Comments on Citizen's Petition #FDA-2013-P-1001/CP-1

Submitted by

Howard M. Druce, MD

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Summary of Petition and Analysis

The Petitioners request that the Commissioner of Food and Drugs add a warning to the labeling of all nonprescription drug products containing an ingredient with "anticholinergic or histamine H_1 inverse agonist effects" noting that the product can cause a confusional state. They also note that older adults may be at risk for impaired cognition, especially in the context of concurrent use of multiple drugs with similar anticholinergic/H_1 inverse agonist effects.

Evidence cited by the Petitioners in the "Statement of Grounds" section of the Petition was reviewed for relevance towards the requested warning. While the ability of antihistamine products to produce sedation is well-known, current labeling for these products reflects the potential for drowsiness to occur.

Justification of a class-related warning should require sufficient evidence of the effect occurring with many, most or all of the drugs in the class. As outlined in more detail below, the evidence provided by the petitioners in support of their request, which includes published case reports, observational and prospective controlled trials as well as other reports in the literature, does not justify the addition of a class labeling statement to all nonprescription antihistamine products with H_1 inverse agonist effects.

Analysis of Scientific References Cited by the Petitioners

This review will follow the chronologic order of the references as cited by The Petitioners.

The Petitioners state that "As early as 1971, case reports were published suggesting that the confusional state following certain medications was due to the anticholinergic effect of the medicines."

Commentary: Although published, The Petitioners do not cite these case report references. It is thus not possible to assess which medications were involved, the dosage and route of administration, the indication for administration, concomitant medications, and any underlying medical conditions suffered by the subjects of these case reports. This type of information is typically contained in a published case report and is essential to assess the relevance of case reports.

The Petitioners cite Janowsky et al. (1972) who they state "published a placebo-controlled study showing that the confusional state caused by some drugs with anticholinergic effects was not affected by placebo but was improved by physostigmine confirming the anticholinergic mechanism for the confusion."

Commentary: The reference refers to a letter to the editor in which 3 patient histories are detailed. One received a tricyclic-phenothiazine-benztropine combination product and the other two received phenothiazine-benztropine combinations. Their confusional state was not altered by a placebo injection but was reversed temporarily by physostigmine. No placebo-controlled study is detailed in this reference. None of these patients received any H_1 antihistamines.

The Petitioners report that "Tune, et al, 1992 assessed the 25 drugs most commonly prescribed for the elderly for anticholinergic activity and found 10 had levels associated with impairment in normal elderly subjects."

Commentary: Tune at al report an *in vitro* experiment. The authors obtained samples of the 25 medications most commonly prescribed for elderly patients according to a HCFA listing of 225 drugs. They assessed the anticholinergic effects of a standard concentration (*i.e*. 10^{-8} M) of each compound in an anticholinergic radioreceptor assay. They compared the drug levels to an internal standard of atropine sulfate. They expressed each level as nanograms per milliliter of equivalent amounts of atropine. The top 10 drugs in Table 1 of their paper were ranked by frequency of their prescription for elderly patients: furosemide, digoxin, dyazide, lanoxin, hydrochlorothiazide, propranolol, salicylic acid, dipyridamole, theophylline anhydrous and nitroglycerin. No H_1 antihistamines appear in the table.

The Petitioners state that the "American Geriatrics Society 2012 Beers Criteria for potentially inappropriate medications for older adults include 12 first generation antihistamine H_1 receptor antagonists / reverse agonists, many of which are nonprescription drugs."

Commentary: The 2012 updated Beers criteria include 53 medications or medication classes. Of this large number of specific medications, 12 first generation antihistamines are named. Of these, some are not actively marketed (carbinoxamine), or are only available on prescription for specific indications (cyprohepatadine, hydroxyzine). The quality of evidence for all but hydroxyzine and promethazine is moderate. No references are cited in the paper to allow examination of the quality of the supporting data.

The Petitioners state that all H_1 receptor antagonists have central nervous system activity. (Brunton 2011).

Commentary: This reference is taken from the chapter on H_1-receptor antagonists of a standard pharmacology textbook. The reference states..."the first-generation antagonists can both stimulate and depress the CNS. Stimulation occasionally is encountered in patients given conventional doses……Central depression…usually accompanies therapeutic doses of the older H_1 antagonists. ….Patients vary in their susceptibility and responses to individual drugs." The Petitioners do not refer to the very next page where positive anticholinergic effects are detailed. From P.920 – Many of the first-generation antagonists tend to inhibit responses to ACh (acetylcholine) that are mediated by muscarinic receptors and may be manifest during clinical use. Some H_1 antagonists also can be used to treat motion sickness.

The Petitioners cite Duran et al who reviewed multiple published risk scales and identified 100 drugs as having this activity and "a way to sum the anticholinergic activity of each to determine the anticholinergic burden for a medication regimen of multiple drugs". They state that many of the high potency anticholinergic drugs on the list are nonprescription antihistamines including chlorpheniramine, cyproheptadine, diphenhydramine and hydroxyzine.

Commentary: Duran et al (2013) published a literature search review. The authors looked in MEDLINE for studies including a finite list of anticholinergic drugs, a grading score of anticholinergic potency and a validation in a clinical or experimental setting. The authors

identified seven risk scales and evaluated 225 different drugs. The authors concluded that there was considerable variation among anticholinergic risk scales in terms of selection of specific drugs as well as of grading of anticholinergic potency. The authors stated that their selection of 100 drugs to be included in a screening software program for anticholinergic burden needs to be supplemented with validated information on dosing and route of administration for a full estimation of the anticholinergic burden in poly-medicated older adults. Cyproheptadine and hydroxyzine are not nonprescription drugs in the U.S.

