NIOSH List of Hazardous Drugs in Healthcare Settings, 2020

DEPARTMENT OF HEALTH AND HUMAN SERVICES
Centers for Disease Control and Prevention
National Institute for Occupational Safety and Health

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List of Acronyms

AHFS	American Hospital Formulary Service
CFR	Code of Federal Regulations
FDA	Food and Drug Administration
IARC	International Agency for Research on Cancer
MSHI	Manufacturer's special handling information
NIOSH	National Institute for Occupational Safety and Health
NTP	National Toxicology Program

Drugs Considered Hazardous

Introduction

Healthcare workers may be occupationally exposed to drugs and may experience adverse health effects as a result. The NIOSH Alert: *Preventing Occupational Exposures to Antineoplastic and Other Hazardous Drugs in Healthcare Settings* was published in September 2004, http://www.cdc.gov/niosh/docs/2004-165/. The Alert contained a sample list of drugs identified by NIOSH as hazardous to workers in healthcare settings. NIOSH published updated Lists in 2010, 2012, 2014, 2016, and now this in 2020.

This document supersedes previous versions of the *List* and presents the current list of drugs determined by NIOSH to be hazardous.

The *NIOSH List of Hazardous Drugs in Healthcare Settings* (*List*) assists employers in providing safe and healthy workplaces by identifying drugs approved by the FDA Center for Drug Evaluation and Research (CDER) that have intrinsic properties that meet the NIOSH definition of a hazardous drug. The NIOSH *List* creates no legal obligation for employers; it is advisory in nature and informational in content.

CAUTION: Drugs purchased and used by a facility may have entered the marketplace after the list below was assembled. Therefore, this list may not be all-inclusive and employers should consider creating a facility-specific hazardous drug list.

Defining Hazardous Drugs

NIOSH has formalized the methodology NIOSH uses to guide the addition of drugs to or removal of drugs from the List, in a document entitled *Procedures for Developing the NIOSH List of Hazardous Drugs in Healthcare Settings (Procedures)*.[1]

As stated in the *Procedures*, NIOSH defines a hazardous drug as a drug that is:

[1] NIOSH [2020]. Procedures for Developing the NIOSH List of Hazardous Drugs in Healthcare Settings. By Whittaker C, Ovesen JL, MacKenzie BA, Hartley T, Berry KA, Piacentino J. Cincinnati, OH: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, DHHS (NIOSH) Publication Number 2020-xxx

1. Approved for use in humans[2] by the FDA-CDER;[3] and

2. Not otherwise regulated by the U.S. Nuclear Regulatory Commission;[4] and

3. Either:

   a. Is accompanied by prescribing information in the "package insert"[5] that specifies special handling information (Manufacturer Special Handling Information-MSHI) to protect workers handling the drug; or

   b. Is identified as a carcinogenic hazard, developmental hazard, reproductive hazard, genotoxic hazard, or other health hazard by exhibiting one or more of the following toxicity criteria in humans, animal models, or *in vitro* systems:

      - carcinogenicity;
      - developmental toxicity (including teratogenicity);
      - reproductive toxicity;
      - genotoxicity;
      - organ toxicity at low doses;[6] or
      - structure and toxicity profile that mimics existing drugs determined hazardous by exhibiting any one of the previous five toxicity types;[7]

      unless the drug also exhibits a molecular property[8] that may limit the potential for adverse health effects in healthcare workers from exposure to the drug.

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[2] Although only drugs approved by the FDA for use in humans are included in the definition of hazardous drug, some of those drugs may be used in veterinary settings for treatment of animals and may be a hazard for veterinary care workers.
[3] 21 U.S.C. 301 *et seq.*
[4] 10 CFR Parts 19, 20, and 35. See https://www.nrc.gov/materials/miau/med-use.html.
[5] See Drug Advertising: A Glossary of Terms at https://www.fda.gov/drugs/resourcesforyou/consumers/prescriptiondrugadvertising/ucm072025.htm. "Prescribing information is also called product information, product labeling, or the package insert ("the PI"). It is generally drafted by the drug company and approved by the FDA. This information travels with a drug as it moves from the company to the pharmacist. It includes the details and directions healthcare providers need to prescribe the drug properly. It is also the basis for how the drug company can advertise its drug. The prescribing information includes such details about the drug as: its chemical description; how it works; how it interacts with other drugs, supplements, foods, and beverages; what condition(s) or disease(s) it treats; who should not use the drug; serious side effects, even if they occur rarely; commonly occurring side effects, even if they are not serious; effects on specific groups of patients, such as children, pregnant women, or older adults and how to use it in these populations."
[6] All drugs have toxic side effects, but some exhibit toxicity at low doses. The level of toxicity reflects a continuum from relatively nontoxic to production of toxic effects in patients at low doses (for example, a few milligrams or less). For example, a daily therapeutic dose of 10 mg/ day or a dose of 1 mg/kg per day in laboratory animals that produces serious organ toxicity, developmental toxicity, or reproductive toxicity has been used by the pharmaceutical industry to develop occupational exposure limits (OELs) of less than 10 $\mu g/m^3$ after applying appropriate uncertainty factors [Sargent and Kirk 1988; Naumann and Sargent 1997; Sargent et al. 2002]. OELs in this range are typically established for potent or toxic drugs in the pharmaceutical industry. Under all circumstances, an evaluation of all available data should be conducted to protect health care workers.
[7] NIOSH [2004]. Preventing occupational exposures to antineoplastic and other hazardous drugs in health care settings. By Burroughs GE, Connor TH, McDiarmid MA, Mead KR, Power LA, Reed LD, Coyle BJ, Hammond DR, Leone MM, Polovich M, Sharpnack DD. Cincinnati, OH: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, DHHS (NIOSH) Publication No. 2004-165.
[8] Properties of a drug molecule that may limit adverse effects in healthcare workers are typically chemical, physical and structural properties that affect its absorption, distribution within the body, metabolism, or excretion e.g., chemical structure, molecular

Determining Whether a Drug Is Hazardous

NIOSH uses a sequential approach for assessing and interpreting scientific information in order to determine whether an FDA-approved drug meets the NIOSH definition of hazardous drug. NIOSH's approach to evaluating the hazard potential of a drug includes: (1) reviewing FDA databases to identify drugs that have the potential to meet the NIOSH definition of hazardous drug; (2) reviewing molecular properties and information in the manufacturer-provided drug package insert to identify information relevant to making a determination about placing a drug on the *List*, excluding a drug from the *List*, or removing a drug from the *List*; (3) assessing, integrating, and synthesizing evidence from human, animal, and *in vitro* studies of drug toxicity; (4) using molecular property, toxicity and hazard characterization criteria established in the *Procedures* in making a decision to place a drug on the *List* or to exclude a drug from the *List*; and (5) allowing for reconsideration of a NIOSH decision to place a drug on the *List* or to remove a drug from the *List*.

