

**My Comments to the Agency Report of Investigation
OSC File No. DI-13-2584**

Allegation 3

In most cases, it takes a long time for the untoward effects of cumulative exposures to chemotherapeutic drugs to be seen.

The National Institute for Occupational Safety and Health has identified agriculture and firefighting as potentially high-risk areas for cancer, he said, along with construction and healthcare [1].

I shall share my personal experience of an occupational exposure to a biohazardous agent. I had repeated occupational exposure to TheraCys® BCG Live (Connaught strain), which I reconstituted for use as treatment for the FDA-labeled indication of Carcinoma in situ of bladder. I prepared, handled and disposed of the Bacillus of Calmette and Guerin (BCG) Vaccine, Live as a biohazardous material while wearing the proper garb. It was administered intravesically via a 60-mL catheter-tip syringe (an open-tip syringe). Even with proper garbing and biohazard precautions, I was still exposed to the BCG. This was **not** discovered until almost a year after my initial exposure, when I was administered a tuberculin (PPD) skin test as a new employee at the New Orleans VAMC: positive hypersensitivity reaction to the tuberculin (PPD) skin test; erythema at the injection site, inflammation of my forearm, palpable induration and warmth at the injection site; fever/temperature. I still did **not** receive prophylaxis pharmacotherapy for tuberculosis (TB) until about 7 months later after reporting to my permanent duty station for active service in the U.S. Air Force.

The biological safety cabinets (BSCs) like the Baker ChemoSHIELD Compounding Aseptic Containment Isolators in the GVSM VAMC Inpatient Pharmacy Service clean room are considered to be closed-containment systems; **however**, that does **not** mean that contamination cannot occur:

In 1999, Connor and others [24] published a paper showing surface contamination in six hospitals in North America. The pharmacies were using "biological safety cabinets," – specialized chemo hoods that are supposed to stop contamination -- but the study showed the drugs were still not contained.

"People thought that was a magic box," he said. "But once you put your arms in there, it breaks the seal. And they're packing them full of equipment - taking things in and out. People's hands are contaminated, (their) gloves, badges.

"Gown use is terrible – it's not improved in 20 years," said Polovich.

Eisenberg, the safety expert, said in his experience, gowns are only used about 50 percent of the time they are recommended. He calls this cavalier attitude toward worker safety, "chemo roulette [2]."

Like the pharmacists in the news articles, most GVSM VAMC pharmacists do **not** report the

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minor cuts and needle sticks that occur when preparing chemotherapy.

“But the feeling at the time was – whatever little vapors or splash – it was such a low exposure through the skin, it was insignificant.”

That was a common attitude then – and now, said Dr. Melissa McDiarmid, director of occupational health at the University of Maryland in Baltimore.

“So many people think it’s just a ‘little bit.’ They don’t understand, it’s a little bit of something designed to be toxic, and to be highly absorbed biologically.[2]”

Gown use—actually use of most personal protective equipment (PPE) is **pretty lax** in the GVSM VAMC Pharmacy Service. Some of the pharmacy staff that do wear the gowns do so outside of the compounding- (clean room) and ante areas, possibly exposing others to the hazardous drugs.

“Do not wear gowns outside the compounding or administration area to avoid spreading drug contamination to other areas and possibly exposing nonprotected workers.”
—DHHS (NIOSH) Publication Number 2009-106

The GVSM VAMC Pharmacy Service frontline staff is so often pressured to produce a lot in a short timeframe that some try to shave minutes off of the wait time by **not** properly putting on the appropriate garb (PPE).

The late pharmacist Bruce R. Harrison passed away from a rare form of oral cancer in August 2009, at the age of 59. He had **no** known risk factors for cancer except his occupational exposure to cancer-treating drugs. Harrison was also one of the co-authors of the **voluntary** safety guidelines listed as the first document reviewed by the OMI and submitted in a PDF to OSC. I have highlighted everywhere Harrison was referenced in the copy of that same NIOSH Publication that I have submitted to OSC. I learned of Harrison via a series of newspaper articles on healthcare workers being diagnosed with cancers after occupational exposures to chemotherapeutic agents in the *Seattle Times* Newspaper. He was the subject of the article “Exposure may have killed author of safety guidelines.” I have submitted a copy of that article, too. Harrison, his wife and his oncologist came to the conclusion that his long occupational exposure to the hazardous drugs was the **only** risk factor for his cancer.

