

INDOOR AIR QUALITY

Issue Summary

Studies by the U.S. Environmental Protection Agency, American Lung Association and other organizations has shown that the air in our own homes can be even more polluted than the air outside. Laws, research and many millions of dollars have been spent to keep outside air clean. Yet indoor air quality has only recently been better understood and funded.

Air, like water, can hold suspended particles (asbestos fibers, radon nuclei, lead dust, synthetic fibers, etc.), chemicals (pesticide sprays, air fresheners, perfume, etc.), biological organisms (pollen, mold spores, dust mites, bacteria, viruses, etc.) and many different gaseous elements and compounds (carbon monoxide, oxygen, sulfur dioxide, carbon dioxide, etc.). Because of this wide variety of environmental components, some things have been studied in detail with numerous regulatory laws in place (such as asbestos in air) and some situations may have little investigative work done and no regulatory considerations even attempted. As examples, few regulations have been put in place to deal with issues such as mold. Research into the health effects of chemical mixtures, such as those from wearing a particular perfume while using a particular home cleaning product, are just starting.

Health/Environmental Concerns

What Types of Health Problems Can IAQ & Poor Housing Conditions Cause?

A number of health problems can be associated with IAQ, including but not limited to:

Respiratory Problems – These generally include:

Respiratory Allergies – congestion and difficulty breathing due to an immune response to certain substances such as dust and particulates, pet dander and urine, molds, pollens, foods such as peanuts, bug parts or dust mites. Some of the allergies can be severe enough to cause death.

Asthma - the reasons for asthma are not currently known, but certain allergens or substances can bring on severe asthma reactions.

Respiratory Diseases - such as black lung, mesothelioma due to asbestos exposure, lung cancer due to radon and/or smoking.

Skin Allergies and Problems - constant exposure to some substances causes the body to become resistant or over react to a substance when re-exposed. Latex products can effect some individuals in this manner. Skin reactions consisting of rashes, pustules, or welts can occur. Contact dermatitis is a common example of a reaction to certain metals consistently touching the skin. Fungal infections such as athletes foot are not uncommon.

Multiple Chemical Sensitivities (MCS) - some individuals become very sensitive to numerous chemicals and compounds with severe reactions when exposed. Many of these individuals must live in structures with minimal man-made chemicals or substances.

Immune-Dysfunction and Disease - individuals with AIDS, individuals on immune-suppressing drugs due to organ transplants, and individuals on certain medications tend to be more likely to have problems due to poor indoor air quality or household hazards. Repeated or long-term exposures to some substances can reduce or over-activate the immune system. Very young children and older individuals can have problems with diseases due to an undeveloped or decreasing immune system. In general, women tend to be more sensitive than men (possibly due to overall body mass or more complex reproductive functions).

Learning or Physical Disabilities - Some substances can affect learning or cognitive ability. Some individuals appear to lose cognitive ability with high exposures to some chemicals or long exposures to toxins released by molds. Heavy metals, such as lead poisoning in young children, can reduce lifetime learning abilities. Mercury poisoning can cause severe birth defects.

Physical Distress - discomfort may cause missed days of work, reduced work ability, lack of sleep, etc. which in turn can cause other problems. People are generally most comfortable at:

Interior Temperatures: Winter 68 – 75 F; Summer 73 – 79 F

Relative Humidity: 30 to 60 %

Air flow (when sitting): ~ 50 feet per minute

Odors: Minimal

DNA Disruption & Birth Defects- due to various forms of radiation or heavy metals

Bacterial and/or Viral Infections and Poisonings - from food or water contamination, dried sewage becoming airborne, HVAC systems with mold, bacteria or viruses from pet birds or reptiles.

Death - from accidents or carbon monoxide poisonings

Mold Growth and Health Effects

Mold growth tends to be the most common complaint received by the Health Department. This is partly due to the natural, widespread amounts of mold always present in any environment. However, most of the individuals that call with a mold complaint do so because they have heard on TV that “toxic mold” or “black mold” is possibly in their homes.

“Toxic Mold” or “Black Mold” – Does not really refer to any specific list of molds or a type of mold. It is used as a general term by the media for any mold that a particular individual will have some sort of reaction. So “toxic mold” doesn't cause health problems in all people. If two people are exposed to the same mold in the same space, one might have negative health effects while the other person has none.