The methodology used by NIOSH to evaluate chemical properties, pre-clinical information, and clinical information about each drug is detailed in the *Procedures*.

Developing a Facility-Specific List of Hazardous Drugs

The NIOSH *List* is an aid designed to enable employers to identify which drugs handled by employees are considered by NIOSH to be hazardous drugs. Because new drugs and new formulations are continuously brought to market between NIOSH's periodic updates hazardous drug evaluation should be a continual process. Employers should establish their own procedures to identify and evaluate new drugs as they enter their workplace and, when appropriate, reassess their presence on hazardous drug lists as toxicological data become available to support re-categorization.

In developing a facility-specific list of hazardous drugs, workplaces may consider facility-specific criteria, including the specific product formulations and packaging within their facility, which NIOSH cannot utilize when developing the *List*. In addition to the NIOSH *List*, non-governmental organizations have developed various approaches to identifying and classifying hazardous drugs [Chaffee *et al*. 2010; Badry *et al*. 2013; Kaestli *et al*. 2013]. When creating a facility specific list some facilities may find they handle investigational drugs, which have not been approved by FDA-CDER or reviewed by NIOSH. Toxicological data may be incomplete or unavailable for investigational drugs. If the mechanism of action suggests that there may be a concern, it is prudent to handle them as hazardous drugs until adequate information becomes available to exclude them.

A site-specific risk assessment is outside of the scope of the *List* and includes consideration of dose, potency, and exposure potential during formulation and use from events such as: routine handling,

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weight or mass. *See* Clementi F, Fumagalli G. *Molecular Pharmacology.* Hoboken, NJ: Wiley & Sons;2015; Di L, Kerns EH. *Drug-Like Properties: Concepts, Structure, Design, and Methods*. Oxford, UK: Elsevier;2016; Mattson P, Kihlberg J. How big is too big for cell permeability. J Med Chem. 2017;60:1662-1664. https://doi.org/10.1021/acs.jmedchem.7b00237 .

compounding, spills, broken device, needle stick, inadvertent contact, or surface contamination. When using a drug on the *List*, NIOSH encourages employers to do a site-specific risk assessment that informs effective risk management procedures. More information about managing the risk of handling hazardous drugs can be found in *Managing Hazardous Drug Exposures: Information for Health Care Settings* (NIOSH, 2020). A facility-specific list along with *Managing Hazardous Drug Exposures: Information for Health Care Settings* [NIOSH 2020] and other guidance from American Society of Health System Pharmacist (ASHP), United States Pharmacopeia (USP), Oncology Nursing Society (ONS) and other organizations, can help employers establish effective hazardous drug management procedures specific to their workplace

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NIOSH [2020] Procedures for Developing the NIOSH List of Hazardous Drugs in Healthcare Settings. Whittaker C, Ovesen JL, MacKenzie BA, Hartley T, Berry KA, Piacentino, J. Cincinnati, OH: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, DHHS (NIOSH) Publication Number 2020-xxx.

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NIOSH List of Hazardous Drugs in Healthcare Settings 2020

NIOSH performed a hazard identification and characterization of each drug on the *List*, in accordance with the NIOSH *Procedures for Developing the NIOSH List of Hazardous Drugs in Healthcare Settings*.

The 2020 *List* supersedes previous versions.

2020 Hazardous Drugs List Changes

The 2020 *List* adds 16 drugs, three of which have special handling[9] information from the manufacturers and removes five drugs[10] from the list. Drugs reviewed for this update were new drug approvals or received safety related new warnings from FDA in the period between January 2014 and December 2015. In addition to these updates, the tables categorizing hazardous drugs have been reorganized and are discussed below.

Table 1 now includes drugs that meet the NIOSH definition of a hazardous drug and contain MSHI in the package insert; and/or are classified by the NTP as "known to be a human carcinogen," or classified by IARC as "carcinogenic" or "probably carcinogenic." In the 2016 *List* this table identified antineoplastic drugs, however, in this update not all of the drugs on Table 1 are antineoplastic drugs.

Table 2 contains drugs that meet one or more of the NIOSH definition of a hazardous drug but are not drugs which have MSHI or are classified by the NTP as "known to be a human carcinogen," or classified by the IARC as "carcinogenic" or "probably carcinogenic," some of which also have adverse reproductive effects for populations at risk. This table now also includes drugs that only meet the NIOSH criteria as a developmental (including teratogenicity) and/or reproductive hazard. In the 2016 update of the *List* this table did not include drugs that only posed a developmental and/or reproductive hazard.

In the 2016 *List*, Table 3 provided a list of drugs that met the NIOSH criteria of a reproductive hazard (damaging to a male or female person's ability to conceive or carry to term an offspring) or developmental hazard (able to cause disruption in the development of unborn children including teratogenic outcomes). In this 2020 *List*, those drugs that only meet NIOSH's criteria as a developmental and/or reproductive hazard are identified in the supplemental information column with a blue notification; a separate Table is no longer provided.

[9] When NIOSH becomes aware of recently approved drugs that include MSHI, it adds them to the *List* immediately. The notification of these additions are posted to the NIOSH website at: https://www.cdc.gov/niosh/docs/2016-161/default.html. These drugs would have been officially on the previous version of the list from the date of the notification and are only now being added into the publication.

