

Chapter 4. Patient Exposures

Patients seen by the NYS Occupational Health Clinic Network (OHCN) are evaluated to determine not only the medical diagnosis, but also the likely etiologic agents responsible for causing or exacerbating the disease. Appropriate identification of an etiologic agent can improve the treatment and management of a disease. Identification of workplace hazards can also be used to prevent occupational diseases through training and education of workers and companies; along with establishing effective workplace intervention programs.

This chapter provides data describing the exposures reported by the NYS OHCN patients. Putative exposures are identified by the clinicians based on the patient's diagnosis or reason for the visit. Up to two potential etiologic agents can be identified for each diagnosis. A patient may have one exposure associated with multiple diagnoses. The number of exposures is defined as one exposure per diagnosis per patient. Therefore, the number of exposures far exceeds the number of patients.

Exposure agents are classified using the coding scheme developed by the Association of Environmental and Occupational Clinics.¹ Patients are represented by the first time an agent is suspected to be associated with a disease or a clinic visit. The suspected agents may change with subsequent visits due to further testing and presentation of symptoms. At least one percent of the NYS OHCN patient population reported exposures to agents in the following nine categories:

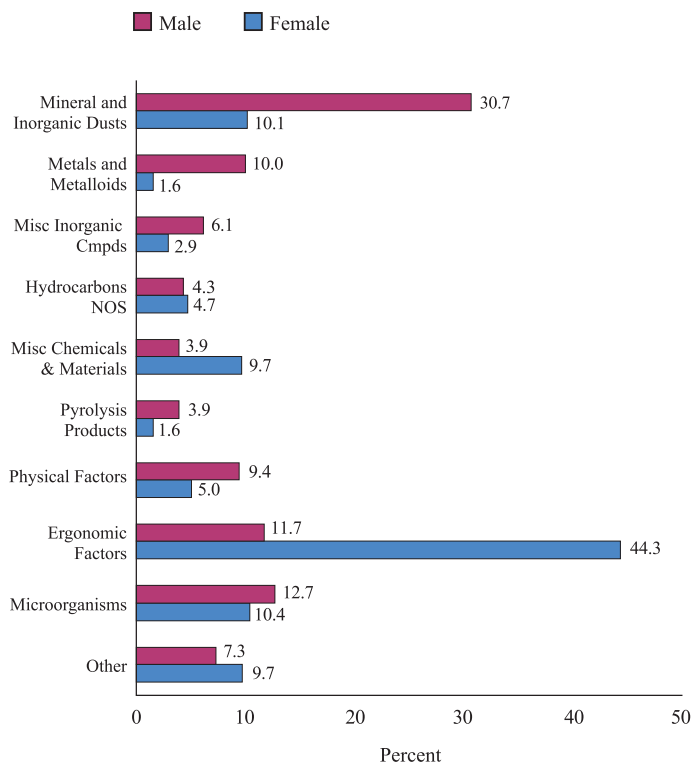
- Mineral and inorganic dusts (010-012);
- Metals and metalloids (020-024);
- Miscellaneous inorganic compounds (040-042);
- Hydrocarbons, NOS (170-171);
- Miscellaneous chemicals & materials (320-327);
- Pyrolysis products (330-331);
- Physical factors (350-354);
- Ergonomic factors (360-362); and
- Microorganisms (390-391).

Because of the small number of patients (<1%) reporting exposures in the following categories, these groups were not analyzed:

- Halogens (030);
- Acids, bases, and oxidizing agents (050-052);
- Aliphatic and alicyclic hydrocarbons (060-061);
- Alcohols (070);
- Glycols (080);
- Glycol ethers (090-091);
- Ethers (100);
- Epoxy compounds (110);
- Aldehydes and acetals (120);
- Ketones (130);
- Esters (140-142);
- Carboxylic acids and anhydrides (150-151);
- Aromatic hydrocarbons (160-161);
- Phenols and phenolic compounds (180-181);
- Halogenated aliphatic hydrocarbons (190-201);
- Cyanides and nitriles (210-211);
- Isocyanates (220-221);
- Aliphatic and alicyclic amines (230-232);
- N-Nitrosamines (240);
- Aromatic nitro and amino compounds (250-252);
- Aliphatic and miscellaneous nitrogen compounds (260-261);
- Polymers (270-271);
- Organochlorine pesticides (280);
- Organophosphate and carbamate pesticides (290-292);
- Organic phosphates (300);
- Organic sulfur compounds (310);
- Plant material (370-373); and
- Animal material (380-382).