Individuals tend to react to certain molds that are present depending on the amount of mold, type of mold, amount of time the individual spends in a moldy environment and the biological makeup of the individual. These variables will differ over time, place and individual. For this reason, it is difficult to determine what amount of mold is too much. In addition, the health effects of many molds have not been studied. These variables are also one of the reasons why there are no laws, regulations or threshold limits for molds at present (though some states have started to create such laws). Instead, the regulations and codes are based on water intrusion into a structure or deterioration of building components. No water therefore means no mold growth.

Mold spores are always in the air naturally and will grow if a spore drifts onto a damp surface with a food source (such as cellulose, wood pulp and dust). There are thousands of different types of mold and some mold in a dwelling is always expected. The problem in many cases occurs when an abundance of mold growth occurs in an enclosed space such as a dwelling. With increasing mold growth in a dwelling, more spores are produced and confined in the dwelling, thus allowing levels of mold spores, mold fragments and toxins produced by the molds to increase in the dwelling environment.

At some point the level of mold in the dwelling reaches a critical level where certain occupants, each with their unique biological makeup, start to have problems. This is what basically occurs in nature during the allergy seasons of spring and fall. In a dwelling, however, a level of mold and moisture can eventually be reached so that the cycle of more moisture/more growth surpasses the ability to keep the mold under control by general cleaning. Unlike the general environment where the mold spores can disperse, there is little dilution of levels in a dwelling except when carried out by open windows, doors or vacuum cleaner bags.

Some molds can cause allergic reactions and respiratory difficulties in some individuals. When exposed over a long period of time, some individuals can develop a severe sensitivity to certain molds. Sometimes small amounts can be tolerated, but some people with a severe sensitivity to certain molds can have a reaction with even low exposures.

In general, individuals with allergic sensitivities to mold, a history of allergy problems, asthma issues, individuals with immune-compromised health conditions (such as individuals on immune suppressive drugs due to organ transplants or who have HIV), young children or individuals that are pregnant are the most sensitive. An indication of a problem home, by at least some environmental factor, is when an individual is well outside the home, but after a short stay becomes ill inside the home with the same symptoms during each visit.

Mycotoxins (Myco = Fungus / Toxin = Poison) - are the chemical scent the mold produces on the food it is eating to keep other molds from invading its food source. Some molds, such as *Aspergillus versicolor* and *Stachybotrys atra (chartarum)*, are known to produce potent toxins under certain circumstances.

Although some mycotoxins are well known to affect humans and have been shown to be responsible for human health effects, little information is available for many mycotoxins, and in some cases research is still ongoing. For example, some strains of *Stachybotrys atra* can produce one or more potent toxins. In addition, preliminary reports from an investigation of an outbreak of pulmonary hemorrhage in infants suggested an association between pulmonary hemorrhage and exposure to *Stachybotrys chartarum*. Review of the evidence of this association at CDC resulted in a published clarification stating that such an association was not established. Research on the possible causes of pulmonary hemorrhage in infants continues (consult the Centers for Disease Control and Prevention (CDC) for more information on pulmonary hemorrhage in infants).

Health Problems Associated with Mold

Some of the more common health effects noted by individuals with problems to certain mold growths include:

Allergic Reactions - Inhaling or touching mold or mold spores may cause allergic reactions in sensitive individuals. Allergic reactions to mold are common – these reactions can be immediate or delayed.

Allergic responses include hay fever-type symptoms, such as sneezing, runny nose, red eyes, and skin rash (dermatitis). Mold spores and fragments can produce allergic reactions in sensitive individuals regardless of whether the mold is dead or alive.

Asthma - Molds can trigger asthma attacks in persons who are allergic (sensitized) to molds. The irritants produced by molds may also worsen asthma in non-allergic (non-sensitized) people.

Reactions due to repeat exposures - Repeated or single exposure to mold or mold spores may cause previously non-sensitive individuals to become sensitive. Repeated exposure has the potential to increase sensitivity.

Hypersensitivity Pneumonitis - Hypersensitivity pneumonitis may develop following either short-term (acute) or long-term (chronic) exposure to molds. The disease resembles bacterial pneumonia and is uncommon.

Irritant Effects - Mold exposure can cause irritation of the eyes, skin, nose, throat, and lungs, and sometimes can create a burning sensation in these areas.