[10] When NIOSH removes a drug from the *List*, the notification of these removals are posted to the NIOSH website at: https://www.cdc.gov/niosh/docs/2016-161/default.html

In the 2016 *List*, Table 4 provided a list of the drugs removed from the *List*. In this 2020 *List*, a new section identifies changes to the placement of drugs on the *List*, including drugs that are no longer considered hazardous and those that have been moved from one table to another.

In the 2016 *List*, Table 5 provided information on recommended exposure controls for hazardous drugs based on formulations. NIOSH has removed the table from the *List*. Risk management is outside the scope of the *List* document. NIOSH addresses risk management issues in **Managing Hazardous Drug Exposures: Information for Healthcare Settings** which includes information on using engineering controls, administrative controls and personal protective equipment for working with hazardous drugs in healthcare settings. It is available on the NIOSH website at: www.cdc.gov/niosh/topics/hazdrug/.

In previous *Lists*, the supplemental information column has contained information that may be useful for individual drugs, including pregnancy categories. This information may not have been related to NIOSH's decision to place the drug on the *List*. As of 2015, FDA no longer uses the letter pregnancy categories for drugs and NIOSH has removed that information from the supplemental information column. For drugs listed prior to this 2020 *List*, all other supplemental information has been retained, though that information may not be related to the listing of the drug. For drugs listed in this 2020 *List*, NIOSH has identified the relevant hazard criteria of the drug in the supplemental information column.

CAUTION: Drugs purchased and used by a facility may have entered the marketplace after the list below was assembled. This list is not all-inclusive**.** Drugs reviewed for this update were new drug approvals or received safety related new warnings from FDA in the period between January 2014 and December 2015.

More recent information on drugs, including updated product inserts and information on new safety related changes to labels, can be found at:

FDA Approved Drugs:
www.accessdata.fda.gov/scripts/cder/daf/index.cfm

FDA Safety-related Labeling Changes:
www.accessdata.fda.gov/scripts/cder/safetylabelingchanges/

DailyMed:
dailymed.nlm.nih.gov

DrugBank:
www.drugbank.ca

The National Library of Medicine Drug Portal:
druginfo.nlm.nih.gov

NIOSH List of Hazardous Drugs in Healthcare Settings 2020

The drugs in Table 1 meet the following classification criteria:

Drugs which contain manufacturers' special handling information; and/or

Drugs which meet the NIOSH definition of a hazardous drug and are classified by the NTP as "known to be a human carcinogen," and/or classified by the IARC as "carcinogenic" or "probably carcinogenic"

Many of these drugs are cytotoxic and the majority are hazardous to males or females who are actively trying to conceive, women who are pregnant or may become pregnant, and women who are breast feeding, because the drugs may be excreted in breast milk.

Not all drugs in Table 1 are antineoplastic drugs.

Drugs reviewed for this update were new drug approvals or received safety related new warnings from FDA in the period between January 2014 and December 2015.

Drugs underlined and in red font were added in 2020.

MSHI = manufacturer's special handling information

Table 1. Drugs that contain MSHI in the package insert and/or meet the NIOSH definition of a hazardous drug and are classified by the NTP as "known to be a human carcinogen," and/or classified by the IARC as "carcinogenic" or "probably carcinogenic."

Drug	AHFS classification	MSHI	Supplemental Information[11]
trastuzumab emtansine	10:00 antineoplastic agents	yes	Monoclonal antibody conjugated to mertansine (emtasine)
altretamine	10:00 antineoplastic agents	yes	
amsacrine	NA antineoplastic agents	yes	IARC Group 2B
arsenic trioxide	10:00 antineoplastic agents	yes	IARC Group 1 carcinogen
azacitidine	10:00 antineoplastic agents	yes	IARC Group 2A carcinogen

[11] Drugs identified as IARC Group 2B are listed in Table 1 because they have MSHI.

Table 1. Drugs that contain MSHI in the package insert and/or meet the NIOSH definition of a hazardous drug and are classified by the NTP as "known to be a human carcinogen," and/or classified by the IARC as "carcinogenic" or "probably carcinogenic."

Drug	AHFS classification	MSHI	Supplemental Information[11]
azathioprine	92:44 immunosuppressant	yes	IARC Group 1 carcinogen; NTP "known to be human carcinogen"
belinostat	10:00 antineoplastic agents	yes	May cause teratogenicity and/or embryo-fetal lethality because it is a genotoxic drug and targets actively dividing cells
bendamustine	10:00 antineoplastic agents	yes	Cytotoxic; Developmental toxicity
bleomycin	10:00 antineoplastic agents	yes	IARC Group 2B
bortezomib	10:00 antineoplastic agents	yes	
brentuximab vedotin	10:00 antineoplastic agents	yes	Monoclonal antibody conjugated to vedotin
busulfan	10:00 antineoplastic agents	yes	IARC Group 1 carcinogen
cabazitaxel	10:00 antineoplastic agents	yes	
capecitabine	10:00 antineoplastic agents	yes	Metabolized to 5-fluorouracil
carboplatin	10:00 antineoplastic agents	yes	
carmustine	10:00 antineoplastic agents	yes	IARC Group 2A carcinogen
chlorambucil	10:00 antineoplastic agents	yes	IARC Group 1 carcinogen; NTP "known to be human carcinogen"
chloramphenicol	8:12:08 chloramphenicols		IARC Group 2A carcinogen; NTP "known to be human carcinogen"
cidofovir	8:18:32 nucleoside and nucleotides	yes	
cisplatin	10:00 antineoplastic agents	yes	IARC Group 2A carcinogen
cladribine	10:00 antineoplastic agents	yes	
clofarabine	10:00 antineoplastic agents	yes	
cyclophosphamide	10:00 antineoplastic agents	yes	IARC Group 1 carcinogen; NTP "known to be human carcinogen"
cyclosporine	92:44 immunosuppressive agents		IARC Group 1 carcinogen; NTP "known to be human carcinogen"
cytarabine	10:00 antineoplastic agents	yes	
dacarbazine	10:00 antineoplastic agents	yes	IARC Group 2B

Table 1. Drugs that contain MSHI in the package insert and/or meet the NIOSH definition of a hazardous drug and are classified by the NTP as "known to be a human carcinogen," and/or classified by the IARC as "carcinogenic" or "probably carcinogenic."