Pharmacist P. Melonee Wise Green and I have **not** ever been offered by GVSM VAMC Employee Health an annual physical and laboratory evaluation as part of a medical surveillance program. We were unaware of such medical surveillance program at GVSM VAMC although such existed at our prior employers. I only became aware of the alleged program at GVSM VAMC from the agency report of investigation. Mrs. Green became aware of it when I asked her about it after learning of it myself.

I do get an annual physical and have laboratory work done as needed at GVSM VAMC as a **Veteran/patient, not** as an **Employee Veteran**. I have an Employee Health medical record

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separate from my Veteran/patient medical record. The two are **not** to be commingled **without** my proper, written consent because to do so otherwise would be a violation of The Privacy Act of 1974, HIPAA and any other applicable privacy regulations, policies and laws.

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Additional Issues

Having received advanced notice of the scheduled OMI tour, of course the administrators at GVSM VAMC and in Pharmacy Service made sure the carpeted areas, flooring and shelves were clean as they routinely do when they are aware of *any* upcoming announced/unannounced inspection—especially the JCAHO inspections that are **supposed** to be **unannounced**. The finding of live reptiles in the Inpatient Pharmacy Service at GVSM VAMC is *not* an *everyday* occurrence; so, it is *not* surprising that one was *not* seen during the OMI tour. However, that does **not** negate the fact that the many color photographs taken inside the GVSM VAMC Inpatient Pharmacy Service—and submitted with my disclosures—showed the dirty carpeting, crushed medications, the live reptile, stacked cardboard boxes, etc. as stated in my allegation(s). Many of my co-workers are **afraid** to step forward and speak the truth because they are well aware of the **retaliation** against me for speaking out about other wrongs within the Pharmacy Service at GVSM VAMC; thus, they choose to remain silent so they **will not experience the wrath** of GVSM VAMC Pharmacy Service Administration, H.R., upper management and even the labor union(s) that is supposed to represent the non-management staff at GVSM VAMC. So, I did **not** expect that they would come forth with the truth about the reptile—that is why I provided color photos as **supporting evidence** of my disclosure(s).

The current furniture and flooring at work are the **same** as that present when the photos were taken. Since an employee from Environmental Service (Housekeeping) usually lightly cleans the Inpatient Pharmacy Service and infrequently vacuums the carpet in the GVSM VAMC Inpatient Pharmacy Service, there is the *possibility* that there may *not* have been pulverized tablets or spilled powdered drugs visible on the carpeting when the OMI tour took place. Inpatient Pharmacy Service Pharmacy Technician Mildred A. James sometimes uses a broom to sweep the carpet in the Unit-Dose section of the Inpatient Pharmacy Service at GVSM VAMC, too. However, the stained carpet **is still** there—and that carpet has been there since it was originally installed **greater than 14 years ago!** There are even laws requiring the carpet in rental properties to be removed then replaced with new carpeting after so many years of wear-and-tear in the rented properties. You would think that surely GVSM VAMC would have removed that old, germ-infested carpet from the Inpatient Pharmacy Service for **sanitary** reasons after all these years!

As a Veteran, I expect the best medical and pharmaceutical care for my service as promised to me when I committed to military service for my country. If **non-Veteran** Renée E. Smith, former GVSM VAMC Inpatient Pharmacy Supervisor/Residency Program Manager and current Chief of Pharmacy Service at the Birmingham (AL) VAMC, can have some of that same, old carpet that was in her office in the GVSM VAMC Pharmacy Service Administration section adjacent to the Inpatient Pharmacy Service pulled up and replaced with new laminate-wood flooring because she said the germ-infested old carpeting was causing her allergies to act up, then surely new tile- or laminate flooring or something similarly appropriate can be installed to replace the current old, filthy carpet in the Inpatient Pharmacy Service at GVSM VAMC. Note that the old carpet that was in the rest of the GVSM VAMC Pharmacy Service Administration area was also removed then replaced with laminate-wood flooring. **In fact, most of the laminate flooring throughout GVSM VAMC is practically new, having been laid down within about the last 2 years!** My allergies **also** bothered me badly every day I worked in the Inpatient Pharmacy Service at GVSM VAMC. I was taking concomitantly **three antihistamines** that my provider at GVSM VAMC prescribed for my allergies, but I—**the Veteran**—do **not** have the authority to have new and appropriate flooring installed in the Inpatient Pharmacy Service in my primary work area. Inpatient Pharmacy Service should be almost—if not—as clean as a surgical suite; after all, the Pharmacy is where commercially-prepared drugs, extemporaneously-made

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medications and sterile products are being stored, compounded and dispensed from.

