Investigators Trust ChemoAlert™ in Eye-opening Study of Engineering Controls in Veterinary Oncology

CASE STUDY

SECTOR: Veterinary Oncology

CLIENT: Dr. Nicole Northrup, DVM, DACVIM (Veterinary Oncologist)

CHALLENGE

- To assess surface contamination with commonly used antineoplastic agents and the use of engineering controls (C-PEC and CSTD) in a sample of veterinary oncology specialty hospitals, as part of a larger study to assess the risk of exposure to veterinary professionals.

SOLUTION

- ChemoAlert, with its swabbing protocols, kits that can be divided among multiple test locations, ability to test for multiple hazardous drugs with a single swab and AIHA-LAP, LLC accreditation, was the sample-testing kit of choice.
- The researchers selected Maxxam for our recognized expertise in analyzing hospital and pharmaceutical samples, as well as our AIHA-LAP, LLC accreditation.

KEY RESULTS

- The study found no contamination with intravenous chemotherapy drugs in any of the 20 hospitals tested.
- 20% of hospitals were contaminated with oral cyclophosphamide; greater vigilance and additional safety protocols are required with these drugs.
- Many hospitals will need to review and adjust their protocols to ensure compliance with USP < 800 > standards.

READ THE COMPLETE CASE STUDY

Background

The Animal Cancer Foundation estimates that each year the U.S. sees 6 million new cancer diagnoses in dogs, and a similar number in cats. Veterinarians treat these animal cancers with many of the same chemotherapy (antineoplastic) drugs that are used with human patients. A 2006 study by Meijster et al. identified veterinary medicine as an occupation of concern for exposure to antineoplastic drugs, with levels of contamination as much as 15 times greater than in hospitals treating human cancer patients[1]. In order to better understand chemotherapy exposure in veterinary medicine, veterinary oncology investigators undertook a study of surface contamination with commonly used antineoplastic agents in veterinary oncology specialty hospitals in the U.S.

Objective

The objectives of this exploratory study were two-fold: (1) to determine, via self-reporting, which of the engineering controls – C-PEC (containment primary engineering control) and/or CSTD (closed-system transfer devices) – American College of Veterinary Internal Medicine (ACVIM) board-certified veterinary oncologists were using; and (2) to assess surface contamination with commonly used antineoplastic agents and the use of C-PEC and CSTD in a sample of veterinary oncology specialty hospitals.

Methodology

In keeping with its dual objectives, the study was divided into two parts:

1) A survey of veterinary oncologists regarding engineering controls, and
2) Environmental surveillance for four commonly used antineoplastic drugs – carboplatin, cyclophosphamide, doxorubicin and vincristine.

[1] Meijster T, Fransman W, Veldhof R, Kromhout H. Exposure to antineoplastic drugs outside the hospital environment. Ann Occup Hyg 2006;50:657-664.

Part 1 comprised an online survey sent to practitioners who were:

a) Board-certified in the Specialty of Oncology by the ACVIM and
b) Currently practicing clinical oncology. The survey asked participants about their use of C-PEC and CTSD as well as their chemotherapy administration caseload. Responses were submitted anonymously.

Part 2 involved environmental surveillance – the testing of surface areas for contaminants and hazardous drugs and the analysis of the results – at 20 veterinary specialty hospitals. Inclusion criteria were:

1) The presence of an ACVIM board-certified veterinary oncologist who treated patients onsite,
2) The administration of chemotherapy multiple times per week,
3) Location within the U.S., and
4) Use of C-PEC and CSTD falling into one of four specified groups, and
5) Informed consent to participate.

Business Challenge

For Part 2 of the study, the investigators needed to find a commercially available testing kit, a consistent methodology for sampling any surface-area contaminants, and a diagnostic laboratory that could creatively allow the inclusion of multiple hospitals while working within their budget and be trusted to deliver an accurate analysis of the samples– preferably a lab accredited by the American Industrial Hygiene Association Laboratory Accreditation Program (AIHA-LAP, LLC).

Why Maxxam

> **"Maxxam Analytics was chosen because of their recognized expertise in analyzing hospital and pharmaceutical samples…and also for their verified sample integrity with the planned sampling and submission methods. Their analytical technique met the high level of sensitivity required for the study."**
>
> Dr. Nicole Northrup

Maxxam's accreditation by the American Industrial Hygiene Association Laboratory Accreditation Program (AIHA-LAP, LLC) to the ISO / IEC 17025:2005 standard was also a selling point.

The investigators selected Maxxam's ChemoAlert Surface Sampling Kit for the gathering of samples. Dr. Northrup appreciated that ChemoAlert gave her the option of splitting a single kit among multiple hospitals, which enabled her to include a greater number of hospitals while also realizing cost savings. ChemoAlert included clear instructions and swabbing protocols, which contributed to a consistency of results across testing locations. ChemoAlert is also AIHA-LAP, LLC-accredited which is key in ensuring quality, accuracy and adherence to standard practices.

Key Results

As noted above, this study sought to better understand environmental contamination and the use of engineering controls in specialty practices with ACVIM-board-certified veterinary oncologists. Remarkably, the study found no contamination with intravenous chemotherapy drugs in any of the 20 hospitals tested, suggesting that existing safety measures with IV drugs appear to be effective.

The study did highlight one area of concern: 20% of the hospitals tested showed contamination with oral cyclophosphamide. Several possible sources of contamination were suggested, including contact with contaminated packaging, compounding, counting and repackaging medications, and opening capsules or splitting tablets.

The ChemoAlert sampling kit is AIHA-LAP, LLC accredited which is key in ensuring quality, accuracy and adherence to standard practices.

In addition, veterinary medicine may carry increased risk of exposure during administration of the drug when patients are unwilling to ingest the drug or resist its oral administration. Further investigation is needed to better understand how contamination is occurring so it can be prevented.

Investigators acknowledged that this was an exploratory study, including limited numbers of hospitals and sites tested. In addition, surface testing was performed on a single day in each location, and results might vary over time, in keeping with variances in personnel, procedures, caseload and cleaning. It is possible that some contamination was missed or that results would have been different on a different day.

Importantly, the study also raised the point that many hospitals will need to review and adjust their protocols to ensure compliance with USP < 800 > standards.

Future Directions

Dr. Northrup and colleagues are currently investigating possible causes for environmental contamination with oral cyclophosphamide.

In anticipation of USP < 800 > standards, veterinarians administering chemotherapy will need to review and consider adjusting their safety protocols. Maxxam Analytics and ChemoAlert address all USP < 800 > requirements and the Maxxam team works collaboratively with its clients to ensure that their processes and engineering controls conform to the new standards.

> **"I highly recommend Maxxam. They are experts, provide excellent service, and are a great resource for practices concerned about occupational safety."**
>
> Dr. Nicole Northrup

About Us

Maxxam is a leading North American provider of analytical services and solutions to the energy, environmental, food, Industrial Hygiene and DNA industries. We are a member of the Bureau Veritas Group of companies – a world leader in testing, inspection and certification services. We support critical decisions made by our customers through the application of rigorous science and the knowledge and expertise of over 2,500 employees.

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