Figure 4.1. Percent of NYS OHCN exposures, by exposure category and sex. Overall, there were 70,767 different exposures identified in the NYS OHCN database. Almost one-fourth of these (n=16,592) were to mineral and inorganic dusts which includes asbestos, silica and non-specified dusts, and another quarter of these exposures were to ergonomic factors such as keyboard use and repetitive motion (n=16,442). The next largest groups of exposures include microorganisms including molds and yeast (n=8,410), physical factors such as heat, cold and radiation (n=5,557), and metals including lead (n=4,959). Miscellaneous chemicals and materials accounted for 4,190 exposures and includes indoor and outdoor air pollutants and pesticides, and miscellaneous inorganic compounds accounted for 3,153 exposures and includes gases such as carbon monoxide and nitrogen oxides. Non-specified hydrocarbons accounted for 3,153 exposures, and all other chemicals combined accounted for 5,751 exposures. Females were more likely to have reported exposures to ergonomic factors while males were most likely to have reported exposures to mineral and inorganic dusts.

Figure 4.1. Percent of NYS OHCN Exposures, by Exposure Category and Sex



Exposures to Mineral and Inorganic Dusts

Figure 4.2. Number of NYS OHCN exposures to mineral and inorganic dust, by year, World Trade Center (WTC) status and patient type. There were 16,592 reported exposures to mineral and inorganic dusts, of which 7,768 (45%) were among group screening patients, and 3,925 (24%) were related to the World Trade Center (WTC) disaster. Among the dust exposures, 9,507 were asbestos and 6,512 were non-specified dusts (data not shown).

The majority of exposures to mineral and inorganic dusts were associated with V-codes recorded in the medical records (n=8,083). Patients recorded with V-codes in their medical records by the NYS OHCN were patients who were not currently experiencing symptoms; they encountered the NYS OHCN for some specific purpose such as to receive prophylactic vaccinations or to be screened for conditions for which the patients were at high risk (such as Lyme disease, asbestos screenings, and lead screenings). Of these, 866 (11%) were related to the WTC disaster. Among the non-WTC-related dust exposures associated with V-codes (n=7,217), 80% were among group screening patients. Another 6,593 dust exposures were associated with diagnoses of diseases of the respiratory system, and 920 were associated with diagnoses of symptoms, signs and ill-defined conditions (data not shown).

Figure 4.2. Number of NYS OHCN Exposures to Mineral and Inorganic Dust, by Year, World Trade Center (WTC) Status and Patient Type