References

1. Smith, C. (2011). *Lawmakers to take up health-care worker safety following InvestigateWest reporting*. Retrieved from <http://www.invw.org/content/lawmakers-to-take-up-health-care-worker-safety-following-investigatwest-reporting>

2. Smith, C. (2010). *Lifesaving drugs; deadly consequences: 'secondhand chemo' puts healthcare workers at risk*. Retrieved from <http://www.invw.org/chemo-main>

Although the OMI team did **not** substantiate my allegation(s) about the **uncleanliness** of the carpeting/flooring in the Inpatient Pharmacy—referred to as *IP pharmacy* in the forwarded Vista email message below—at GVSM VAMC, ironically, the forwarded email message that follows sure does seem to be a **covert admission** of guilt and substantiation of my aforementioned allegation(s) by GVSM VAMC. It is **clearly a response** by GVSM VAMC to the OMI report and to those same allegation(s) made by me in my disclosures to OSC.

Subj: remodel in IP pharmacy [#39265628] 02/11/14@14:50 20 lines
From: HOPKINS,ELLEN M In 'IN' basket. Page 1 *New*

Everyone that works in or traverses the IP Pharmacy will notice (if they haven't already) that preparations for much needed renovations are underway.

Carpet will be removed and vinyl flooring will be installed in phases and painting will be done.

Phase one will consist of the area covered by carpet in the break room, IV printer area, Rick's area, the flu room and around the dumbwaiter/tube station.

The drugs in those areas have been moved to stacking bins in other areas of the IP pharmacy. Most of the bins are stacked as endcaps to the shelving units already in place.

There will be updates as things progress. There will be some

Please be patient! The end result will be worth the short term inconvenience.

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Allegation 4

To my knowledge, the Boards of Pharmacy in most states and territories of these United States currently require that pharmacy technicians be certified. The current Standard of Practice in pharmacy practice is for pharmacy technicians to be certified by successful completion of one of the following exams:

- ExCPT Exam

Mail- 7500 West 160th St. Stilwell, KS 66085

Phone-(800) 499-9092

www.nationaltechexam.org

- PTCB

Mail-2215 Constitution Avenue, NW Washington, DC 20037

Phone-(800) 363-8012

www.ptcb.org

Medication errors are serious! Pharmacy technicians play an integral part in assisting pharmacists in providing pharmaceutical care. Pharmacy technicians are also involved in quite a few medication errors, too. So, it's vital that they have professional standards to meet, also. Although all the states and territories of the United States may not presently require pharmacy technicians to be certified, most of the employers do.

Though **not yet** required for all VA pharmacy technicians, most VAMC's **are** having all their pharmacy technicians get certified if they are not so already. If a position assignment or job offer came down to two equally-qualified applicants **except** that *only* one of them is certified (CPhT), you can bet your last dollar that the CPhT will most likely be offered the job.

R. Ken Strum, the new Chief, Pharmacy Service at GVSM VAMC, *seems* to be aware that the Pharmacy Service at GVSM VAMC is far behind the current Pharmacy Standards of Practice in some pertinent aspects. Please refer to the following email message:

From: Strum, Rupert K. (VHAJAC)

Sent: Monday, November 25, 2013 10:23 AM

To: VHAJAC Pharmacy Staff All

Subject: Volunteers to teach Pharmacy Technician CPhT Test Preparation

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Everyone

The teaching materials for our class to prepare any technician who wants to become a Certified Pharmacy Technician (CPhT) are here. We are looking for volunteers to teach blocks of the material during work hours. The classes will be short and focused on specific skills and knowledge.

Note that you can volunteer to teach a subject or skill, all of the course, or just some of it. This is an organized "let's help each other effort", so the call is for everyone who wants to bring others along and who like to teach.

Please contact me to volunteer. For those selected, we'll work out scheduling with the supervisor.

Ken

R. KENNETH STRUM, RPh

Chief, Pharmacy Services

G. V. (Sonny) Montgomery VA Medical Center

1500 E. Woodrow Wilson Drive

Jackson, MS 39216

Ken.Strum@va.gov

601-364-1351

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Addressing the Availability of Pharmacists, Especially the Call Center Pharmacist

Pendings are outpatient medication orders (basically, prescriptions (Rx's) for non-hospitalized patients) that have not been processed by a registered/licensed pharmacist nor completed for dispensing in-person to the Veteran patient or by USPS mail or courier service.