The Petitioners state that "many population-based observational studies have been published showing worse performance in elderly taking drugs with anticholinergic activity than controls who don't take these drugs."

Commentary: The Petitioners cite only 2 examples of studies which can be evaluated. Regarding the "many" studies there is no indication of the specific drugs involved, the indications for use, dosage and route of administration of use and underlying medical conditions, all of which need to be considered to assess the validity of the conclusions.

The Petitioners cite 2 examples for review: Ancelin et al (2006) and Landi et al (2007).

Ancelin et al 2006. The Petitioners do not describe the findings of this study.

Commentary: Ancelin et al performed a longitudinal cohort study which included 372 subjects over age 60, from 63 randomly selected general practices in the Montpellier region of southern France. There was a significant refusal rate of 7%, and 372 elderly subjects without senile dementia were followed for two years. The endpoint for the study was a novel anticholinergic burden classification the authors developed by constructing a table associating known anticholinergic drugs with their serum anticholinergic activity where available, as shown by radioreceptor assays. Also, each participant's records were examined by a pharmacologist, physician and biologist to classify the burden from 0-3 (0= no anticholinergic drugs used, 1= drugs used with no likely effect, 2= drugs used with low effect, 3= drugs used with high effect). This manuscript does not detail which drugs would contribute to each category. However, Table 1 in the manuscript does contain a list of the anticholinergic drugs used by study participants which had an anticholinergic burden classification of 3. Of the 27 drugs cited, only 2 were given for allergy relief: Dexchlorpheniramine, and Alimemazine, which is a combination product containing a sedative phenothiazine). The authors state that chlorpheniramine was being used for an analgesia and anti-inflammatory application, which is not relevant to U.S. practice. Most of the study participants were taking their anticholinergic medications chronically. 51/372 subjects were taking at least one anticholinergic drug at the start of the study, and at the one year follow up 30/51 were still taking anticholinergic drugs regularly. The list of drugs cited in Table 1 includes prescription medications such as colchicine, digoxin, furosemide, and oxybutynin. Because these were prescribed for chronic conditions, continued adherence is not surprising.

Landi 2007. The Petitioners do not describe the findings of this study.

Commentary: Landi et al reviewed data from a baseline evaluation of 364 subjects enrolled in a study termed iISIRENTE which is a prospective cohort study of elderly subjects age 80 and above in a mountain community in the Sirente area of Central Italy. The goals of the study,

inclusion criteria etc. are not cited in the manuscript. The authors assessed physical performance using a battery of tests including 4-meter walking speed, balance, and chair stand tests. There was no assessment of cognitive or behavioral impairment. The only class of drugs mentioned in the manuscript is "anticholinergic drugs" which the authors define as all medications for which serum anticholinergic activity was previously demonstrated. The authors state that all these physical and functional measures showed significant associations with anticholinergic drug use. After adjustment for potential confounders, the associations were weaker but still statistically significant. Table 4 in the manuscript details the frequency of use of drugs with anticholinergic properties among study participants. The top 5 were: digoxin (21%), furosemide (15.6%), theophylline (4.7%), lorazepam (3.8%) and bromazepam (2.5%). It is inappropriate to extrapolate from use of these prescription medications to "all nonprescription drugs containing an ingredient with anticholinergic or histamine H_1 inverse agonist effects" as requested by The Petitioners.

The Petitioners state "The idea that anticholinergic drugs and especially first generation antihistamines cause cognitive impairment has been so well documented that it is now standard textbook content in geriatrics (Halter JB, et al, 2009), neurology (Roper and Samuels, 2009), and internal medicine (Goldman and Schafer, 2012)."

Commentary: Halter 2009. There is no reference to antihistamines on page 765 as cited by the Petitioners.

Commentary: Roper and Samuels 2009. On P 404 a Table (20-1) is presented of the classification of delirium and acute confusional states. In the large list of disorders of acute confusional states, drug intoxication from multiple classes of drugs are listed – opiates, anticholinergics, barbiturates and other sedatives, trihexyphenidyl, corticosteroids, L-dopa, dopaminergic agonists, serotonergic antidepressants. There is no specific mention of antihistamines. There is no specific mention of nonprescription drugs.

On P. 406 there is a paragraph entitled "confusional states and delirium induced by medications. The authors note that "it must be again emphasized that drug intoxication – predominantly with drugs prescribed by physicians – is among the most common causes in practice. Among the most distinctive syndromes are those from drugs that have direct or indirect anticholinergic properties." Note here that there is again no mention of antihistamines, and the syndrome is characterized as "distinctive" – as opposed to frequent, severe or other possible qualifiers.

Commentary: Goldman and Schafer 2012. The reference is taken from a standard internal medicine textbook. The reference is apparently directed to a chapter entitled "Acute Poisoning." Table 110-1 on Page 670 details the signs and symptoms caused by overdose of multiple drug classes. First generation antihistamine receptor antagonists are included in the table, as are many other classes of drugs. There is no specific reference in the text to this class of drug. The relevance of this reference is uncertain to this author.

The Petitioners cite two prospective controlled trials showing "the same thing" (Author's emphasis).

Sunderland et al (1987) showed that patients with dementia of the Alzheimer's type had marked impairment to 0.25 mg scopolamine compared to matched elderly control subjects.