Drug	AHFS classification	MSHI	Supplemental Information[11]
dactinomycin	10:00 antineoplastic agents	yes	
dasatinib	10:00 antineoplastic agents	yes	
daunorubicin	10:00 antineoplastic agents	yes	IARC Group 2B; AKA daunomycin
decitabine	10:00 antineoplastic agents	yes	
dexrazoxane	92:56 protective agents	yes	Secondary malignancies observed in patients treated long term with Razoxane (a racemic mixture containing dexrazoxane); Genotoxic *in vitro* and *in vivo*; in laboratory studies, Testicular atrophy observed at or below the human dose
diethylstilbestrol	NA		IARC Group 1 carcinogen; NTP "known to be human carcinogen"
docetaxel	10:00 antineoplastic agents	yes	
doxorubicin	10:00 antineoplastic agents	yes	IARC Group 2A carcinogen
enfortumab vedotin	10:00 antineoplastic agents	yes	Monoclonal antibody conjugated to vedotin; Cytotoxic; Developmental toxicity
epirubicin	10:00 antineoplastic agents	yes	
estramustine	10:00 antineoplastic agents	yes	
estrogen/ progesterone combinations	68:12 contraceptives		IARC Group 1 carcinogen; NTP "known to be human carcinogen"
estrogens, conjugated	68:12 contraceptives		NTP "known to be human carcinogen"; Black Box warning for endometrial cancer and cardiovascular risks; Long-term use in women and laboratory studies increases frequency of several cancers
estrogens, esterified	68:12 contraceptives		NTP "known to be human carcinogen"; Black Box warning for endometrial cancer and cardiovascular risks
etoposide	10:00 antineoplastic agents	yes	IARC Group 1 carcinogen
everolimus	10:00 antineoplastic agents	yes	
floxuridine	10:00 antineoplastic agents	yes	
fludarabine	10:00 antineoplastic agents	yes	
fluorouracil	10:00 antineoplastic agents	yes	

Table 1. Drugs that contain MSHI in the package insert and/or meet the NIOSH definition of a hazardous drug and are classified by the NTP as "known to be a human carcinogen," and/or classified by the IARC as "carcinogenic" or "probably carcinogenic."

Drug	AHFS classification	MSHI	Supplemental Information[11]
ganciclovir	8:18:32 nucleosides nucleotides	yes	
gemcitabine	10:00 antineoplastic agents	yes	
gemtuzumab ozogamicin	10:00 antineoplastic agents	yes	Monoclonal antibody conjugated to ozogamicin; Cytotoxic; Developmental toxicity
hydroxyurea	10:00 antineoplastic agents	yes	Special warning on handling bottles and capsules
idarubicin	10:00 antineoplastic agents	yes	
ifosfamide	10:00 antineoplastic agents	yes	
imatinib	10:00 antineoplastic agents	yes	
inotuzumab ozogamicin	10:00 antineoplastic agents	yes	Monoclonal antibody conjugated to ozogamicin; Cytotoxic; Developmental toxicity
irinotecan	10:00 antineoplastic agents	yes	
ixazomib	10:00 antineoplastic agents	yes	Male and female patients of childbearing potential must use effective contraceptive measures during and for 3 months following treatment
ixabepilone	10:00 antineoplastic agents	yes	
lenalidomide	92:20 biologic response modulators	yes	Analog of thalidomide; FDA Black box warnings for limb abnormalities; in laboratory studies, caused thalidomide-type limb defects in monkey offspring
lomustine	10:00 antineoplastic agents	yes	IARC Group 2A carcinogen
mechlorethamine	10:00 antineoplastic agents	yes	
melphalan	10:00 antineoplastic agents	yes	IARC Group 1 carcinogen; NTP "known to be human carcinogen"
mercaptopurine	10:00 antineoplastic agents	yes	
methotrexate	10:00 antineoplastic agents	yes	
mitomycin	10:00 antineoplastic agents	yes	IARC Group 2B
mitotane	10:00 antineoplastic agents	yes	
mitoxantrone	10:00 antineoplastic agents	yes	IARC Group 2B
nelarabine	10:00 antineoplastic agents	yes	
omacetaxin	10:00 antineoplastic agents	yes	

Table 1. Drugs that contain MSHI in the package insert and/or meet the NIOSH definition of a hazardous drug and are classified by the NTP as "known to be a human carcinogen," and/or classified by the IARC as "carcinogenic" or "probably carcinogenic."

Drug	AHFS classification	MSHI	Supplemental Information[11]
oxaliplatin	10:00 antineoplastic agents	yes	
paclitaxel	10:00 antineoplastic agents	yes	
panobinostat	10:00 antineoplastic agents	yes	Special warnings on contraception for females while taking and one month post- treatment
pemetrexed	10:00 antineoplastic agents	yes	
pentostatin	10:00 antineoplastic agents	yes	
polatuzumab vedotin	10:00 antineoplastic agents	yes	Monoclonal antibody conjugated to vedotin; Cytotoxic; Developmental toxicity
pomalidomide	10:00 antineoplastic agents	yes	Analog of thalidomide; Females of reproductive potential must use 2 forms of contraception or continuously abstain from heterosexual sex during and for 4 weeks after stopping treatment
pralatrexate	10:00 antineoplastic agents	yes	
procarbazine	10:00 antineoplastic agents	yes	IARC Group 2A carcinogen
romidepsin	10:00 antineoplastic agents	yes	
streptozocin	10:00 antineoplastic agents	yes	IARC Group 2B
tamoxifen	10:00 antineoplastic agents; 68.16.12 estrogen agonist-antagonist		IARC Group 1 carcinogen; NTP "known to be human carcinogen"
temozolomide	10:00 antineoplastic agents	yes	
temsirolimus	10:00 antineoplastic agents	yes	
teniposide	10:00 antineoplastic agents	yes	IARC Group 2A carcinogen
thalidomide	92:20 biologic response modulators	yes	
thioguanine	10:00 antineoplastic agents	yes	
thiotepa	10:00 antineoplastic agents	yes	IARC Group 1 carcinogen; NTP "known to be human carcinogen"
topotecan	10:00 antineoplastic agents	yes	
trabectedin	10:00 antineoplastic agents	yes	Cytotoxic; Genotoxic
trastuzumab deruxtecan	10:00 antineoplastic agents	yes	Monoclonal antibody conjugated to deruxtecan; Cytotoxic

Table 1. Drugs that contain MSHI in the package insert and/or meet the NIOSH definition of a hazardous drug and are classified by the NTP as "known to be a human carcinogen," and/or classified by the IARC as "carcinogenic" or "probably carcinogenic."

