New York State

OCCUPATIONAL HEALTH

Clinic Network Report 1988–2003

New York State Department of Health • Bureau of Occupational Health

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Executive Summary

Since 1988, the New York State Occupational Health Clinic Network (OHCN) has contributed to maintaining a healthy workforce in New York State. Utilizing a public health approach, the eight regionally-based clinics in the Network have diagnosed and treated occupational diseases and helped improve the working environments in New York. The work of these Clinics has extended to entire communities by providing education and training tools to workers, employers and medical care providers. The Clinic Network has also contributed to occupational medicine by publishing in peer-reviewed journals, developing clinical practice reviews for occupational illnesses, and defining new examples of work-related diseases.

The Clinics employ multidisciplinary teams of physicians, nurses, industrial hygienists, health educators and social workers trained in occupational health to perform a variety of prevention activities as well as provide clinical services. Staff are able to provide diagnosis and basic treatment for the full range of occupational diseases, evaluate the work conditions of the patients to determine whether other co-workers are at risk and suggest measures and make recommendations to improve the workplace environment. The Clinics are open to anyone in NYS with a potential work-related illness. A sliding fee scale assures access for those without health insurance. Receiving funding from NYS allows Clinic staff to spend more time with each of their patients than typical health care facilities. Patients are seen primarily for work-related conditions, but are also seen for environmental exposures. The Clinics offer screening services for groups of exposed workers.

The Clinics are located throughout the state in order to meet specific regional needs. One clinic is specifically designated to provide services in the area of agricultural safety and health. While occupational medicine practice is generally similar through all regions of the United States, integration of practice with specific local needs is desirable. Therefore, each Clinic maintains a local advisory committee which is used to reach into its own community and raise awareness of its services and learn more about local needs. Each Clinic also focuses on the high-risk industries and occupations within its area. The Clinic Network works together to meet the general needs of New York workers.

The Clinics have developed nine clinical practice reviews, which were published in the January 2000 issue of the *American Journal of Industrial Medicine*.[1] These were designed to assist clinicians in the diagnosis, treatment and prevention of the following occupational conditions: asbestos-related diseases, work-related asthma, work-related upper extremity disorders, carpal tunnel syndrome, low back disorders, lead poisoning, noise-induced hearing loss, and solvent-related disorders. A guide for respirator clearance examinations was also developed. The reviews integrate public health approaches (primary, secondary and tertiary disease prevention) into the clinical model by emphasizing a team approach to the diagnosis and treatment of occupational diseases. These clinical practice reviews were utilized by the OHCN as a tool to guide clinical practice and to foster quality of care and consistent practice. A quality assurance/quality improvement (QA/QI) program was developed and implemented to evaluate the level and consistency of care provided in the diagnosis of each of those conditions chosen for the clinical practice reviews. The QA/QI process also enables the Network to evaluate the quality and consistency of case management and the degree to which prevention is integrated into the Clinics' practices.

The World Trade Center (WTC) disaster on September 11, 2001 provided a number of significant public health challenges. The Clinics worked closely with local, state and federal governmental agencies, as well as with employers and unions to assist in providing a coherent public response. The Clinics helped obtain and/or interpret environmental and occupational samples to evaluate the physical, chemical and psychological risks posed by the disaster and its cleanup. They assisted in providing medical certification and fit-testing for respirator use. The Clinics were also part of a nationwide consortium of providers, led by Mount Sinai in NYC, funded by the CDC's National Institute for Occupational Safety and Health (NIOSH) and private philanthropic funding that developed, coordinated and provided medical evaluation, monitoring and treatment services for WTC responders. This program continues to provide free, standardized medical assessments, clinical referrals, and occupational health education for workers and volunteers exposed to hazards during the WTC rescue and recovery effort.

Patient Characteristics

This report includes more than 100 figures and tables describing the patient population seen by the New York State OHCN from its inception in 1988 through 2003. Overall, there were 47,210 patients seen in 115,406 visits. In 2003, the Clinics conducted 127 industrial hygiene site visits, and reached out to a minimum of 35,437 people at educational events and meetings.