Commentary: This was a small study of 10 patients with dementia and 10 control subjects. Three different doses of scopolamine (0.1, 0.25mg and 0.5 mg) were dosed intravenously. The patients were inpatients in a National Institute of Mental Health research ward, whereas the controls were healthy outpatients brought into the hospital for study dosing. The dosing was not completely randomized but as the authors describe it "pseudorandomised" so that lower doses were administered before the highest dose. The battery of cognitive tasks was administered one and two hours after infusion. One issue that the authors discuss is that the two study groups clearly had different cognitive and behavioral measures at baseline. There was no dose-response seen for the physiologic or cognitive effects of the scopolamine. Extrapolation from this small study should be limited and this author would not consider it to be applicable to general populations or for oral dosage.

Pomara et al (2008) showed that normal healthy elderly with the APOE Ɛ4 gene (carriers) had impaired recall and mental slowness compared to non-carriers when given 2mg trihexyphenidyl orally in a randomized double-blind placebo-controlled study.

Commentary: Trihexyphenidyl is a potent anticholinergic drug available on prescription for the treatment of Parkinson's disease and tremors of other types. This study comprised 24 cognitively intact, healthy adult adults, 12 of whom were carriers for the APOE Ɛ4 allele at an outpatient geriatric psychiatry research clinic. The design was randomized, double-blind and placebo controlled. All participants received 1mg or 2mg of trihexyphenidyl or placebo over a period of three consecutive weeks. Cognitive tests were administered at baseline, 1, 2.5 and 5 hr. post-drug administration. Only the highest 2.0mg dose increased subjective ratings of mental slowness. The authors concluded that the Ɛ4 allele was associated with increased subjective mental slowing after trihexyphenidyl anticholinergic challenge. No data are presented in this paper that suggests that these results could be extrapolated to drugs such as H_1-antihistamines.

The Petitioners cite Perry (2003) to state that an "[a]dditional risk of prolonged anticholinergic drug therapy is an increase in the severity of amyloid plaque and neurofibrillary tangles seen in autopsied Parkinson's disease patients who were receiving anticholinergic drugs compared to those who had not received these drugs…"

Commentary: Perry et al (2003) presented a manuscript in the "Brief Communications" section of the Annals of Neurology. They examined case records for 120 neuropathologically confirmed cases of Parkinson's disease aged more than 70 yr. at time of death in a teaching hospital brain bank. They recorded the duration of disease and treatment with the following antimuscarinic agents: antiparkinsonian: benztropine, orphenadrine, trihexyphenidyl; bladder dysfunction: oxybutynin, and tricyclic antidepressants amitriptyline and imipramine. Smoking histories were only available for 3 cases. The authors concluded that their data was consistent with the possibility that prolonged use of antimuscarinic drugs accelerates β amyloidosis and senile plaque formation in the aging brain in subjects with Parkinson's disease. The increase in plaque density was not great and far short of that seen in Alzheimer's disease. Neither plaque nor tangle densities were elevated in Parkinson's disease patients treated with antimuscarinic drugs for less

than 2 years. There is no mention of antihistamines in this paper and no suggestion that the data can be extrapolated to other drugs such as antihistamines.

In another study, Cai et al (2012) "found that subjects receiving 3 or more months of anticholinergic medications had an increased chance of being mildly cognitively impaired than those not receiving anticholinergic medications".

Commentary: The authors note that their study found an association between anticholinergic burden and the risk of developing cognitive impairment. However, they found that such an association required both a high anticholinergic burden and 2-3 months of continuous exposure to such a high burden. The authors discuss some limitations of their study. The authors did not systematically measure medication adherence, but used drug dispensing as a surrogate. They state that this is an accurate substitute in assessing adherence for antihypertensive medications, but no data are provided for the type of medications under consideration in this study. Also the methodology of this study specifically did not capture OTC medication use. Other potentially confounding covariates of interest were also not recorded, such as depressive symptoms, APOE genotyping and alcohol and tobacco use. An important comment was made by the authors that they were unable to determine the reversibility of the association between anticholinergic exposure and cognitive impairment, but cite a reference which might suggest potential reversibility of the association.

The indications for nonprescription antihistamines are generally short-lived or self-limiting and do not require 3 or more months of medication use.

Analysis and Conclusions

The Petitioners request a general class-related warning for nonprescription drugs marketed in the U.S. The evidence they cite does not include any case report or clinical or epidemiologic study of any of the "nonprescription drugs containing an ingredient with anticholinergic or histamine H_1 inverse agonist effects." Diligent literature review has failed to discover any such study. Extrapolation from the data the Petitioners quote is not justified based on the restricted or specialized populations used in the studies they cite, and also based on the anticholinergic drugs taken by the study subjects, predominantly prescription medications such as digoxin, furosemide and theophylline.

In general, the literature on "anticholinergic burden" of medications appears to be based on the pharmacology of the individual medications. There is some controversy on the degree of "anticholinergic burden" that each medication exerts depending on the scale selected for assessment. What appears to be lacking are real-life descriptions of the effects of individual drugs dosed together. Thus, even in the Beers criteria, drug interactions are described as "potentially" harmful. To fully assess these interactions, the patient's underlying condition(s), dose of drug, drug combinations, route of administration and dosing interval need to be considered. Nonprescription drugs are often administered on "as needed" or "PRN" basis.

The effects of anticholinergic agents on cognitive measures only appear to be evident in acute dosing experiments or after 2-3 months of continuous dosing. Data obtained from clinical studies with 2-3 months of continuous dosing cannot be directly extrapolated.

The effects of short-term intermittent use of nonprescription drugs such as H_1-histamine antagonists on cognitive impairment cannot reasonably be extrapolated from the data submitted by the Petitioners. The indications and labeling for use of these drugs are determined by FDA after careful consideration.

In summary, no data have been produced to warrant change in current labeling.