Even when there was a dedicated *Telephone Line (TL) pharmacist working "on the wall" in the GVSM VAMC Outpatient Pharmacy and before there was a Medical Center Advice Line Call Center (hereafter referred to as the Call Center) pharmacist, the pharmacy technicians were instructed to direct phone calls to the other pharmacists working "on the wall" if the Telephone Line (TL) pharmacist was unavailable or inundated with calls. The Call Center pharmacist takes forwarded calls from not only the pharmacy technicians but from other Nursing Service staff who also work in the Call Center. As a malicious, retaliatory act, Pharmacy Service did away with the TL pharmacist and ordered the pharmacy techs to forward all medication-related calls to the Call Center pharmacist; the technicians immediately stopped using the other pharmacists "on the wall" in the Outpatient Pharmacy as backup coverage for the Call Center pharmacist when the latter is unavailable or swamped with callers on hold. This change greatly impedes the pharmaceutical care directly provided to the Veterans, who wind up playing telephone tag before finally speaking with a pharmacist, holding on the phone for extended periods of time waiting to speak with a pharmacist or never getting to speak by phone with a pharmacist during each call. The Veterans are indirectly negatively impacted when other healthcare providers who occasionally phone the Call Center pharmacist with drug questions/concerns for their patients cannot get through to the Call Center pharmacist because she alone is trying to handle the majority of the pharmacy/medication-related phone calls directly or indirectly coming into the Call Center.

Pharmacy Service often hosts parties for staff who are in the "clique." Now paraphrasing the law, if Pharmacy Service is going to hypothetically throw a birthday party for Jane Doe, then Pharmacy Service should host a birthday party for each individual employee or just host a monthly party to celebrate the birthday of any of its staff born in that month, retiring in that month, etc. so as to not appear to be biased and showing favoritism. However, at GVSM VAMC, such acts are done only for those in the "in crowd." These parties are held over 1-3 hours during the most inopportune time of the normal business hours. Patients are usually already agitated from lengthy wait times for clinic visits, tests, etc. Then, the Veteran patients get even angrier because they have to wait an unreasonably long time for their prescriptions to be processed and filled by the Outpatient Pharmacy because of staffing shortage secondary to Pharmacy Service staff attending the party of the day. Pharmaceutical care is almost nil during those times. Why not have the party after the normal close of business! Then to add insult to injury, Pharmacy Service administrators made overtime (OT) available so that the staff could do the work that should have been done during the normal hours of operation were it not for the Pharmacy Service staff leaving their posts to attend the office party. Now, that is an act of fraud, waste and abuse (FWA)!

I am **not only** an employee at GVSM VAMC but one of the Veteran patients who receive medical care and medications there. So, I can speak as a Veteran patient and GVSM VAMC employee who is not in the clique and seldom got to go and never hung out as long as I wanted to at the "office" parties.

Naturally, Pharmacy Service forwards all medication-related phone calls received during the party hours to the Call Center pharmacist because most of the Outpatient- and Inpatient Pharmacy staffs are stuffing their mouths and hanging out at the Pharmacy Service party. The parties are usually held in either the Inpatient- or Outpatient Pharmacy but are sometimes held

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elsewhere within the medical center if many party guests from outside Pharmacy Service are expected to be in attendance. In the Outpatient Pharmacy, the workload does **not** decrease while the staff is partying. Work comes to almost a complete halt in the Inpatient Pharmacy. Instead of outpatient prescriptions, though, you have medication orders (like prescriptions for the Veteran patients hospitalized at GVSM VAMC) on the Inpatient side that need to be processed. All the while, the number of *Pendings* is growing.

This causes substantial and specific danger to the Veteran patients from their **not** receiving their medications in a **timely** manner either in person, via mail or while hospitalized at GVSM VAMC.

