postal Service), bloodborne pathogens, medical waste, medical specimens, needlestick injuries, emergency response.

II. INTRODUCTION

In July 1993, the National Institute for Occupational Safety and Health (NIOSH) received a joint request from representatives of the National Postal Mail Handlers Union, Local 300, and the New York Metro Area Postal Union to evaluate procedures developed to prevent worker exposures to medical specimens and waste sent through the mail at the United States Postal Service New Jersey International and Bulk Mail Center (NJI & BMC) in Jersey City, New Jersey. The request was prompted by union concerns about employees handling containers of medical specimens and medical waste, and resultant exposure to the contents of broken containers, including needlesticks. On November 3-4, 1993, NIOSH investigators conducted an industrial hygiene and medical survey to look at these issues.

III. BACKGROUND

The NJI & BMC facility was opened in 1973. The 1.6 million-square foot facility consists of eight distinct buildings/areas: the Bulk Building, the International Building, the Military Building, the Foreign Inbound Mezzanine, the Administration Building, the Maintenance Penthouse/HVAC Area, the Container Repair Annex, and the Vehicle Administration Building. The center has 275 loading docks and over 25 miles of conveyors for moving mail. This investigation was centered in the Bulk Building. The facility handles approximately 1/2 million parcels daily. There are about 3,300 employees, 1,000 of whom handle packages.

Incoming Bulk and First Class Mail is transported to NJI & BMC in large trucks. The mail arrives in mail sacks (approximately 60 pounds in weight), boxes, or large bins. Conveyor belts are moved into the trucks, and the sacks and boxes are manually loaded onto the conveyor belts. The conveyors are monitored from a central control office. Mailhandlers spot check items entering the conveyor system for proper packaging. There are two conveyor lines for parcels, bins, and sacks from other areas in the facility and some of the local post offices. These two lines are automatically unloaded. The contents of the sacks and bins are not known until they are dumped on the conveyor.

Miscellaneous papers and other debris from the conveyor lines are collected in hampers and sorted on the debris culling line. Packages that opened during the sorting process are put in barrels and sent to the rewrap area. There, the packages are hand-sorted, repackaged using shrink wrap, and placed back into the mail stream.

According to management and union representatives, when packages are identified in the Bulk Mail stream as biohazards, they are pulled and put on the supervisor's desk for processing. An Irregularity Form is sent to the originating office of the package explaining that First Class Mail (medical waste or specimens) was sent to the non-preferential facility where it could enter the Bulk Mail stream. Often packages are sent return postage due and have no return address. Each day, employees pull approximately 10 to 30 packages, which contain biohazards, from the Bulk Mail stream. About 50% of these boxes do not have return addresses.

According to the emergency response plan for the facility, incidents involving potential biohazards are dealt with in the following manner. Disposable absorbent towels are placed

around the area to contain any spilled liquid. Tools and a three glove no-touch technique are used to pick up sharps to avoid contact. A rigid plastic container is used to contain the sharps. Other material is placed in double red plastic bags. The containers containing the material or sharps are placed in the hazardous material response team (HAZMAT) response vehicle container and taken to the HAZMAT block house for disposal. The areas are then cleaned up using Chlorasorb, a biocide.

The Registered Mail area has a special loading dock. It is a secure area and handles a few thousand parcels per day. Registered Mail is loaded and unloaded by hand with minimal mechanical handling. All packages are documented and logged with a chain of custody. The First Class Mail area has two conveyors and is automated.

An Occupational Safety and Health Administration (OSHA) inspection was conducted at this facility between November 1990 and February 1991. The inspection, which was conducted before the OSHA bloodborne pathogens standard[1] took effect, identified routine and potential exposure to medical waste (which may contain human immunodeficiency virus [HIV] or Hepatitis B virus [HBV]) as a hazard at NJI & BMC. Exposure could occur during the handling of packages containing medical waste and during the clean-up of spills from these packages. OSHA inspectors suggested that the medical waste mailing regulations be amended to require that medical waste be sent by Registered Mail. This change would help insure proper packaging, eliminate the automated handling of medical waste packages (which can lead to increased breakage), and identify the generator in case a problem arises during shipment.