/Howard Druce

Howard M. Druce, MD

Dated: June 3, 2014

Appendix 1: Author CV

Curriculum Vitae

Name: Howard Martin Druce

Office Address: 242 E. Main Street

Somerville, NJ 08876-3049

908-704-9696

1. Education

a. Undergraduate

Oxford University

Oxford, England, UK

Degree: BA with 1st class Honors in Physiological Sciences

9/1971-6/1974

b. Graduate

Oxford University

Oxford, England, UK

Degree: MA, Physiological Sciences

10/1978

University of London, Middlesex Hospital Medical School (Now University College London Medical School)

London, England, UK

Degree: MB, BS. (equivalent to U.S. MD), Medicine with Honors in Clinical Pharmacology and Therapeutics

9/1974-10/1977

2. Post-Doctoral Training

a. Internship and Residencies

NY Hospital Queens (formerly Booth Memorial Medical Center affiliated with New York University Medical Center)

Flushing, NY

Internship and Residency: Internal Medicine

7/1979 – 6/1982

United Manchester Teaching Hospitals, University of Manchester

Manchester, England, UK

Residency: ENT, Gynecology

8/1978 – 6/1979

University College Hospital (formerly Middlesex Hospital), University of London

London, England, UK

Internship: Medicine

2/1978 – 8/1978

b. Research Fellowships

National Institute of Allergy and Infectious Diseases

Bethesda, MD

Visiting Associate, Laboratory of Clinical Investigation, Allergy and Clinical Immunology
7/1983 – 6/1985

National Institute of Allergy and Infectious Diseases

Bethesda, MD

Fogarty Fellow, Laboratory of Clinical Investigation, Allergy and Clinical Immunology

7/1982 -6/1983

3. Military Service

N/A

4. Licensure

New Jersey State Medical License (#25MA05938300)

Medicine, July 1993

Expiration: June 2014

Missouri State Medical License (#R4E80)

Medicine

November 1984- January 1996

Maryland State Medical License (#D27910)

Medicine

June 1982- September 1986

D.C. District Medical License (#13387)

Medicine

May 1982- July 1985

New York State Medical License (#143883)

Medicine

October 1980- December 1985

United Kingdom General Medical Council (#2403344)

Medical Practitioner

November 1977- November 2003

5. Certification

Diplomate Certified: American Board of Allergy & Immunology

No. 2570

October 1985

Diplomate Certified: American Board of Internal Medicine

No. 084713

September 1983

6. Narcotics Certification

New Jersey State

CDS License # D06284700

Expiration: October 2015

New Jersey
DEA License # BD 3701679

Expiration: June 2014

7. University Appointments

Department of Medicine, Division of Allergy and Immunology

Rutgers - New Jersey Medical School (formerly UMDNJ)

Clinical Professor of Medicine

July 2008- present

Department of Medicine, Division of Allergy and Immunology

University of Medicine and Dentistry of New Jersey - New Jersey Medical School

Clinical Associate Professor of Medicine

July 1994- July 2008

Department of Internal Medicine, Division of Allergy and Immunology

Saint Louis University School of Medicine, St. Louis, MO

Associate Professor of Medicine

July 1991- July 1992

Department of Otolaryngology, Head and Neck Surgery

Saint Louis University School of Medicine, St. Louis, MO

Assistant Professor of Otolaryngology

July 1990- July 1992

Department of Internal Medicine, Division of Allergy and Immunology

Saint Louis University School of Medicine, St. Louis, MO

Assistant Professor of Medicine

July 1985- June 1991

8. **Hospital Appointments**

Department of Medicine

Robert Wood Johnson University Hospital Somerset (formerly Somerset Medical Center, Somerville, NJ)

Attending Physician, Department of Medicine

July 2009-Present

Department of Medicine, Allergy/Immunology/Rheumatology

University Hospital, Newark, NJ

Attending Physician (Courtesy status)

July 1994- December 2009

Department of Internal Medicine

Saint Louis University Hospital, St. Louis, MO

Co-Director, Comprehensive Sinus Clinic

July 1989- July 1992

Department of Pediatrics

Cardinal Glennon Children's Hospital, St. Louis, MO

Attending Physician

November 1986- July 1992

Department of Internal Medicine

Saint Louis University Hospital, St. Louis, MO

Attending Physician

July 1985- July 1992

Department of Internal Medicine

John Cochran Veterans Administration Medical Center, St. Louis, MO

Consultant, Medical Service/Allergy

July 1985- September 1992

Department of Internal Medicine

Washington Hospital Center, Washington, DC

Junior Attending Physician

May 1984- July 1985

9. **Other Professional Positions and Major Visiting Appointments**

U.S. Food and Drug Administration
Industry Representative, Pulmonary-Allergy Drugs Advisory Committee

2012-2015

Department of Medical Affairs

McNeil Consumer HealthCare, Morris Plains, NJ

Senior Director, Upper Respiratory

January 2007-December 2008

Department of Clinical Research and Medical Affairs

Pfizer Consumer Healthcare

Senior Director, Upper Respiratory, Tobacco Dependence and Eye Care

September 2000- January 2007

Department of Clinical Research and Medical Affairs

Warner-Lambert Consumer Healthcare

Senior Director, Upper Respiratory

November 1998- September 2000

Department of Clinical Research and Medical Affairs

Whitehall-Robins Division of American Home Products Inc. (Now Wyeth)

Director, Upper Respiratory and Fertility

January 1996- November 1998

Department of Clinical Research

Hoffman-LaRoche Inc.