All of the pharmacy technicians who were rotating through or permanently assigned to the GVSM VAMC Call Center have since been removed from the Call Center. Some might consider that act in itself an admission of guilt. Why! Well, there are **no** national licensing boards for healthcare professionals: physicians, physician assistants, dentists, pharmacists, pharmacy technicians, pharmacy aids, pharmacy clerks, nurse practitioners, nurses, certified nursing assistants, etc. Only the States have the power to license healthcare providers. The Pharmacy Practice Acts of the Boards of Pharmacy for the states and territories of the United States say that **only** pharmacists can practice pharmacy and counsel patients/Veterans, and those supportive pharmacy personnel such as pharmacy technicians must be supervised by licensed/registered pharmacists. Just because a federal agency does not require a pharmacy technician to be licensed/registered does not mean that the law is not being broken because any actively practicing, licensed/registered pharmacist is required to supervise anyone performing any scope of duties as a pharmacy technician, regardless of the job title (*semantics*). All of the pharmacy technicians who worked in the Call Center at GVSM VAMC were doing so illegally since they were **not** being supervised by a licensed/registered pharmacist, per the Pharmacy Practice Acts of the Boards of Pharmacy.

James "Jim" Whelan, Associate Chief (Operations) Pharmacy Service at GVSM VAMC has barred the Call Center pharmacist from entering Pharmacy Service.

*Refer to the submitted work schedule(s) for GVSM VAMC Pharmacists

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Center Director Joe D. Battle has previously said that the wrongdoings at GVSM VAMC that have been brought to light did not happen on his watch. **That statement is no longer valid because the incident with the chemohood(s) and chemotherapy occurred on his watch. My other allegations may not have started on his watch but were ongoing during his watch, too.**

Also, the cancer patients may have experienced untoward effects from the chemotherapeutic agents prepared in the non-compliant chemohood(s) but not reported them because they assumed the adverse effects they experienced were a normal part of their disease processes.

OCCUPATIONAL EXPOSURE TO ANTINEOPLASTIC AGENTS

 [cdc.gov/niosh/topics/antineoplastic/](https://www.cdc.gov/niosh/topics/antineoplastic/)

Introduction

On this Page

The adverse health effects associated with antineoplastic agents (cancer chemotherapy drugs, cytotoxic drugs) in cancer patients and some non-cancer patients treated with these drugs are well documented. The very nature of antineoplastic agents make them harmful to healthy cells and tissues as well as the cancerous cells. For cancer patients with a life-threatening disease, there is certainly a great benefit to treatment with these agents. However, for the health care workers who are exposed to antineoplastic agents as part of their work practice, precautions should be taken to eliminate or reduce exposure as much as possible. Pharmacists who prepare these drugs or nurses who may prepare and/or administer them are the two occupational groups who have the highest potential exposure to antineoplastic agents. Additionally, physicians and operating room personnel may also be exposed through the treatment of patients. Hospital staff, such as shipping and receiving personnel, custodial workers, laundry workers and waste handlers, all have potential exposure to these drugs during the course of their work. The increased use of antineoplastic agents in veterinary oncology also puts these workers at risk for exposure to these drugs.



In addition to acute or short-term effects related to treatment with antineoplastic agents, there are a number of long-term or chronic effects that have been identified in patients. These include liver and kidney damage, damage to the bone marrow, damage to the lungs and heart, infertility (temporary and permanent), effects on reproduction and the developing fetus in pregnant women, hearing impairment and cancer. The International Agency for Research on Cancer (IARC) in Lyon, France has identified a number of antineoplastic agents and two combination therapies as having an association with cancer in patients who are treated with them. These include both cancer and non-cancer patients. IARC currently lists eleven agents and two combined therapies as Group 1 (Human carcinogens), twelve as Group 2A (Probable human carcinogens) and eleven as Group 2B (Possible human carcinogens).

A number of studies have documented environmental and worker exposure to the antineoplastic agents. A variety of biological endpoints have been used to evaluate worker exposure. These include, urine mutagenicity, chromosomal damage, sister chromatid exchange, micronuclei induction, DNA damage, HPRT mutations, and thioether excretion.

Additionally, analytical methods have been used to document worker exposure to antineoplastic agents by measuring these drugs and/or their metabolites in the urine of health care workers.

Similar analytical methods are currently being employed to measure the level of environmental contamination in the workplace. Although the studies on air sampling are limited, there have been numerous studies published on environmental wipe sampling for these drugs.

In September, 2004, The National Institute for Occupational Safety and Health (NIOSH) published an Alert: Preventing Occupational Exposures to Antineoplastic and Other Hazardous Drugs in Health Care

Settings (*DHHS (NIOSH) Publication No. 2004-165*). This topic page is an expanded bibliography of related publications drawn from the published literature related to the Alert. Additional information on this topic can also be found on the NIOSH [Hazardous Drug Exposures in Health Care](#) topic page.