- Patients were seen from all but one county in New York State with large percentages residing in counties with large metropolitan areas such as New York City, Albany, Erie, Monroe and Onondaga counties.
- Among those patients seen for occupational exposures, 23% were employed in the services industry, and 22% were employed in construction with another 22% employed in public administration.

Diagnoses

The primary diagnoses for both males and females were diseases of the respiratory system, nervous system and musculoskeletal system.

- Almost one-third of the work-related non-WTC respiratory system disease diagnoses were classified as pneumoconioses, including asbestosis.
  - Other respiratory diagnoses included conditions due to chemical fumes and vapors and work-related asthma.
- WTC-related respiratory system disease diagnoses included chronic pharyngitis, sinusitis and asthma.
- Diseases of the nervous system included carpal tunnel syndrome, noise-induced hearing loss, and cubital tunnel syndrome.
  - Half of the nervous system diagnoses among males were noise-induced hearing loss.
  - Over half of the nervous system diagnoses among females were carpal tunnel syndrome.
- There has been a steady increase in the number of diagnoses and patient visits for musculoskeletal conditions.
  - 28% of the diagnoses of musculoskeletal diseases worked in administrative support occupations, while 26% worked in executive and professional specialty occupations.
  - The majority of the diagnoses were disorders of the cervical region and other disorders of the back.
  - More than a third of the diagnoses were due to repetitive stress injuries.

Exposures

Patients seen by the NYS 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 sometimes improve the treatment and management of a disease. More importantly, 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.

- Almost a quarter of the exposures were to mineral and inorganic dusts which includes asbestos, silica and non-specified dusts.
  - Diagnoses due to these exposures included pleural thickening due to asbestos, asbestosis, asthma, chronic obstructive pulmonary disease, and chronic bronchitis.
  - Among those patients with WTC dust exposures, diagnoses included chronic pharyngitis, chronic sinusitis, and asthma.
  - Patients exposed to mineral and inorganic dusts worked primarily in the construction industry, followed closely by the services industry.
- Another quarter of the exposures were to ergonomic factors.
  - 66% were repetitive motion including keyboard use, 8% were stress, and 6% were lifting.
  - Exposures to repetitive motion were primarily associated with diagnoses of carpal tunnel syndrome, tenosynovitis of the hand or wrist, lateral or medial epicondylitis, and cubital tunnel syndrome.

Industries and Occupations

The patients seen for occupational exposures by the Clinics were employed primarily in services, construction and public administration industries.

- The principal service occupations included cleaning and building services, and protective services (primarily firefighting and fire prevention).

- Almost half of these patients were seen as part of group screenings due to potential exposures.
- Diseases diagnosed among the patients working in the services industry were primarily diseases of respiratory system including asthma, chronic pharyngitis and sinusitis, asbestosis, and pleural thickening due to asbestos. A large percent of these patients were also diagnosed with diseases of the musculoskeletal system.
- Exposures among patients working in the service industry included mineral and inorganic dusts, primarily asbestos exposure; and ergonomic factors, primarily repetitive motion.

• Among patients working in construction, 57% of the patients were seen as part of group screenings.
- Diagnoses were primarily respiratory diseases including pleural thickening due to asbestos, asbestosis and asthma, and lead poisoning.

• Almost half of the patients employed in the public administration industry were seen as part of group screenings; 27% were for exposures to microorganisms, 23% were screened for exposures to miscellaneous inorganic compounds, and 21% were screened for exposures to combustion products, fumes and smoke inhalation.
- The primary diagnosis among this group was diseases of the respiratory system of which 47% were among patients involved with the WTC rescue and recovery.
- Patients were also diagnosed with diseases of the musculoskeletal system and diseases of the nervous system, including noise-induced hearing loss.

New York State Workforce

The patients seen by the NYS OHCN represent a unique subset of the NYS working population. It is important to be familiar with the current and expected future characteristics of NY workers in order to identify future directions for the Clinic Network.