IV. EVALUATION CRITERIA AND GUIDELINES

A. HEALTH REGULATIONS

In 1989 NIOSH, in conjunction with the Centers for Disease Control and Prevention (CDC), released guidelines to reduce the potential of HBV and HIV exposure to public-safety and emergency-response workers.[2] The central principle behind these guidelines is referred to as universal precautions. Universal precautions should be followed when workers are exposed to blood, certain other body fluids (amniotic fluid, pericardial fluid, semen, vaginal secretions, etc.), or any body fluid visibly contaminated with blood. In the United States in 1993, there were 12,106 HBV cases and 93,282 Acquired Immunodeficiency Syndrome (AIDS) cases reported to the CDC.[3]

The universal precautions principle has been incorporated into the OSHA bloodborne pathogens standard. The OSHA regulation on bloodborne pathogens, 29 CFR 1910.1030, took effect on March 6, 1992.[1] The OSHA standard covers all employees who may be reasonably anticipated to be occupationally exposed to blood and other potential infectious materials. The key requirements of the standard are the determination of occupational exposure, and the implementation of appropriate control measures and work practices to minimize these exposures. The following section outlines the major requirements of the bloodborne pathogens standard.

1. Written Exposure Control Plan

   - Identification of job classifications where there is exposure to blood or other potentially infectious materials.

   - Identification of protective measures currently in effect at the facility.

   - Establishment of procedures to evaluate the circumstances of an exposure incident.

2. Hazard Communication to Employees

   - Implementation of employee training programs which should include information on bloodborne pathogens, OSHA regulations, and the employer's exposure control program.

3. Preventive Measures

   - Hepatitis B vaccination should be provided within 10 working days of initial job assignment at no cost to the employee.

   - Application of the universal precautions approach that requires that all human blood and other potentially infectious materials be treated as if they were infected with HBV and HIV.

4. Engineering and Work Practice Controls

   - Use of puncture-resistant, leak-proof containers (color-coded red or labeled as a biohazard) to discard or transport sharps and other potentially infectious material.

   - Use of work practice controls to reduce the probability of exposure by altering the manner in which the task is performed.

5. Personal Protective Equipment (PPE)

   - Use of gloves, face shields, face masks, protective clothing and other PPE to reduce workers' risk of exposure.

6. Procedures after Exposure Incident

   - Employee must be directed to health care professional.

   - Medical evaluations and follow-up at no cost to individual.

7. Recordkeeping

   - A medical record must be established for each employee with potential occupational exposure. The record must be confidential and separate from other personnel records.

   - Training records must be kept for three years.

On July 6, 1992, OSHA announced that it would allow employers to offer HBV vaccinations to first aid providers after they had given first aid rather than offering pre-exposure vaccinations. The other requirements of the bloodborne pathogens standard would remain the same for these employees.

B. REGULATIONS CONCERNING THE SHIPMENT OF BIOHAZARDS

1. United States Postal Service

   Package and current mail class requirements for mailing medical waste are listed in the Domestic Mail Manual (DMM) Section CO42: Hazardous Materials - Section 8.0: Etiologic Agent Preparation, Clinical Specimens and Biological Products (Issue 46: 7/1/93).[4] Etiologic agent preparations must be packaged in a securely sealed and watertight container, which is then enclosed in a second sealed, watertight, and durable container. There must be enough absorbent material between the two containers to absorb the entire contents of the primary container(s) in case of breakage. The primary and secondary containers must be enclosed in an outer shipping container and bear the International Etiologic Agents/Biohazard Material label. These packages must be sent by First Class Mail, Priority Mail, or Express Mail.

   Clinical specimens and biological products (such as urine or blood specimens not reasonably believed to contain an etiologic agent [e.g., specimens for routine medical tests]) must be packed in a sealed primary container, with sufficient material to withstand shock and absorb the contents in case of leakage, and a secondary container of leak proof material. The packages should be labeled as clinical specimens.