Drug	AHFS classification	MSHI	Supplemental Information[11]
trifluridine	10:00 antineoplastic agents	yes	Embryo-fetal lethality and embryo-fetal toxicity at doses lower than or similar to exposures at the recommended human dose
uracil mustard	NA	yes	IARC Group 2B
valganciclovir	8:18:32 nucleosides and nucleotides	yes	
valrubicin	10:00 antineoplastic agents	yes	
vandetanib	10:00 antineoplastic agents	yes	
vinblastine	10:00 antineoplastic agents	yes	
vincristine	10:00 antineoplastic agents	yes	
vinorelbine	10:00 antineoplastic agents	yes	
vorinostat	10:00 antineoplastic agents	yes	Adverse embryo-fetal effects at less than the recommended human dose

The drugs in **Table 2** meet the NIOSH definition of a hazardous drug but are not drugs which have MSHI and are not classified by the NTP as "known to be a human carcinogen," and/or classified by the IARC as "carcinogenic" or "probably carcinogenic." These drugs exhibit one or more of the types of toxicity described in the NIOSH definition of hazardous drug. Some of these drugs may present an occupational hazard to males or females who are actively trying to conceive, women who are pregnant or may become pregnant, and women who are breast feeding, because they may be present in breast milk.

Drugs reviewed for this update were new drug approvals or received safety related new warnings from FDA in the period between January 2014 and December 2015.

Drugs underlined and in red font were added in 2020.

Table 2. Drugs that meet the NIOSH definition of a hazardous drug but are not drugs that have MSHI or are classified by the NTP as "known to be a human carcinogen," or classified by the IARC as "carcinogenic" or "probably carcinogenic." (some also may have adverse development and/or reproductive effects)

Drug	AHFS classification	Supplemental Information
abacavir	8:18.08.20 nucleoside and reverse transcriptase inhibitors	Malignant tumors observed in male and female mice and rats; Genotoxic in vivo micronucleus test.
abiraterone	10:00 antineoplastic agents	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**; Women who are pregnant or women who may be pregnant should not handle without protection (e.g., gloves)
acitretin	88:04 vitamin A	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**
afatinib	10:00 antineoplastic agents	Special warnings on contraception for females while taking and two weeks post- treatment
aflibercept	10:00 antineoplastic agents	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**; Embryotoxic and teratogenic in rabbits at exposure levels lower than human exposures at the recommended dose, with increased incidences of external, visceral, and skeletal fetal malformations
alefacept	84:92 skin and mucous membrane agents, miscellaneous	Increased frequency of malignancies observed in treated patients
alitretinoin	84:92 skin and mucous membrane agents, miscellaneous	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**
ambrisentan	24:12:92 vasodilating agents, miscellaneous	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**

Table 2. Drugs that meet the NIOSH definition of a hazardous drug but are not drugs that have MSHI or are classified by the NTP as "known to be a human carcinogen," or classified by the IARC as "carcinogenic" or "probably carcinogenic." (some also may have adverse development and/or reproductive effects)

Drug	AHFS classification	Supplemental Information
anastrozole	68.16.04 antiestrogens; 10:00 antineoplastic agents	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**
apomorphine	28:36.20.08 Nonergot-derivative dopamine receptor agonists	Genotoxic in several in vitro assays
axitinib	10:00 antineoplastic agents	Teratogenic, embryotoxic and fetotoxic in mice at exposures lower than human exposures
bexarotene	10:00 antineoplastic agents	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**
bicalutamide	10:00 antineoplastic agents	
blinatumomab	10:00 antineoplastic agents	Organ Toxicity at Low Dose - Neurotoxicity
bosentan	24:12:92 vasodilating agents, miscellaneous	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**
bosutinib	10:00 antineoplastic agents	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**
cabergoline	28:36:20:04 ergot-derivative dopamine receptor agonists	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**
cabozantinib	10:00 antineoplastic agents	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**; Embryo lethal in rats at exposures below the recommended human dose
carbamazepine	28:12:92 anticonvulsants, miscellaneous	Black Box warning for aplastic anemia; Congenital malformations in offspring of mothers who took drug; Rapid transplacental passage
carfilzomib	10:00 antineoplastic agents	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**; Special warnings on contraception while taking and two weeks post-treatment
ceritinib	10:00 antineoplastic agents	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**; Developmental toxicity
cetrorelix	92:40 gonadotropin-releasing hormone antagonists	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**
choriogonadotropin	68:18 gonadotropins	**Only met the NIOSH criteria as a developmental and/or reproductive hazard;** Developmental toxicity
clobazam	28:12.08 benzodiazapines	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**; Developmental toxicity; Reproductive toxicity-male; Reproductive toxicity-female
clomiphene	68:16:12 estrogen agonist-antagonists	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**
clonazepam	28:12:08 benzodiapines	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**
cobimetinib	10:00 antineoplastic agents	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**; Developmental toxicity;

Table 2. Drugs that meet the NIOSH definition of a hazardous drug but are not drugs that have MSHI or are classified by the NTP as "known to be a human carcinogen," or classified by the IARC as "carcinogenic" or "probably carcinogenic." (some also may have adverse development and/or reproductive effects)