Opportunistic Infections - People with weakened immune systems (i.e., immune-compromised or immune-suppressed individuals) may be more vulnerable to infections by molds (as well as more vulnerable than healthy persons to mold toxins). Aspergillus fumigatus, for example, has been known to infect the lungs of immunocompromised individuals. These individuals inhale the mold spores that then start growing in their lungs. Trichoderma has also been known to infect immune-compromised children. Healthy individuals are usually not vulnerable to opportunistic infections from airborne mold exposure. However, molds can cause common skin diseases, such as athlete's foot, as well as other infections such as yeast infections.

Exposure Routes

The characteristics of indoor air quality are attributed to:

1. Physical Factors – temperature, humidity, building structural condition +
2. Mechanical Factors - ventilation rates, air filtration +
3. Chemical Factors - building materials, smoking, office equipment, disinfectants and pollutants from combustion devices, formaldehyde, pesticides, endotoxins, mycotoxins +
4. Biological Factors – mold, dust mites, asthma allergens, pollen, bacteria, viruses +
5. Gases – oxygen, carbon monoxide, carbon dioxide +
6. Particulate - asbestos fibers, lead dust, synthetic fibers +
7. Radiation – radon, radium from watches, microwaves, smoke detectors +

Two other terms are generally mentioned when discussing IAQ. They are:

Sick Building Syndrome (SBS) refers to eight non-inclusive symptoms identified by the WHO in 1983 -

1. Irritation of the eyes, nose and throat.
2. Dry mucous membranes and skin
3. Erythema (skin redness)
4. Headache and mental fatigue
5. Respiratory infections and cough
6. Hoarseness of voice and wheezing
7. Hypersensitivity reactions
8. Nausea and dizziness

These symptoms are generally perceived by the building occupants as being from an exposure to an unidentified contaminant or mixture in the structure. Individuals generally see relief from their symptoms after leaving the building. Symptoms may be reduced or eliminated by modifying the ventilating system or from some other alteration of the building. Many symptoms of occupants are subject to variations in individual sensitivities mirroring the “dose + host = the poison” scenario. Thus one individual or many can experience symptoms in variations of severity.

Building-Related Illness (BRI) are specific medical conditions of known cause or origin, which can often be documented by physical signs and laboratory findings:

1. Sensory irritation when caused by known agents
2. Respiratory allergies
3. Nosocomial infections
4. Humidifier fever
5. Hypersensitivity pneumonitis
6. Legionnaires' disease

Population Affected

For many of us in Oneida County almost 70 to 90 percent of our time is spent inside buildings.¹ These structures are often our own homes where we sleep, cook, bathe, watch television or go for safety and comfort during snowy or rainy days. Another large part of our days is spent with our job, possibly in office buildings, schools or manufacturing plants. Even when away from our house or job, we enter malls, stores, restaurants, and other structures where we believe we will be safe. But even though we may feel safe, see no dangers or experience any threats by our senses, our safety and health can still be at risk. We all breathe, and with each breathe our bodies take in gases, chemicals, particles, and living organisms. For most individuals our bodies do a fairly good job taking in oxygen and filtering out other substances that are not needed or wanted, but occasionally our immune systems or protective membranes are overwhelmed by a substance that is unpleasant, an irritant, or possibly harmful. The quality of the air we breathe is vital to our health and safety, and because of the large amounts of time we spend inside a structure the air, temperature, and humidity inside must be clean and the environment comfortable.

Indoor air quality can effect everyone who walks into a building. If the indoor air quality is poor it can result in illness, discomfort, decreased productivity, lost quality time, lost employees, lost customers, and lost revenue.

Standards and Regulatory Controls

Public Health Law

- Any individual does have the right to list a complaint at a Health Department regarding an issue involving Public Health Law or Title X NYCRR. They do not have to leave their name and, if done, this name is confidential.
- Under Article 13, Title I, 1303.1, every local board of health and local health officer shall receive and examine into all complaints made by any inhabitant concerning nuisances, or causes of danger or injury to life and health within the health district and may enter upon or within any place or premises where nuisance or conditions dangerous to life and health or which are the cause of nuisances existing elsewhere are known or believed to exist, and by its members or other persons designated for that purpose, inspect and examine the same.