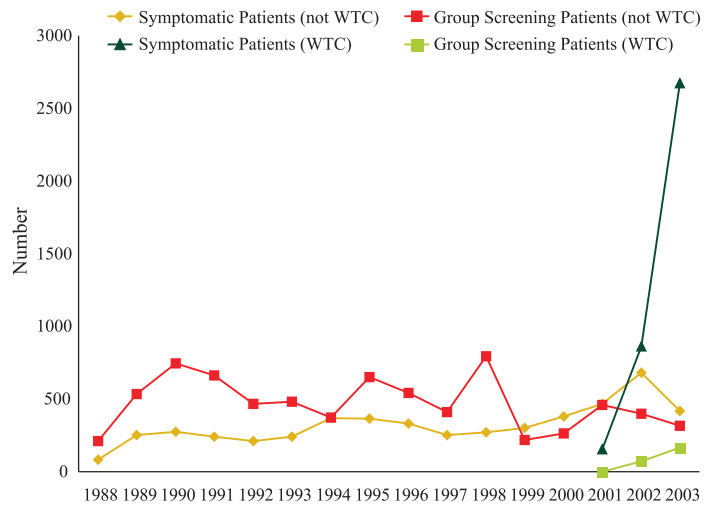


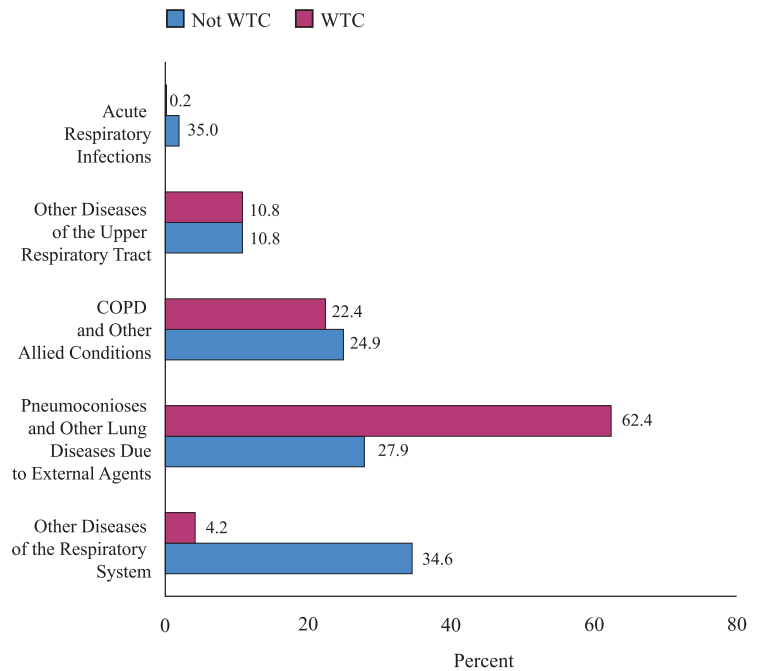


Figure 4.3. Percent of NYS OHCN exposures to mineral and inorganic dusts, by type of respiratory disease diagnosis and World Trade Center (WTC) status.

Among reported exposures to mineral and inorganic dusts not related to the WTC disaster, there were 4,515 (35%) diagnoses of “other diseases of the respiratory system”, of which 1,438 (32%) were pleural thickening due to asbestos (ICD-9-CM Code 511). Among the 1,258 diagnoses of pneumoconioses among dust exposures not related to the WTC disaster (28%), 940 diagnoses were asbestosis (ICD-9-CM Code 501) and 237 diagnoses were respiratory conditions due to chemical fumes and vapors (ICD-9-CM Code 506). There were an additional 1,123 (25%) diagnoses of “chronic obstructive pulmonary disease and other conditions” among dust exposures not related to WTC of which 557 were asthma (ICD-9-CM Code 493), 265 were chronic obstructive pulmonary diseases and 210 were chronic bronchitis.

Among the reported mineral and inorganic dust exposures related to the WTC disaster, there were 2,078 diagnoses of respiratory diseases. Among those, 1,296 (62%) were diagnosed with “other diseases of the upper respiratory tract” including 613 patients with chronic pharyngitis and 398 with chronic sinusitis (ICD-9-CM Codes 472 and 473, respectively). There were another 465 diagnoses (22%) of “chronic obstructive pulmonary disease and other conditions” of which 408 were asthma.

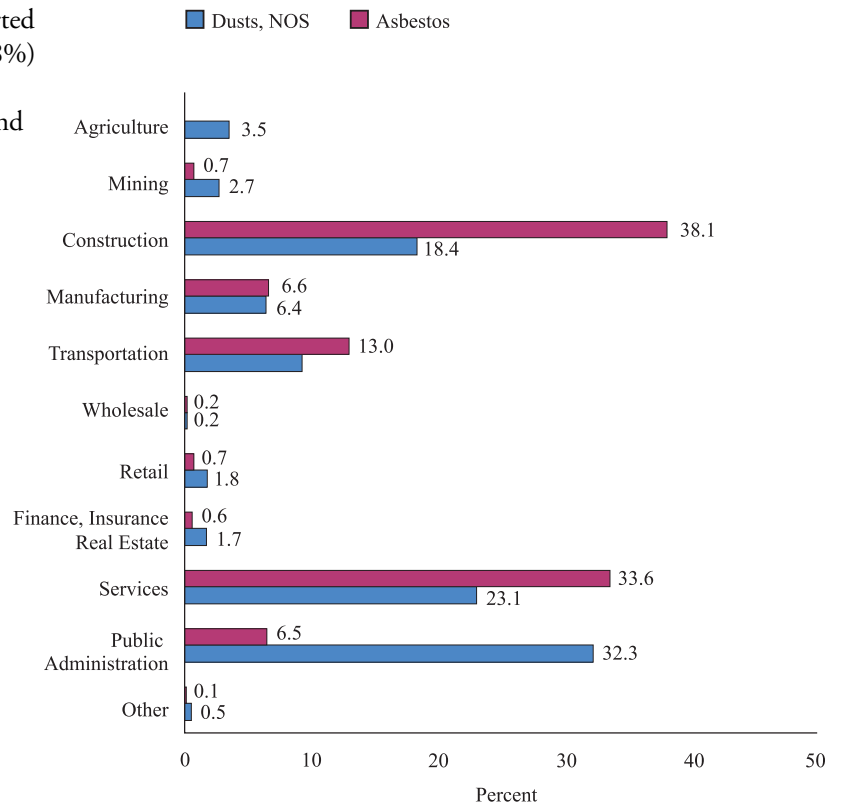
Figure 4.3. Percent of NYS OHCN Exposures to Mineral and Inorganic Dusts, by Type of Respiratory Disease Diagnosis and World Trade Center (WTC) Status



Non-specified Dusts or Asbestos

Figure 4.4. Percent of NYS OHCN exposures to non-specified dusts or asbestos, not World Trade Center (WTC) related, by industry. Exposures to asbestos, not related to the WTC disaster, were reported primarily among those in construction industries (38%) followed closely by the services industries (34%). The latter group was from exposures in elementary and secondary schools and colleges. Exposures to non-specified dust not related to the WTC disaster were reported primarily in public administration (32%), services (23%) and construction (18%).