Associate Director, Respiratory Medicine

July 1992- January 1996

10. Awards and Honors

Travel Grant

XII International Congress of Allergology and Clinical Immunology

Washington, DC

June 1985

Travel Grant

American Academy of Allergy and Immunology Annual Meeting

Chicago, IL

March 1984

AMA Physicians Recognition Award for CME

1983, 1985, 1991

Temple Frere Class Prize in Obstetrics/Gynecology

Middlesex Hospital Medical School, London UK

November 1977

Studentship in Community Medicine

Health Education Council of UK

1977

Third David Moore Class Prize in Obstetrics/Gynecology

Middlesex Hospital Medical School, London UK

November 1977

University of Glasgow

Certificate of Merit: Class of Clinical Obstetrics

March 1976

Nuffield Foundation Exchange Scholarship in Gynecology

University of Glasgow, Scotland

January –March 1976

11. Membership on Boards of Directors or Trustees

None

12. Major Teaching Experience

a. Lectures

Rutgers – New Jersey Medical School

Department of Medicine, Division of Allergy and Immunology

Introductory Course on Allergy and Immunology

2002- present

UMDNJ – New Jersey Medical School

Department of Medicine, Division of Allergy and Immunology

Basic Science Immunology Course

2002- 2006

UMDNJ – New Jersey Medical School

Department of Medicine, Division of Allergy and Immunology

Faculty mentor, Allergy and Immunology Journal Club

2002- present

Saint Louis University School of Medicine

Department of Medicine

Preceptor, "Ethics of Death and Dying" Course

2002

Saint Louis University School of Medicine

Department of Medicine

Preceptor, Community Medicine Elective

1986-1992

Saint Louis University School of Medicine

Department of Medicine

Resident Faculty Advisor

1986-1992

Saint Louis University School of Medicine

Department of Medicine

Preceptor, Internal Medicine Course

1986-1992

Saint Louis University School of Medicine

Department of Medicine

Faculty Mentor, Allergy and Immunology Journal Club

1985-1992

b. Research Training

1. Post-Doctoral Fellow

None

2. Pre Doctoral Students

Martha Kalasky (Penn State University)

June 2007 – August 2007

c. Instruction to (unique circumstance)

None

13. Principal Clinical and Hospital Service Responsibilities

University of Medicine and Dentistry of New Jersey – University Hospital

Department of Medicine, Division of Allergy and Immunology

Allergy and Immunology Service Attending

Responsibilities: Ambulatory medicine clinical practice, graduate fellow education, resident education, medical student education

July 1992 – December 2009

Saint Louis University School of Medicine

University Hospital

Department of Internal Medicine, Division of Allergy and Immunology

Internal Medicine and Allergy and Immunology Service Attending

Responsibilities: In-patient and ambulatory medicine clinical practice, graduate fellow education, resident education, medical student education
July 1985 – June 1992

14. Major Committee Assignments

a. International

WHO Expert Committee on Drug Dependence

Geneva, Switzerland

June 1998

b. National

Member, Taskforce on Practice Parameters for Allergic Rhinitis

Joint Council for Allergy and Immunology

October 2004 – present

Member, Taskforce on Practice Parameters for Sinusitis

Joint Council for Allergy and Immunology

October 2004 – present

New Jersey State Representative, House of Delegates

American College of Allergy, Asthma and Immunology

2011-

c. Medical School

Member, University Faculty Senate

Saint Louis University School of Medicine
June 1991- June 1992

Member, Biomedical Communications Advisory Committee

Saint Louis University School of Medicine

July 1991- June 1992

Member, International Services Advisory Board

Saint Louis University School of Medicine

January 1987- June 1992

Member, Institutional Review Board

Saint Louis University School of Medicine

July 1986- June 1992

d. **Hospital**

Member, CME Committee

Somerset Medical Center, Somerville, NJ

December 2009 – January 2013

Member, Medical Staff Nominating Committee

Saint Louis University Hospital

July 1991- June 1992

Member, Biomedical and Instrumentation Committee

Saint Louis University Hospital

July 1991- June 1992

Member, Antibiotic Review Committee

Saint Louis University Hospital

July 1990- June 1991

Member, Laboratory Utilization/Transfusion Practices Committee

Saint Louis University Hospital

July 1988- June 1989

e. Department

Member, Fellowship Review Committee

Division of Allergy and Immunology/ Department of Medicine

Rutgers - New Jersey Medical School

November 1992- present

Member, Faculty Committee

Division of Allergy and Immunology/ Department of Medicine

Rutgers - New Jersey Medical School

July 1992- present

f. Editorial Boards

American Journal of Rhinology

1992-2005

Annals of Allergy, Asthma and Immunology

1990-1995

g. Ad Hoc Reviewer

Journal Reviewer

Allergy (European Journal of Allergy and Clinical Immunology)

Allergy and Immunology Practice

American Journal of Rhinology

American Review of Respiratory Disease

Annals of Allergy, Asthma and Immunology

Diagnostic Cytopathology

Journal of Allergy and Clinical Immunology

Journal of Applied Physiology

Journal of Clinical Investigation

New Jersey Medicine

Pediatric Asthma, Allergy and Immunology

Sentinel Reviewer, American College of Physicians

Grant Reviewer

Medical Research Council of Canada

Cystic Fibrosis Foundation

15. Memberships, Offices and Committee Assignments in Professional Societies

Society for Research on Nicotine and Tobacco (SRNT)

Associate Member

2004-2006

American Academy of Allergy, Asthma and Immunology (AAAAI)

Member, Rhinitis Committee

March 2003- March 2011

American Academy of Allergy, Asthma and Immunology (AAAAI)

Member, Rhinitis, Rhinosinusitis and Ocular Allergy Committee (formerly Sinusitis Committee)