Drug	AHFS classification	Supplemental Information
		Reproductive toxicity-male; Reproductive toxicity-female
colchicine	92:16 antigout agents	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**
crizotinib	10:00 antineoplastic agents	
dabrafenib	10:00 antineoplastic agents	Special warnings on contraception for females while taking and two weeks post-treatment
deferiprone	64:00 Heavy metal antagonists	Genotoxic *in vitro* and *in vivo*
degarelix	68:18.04 antigonadropins; 10:00 antineoplastic agents	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**
dihydroergotamine	12:16.00 sympatholytic (andrenergic blocking) agents	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**; Developmental toxicity
dinoprostone	76:00 oxytocics	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**
divalproex	28:12:92 anticonvulsants, miscellaneous	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**; Black box warning on embryo-fetal death or severe birth defects; Recommend effective contraception for females during therapy and for seven months after treatment; Present in semen; No sperm donation during and three months post-treatment
dronedarone	24:04:04 antiarrythmics	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**
dutasteride	92:08 5-alpha reductase inhibitors	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**
entecavir	8:18:32 nucleosides and nucleotides	
enzalutamide	10:00 antineoplastic agents	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**; Embryo-fetal toxicity in mice at exposures that were lower than in patients receiving the recommended dose
ergonovine/methylergonovine	76:00 oxytocics	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**; Developmental toxicity – third trimester
eribulin	10:00 antineoplastic agents	
erlotinib	10:00 antineoplastic agents	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**
eslicarbazepine	28:12:92 anticonvulsants, miscellaneous	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**
estradiol	68:16:04 estrogens	Black Box warning for malignant neoplasms; Increased risk of endometrial cancer, breast cancer, and ovarian cancer; in laboratory studies, increased frequency of carcinomas of the breast, uterus, cervix, vagina, testis, and liver; Present in breast milk
estropipate	68:16:04 estrogens	Black Box warning for endometrial carcinoma in postmenopausal women and use during pregnancy

Table 2. Drugs that meet the NIOSH definition of a hazardous drug but are not drugs that have MSHI or are classified by the NTP as "known to be a human carcinogen," or classified by the IARC as "carcinogenic" or "probably carcinogenic." (some also may have adverse development and/or reproductive effects)

Drug	AHFS classification	Supplemental Information
exemestane	68.16.04 Antiestrogens; 10:00 antineoplastic agents	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**
exenatide	68:20.06 incretin mimetics	Carcinogenicity; Developmental toxicity
finasteride	92:08 5-alpha reductase	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**
fingolimod	92:20 biologic response modifiers	In laboratory studies, increased malformations and embryo-fetal deaths at less than the RHD; Malignant lymphomas observed in male and female mice
fluconazole	8:18.08 azoles	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**
fluoxymesterone	68:08 androgens	Tumors in mice and rats and possibly humans
flutamide	10:00 antineoplastic agents	Indicated only for men
fosphenytoin	28:12.12 hydantoins	Metabolized to phenytoin
fulvestrant	10:00 antineoplastic agents	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**
ganirelix	92:40 gonadotropin- releasing hormone antagonists	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**
gonadotropin, chorionic	68:18 gonadotropins	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**
goserelin	68:16.08 gonadotropins; 10:00 antineoplastic agents	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**
histrelin	68:16.08 gonadotropins; 10:00 antineoplastic agents	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**; Can cause fetal harm when administered to a pregnant patient with the possibility of spontaneous abortion
icatibant	92:32 complement inhibitors	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**
isotretinoin	84:92.00 misc. skin and mucous membrane agents	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**; Developmental toxicity
ivabradine	24:04.90 misc. cardiac agents	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**; Developmental toxicity
leflunomide	92:36 disease-modifying antirheumatic agents	Teratogenic in laboratory studies at 1/10 HD; Marked postnatal survival at 1/100 HD; Severe liver injury reported in patients; Carcinogenicity observed at doses below HD
lenvatinib	10:00 antineoplastic agents	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**; Developmental toxicity
letrozole	68.16.04 Antiestrogens; 10:00 antineoplastic agents	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**
leuprolide	68:16.08 gonadotropins; 10:00 antineoplastic agents	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**
liraglutide recombinant	68:20.06 incretin mimetics	Black Box warning for thyroid C-cell tumors, with supporting evidence in laboratory studies; In laboratory studies, teratogenic at or below the MRHD

Table 2. Drugs that meet the NIOSH definition of a hazardous drug but are not drugs that have MSHI or are classified by the NTP as "known to be a human carcinogen," or classified by the IARC as "carcinogenic" or "probably carcinogenic." (some also may have adverse development and/or reproductive effects)

Drug	AHFS classification	Supplemental Information
lomitapide	24:06:92 antilipemic agents, miscellaneous	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**
macitentan	48:48 vasodilating agents	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**
medroxyprogesterone acetate	68:32 progestins	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**; IARC Group 2B
megestrol	10:00 antineoplastic agents	Nursing should be discontinued if megestrol is required; Women at risk of pregnancy should avoid exposure
menotropins	68:18 gonadotropins	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**
methimazole	68:36:08 antithyroid agents	Appears in human breast milk
methyltestosterone	68:08 androgens	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**
mifepristone	76:00 oxytocics	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**
miltefosine	8:30.92 misc. antiprotozoals	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**; Developmental toxicity; Reproductive toxicity – male; Reproductive toxicity – female
mipomersen	24:06:92 antilipemic agents, miscellaneous	Black box warning of hepatotoxicity
misoprostol	56:28.28 prostaglandins	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**
mycophenolate mofetil	92:44 immunosuppressive agents	Black Box warning for embryo fetal toxicity, malignancies and serious infections; Increased risk of first- trimester pregnancy loss and increased risk of congenital malformations; Special warning: tablets should not be crushed and capsules should not be opened or crushed. Avoid inhalation or direct contact with skin or mucous membranes of the powder contained in capsules and oral suspension (before or after constitution). If such contact occurs, wash thoroughly with soap and water; rinse eyes with plain water.
mycophenolic acid	92:44 immunosuppressive agents	Black Box warning for embryo fetal toxicity, malignancies and serious infections; Increased risk of first- trimester pregnancy loss and increased risk of congenital malformations; Black Box warning for lymphomas and other malignancies; genotoxic *in vitro* and *in vivo*
nafarelin	68:18 gonadotropins	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**
nevirapine	8:18.08.16 nonnucleoside reverse transcriptase inhibitors	In laboratory studies, hepatocellular adenomas and carcinomas at doses lower than human dose

Table 2. Drugs that meet the NIOSH definition of a hazardous drug but are not drugs that have MSHI or are classified by the NTP as "known to be a human carcinogen," or classified by the IARC as "carcinogenic" or "probably carcinogenic." (some also may have adverse development and/or reproductive effects)