Figure 4.4. Percent of NYS OHCN Exposures to Non-specified Dusts or Asbestos, Not World Trade Center (WTC) Related, by Industry

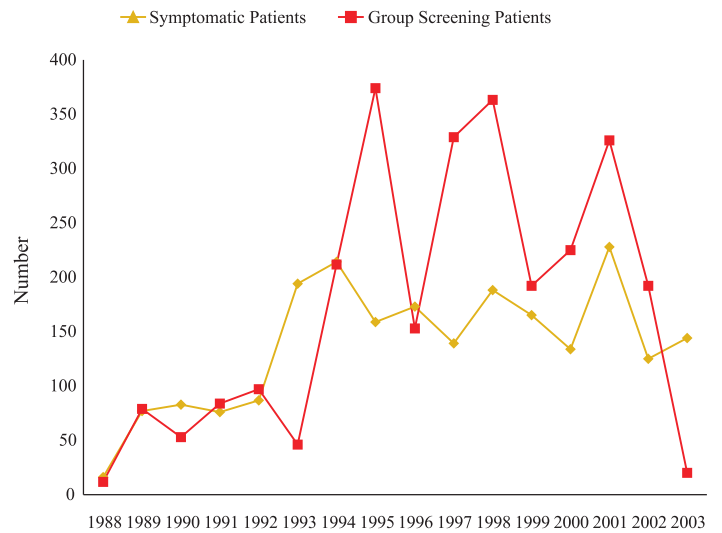


Exposures to Metals and Metalloids

Figure 4.5. Number of NYS OHCN exposures to metals and metalloids, by year. There were 4,959 reported exposures to metals and metalloids, of which 2,757 (56%) were among group screening patients. Included among these exposures were 3,839 exposures to lead, 162 to inorganic mercury and 232 to non-specified welding (data not shown). Among those with reported exposures to lead, 3,135 (82%) were from the construction industry.

The majority of reported exposures to metals were associated with V-codes recorded in the medical records (n=3,268). Among these, 2,164 (66%) were group screening patients. Another 1,043 exposures were associated with diagnoses of injuries and poisonings of which 884 (85%) were toxic effects of lead and its compounds (ICD-9-CM Code 984). Of interest 374 (42%) of exposures associated with this diagnosis were not part of group screenings. Another 321 metals exposures were associated with diseases of the respiratory system (data not shown).

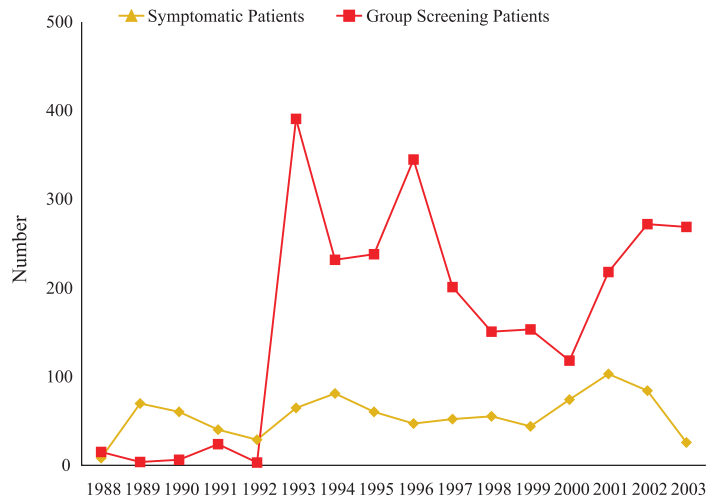
Figure 4.5. Number of NYS OHCN Exposures to Metals and Metalloids, by Year



Exposures to Miscellaneous Inorganic Compounds

Figure 4.6. Number of NYS OHCN exposures to miscellaneous inorganic compounds, by year. There were 3,538 reported exposures to miscellaneous inorganic compounds, of which 2,580 (75%) were among group screening patients. Exposures were primarily non-specific irritant gases (n=2,640) and carbon monoxide (n=690) (data not shown). Of those reporting exposures to non-specific irritant gases, 1,707 (66%) worked in fire protection (data not shown).