March 2003- present

The Association for Research in Vision and Ophthalmology (ARVO)

Member

2003-2005

Drug Information Association

Member

May 2002- December 2005

American Academy of Allergy, Asthma and and Immunology (AAAAI)

Chair, Sinusitis Committee

March 2001- March 2002

Food Allergy and Anaphylaxis Network (FAAN)

Member

1998 - present

Consumer Healthcare Products Association (CHPA) working groups: Decongestant Subgroup, Nasal decongestant, Alcohol Task Groups; Antihistamine, Asthma, Cough/Cold, PPA, Phenylephrine, Theophylline, Dextromethorphan, Pediatric Cough/Cold Dosing

1996- 2008

Mothers of Asthmatics/Asthma and Allergy Network

Member

1994 - present

New Jersey Allergy/Immunology Society

Member

September 1993- present

American Academy of Allergy, Asthma and Immunology (AAAAI)

Task Force on Practice Standards: Sinusitis subcommittee

1991-1999

American Academy of Allergy, Asthma and Immunology (AAAAI)

Chair, Rhinitis Committee
March 1991- March 1993

American Academy of Allergy, Asthma and Immunology (AAAAI)

Workshops Sub-Committee, Continuing Medical Education Committee

March 1990- March 1993

American Physicians Fellowship for Medicine in Israel

Member

1990- present

American Academy of Allergy, Asthma and Immunology (AAAAI)
Program Committee, Asthma, Rhinitis and Respiratory Diseases Interest Section

March 1989- March 1990

American Academy of Allergy, Asthma and Immunology (AAAAI)

Chair, Nasal Provocation Subcommittee

March 1988 – March 1989

American College of Allergy, Asthma and Immunology

Fellow

May 1987 - present

American College of Physicians

Fellow

September 1986 – present

American College of Physicians

Member

September 1984- September 1986

American Thoracic Society

Member

November 1984 – October 2009

American Federation for Clinical Research

Member
March 1984- June 1987

16. Major Research Interests

My initial post-doctoral research focused on the pathophysiology of allergic rhinitis, non-allergic rhinitis and sinusitis. Using novel techniques of laser-Doppler velocimetry, and nasal provocation challenge, I developed new techniques for measurement of nasal blood flow and analysis of chemical mediators. This research extended to studies of nasal reflexes, nasal cytology and olfaction, including work in Alzheimer's disease. More recently, I have been responsible for designing and conducting clinical studies to obtain regulatory approval for new drugs and to convert prescription drugs to over-the-counter status. These studies are in the areas of allergic rhinitis, non-allergic rhinitis, prevention of sinusitis, tobacco dependence, and symptomatic relief of dry eye conditions. I am particularly interested in developing new and more accurate measures to record and measure cough and other subjective upper respiratory symptoms.

17. Grant History

a. Principal Investigator

Abbott Laboratories.

The effects of clarithromycin on nasal mucus rheology. Co-PI with Bruce Rubin, MD.

1992-3.

Total amount awarded: $31,500.

Glaxo Pharmaceuticals Inc.

A randomized double-blind, placebo-controlled study of the efficacy and safety of aqueous fluticasone propionate given twice daily versus placebo for four weeks in patients with perennial non-allergic rhinitis.

1991-2.

Total amount awarded: $37,500.

Fisons Pharmaceuticals Inc.

A dose ranging multi-center double-blind placebo-controlled, group comparative study of tipredane nasal spray in seasonal allergic rhinitis caused by ragweed pollen.

1991.

Total amount awarded: $41,700.

Bristol-Myers-Squibb Pharmaceutical Research Institute.

A noncomparative study of cefprozil in the treatment of acute bacterial sinusitis.

1990-1.

Total amount awarded: $46,900.

Burroughs Wellcome Pharmaceuticals Inc.

A double blind evaluation of DUACT and its individual components administered four times daily for 15 days for the treatment of seasonal allergic rhinitis symptoms.

1990.

Total amount awarded: $78,000.

Syntex Laboratories Inc.

Placebo-controlled assessment of flunisolide nasal spray as an adjunct in the treatment of sinusitis.

1989-90.

Total amount awarded: $16,500.

Muro Pharmaceuticals Inc.

A double blind randomized comparative study of atropine sulfate nasal solution and placebo in subjects ages 18-59 symptomatic for allergic or perennial rhinitis with rhinorrhea as a major symptom.

1989.

Total amount awarded: $40,117.

Boehringer Ingelheim Pharmaceuticals Inc.

Randomized, double-blind, parallel comparison of intranasal Atrovent nasal spray (21 mcg per nostril) versus placebo in nonallergic perennial rhinitis.

1989.

Total amount awarded: $96,709.

State of Missouri.

Physiology of olfaction and etiology of Alzheimer's Disease.

1989.

Total amount awarded: $20,000.

Syntex Laboratories Inc.

Placebo controlled assessment of flunisolide nasal spray as an adjunct in the treatment of sinusitis.

1988-9.

Total amount awarded: $22,788.

Merrell/Dow Research Institute.

Equipment Grant

1988.

Total amount awarded: $3,000

Boehringer Ingelheim Pharmaceuticals Inc.

Randomized, double-blind, dose-ranging parallel comparison of intranasal Atrovent nasal spray versus placebo in nonallergic perennial rhinitis.

1987-8.

Total amount awarded: $99,802.

Fisons Pharmaceuticals Inc.

A double-blind placebo-controlled study of the efficacy and safety of nedocromil sodium nasal spray 1% QID in ragweed sensitive rhinitis.

1987.