- Under Article 13, Title I, 1303.2 The local board of health or local health officer having the powers of a local board of health shall furnish the owners, agents and occupants of the premises with a written statement of the results and conclusions of any examination conducted pursuant to the provisions of (this section)
- Under Article 13, Title I, 1303.3 Every local board of health shall order the suppression and removal of all nuisances and conditions detrimental to life and health found to exist within the health district.

10 NYCRR

- Section 16.130 – Radon testing and reporting

Oneida County Sanitary Code

- Article II, Section 6 - Inspectors may access a parcel (land) for inspection if a possible health threat is present.
- Article VIII (Public Health Nuisances), Article IX (Offensive Materials), Article X (Lead Poisoning Control) and Article XI (Housing Hygiene, Property Maintenance and Fire Safety Requirements) can be utilized in enforcement of non-permitted facilities.
- Article VIII talks about Public Health Nuisances. Section 1 defines a public Health Nuisance as a condition or act which is or may become a detriment or menace to human health or interfere with the free use of property, so as to cause discomfort to the community or persons in the neighborhood.
- Article VIII, Section 2 states that the Commissioner shall receive and examine into all complaints made by any inhabitants of the Health District concerning nuisances or causes of danger or injury to life and health in the Health District and may request such complaints be made in writing.
- Article VIII, Section 3 allows the Oneida County Health Department to conduct the following actions:
 - (a) The Commissioner may enter upon or within any place or premises where nuisances or conditions dangerous to life and health, or which are the causes of nuisances elsewhere, are known or believed to exist to inspect or examine same.
 - (b) The owners, agents or occupants of any place or premises shall permit sanitary examinations and inspections to be made pursuant to the provisions of this Article and Title One (1) of Article Thirteen (13) of the Public Health Law.
 - (c) The Commissioner shall furnish the owners, agents and occupants of the place or premises on which such conditions exist with a written statement of the results and conclusions of an examination or inspection conducted pursuant to this Article.
- Article VIII, Section 3 gives the Department the following powers:

- (a) The Commissioner shall order the suppression and removal of all nuisances and conditions detrimental to life and health found to exist within the Health District.
- (b) The Commissioner may, if the owner, agent or occupant of any place or premises whereon any nuisance or condition deemed to be detrimental to the public health exists, or causes the existence of such nuisance or condition elsewhere, fails to comply with any such order, enter upon the place or premises to remove or suppress such nuisance, condition or matter to which said order relates.
- (c) The expense of such removal and abatement shall be paid and may be collected in the manner prescribed in the Sections 1306 and 1307 of the Public Health Law.

Other Regulations:

- IAQ complaints in schools should be dealt with under the "RESCUE Regulations" adopted by the State Education Department (8 NYCRR 155). These state that each school district is to establish a Health and Safety Committee to monitor the condition of the District's schools. Though not enforceable by the Oneida County Health Department, 8 NYCRR 155 does give guidelines for IAQ conditions in schools. 8 NYCRR 155 violations found by this department need to be referred to the New York State Education Department.
- For owner occupied apartment structures less than four apartments, the owner can keep or evict tenants based on the contract/lease that you have with the tenant. If the structure is not owner occupied and/or it has greater than four apartments under NYS Real Property Law, Sub-Section 223-b, it is presumed that it is retaliation if a landlord seeks to evict a tenant within 6 months of a complaint.
- Under NYS Real Property Law, Sub-Section 236, except for 1-2 family owner occupied homes, it is a misdemeanor to refuse to rent to a family with children.
- The New York State Department of Environmental Conservation (NYS DEC) has regulations involving petroleum spills and storage, chemical spills and storage and hazardous material spills. Such instances will need to be referred to the NYS DEC Spills Hotline (1-800-457-7362).
- New York Education Law §§ 409-d, 409-e
- Requires the Commissioner of Education to establish, develop and monitor a comprehensive public school building safety program which must include a uniform inspection, safety rating and monitoring system. Regulations promulgated under the law (8 NY Code Rules & Regs §§ 155.3--155.6) require a comprehensive maintenance plan for all major building systems, including provisions for establishing maintenance procedures and guidelines that will contribute to acceptable indoor air quality. Regulations also require: annual and five-year inspections that include IAQ components; and an annual safety rating and school facility report cards that include information on the status of IAQ activities and radon testing. Law also establishes requirements relating to IAQ during construction and renovation, and mandates establishment of health and

safety committees at the school district level consisting of representation from district officials, staff bargaining units and parents.