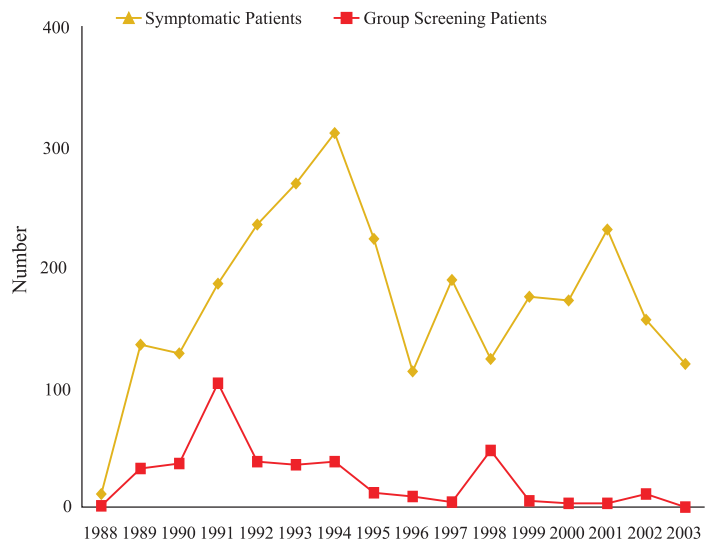
Figure 4.6. Number of NYS OHCN Exposures to Miscellaneous Inorganic Compounds, by Year



Exposures to Non-specified Hydrocarbons

Figure 4.7. Number of NYS OHCN exposures to non-specified hydrocarbons, by year. There were 3,153 reported exposures to non-specified hydrocarbons, of which 377 (12%) were among group screening patients. The reported exposures were primarily solvents (n=1,087) and cutting oils (n=649) (data not shown). The diagnoses associated with these exposures were varied with 1,087 (34%) diseases of the respiratory system, 551 (17%) signs and symptoms and 402 (13%) diseases of the nervous system (data not shown).

Figure 4.7. Number of NYS OHCN Exposures to Non-Specified Hydrocarbons, by Year



Exposures to Miscellaneous Chemicals and Materials

Figure 4.8. Number of NYS OHCN exposures to miscellaneous chemicals and materials, by year. There were 4,190 reported exposures to miscellaneous chemicals and materials, of which 716 (17%) were among group screening patients. The increase observed in 1991 among group screening patients appears to be due to screenings for exposures to indoor air pollutants and pesticides (data not shown). The large increases observed among symptomatic patients in 2000 and 2001 do not appear to be due to any one particular exposure. The majority of these reported exposures (n=1,551) were associated with diagnoses of respiratory disease, and another 780 patients were associated with diagnoses of signs or symptoms (data not shown). Of the exposures among group screening patients, 68% had a V-code recorded in their medical record.

Figure 4.8. Number of NYS OHCN Exposures to Miscellaneous Chemicals and Materials, by Year