Sharps must bear the international biohazard symbol and be mailed only as First Class or Priority Mail. Used sharps must be packaged in a sealed, leak resistant, and puncture resistant primary container, which is packaged inside a watertight secondary containment system. Several primary containers can be enclosed within a secondary containment system. The secondary containment system must be enclosed in a watertight outer shipping container constructed of heavy-weight material containing absorbent material. The maximum allowable weight of the package is 35 pounds. Each package design has to meet specific environmental and test conditions specified in 49 CFR 178 (U.S. Department of Transportation). Each package must have a four-part manifest or mail disposal shipping record. Each distributor or manufacturer of kits and packaging to be used to mail sharps needs to obtain an authorization form from the United States Postal Service (USPS). A letter of credit or surety bond is required to cover disposal costs if the manufacturer or distributor goes out of business. Other used medical devices must also be packaged using double leak-proof packaging with absorbent material.

According to management, current guidelines for postal clerk personnel indicate that: if the international biohazard symbol appears on any item, it should be considered, at a minimum, First Class Mail, regardless of what the label or postage indicates. This will prevent these items from entering the Bulk Mail stream.

2. Centers for Disease Control and Prevention

Several other agencies have also developed regulations for shipping medical waste and specimens. CDC has published regulations on the interstate shipment of etiologic agents (42 CFR Chapter 1 - Part 72).[5] These regulations require packages to be packed to withstand leakage of the contents, shocks, pressure changes, and other conditions incident to ordinary handling in transport. Certain etiologic agents listed in the regulations are to be sent by Registered Mail or an equivalent system which provides notification of receipt to the sender upon delivery.

3. United States Department of Transportation

The U.S. Department of Transportation has published regulations on the shipment of regulated medical waste (49 CFR, Chapter 1:173.197).[6] The packages must be rigid, leak resistant, impervious to moisture, able to withstand normal handling during shipping, sealed to prevent leakage during transport, puncture resistant for sharps and sharps with residual fluids, and break resistant and tightly sealed for fluids in quantities greater than 20 cubic centimeters (cc).

4. United States Environmental Protection Agency

The United States Environmental Protection Agency (EPA) established a demonstrative tracking system for medical waste under 40 CFR Chapter 1 Part 259 - Standards for the Tracking and Management of Medical Waste.[7] The program was to be effective from June 1989 to June 1991 for the States of Connecticut, New Jersey, New York, Rhode Island, and the Commonwealth of

Puerto Rico. The State of New Jersey has continued to use this tracking system. Exemptions to this tracking system included: (1) generators of less than 50 pounds of medical waste per month; (2) shipments between the generator's facilities, and (3) shipments of regulated medical waste through the USPS. Under the EPA system, shipments sent through the USPS were required to be sent Registered Mail, return receipt requested (indicating to whom the package was sent, signature, date, and address where delivered). The generator must compile a shipment log and maintain the original receipt and the returned mail receipt. For non-exempt shipments, packing requirements must ensure that the packages of regulated medical wastes should be placed in containers that are rigid, leak-resistant, impervious to moisture, sufficiently strong to prevent tearing or bursting under normal conditions of use and handling, and sealed to prevent leaking during transport. Sharps should be packaged in puncture resistant containers. The trial program required tracking forms on which generator, transporter, and destination facility signed off on each step in the process. Regulated wastes included: cultures and stocks, pathological wastes, human blood and blood products, sharps, animal waste, isolation waste, and unused sharps. The tracking system also covered on-site incinerators.

5. Research and Special Programs Administration for Hazard Waste Shipping

Effective as of January 1, 1994, the Research and Special Programs Administration for Hazard Waste Shipping required that quantities of medical wastes or infectious substances under 50 cc must meet United Nations (UN)-recommended infectious substance packaging and shipping rules.[8] The packages must travel by rapid or overnight delivery services. The UN general packaging requirements for medical waste or infectious substances include inner packaging comprised of a watertight primary receptacle, a watertight secondary packaging, and an absorbent material which must be placed between the primary receptacle(s) and secondary packaging. The secondary packaging must meet specific strength requirements. An itemized list of contents must be included and the outside of the package must carry the name and telephone number of a person responsible for the shipment.

V. METHODS

NIOSH investigators conducted a walk-through survey of areas in the Mail Center which had the potential for handling medical specimens and medical waste. These areas included Bulk/Fourth Class Mail (receiving, parcel sorting, debris sorting, and rewrap areas), First-Class Mail, and Registered Mail.