- New York Energy Law §§ 7930.1 et seq.
- Establishes requirements for Radon Assessment Specialists to participate in the state's Radon Diagnosis Assistance Program. Requires the state's Energy Office to maintain a list of specialists who meet the requirements. Regulations adopted under the law (9 NY Code Rules & Regs 7930) establish requirements for qualifying and provide a list of specialists.
- New York Environmental Conservation Law § 19-0301
- Authorizes the Department of Environmental Conservation to formulate and adopt codes and rules for preventing, controlling or prohibiting air pollution. Regulations adopted under the law (6 NY Code Rules & Regs 232.18) require that owners of dry-cleaning facilities post a notice to inform building tenants and/or customers of the substances used in the dry cleaning system and their potential health effects. Regulations establish the notice to be posted, which states that individuals may request information from the facility about air testing that has been performed, and that individuals may contact the department to report chemical odors or leaks from the facility or to request information about indoor air testing or health effects of dry cleaning chemicals.
- New York Executive Order 111 (2001)
- Requires that new state buildings incorporate, to the maximum extent practicable, state green building guidelines (see N.Y. Tax Law § 19) and the U.S. Green Building Council's LEED™ system, both of which include certain minimum IAQ practices.
- New York General Business Law § 322-c
- Restricts the manufacture, assembly, or sale of unvented space heating appliances. Regulations adopted under the law (10 NY Code Rules & Regs. 71.1 *et seq.*) require manufacturers of vent-free gas space heating devices to label cartons with warnings about the use of the devices and with emission rates for carbon monoxide and nitrogen dioxide. The regulations also require sellers to display the warning and emission rates and also to provide the manufacturer's sizing guidelines at the point of sale.
- New York General Business Law § 391-i
- Requires a person, firm, or corporation that sells or installs urea-formaldehyde insulation to provide a specific written notice of the potential health effects.
- New York Public Health Code § 225
- Authorizes the Department of Public Health to issue regulations relating to ionizing radiation. Regulations issued under the law (10 N.Y. Codes Rules & Regs.16.130) require radon testing and mitigation firms to report testing and mitigation results to the department.
- New York Real Property Law § 462
- Requires all sellers of residential real property to complete and provide to the buyer a property condition disclosure statement, which requires disclosure of the presence of hazardous substances and of any radon testing performed on the property. Also requires sellers to provide a copy of any radon testing reports.
- New York Tax Law § 19

- Establishes a green building tax credit program that includes a variety of IAQ requirements for buildings that seek to qualify for the tax credit. Directs the Department of Environmental Conservation to adopt regulations establishing standards for: ventilation and exchange of indoor/outdoor air; IAQ management plans for the construction or rehabilitation process; and pollutant levels for carbon monoxide, carbon dioxide, total volatile organic compounds, radon, and particulate matter. Regulations adopted under the law (6 NYC Code Rules & Regs. 638.8) establish IAQ standards, detailed testing requirements, and standards for IAQ management plans for certain qualifying projects.

Additional Information

Additional Information can be found in the original version of this summary, titled **Indoor Air Quality Issues in Oneida County** by Francis Zimmer, OCHD.

Existing Baseline Data

Healthy Neighborhood Surveys January - June 2006

Conventional Surveys - The Healthy Neighborhoods Program, Mohawk Valley Community Action Agency, Maternal Child Health, Community Health Workers and Healthy Families personnel conducted **296** surveys in this time period. Of the **296** households approached, Healthy Neighborhoods personnel were able to complete **77** interviews and **6** revisits.

Indoor Air Quality - One of the goals of the Healthy Neighborhoods Program is to improve the general indoor air quality of the residences visited. The following table is a summary of the survey findings for the period of January – June 2006.

Description	Question Text	Count Of Individual	Yes	No	Don't Know	Not Applicable
Indoor Air Quality	Are elevated carbon monoxide levels suspected?	77	1	74	2	-
	Does anyone in the household smoke?	77	37	38	2	-
	Did the residents take the Smoke Free Home Pledge?	77	10	25	2	40
	Are there any malfunctioning appliances that could result in an indoor air hazard?	77	11	66	-	-
	Are there wall-to-wall carpeting or large rugs?	77	52	25	-	-
	Are there any roofing or structural leaks?	77	7	69	1	-
	Are there any plumbing leaks?	77	6	70	1	-