Total amount awarded: $29,900

Merrell Dow Research Institute

A clinical study of the inhibitory properties of terfenadine on histamine-induced microcirculatory changes in nasal mucosa.

1987.

Total amount awarded: $36,116.

USPHS BRSG (Basic Science Research Grant) 396
Microcirculatory control in chronic rhinitis.

1985-6.

Total amount awarded: $15,295

18. Major Administrative Responsibilities

Department of Internal Medicine, Division of Allergy and Immunology

Saint Louis University School of Medicine, St. Louis, MO

Saint Louis University Hospital

Director, Nasal and Paranasal Sinus Research Laboratory

1985-1992

19. Private Practice
Ear Nose & Throat Care P.C. & Allergy

242 East Main Street

Somerville, NJ 08876

April 2009- Current

20. Articles

1. Snowdon J, Solomons R, **Druce H**. Feigned Bereavement. Brit J Psychiatry 1978;133:15-8.

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4. **Druce HM**, Heiberg E, Rutledge J. Imaging in chronic sinusitis: disparity between radiographic and ultrasound interpretation. Am J Rhinol 1988;2:61-4.
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9. **Druce H**, Goldstein S, Melamed J, Grossman J, Moss B, Townley RG. A multicenter placebo-controlled study of Nedocromil sodium 1% nasal solution in ragweed seasonal allergic rhinitis. Ann Allergy 1990;65:212-6.
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15. Goodman GM, Martin DS, Klein J, Awwad E, **Druce HM**, Sharafuddin M. A comparison of a screening coronal CT versus a contiguous coronal CT for the evaluation of patients with presumptive sinusitis. Ann Allergy Asthma Immunol 1995;74:178-82.
16. Peltz S, Barchuk W, Oppenheimer J, **Druce H**, Bielory L. Chronic angio-edema of the tongue associated with pernicious anemia and Hashimoto's thyroiditis. Clin Exp Derm 1995;20:351-2.
17. Moskowitz DW, Gillespie KN, Sutera SP, **Druce HM**, Merli CA, Simon EE. Evidence for acute renal cortical vasoconstriction after uninephrectomy. Renal Failure 1996;18:833-46.
18. Bronsky EA, **Druce H**, Findlay SR, Hampel FC, Kaiser H, Ratner P, Valentine MD, Wood CC. A clinical trial of ipratropium bromide nasal spray in patients with perennial nonallergic rhinitis. J Allergy Clin Immunol 1995;95:1117-22.
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1. **Druce HM**. A study of an Occupational Health Service: Coalworkers' Pneumoconiosis in South Wales. Health Education Council, London, 1978.
2. Mygind N, Anggard A, **Druce HM**. Description, classification and terminology of rhinitis. In: Clinical Aspects of Allergic and Vasomotor Rhinitis. 1st ed (Eds.) Mygind N, Weeke B. Munksgaard, Copenhagen 1985. Pages 15-20.
3. Malm L, **Druce HM**, Holgate ST. Vasoconstrictors and Anti-histamines. In: Clinical Aspects of Allergic and Vasomotor Rhinitis. 1st ed. (Eds.) Mygind N, Weeke B. Munksgaard, Copenhagen 1985. Pages 140-50.
4. **Druce HM**, Kaliner MA. Allergic rhinitis. In: Current Therapy in Respiratory Medicine 2. (Ed.) Cherniack RM. BC Decker, Philadelphia, 1986. Pages 5-6.
5. **Druce HM**. Diagnosis and management of chronic sinusitis and its complications. Immunology Allergy Clin N America 1987;7:117-31.*
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7. **Druce HM**. Rhinitis. In: Korenblat P, Wedner HJ. (Eds.) Allergy: Theory and Practice 2nd ed. Philadelphia, W.B. Saunders 1992. Pages 167-180.
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9. **Druce HM**. Allergy and Respiratory Disease. In: Laser-Doppler Blood Flowmetry. (Eds.) Shepherd AP, Oberg PA, Norwell MA, Kluwer Academic, 1990. Pages 251-64.
10. **Druce HM**, Slavin RG. Sinusitis and its relationships to asthma and allergy. In: Rhinosinusitis Associated with Systemic Conditions. Ch. IV (Eds.) Schatz M, Zeiger R, Settipane G. Providence RI, Oceanside Publications, 1990. Pages 35-42.
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20. **Druce HM**. Allergic and Nonallergic Rhinitis. In: Allergy, Principles and Practice, 5th ed. (Eds.) Middleton E Jr, Reed CE, Ellis EF, Adkinson NF Jr, Yunginger JW. St. Louis, Mosby Year Book, 1998.

22. Abstracts

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6. **Druce HM**, Bonner RF, Ramos D, Kaliner MA. Nasal reactivity: application of laser-Doppler velocimetry to measure microcirculatory parameters. Am Rev Respir Dis 1985;131,333A.
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8. Raphael GD, **Druce HM**, Wright RH, Kaliner MA. Analysis of nasal mucous membrane vascular permeability. J Allergy Clin Immunol 1986;77:239.
9. Raphael GD, **Druce HM**, Wright RH, Kaliner MA. Histamine-induced nasal protein secretion. Proceedings of ACA Annual Meeting, Phoenix, AZ, January 1986.