Written policies and programs for bloodborne pathogens and emergency response procedures were evaluated. Incident reports were also reviewed. Medical records of all four workers that reportedly had contact with blood or other potentially infectious biomedical materials were examined. Informal interviews were conducted with management and union representatives, safety personnel, managers, and randomly selected employees of the First Class, Bulk/Fourth

Class, and Registered Mail departments. Medical staff located at the facility were also interviewed.

VI. RESULTS/DISCUSSION

A. INDUSTRIAL HYGIENE EVALUATION

The written blood-borne pathogen and emergency response plans for the NJI & BMC facility were reviewed and found to be in compliance with current OSHA regulations.[1,9] HBV vaccine was provided to employees in patient services (the staff who provide health services to employees), the HAZMAT response team, the medic alert team, and the confined space rescue team. The facility was following the practice of offering HBV vaccine within 24 hours after an exposure incident for non-primary responders according to the OSHA informational release as July 6, 1992. The groups designated for post-exposure Hepatitis B vaccination included rewrap, debris culling belt, and debris chute employees, supervisors, and custodians.

During the walk-through survey, the following potentially hazardous items were identified. A torn package (plastic envelope) in the First Class Mail area contained a blood sample and needle which could easily have fallen out of the package. Approximately ten packages labeled as biohazards were pulled out of the Bulk Mail conveyor stream. Several of these packages had been sent return postage due (i.e., to be paid by the recipient) and had no return address. Two of the packages had been damaged, but the contents remained intact.

The log of recorded incidents (from 1989 to present) kept by the safety department was reviewed. These incidents included a loose bag of needles without identification or packaging material on a conveyor belt; opened sharps containers with needles loose in a box with no absorbent material; a six-gallon sharps container without a box, postage, or labeling in the Bulk Mail stream; a broken plastic sharps container with needles loose in a box; single needles on the conveyor belts; an open package of medical specimen bottles (not all of the bottles were found); and a package that was ripped open, resulting in two sharps containers being punctured by a metal deflector (used to push mail onto a slide) and needles being sent throughout the conveyor belt system.

B. MEDICAL EVALUATION

Employee medical records of the four workers who reportedly had contact with blood or other potentially infectious materials were reviewed. Three workers had reported needlestick injuries of a finger while handling packages, and the fourth employee had reported contact with unidentified biological waste fluids. In the needlestick incidents, the contaminated needles were either poorly packed or the packages had been mechanically crushed during the transporting process. As a result, needles were protruding from damaged packages. All incidents occurred with packages travelling by Bulk/Fourth Class Mail. The incidents occurred between May 1990 and February 1993. Immediately after the exposure, all three employees were directed to a health care professional. Tests for HIV and HBV were recommended, and when appropriate, HBV

vaccinations were provided. The medical evaluations and follow-up were provided at no cost to the individuals. A medical record was established for each employee with an occupational exposure.

In the incident of skin contact with fluids that were dripping from a damaged biological waste container, the employee was directed to a health care professional. The remaining fluids in the package tested negative for bloodborne pathogens.

VII. CONCLUSIONS

Even though regulations mandate biohazards be sent by at least First Class Mail, these types of packages are entering the Bulk Mail stream. The incident log, walk-through survey, and medical records documented the potential for employee exposures, especially to sharps, in the Bulk Mail department. The USPS and the NJI & BMC facility have implemented written policies and procedures that are designed to reduce employee exposures to medical waste and specimens that are shipped through the mail. These policies and procedures are well-designed and apparently well-executed.

VIII. RECOMMENDATIONS

The following recommendations are offered to reduce workers' exposures to potentially infectious agents at this facility.

1. The potential for exposure to sharps and bloodborne pathogens would be reduced if the generators of medical waste and specimens were required to send them by Registered Mail. This would increase the accountability of the generator and enable the postal service to better track the packages.

2. To reduce the potential for puncture wounds, only containers impervious to sharps should be used when collecting and consolidating loose mail for handling.

3. To avoid skin contact with the packages in the culling area, automated dumping systems should be used to load packages onto the culling belt.

4. To limit culling belt worker, mail handler, and rewrap employee contact with the packages, hand held tools, such as mechanical or vacuum devices, instead of gloved hands, should be used to separate machinable from non-machinable mail.

5. The USPS should work with professional societies such as nursing, medical, and dental associations to educate the generators of medical waste and specimens on the use of proper packaging.

IX. REFERENCES

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