Is the furnace/heat source filter dirty or missing?	77	11	33	32	1
Is a humidifier or vaporizer used?	77	19	51	7	-
Is there stagnant water in or under appliances?	77	1	67	9	-
Does every room have ventilation? (For example, do windows open, is bathroom ventilated?)	77	50	25	2	-
Is there mold/mildew? (observed or musty smell)	77	12	62	3	-
Is there dust accumulation? (observed)	77	8	48	21	-
Are there cockroaches? (observed or reported)	77	10	67	1	-
Are there rats? (evidence or reported)	77	5	71	1	-
Are there mice? (evidence or reported)	77	12	64	1	-
Is there a chemical smell indoors?	77	23	36	18	-
Is there an odor from scented home products?	77	21	35	21	-
Has building been tested for radon?	77	7	23	47	-

From the table above, the following information can be gathered:

- 4.00% of the residences visited during this time period were suspected to have elevated levels of carbon monoxide
- 48.00% of the households had a smoker
- 14.00% of the households had a malfunctioning appliance which could result in an indoor air problem
- 10.00% had leaky roofs
- 9.00% had leaking plumbing
- 25.00% used a humidifier or vaporizer
- 30.00% of the residence have not been tested for radon
- 61.00% of the tenants have no knowledge of if their homes have been tested for radon
- 16.00% had evidence of mice or reported mice lived in the house
- 13.00% of the households had a cockroach infestation
- 16.00% of the households had a mold/mildew problem
- 10.00% of the household visited had a dust problem

Lead - As part of the Healthy Neighborhoods Survey, dwelling units are visually assessed for possible lead hazards and methods for controlling lead hazards are discussed with the

tenants. The following table is a summary of the survey findings for the period of January – June 2006.

Description	Question Text	Count Of Individual	Yes	NO	Don't Know
Lead	Was dwelling built before 1978?	77	66	2	9
	Were any renovations done in past 6 months?	77	13	62	2
	Is there chipping, peeling, deteriorated, chalking paint indoors?	77	23	37	17
	Is there chipping, peeling, deteriorated, chalking paint outdoors?	77	32	45	-

- 86.00% of the dwellings were built before 1978
- 17.00% had some sort of renovation done within the past six months
- 30.00% had chipping, peeling, deteriorated, chalking paint indoors
- 42.00% had chipping, peeling, deteriorated, chalking paint outdoors

Asthma - As part of the household survey, data is collected on the presence (or absences) of Asthma triggers in the homes where an asthmatic is known to reside. The following data summarizes the number of individuals, which identified themselves, their domestic partners, and any children living with them as suffering from asthma. Of the 77 dwellings surveyed 17 dwellings had at least one asthmatic.

The following tables are a summary of the survey findings for the period of January – June 2006.

Description	Question Text	Count Of Residence	Yes	No	Don't Know
Potential Asthma Triggers	Is there mold/mildew? (observed or musty smell)	33	11	22	-
	Is there dust accumulation? (observed)	33	6	25	2
	Are there cockroaches? (observed or reported)	33	7	26	-
	Are there rats? (evidence or reported)	33	4	10	-
	Are there mice? (evidence or reported)	33	6	27	-
	Has s/he ever been told by a doctor or other health professional that s/he has asthma?	33	31	-	-
	Does s/he smoke?	33	4	27	2

- 33.00% of the households with at least one asthma individual had a mold/mildew problem (vs. 16% total visited)
- 18.00% of the households with at least one asthma individual had a dust problem (vs. 10% total visited)
- 21.00% of the households with at least one asthma individual had a cockroach infestation (vs. 13% total visited)
- 30.00% of the households with at least one asthma individual had evidence of mice & rats or reported mice or rats lived in the house (vs. 22% total visited)
- 12.00% of the households with at least one asthma individual had a person that smoked

Potential Action Steps

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Profile Source/References

Information in this profile was taken from **Indoor Air Quality Issues in Oneida County**, 2007, by Francis Zimmer, Senior Sanitarian, Oneida County Health Department. The following were referenced in the original version:

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- New York State Department of Health Field Employees' Job & Duties Performance Guidelines Manual, July 1, 1990
- New York State Real Property Law
- Public Health Law
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- Garrett, Laurie. *The Coming Plague: Newly Emerging Diseases in a World Out of Balance*. New York: Farrar, Straus, Giroux, 1994.