10. **Druce HM**, Ellington-Harris L, Cressman W, Glenn J. Perennial rhinitis and chronic sinusitis: overlapping syndromes. J Allergy Clin Immunol 1987;79:243.
11. **Druce HM**, Rutledge J. Epidemiology of chronic rhinitis and sinusitis. J Allergy Clin Immunol 1988;81:172.
12. Rutledge J, **Druce HM**, Heiberg E. Disparity between radiographic and ultrasound interpretation in chronic sinusitis. J Allergy Clin Immunol 1988;81:284.
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15. Goldstein S, Melamed J, Moss B, Grossman J, Townley R, **Druce H**. Nedocromil sodium nasal for seasonal allergic rhinitis. American Academy of Allergy and Immunology 45th Annual Meeting, San Antonio, Feb 1989. J Allergy Clin Immunol 1989;83:278.
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18. **Druce H**, Goldstein S, Melamed J, Grossman J, Moss B, Townley R. Nedocromil sodium nasal for seasonal allergic rhinitis (SAR). Symposium on Allergy and Infection in the Nose. Baltimore MD, June 1989.
19. **Druce HM**, Rutledge JL. A specific H1-antagonist, terfenadine, inhibits symptoms of nasal histamine provocation challenge without affecting nasal microcirculation. Symposium on Allergy and Infection in the Nose. Baltimore MD, June 1989.
20. **Druce HM**, Spector SL, Fireman P, Kaiser H, Boggs P, Wood CC. Randomized, double-blind, parallel comparison of intranasal atrovent nasal spray versus placebo on nonallergic perennial rhinitis (NAPR). Symposium on Allergy and Infection in the Nose. Baltimore MD, June 1989.
21. Moskowitz DW, Bonar SL, **Druce HM**. Mouse renal cortical blood flow (RCBF) and EGF content do not increase acutely after uninephrectomy. FASEB 1989 Annual Meeting. FASEB J 1989;3:A925.
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24. **Druce HM**, Spector SL, Fireman P, Kaiser H, Boggs P, Meltzer E, Wood CC. Randomized, double-blind, parallel comparison of intranasal Atrovent nasal spray versus placebo on nonallergic perennial rhinitis (NAPR). American Academy of Allergy and Immunology, 46th Annual Meeting, Baltimore, MD, March 1990. J Allergy Clin Immunol 1990;85:165.
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26. **Druce HM**, Goldstein S, Melamed J, Grossman J, Moss BA, Townley RG. Investigations with a new nasally active compound nedocromil sodium. Third International Academic Conference on Immunobiology in Otology, Rhinology, and Laryngology. San Diego, CA, Nov 1990.

27. Kirchoff P, **Druce HM**, Grossberg GT, Woodward V, Russell MB. Epidemiologic approach to rhinitis in geriatric populations. 47th Annual Meeting, American College of Allergy and Immunology, San Francisco, Nov 1990. Ann Allergy 1991;66:88.
28. **Druce HM**, Rutledge JL, Grossberg GT, Woodward V, Colt J, Bidaut-Russell M. Physiology of olfactory loss and etiology of Alzheimer Disease. American Geriatrics Society and American Federation for Aging Research Annual Meeting, Chicago IL, May 1991.
29. **Druce HM**, Gladney JH, Rutledge JL. An academic comprehensive sinus clinic. American College of Allergy and Immunology 48th Annual Meeting, New York NY, November 1991. Ann Allergy 1992;68:94.
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34. Slavin RG, **Druce HM**, Dykewicz MS, Garibaldi EF, Hutchinson PS, Knutsen AP. The "Allergist-in-residence" program: A new approach to continuing medical education. 48th Annual Meeting, American Academy of Allergy and Immunology, Orlando, FL, March 1992. J Allergy Clin Immunol 1992;89:340.
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40. Rubin B, **Druce H**, Ramirez O, Baharav A, Heller J, Palmer R. Clarithromycin thrapy normalizes nasal mucus properties in patients with sinusitis. 33rd International Chemotheraputic and Antibiotic Chemotherapy Congress, New Orleans, LA, 1993.
41. **Druce HM**, Wheeler A. Use of the national asthma education guidelines (NAEG) to design clinical studies for asthma. 51st Annual Meeting, American College of Allergy and Immunology, Atlanta, GA, November 1993. Ann Allergy 1994;72:94.

42. Selner J, Banov C, Boltansky H, Bronsky E, Chervinsky P, **Druce H**, Georgitis J, Kaiser H, LaForce C, Meltzer E, Munk Z, Webb D, Field E, Hamedani A, Milwee S. Fluticasone propionate aqueous nasal spray effectively treats perennial non-allergic rhinitis. American Academy of Allergy and Immunology Annual Meeting, Anaheim, CA, March 1994.
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44. Peltz S, Reyes R, Oppenheimer J, **Druce H**, Bielory L. Chronic angioedema of the tongue heralding the onset of pernicious anemia (PA) and Hashimoto's thyroiditis. American College of Allergy and Immunology Annual Meeting, San Francisco, CA. 1994 Ann Allergy Asthma Immunol 1995;74:105.
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47. **Druce HM**, Furey SA, Kalfus MD, Incledon J, Guido RA. Patterns of use of inhaled epinephrine, Abstract presented at American College of Allergy and Immunology Annual Meeting, Boston, MA, 1996. Ann Allergy Asthma Immunol 1997;78:110.
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57. Frisch SI, **Druce H.** Clinical Efficacy and Preference of Visine-A® and Patanol® in Preventing the Signs and Symptoms of Allergic Conjunctivitis in the Conjunctival Allergen Challenge Model. ARVO Annual Meeting, Ft. Lauderdale, FL, May 2005.
58. Raphael GD, Angello JT, Wu MM, **Druce HM**. Potential for Sinusitis Prevention with Pseudoephedrine (PSE). American College of Allergy, Asthma & Immunology Meeting, Anaheim, CA, November 2005. Ann Allergy Asthma Immunol 2006;96:209.
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23. Reviews

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