Controlling Isoflurane Exposure

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Controlling Isoflurane Exposure

Passive Dosimeters Placements in Small Animal Surgery Room
Overview

- Issue
- Objectives
- Process Improvement
- Data Management
- Lesson Learned
Issue

Routine laboratory sample report indicated DA personnel assigned to local animal research facility were being exposed to elevated levels of isoflurane.
Objectives

- Use the process improvement approach to minimize and/or eliminate DA personnel exposure to waste anesthetic gases (isoflurane)
- Minimize negative impact to research protocols
- Share lessons learned
- Discuss data management via DOEHRS-IH
PROCESS IMPROVEMENT
F-O-C-U-S   P-D-C-A

● Find a Process to Improve
● Organize a Team
● Clarify Knowledge
● Understand the Process
● Study Process

● Plan the Process Improvement
● Do the Process Improvement
● Check the Process
● Act to Hold the Gain
Find a Process to Improve

Monitoring & Controlling DA Personnel Exposures

Isoflurane Trending Upward

Exposure Level (PPM)

Data source: DDEAMC, Preventive Medicine Careline – Industrial Hygiene Section, October 2010
Organize a Team

- Organize Team & Eliminate Cause of Increasing Exposure
- Evaluate:
  - Sampling Errors
  - Procedure Errors
  - Engineering Control Issues
  - Design Issues
  - Maintenance Issues
- Team: IH staff, Research personnel, Senior Leaders
  Clinical Engineering, Maintenance Personnel &
  Equipment Manufacturer’s Technical Rep
  EAMC Environment of Care Committee
Clarify Knowledge

- Where? Clinical Investigation (CI) Animal Research Facility – Operating Room
- Who? Research Physicians and CI Staff
- What? Elevated Exposure To Waste Anesthetic Gas – Isoflurane
- How? FOCUS PDCA
Understand the Cause of the Process

- Review IH Sampling Methods
- Review Research Protocol
- Review Engineering Controls
- Understand Clinical Engineering Preventive Maintenance Process (Leak Tests within specs)
- CI Staff Training (WAG Equipment)
- NIOSH/OSHA Sampling Protocol
- Management Employee Relations
- WAG Equipment Design
- Workload Demand (time constraints & # animals in protocol)
- Exposure, Small vs. Large Animals Procedures
Select - Analyze The Process In Real-Time

Multi Gas Analyzer

WAG Unit 38 PPM

Potential Leak Points

Induction Chamber 297 PPM

Equipment Inspection

Small Animal Nose Cone Interface 1,657 PPM
Plan The Process Improvement

- Advise CI staff of IH Findings (Town Hall Meetings)
- Re-sample Process
- Rotate CI Staff In/Out OR
- Procure Mobile Filtration Units
- Brief EOC Committee
- Conduct Real-time Monitoring
- Use Alternate work location with Local Exhaust
- Phase In Return To Normal Protocol
Do The Improvement – Troubleshoot Process

Data source: DDEAMC, Preventive Medicine Careline – Industrial Hygiene Section, 5 Jan 2011.
Do The Improvement – Controls In Place

- Final Clinical Engineering Checks/WAG Units
- Air flow Studies on Mobile Filtration Units
- Administrative control - Rotation of Staff
- Final confirmation Testing/Exposure Levels
- Confirmation of Root Exposure Cause

****Design Issue With WAG Unit Vaporizer****
Check The Process Improvement Results

Exposure Range - High (H) Low (L) Oct 2010 - Jan 2011

Data source: DDEAMC, Preventive Medicine Careline – Industrial Hygiene Section, 21 Jan 2011.
Act To Hold The Gain

Trend Re-Established within REL

TWA = 0.6 PPM

SAMPLE #s
Sample #s 1-6 taken at Induction chamber; #s 7-30 taken every 15 minutes within operating room @ table # 3

Data source: DDEAMC, Preventive Medicine Careline – Industrial Hygiene Section, 18 Jan 2011.
Act To Hold The Gain
Manage Exposure Data/DOEHRS-IH

DOEHRS-IH Screen Shot Exposure Data Files

Data source: DDEAMC, Preventive Medicine Careline – Industrial Hygiene Section, 18 Jan 2011.
Share Lessons Learned & Celebrate!!!!

- Trust & verify Your Equipment Performance
- Maintain Partnerships
- Changes in Quality Directly Impacts Exposure!!
- Implemented Product Substitution
- Implemented Operational Checklist

<table>
<thead>
<tr>
<th>Replacement Unit</th>
<th>Old Unit</th>
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<tbody>
<tr>
<td>0.4 – 0.9 PPM, Background</td>
<td>1.0 – 7.0 PPM, Background</td>
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Questions?

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