Drug	AHFS classification	Supplemental Information
nilotinib	10:00 antineoplastic agents	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**
olaparib	10:00 antineoplastic agents	Genotoxicity; Developmental toxicity
ospemifene	68:16:12 estrogen agonist-antagonists	Black box warning on increased risk of endometrial cancer in certain populations; Risk of adverse outcomes during pregnancy and labor
oxcarbazepine	28:12:92 anticonvulsants, miscellaneous	Tumors observed in laboratory studies at 1/10 MRHD
oxytocin	76:00 oxytocics	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**; Developmental toxicity – third trimester
palifermin	84:16 cell stimulants and proliferants	Potential for stimulation of tumor growth
pamidronate	92:24 bone resorption inhibitors	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**
paroxetine	28:16:04:20 selective serotonin uptake inhibitors	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**
pasireotide	68:29:04 somatostatin agonists	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**
pazopanib	10:00 antineoplastic agents	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**
peginesatide	20:16 hematopoetic agents	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**
pentetate calcium trisodium	NA	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**
phenoxybenzamine	12:16:04:04 non-selective alpha-andrenergic blocking agents	IARC Group 2B
phenytoin	28:12.12 hydantoins	IARC Group 2B
pipobroman	NA	
plerixafor	20:16 hematopoietic agents	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**
ponatinib	10:00 antineoplastic agents	
progesterone	68:32 progestins	IARC Group 2B
progestins	68:12 contraceptives	
propylthiouracil	68:36.08 antithyroid agents	IARC Group2B
raloxifene	68:16:12 estrogen agonists-antagonists	Abortion and developmental abnormalities seen at low doses in laboratory studies; Evidence of tumors at low doses in laboratory studies
rasagiline	28:36 antiparkinsonian agents	
regorafenib	10:00 antineoplastic agents	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**; Black box warning on severe and sometimes fatal hepatotoxicity; Total loss of pregnancy at doses lower that recommended human dose

Table 2. Drugs that meet the NIOSH definition of a hazardous drug but are not drugs that have MSHI or are classified by the NTP as "known to be a human carcinogen," or classified by the IARC as "carcinogenic" or "probably carcinogenic." (some also may have adverse development and/or reproductive effects)

Drug	AHFS classification	Supplemental Information
ribavirin	8:18:32 nucleosides and Teratogenic and embryotoxic nucleotides	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**
riociguat	48:48 vasodilating agents	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**
sirolimus	92:44 immunosuppressive agents	AKA rapamycin; Increased risk of lymphomas and other malignancies; Embryotoxic and fetotoxic at 0.2 HD
sonidegib	10:00 antineoplastic agents	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**; Developmental toxicity; Reproductive toxicity – female
sorafenib	10:00 antineoplastic agents	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**
spironolactone	24:32.20 mineralocorticoid receptor antagonists	Black box warning for tumorogenicity in laboratory studies
sunitinib	10:00 antineoplastic agents	
tacrolimus	92:44 immunosuppressive agents	Increased risk of lymphomas and other malignancies; Reproductive effects seen in laboratory studies below the MRHD; Excreted in breast milk
temazepam	28:24:08 benzodiazepines	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**
teriflunomide	92:20 immunomodulatory agents	Black box warning on severe hepatotoxicity and teratogenicity including major birth defects
testosterone	68:08 androgens	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**
tofacitinib	92:36 disease modifying antirheumatic drugs	Black box warning for lymphoma and other malignancies
topiramate	28:12.92 anticonvulsants, miscellaneous	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**
toremifene	68.16.12 estrogen agonist-antagonist; 10:00 antineoplastic agents	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**
trametinib	10:00 antineoplastic agents	Embryotoxic and abortifacient at doses less than recommended human dose
tretinoin	84:16 cell stimulants and proliferants	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**
triptorelin	68:18.08 gonadotropins; 10:00 antineoplastic agents	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**
ulipristal	68:12 contraceptives	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**
urofollitropin	68:18.00 gonadotropins	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**; Developmental toxicity
valproate/valproic acid	28:12:92 anticonvulsants, miscellaneous	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**

Table 2. Drugs that meet the NIOSH definition of a hazardous drug but are not drugs that have MSHI or are classified by the NTP as "known to be a human carcinogen," or classified by the IARC as "carcinogenic" or "probably carcinogenic." (some also may have adverse development and/or reproductive effects)

Drug	AHFS classification	Supplemental Information
vemurafenib	10:00 antineoplastic agents	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**
vigabatrin	28:12:92 anticonvulsants, miscellaneous	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**
vismodegib	10:00 antineoplastic agents	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**; Black box warning on embryo-fetal death or severe birth defects; Recommend effective contraception for females during therapy and for seven months after treatment; present in semen; No sperm donation during and three months post-treatment
voriconazole	8:14.08 azoles	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**
warfarin	20:12.04.08 coumarin derivatives	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**
zidovudine	8:18:08 antiretroviral agents	IARC Group 2B
ziprasidone	28:16:08:04 atypical	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**
zoledronic acid	92:24 bone resorption inhibitors	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**
zonisamide	28:12:92 anticonvulsants,	**Only met the NIOSH criteria as a developmental and/or reproductive hazard**

Changes to the Placement of Drugs on the *List*

This table identifies drugs that were either removed after the 2016 update to the *List* or were placed in a table different than they were placed in the 2016 update to the *List.*

Changes to the placement of drugs from the 2016 *List.*

Drugs removed from the *List*	
Drug	**Notation**
Bacillus Calmette Guerin (BCG)	BCG was removed from the NIOSH list because it is an infectious agent and not classified as a drug by FDA. For handling recommendations see drug package insert.
paliperidone	NIOSH reviewed data from studies provided by the manufacturer and determined it is unlikely that paliperidone poses a carcinogenic, reproductive, or developmental hazard to workers in a healthcare setting and is no longer considered a hazardous drug by NIOSH.
pertuzumab	NIOSH reviewed data concerning the developmental effects related to pertuzumab treatment and has determined that it is unlikely that pertuzumab poses a reproductive threat to workers in healthcare settings and is no longer considered a hazardous drug by NIOSH.
risperidone	NIOSH reviewed data from studies provided by the manufacturer and determined it is unlikely that risperidone poses a carcinogenic, reproductive, or developmental hazard to workers in a healthcare setting and is no longer considered a hazardous drug by NIOSH.
televancin	Televancin was removed from the NIOSH list based on data from reproductive studies provided by the manufacturer concerning its lack of reproductive toxicity.
Drugs moved to a different table	
Abiraterone	Moved from Table 1 to Table 2
Acitretin	Moved from Table 3 to Table 2
afatinib	Moved from Table 1 to Table 2
Aflibercept	Moved from Table 1 to Table 2