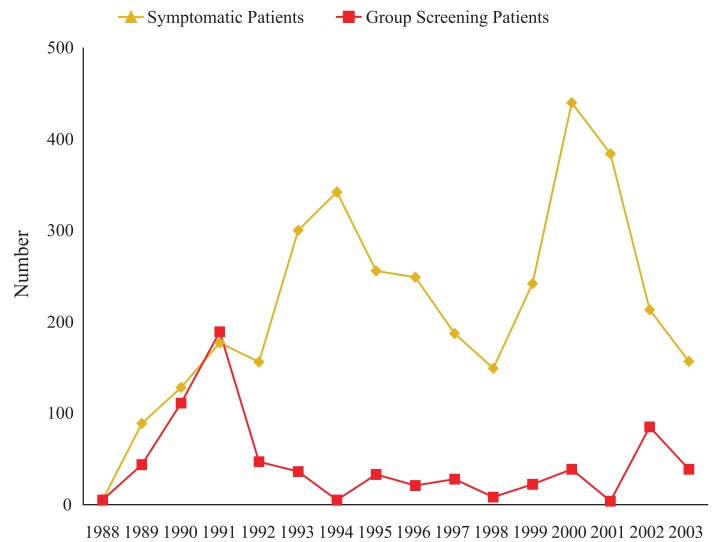
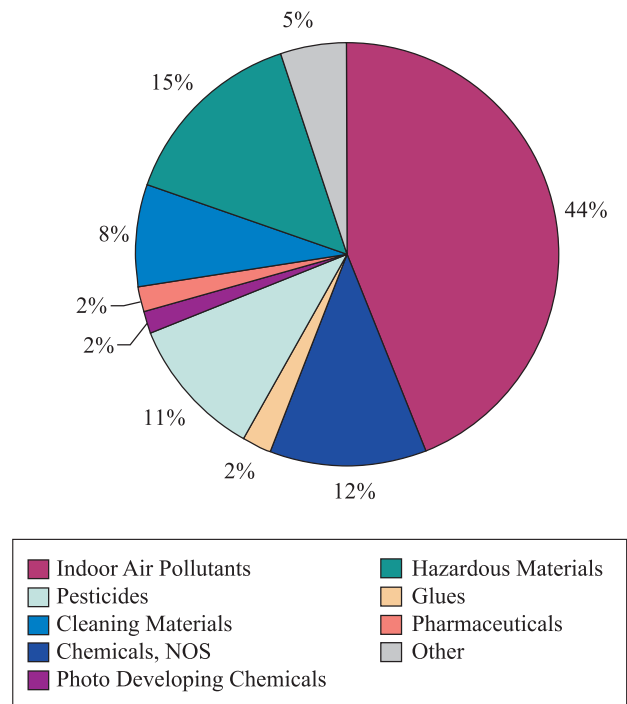


Figure 4.9. Percent of NYS OHCN exposures to miscellaneous chemicals and materials, by type of chemical or material. Among this group, there were 1,835 (44%) reported exposures to indoor air pollutants. There were 617 reported exposures to hazardous wastes, of which 243 (39%) were among group screening patients (data not shown). Twelve percent of these exposures were to non-specified chemicals (n=504) and another 11% were to pesticides (n=456).

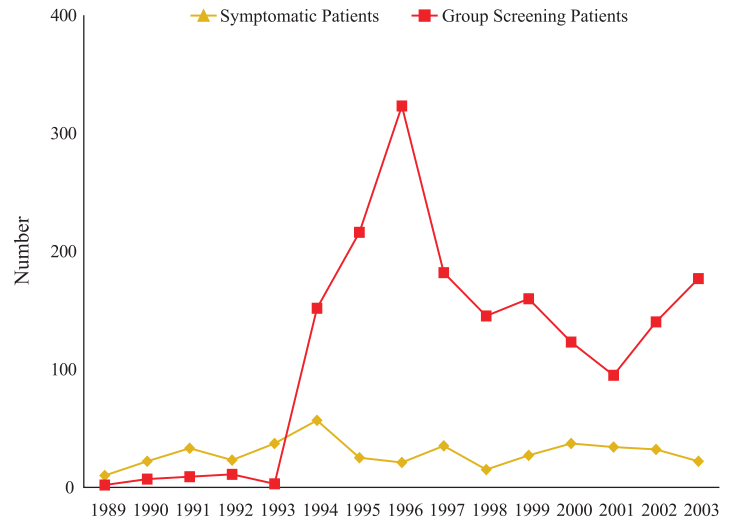
Figure 4.9. Percent of NYS OHCN Exposures to Miscellaneous Chemicals and Materials, by Type of Chemical or Material



Exposures to Pyrolysis Products

Figure 4.10. Number of NYS OHCN exposures to pyrolysis products, by year. There were 2,175 reported exposures to pyrolysis products (products resulting from chemical change brought about by heat), of which 1,745 (80%) were among group screening patients. The majority of the exposures among group screening patients (94%) were seen by one clinic. There were 1,747 exposures to non-specified smoke and 236 exposures to diesel fumes. The smoke exposures occurred primarily in firefighters (n=1,636) (data not shown).

Figure 4.10. Number of NYS OHCN Exposures to Pyrolysis Products, by Year



Exposures to Physical Factors

Figure 4.11. Number of NYS OHCN exposures to physical factors, by year. There were 5,557 reported exposures to physical factors, of which 2,864 (51%) were among group screening patients. The number of patients seen in group screenings for exposures to physical factors declined significantly in 2002 and 2003.