Recent Publications, Guidelines, Review Articles and Surveys

Recent Publications

This page contains articles published within the past three years on all topics related to occupational exposure to antineoplastic agents. These include articles on exposure studies, adverse health effects, evaluation of protective equipment and guidelines for safe handling.

Guidelines, Recommendations and Regulations for Handling Antineoplastic Agents

This page includes guideline for the safe handling of antineoplastic agents from professional organizations, government agencies and international groups. Links to relevant sites are included.

Review Articles

This page lists reviews of the literature published on the topic of safe handling of antineoplastic agents which provide background information on the topic.

Surveys

This page includes surveys conducted by researchers and organizations on handling procedures used when working with antineoplastic drugs. The surveys deal with work practice issues and compliance with published guidelines.

Effects of Occupational Exposure

Acute Effects

Many acute or short-term effects have been observed in patients treated with antineoplastic agents. Some of these same effects have been seen in health care workers who handle them. The acute effects associated with exposure to antineoplastic agents, such as skin rashes, allergic-type reactions, hair loss and others, are included in the publications listed in this page.

Chronic Effects

Chronic or long-term effects of exposure to antineoplastic agents are described in the articles listed in this page.

Effects on Fertility and Reproductive Outcomes

The effects of antineoplastic agents on fertility and reproduction are well documented in patients treated with these drugs. This page includes articles published on the effect of exposure to antineoplastic agents on fertility and reproduction, such as low birth weight, malformations and others. Several studies have reported adverse reproductive outcomes in female health care workers who were exposed to antineoplastic agents.

Association of Exposure to Antineoplastic Agents with Cancer

Because many of the antineoplastic agents are known or suspected human carcinogens, cancer is an area of concern when exposed to these agents. Although limited, some information exists on the relationship of occupational exposure to antineoplastic agents with cancer in health care workers.

Occupational Monitoring

Biological Studies

Several biological endpoints have been employed to monitor health care workers' exposure to

antineoplastic agents. Most of these endpoints measure various types of genotoxic damage.

Urinary Mutagenicity

Because many of the antineoplastic agents are mutagenic, studies have employed methods to study the mutagenicity of urine as an indication of exposure to these agents.

Chromosomal Aberrations

Chromosomal aberrations are known to be present in the cells of patients treated with antineoplastic agents and have been used to monitor health care workers exposed to these drugs.

Sister Chromatid Exchanges

Sister chromatid exchanges have been used as an indicator of exposure to agents that cause DNA repair and are useful for monitoring health care workers exposed to antineoplastic agents.

Micronuclei Induction

Micronuclei induction is another indicator of exposure to DNA-damaging agents and has been used to monitor health care workers exposed to antineoplastic agents.

DNA Damage

Direct damage to the DNA in the cells of health care workers is another method that has been employed as an indicator of exposure to antineoplastic agents.

HPRT Mutations

HPRT mutations in the cells of health care workers exposed to antineoplastic agents has seen limited use as a method to monitor exposure.

Thioether Excretion

The excretion of thioethers in the urine is a non-specific indicator of exposure to certain compounds and has been used in a small number of studies to monitor health care workers exposed to antineoplastic agents.

Analytical Studies Over the past several years, the direct measurement of antineoplastic agents and/or their metabolites in body fluids of health care workers has been employed to assess exposure to these agents. Methods for a number of the more common agents are included in the citations on this page. Currently, these techniques are only used in research settings and not for routine monitoring of health care workers.

Urinary Excretion of Antineoplastic Agents

Recently, sensitive methods have been developed to measure specific antineoplastic agents in the urine of health care workers exposed to these drugs.

Environmental Sampling, Decontamination, Protective Equipment, Closed System Transfer Devices, and Work Practice

Environmental Sampling for Antineoplastic Agents

Sensitive methods are currently available to measure specific antineoplastic agents in surface wipe samples and air samples in the workplace environment. Studies to date have focused more on wipe sampling than on air sampling due to technical problems associated with air sampling methods for these drugs.

Decontamination and Deactivation of Antineoplastic Agents

Methods are available to chemically deactivate some of the antineoplastic agents in order to reduce their toxicity.

Evaluation of Protective Equipment for Handling Antineoplastic Agents

Various types of personal protective equipment have been evaluated for reducing health care worker exposure to antineoplastic agents. These include biological safety cabinets, gloves, protective gowns and closed-system devices.