Alitretinoin	Moved from Table 3 to Table 2
Anastrozole	Moved from Table 1 to Table 2
axitinib	Moved from Table 1 to Table 2
Azathioprine	Moved from Table 2 to Table 1
Bexarotene	Moved from Table 1 to Table 2
Bicalutamide	Moved from Table 1 to Table 2
Bosentan	Moved from Table 3 to Table 2
Bosutinib	Moved from Table 1 to Table 2
Cabergoline	Moved from Table 3 to Table 2
Cabozantinib	Moved from Table 1 to Table 2
Carfilzomib	Moved from Table 1 to Table 2
Ceizotinib	Moved from Table 1 to Table 2
Cetrorelix	Moved from Table 3 to Table 2
Chloramphenicol	Moved from Table 2 to Table 1
Choriogonadotropin	Moved from Table 3 to Table 2
cidofovir	Moved from Table 2 to Table 1
Clomiphene	Moved from Table 3 to Table 2
Clonazepam	Moved from Table 3 to Table 2
Colchicine	Moved from Table 3 to Table 2
Cyclosporine	Moved from Table 2 to Table 1
Dabrafenib	Moved from Table 1 to Table 2
Degarelix	Moved from Table 1 to Table 2
Dexrazoxane	Moved from Table 2 to Table 1
Diethylstilbestrol	Moved from Table 2 to Table 1
Dinoprostone	Moved from Table 3 to Table 2

Divalproex	Moved from Table 2 to Table 3
Dronedarone	Moved from Table 3 to Table 2
Dutasteride	Moved from Table 3 to Table 2
Emzalutamide	Moved from Table 1 to Table 2
Ergovine/Methylergovine	Moved from Table 3 to Table 2
Eribulin	Moved from Table 1 to Table 2
Erlotinib	Moved from Table 1 to Table 2
Eslicarbazepine	Moved from Table 3 to Table 2
Estrogen-progesterone combinations	Moved from Table 2 to Table 1
Estrogens conjugated	Moved from Table 2 to Table 1
Estrogens; esterified	Moved from Table 2 to Table 1
Exemestane	Moved from Table 1 to Table 2
Finasteride	Moved from Table 3 to Table 2
Fluconazole	Moved from Table 3 to Table 2
Flutamide	Moved from Table 1 to Table 2
Fulvestrant	Moved from Table 1 to Table 2
Ganciclovir	Moved from Table 2 to Table 1
Ganirelix	Moved from Table 3 to Table 2
Goserelin	Moved from Table 1 to Table 2
Histrelin	Moved from Table 1 to Table 2
Icatibant	Moved from Table 3 to Table 2
Lenalidomide	Moved from Table 2 to Table 1
Letrozole	Moved from Table 1 to Table 2
Leuprolide	Moved from Table 1 to Table 2
Lomitapide	Moved from Table 3 to Table 2

Macitentan	Moved from Table 3 to Table 2
Magestrol	Moved from Table 1 to Table 2
Medroxyprogesterone	Moved from Table 2 to Table 2
Menotropins	Moved from Table 3 to Table 2
Methyltestosterone	Moved from Table 3 to Table 2
Mifepristone	Moved from Table 3 to Table 2
Misoprostal	Moved from Table 3 to Table 2
Nafarelin	Moved from Table 3 to Table 2
Nilotinib	Moved from Table 1 to Table 2
Oxytocin	Moved from Table 3 to Table 2
Pamidronate	Moved from Table 3 to Table 2
Paroxetine	Moved from Table 3 to Table 2
Pasireotide	Moved from Table 3 to Table 2
Pazopanib	Moved from Table 1 to Table 2
Peginesatide	Moved from Table 3 to Table 2
Pentetate calcium trisodium	Moved from Table 3 to Table 2
Plerixafor	Moved from Table 3 to Table 2
Ponatinib	Moved from Table 1 to Table 2
Regorafenib	Moved from Table 1 to Table 2
Ribavirin	Moved from Table 3 to Table 2
Riociguat	Moved from Table 3 to Table 2
Sorafenib	Moved from Table 1 to Table 2
Sunitinib	Moved from Table 1 to Table 2
Temazepam	Moved from Table 3 to Table 2
Teriflunomide	Moved from Table 3 to Table 2

Testosterone	Moved from Table 3 to Table 2
Thalidomide	Moved from Table 2 to Table 1
Topiramate	Moved from Table 3 to Table 2
Toremifene	Moved from Table 1 to Table 2
Trametinib	Moved from Table 1 to Table 2
Tretinoin	Moved from Table 3 to Table 2
Triptorelin	Moved from Table 1 to Table 2
Ulipristal	Moved from Table 3 to Table 2
Uracil mustard	Moved from Table 2 to Table 1
Valganciclovir	Moved from Table 2 to Table 1
Valproate	Moved from Table 3 to Table 2
Valproic Acid	Moved from Table 3 to Table 2
vemurafenib	Moved from Table 1 to Table 2
Vigabatrin	Moved from Table 3 to Table 2
Voriconazole	Moved from Table 3 to Table 2
Warfarin	Moved from Table 3 to Table 2
Zif-afibercept	Moved from Table 1 to Table 2; now listed as afibercept
Ziprasidone	Moved from Table 3 to Table 2
Zoledronic Acid	Moved from Table 3 to Table 2
Zonisamide	Moved from Table 3 to Table 2

As noted earlier, in previous iterations of this *List*, Table 5 provided information on recommended exposure controls for hazardous drugs based on formulations. Information about managing risk of exposure can now be found in the draft NIOSH risk management document (Insert link when available).