Figure 4.11. Number of NYS OHCN Exposures to Physical Factors, by Year

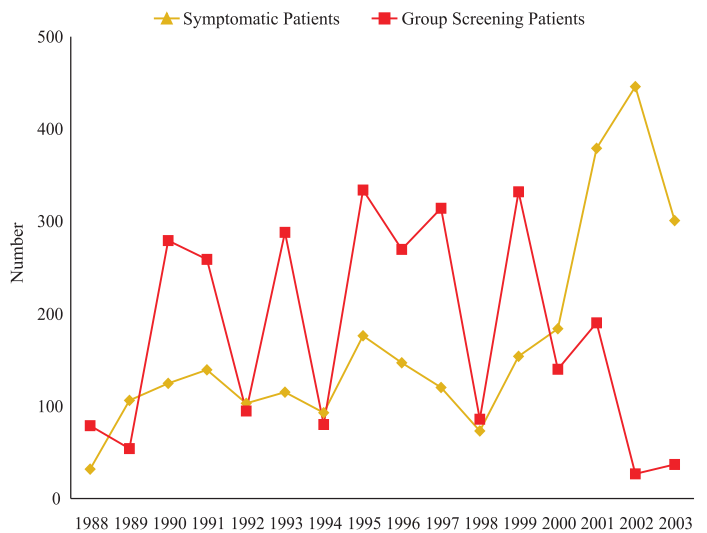
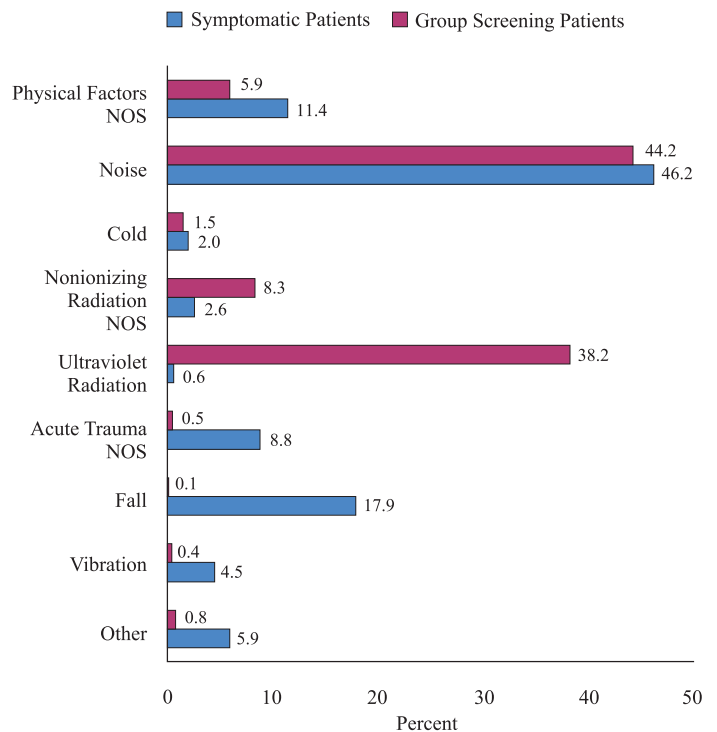


Figure 4.12. Percent of NYS OHCN exposures to physical factors, by physical factor and patient type. There were 2,511 reported exposures to noise of which 1,267 (46%) were among group screening patients. There were 1,110 reported exposures to ultraviolet radiation – 98% of these exposures were skin cancer screenings. Among the exposures occurring among symptomatic patients, 482 (18%) were falls and 238 (9%) were acute trauma. Clinics in the Network, for the most part, are not acute or urgent care facilities and therefore do not often treat acute injuries, but may treat long term health problems that result from the initial injury.

Figure 4.12. Percent of NYS OHCN Exposures to Physical Factors, by Physical Factor and Patient Type



Exposures to Ergonomic Factors

Figure 4.13. Number of NYS OHCN exposures to ergonomic factors, by year. There were 16,442 reported exposures to ergonomic factors, of which 1,176 (7%) were among group screening patients. The increase observed in exposures among group screening patients to ergonomic factors from 1990 through 1992 was due primarily to one clinic's screening of municipal workers. There has been a steady increase in diagnoses made with exposures for health problems associated with ergonomic factors.

Figure 4.13. Number of NYS OHCN Exposures to Ergonomic Factors, by Year

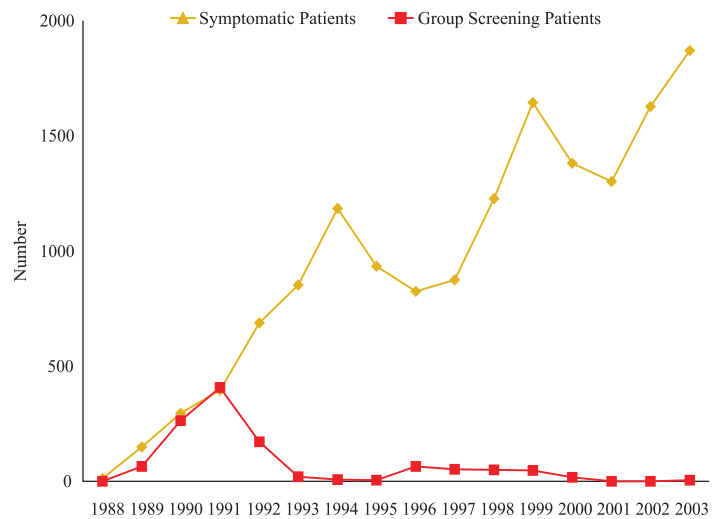
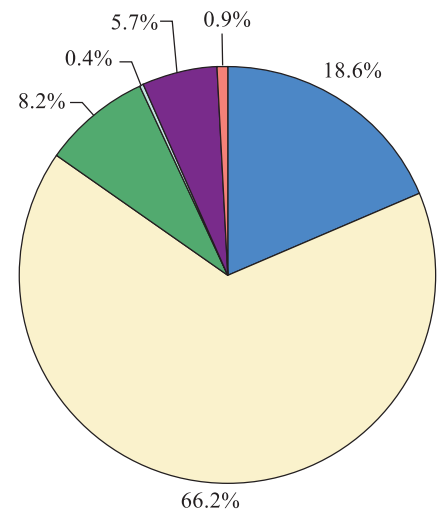
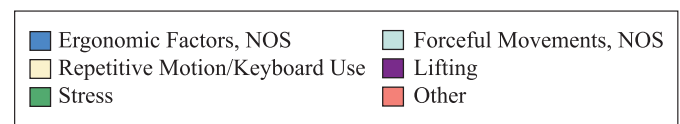


Figure 4.14. Percent of NYS OHCN exposures to ergonomic factors, by type of factor. Of these reported exposures, 10,878 (66%) were repetitive motion including keyboard use, 1,354 (8%) were stress, and 934 (6%) were lifting. Another 3,061 (19%) were to non-specified ergonomic factors.

Figure 4.14. Percent of NYS OHCN Exposures to Ergonomic Factors, by Type of Factor



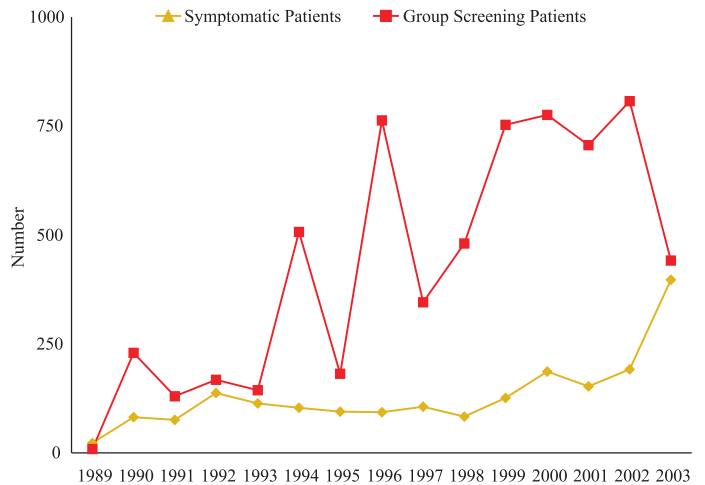
Of those reported exposures to factors associated with stress, 48% were diagnosed with mental disorders. Exposures to repetitive motion were primarily associated with diagnoses of carpal tunnel syndrome (n=2,008), tenosynovitis of the hand or wrist including de Quervain's disease (n=1,058), lateral or medial epicondylitis (n=950), and cubital tunnel syndrome (n=618) (data not shown).



Exposures to Microorganisms

Figure 4.15. Number of NYS OHCN exposures to microorganisms, by year. There were 8,410 reported exposures to microorganisms, of which 6,441 (77%) were among group screening patients. The large increase in exposures to microorganisms among symptomatic patients observed in 2003 was due primarily to an increase in routine examinations by one clinic. The vast majority of these patients (n=6,752) were exposed to non-specified infectious agents, and 1,174 patients (14%) were exposed to molds (data not shown). Most of these patients were seen for prophylactic vaccinations for arthropod-borne viral diseases (n=3,383) or for routine examinations (n=3,077) (data not shown).

Figure 4.15. Number of NYS OHCN Exposures to Microorganisms, by Year



References

¹ Association of Environmental and Occupational Clinics exposure coding system. <http://www.aoec.org/tools.htm>