• In 2003, New York State (NYS) had over 8,726,000 full-time employees – with approximately 3.4 million in NYC and 5.4 million in NYS outside of New York City (NYC).
- Women make up about 47% of the workforce in NYS. Women in NYS are primarily employed in administrative support occupations (22.6%), professional specialties (20.9%), and service occupations (21.4%).
- The largest Hispanic population in the nation resides in NYC where there are more than 1.1 million Hispanic workers. Compared to Whites in NYS, Hispanic workers in NYS account for a disproportionate percentage of those working in service occupations and as machine operators and laborers.
- Approximately 15% of the NYS workforce is African American, compared to 11% nationally. This percentage varies substantially between NYC where approximately 26% of the workforce is African American, compared to the remainder of NYS where only 8% of the workforce is African American. In NYS, African Americans work primarily in services occupations and in administrative support.
- 60% of those aged 55 to 64 are in the labor force, and 14% of those aged 65 years and older are working. On average, over 10,000 workers 55 to 64 years old and over 1,400 workers 65 years and older in NYS are reported with a work-related injury or illness. The hazards encountered by older workers are similar to those faced when they were younger; however, the injuries experienced are often more severe and require longer recovery times.
- Young workers are believed to be at increased risk of occupational injury due to limited job knowledge, training and skills. It is estimated that between 70 to 80 percent of teens have worked for pay at some time during high school.
- In 2004, there were 4,009,000 workers in NYS paid hourly rates, of which 128,000 were paid below minimum wage of $5.15 per hour. Over three-fourths of minimum wage workers were in service occupations – primarily food preparation and serving (59%) and personal care (8%).

• The Clinic Network screens patients with high-risk exposures. Lead, asbestos and physical/ergonomic work factors continue to be important exposures of concern.

• The aging population will result in a need for workers to care for them including nurses and home health aides.

• There is an expected increase in international immigration which will increase the racial and ethnic diversity of the NYS workforce.

Challenges and Recommendations

Since the establishment of the NYS OHCN, the nature of workplace hazards has changed rather significantly. There remains a pressing public health need to diagnose, treat and prevent work-related illness. There is still a profound shortage of trained occupational medicine practitioners. Few other practitioners provide comprehensive preventive services; thus the NYS OHCN remains uniquely qualified to provide this care. Analysis of the data provided by the Clinics, as described in the report, reveals specific areas upon which Clinics may want to focus in the future.

Flat funding of the NYS OHCN since 1997 has inhibited the ability of the Clinics to continue to address their mission due to rising costs and newly emerging occupational health needs. Satellite Clinics that were started have had to close, thus limiting access to the Clinics. Hours have been cut, staff has been reduced, and services such as physical, occupational and medical massage therapy have been cut. New initiatives have had to be cancelled and the Clinics have had to reduce the number of patients seen in order to identify other funding sources. The patient load on the Clinics continues to increase, but many Clinics have found it difficult to offer both continued care to their existing patient population and to identify and assist new patients.

Clinical Services

- The Clinics should ensure that they continue their focus on the diagnosis of occupational disease.
- The Clinics should continue to be able to identify new associations between workplace exposures and diseases.
- Clinics need to plan accordingly to handle the patient load expected due to repetitive stress disorders.
- The Clinics should continue to screen for co-morbid conditions, such as diabetes, hypertension and hypercholesterolemia, during patient visits.
- Mechanisms need to remain in place to assist the patients and their families with psychological and sociological issues.

Prevention Services

Workforce Issues

- Further focus needs to be placed upon low-income and immigrant populations.
- Efforts should continue to reach high-risk female workers, particularly those of Hispanic and African American ethnicities, and those of low-income.
- Outreach should be conducted to aging workers providing prevention information.
- Education regarding physical and ergonomic factors and avoidance of needlestick injuries should be offered, particularly to low-income workers in the medical fields.

High Risk Exposures

- The Clinics need to continue to screen high-risk workers for toxic effects of lead exposure.
- Screenings for asbestos-related diseases should continue.
- Clinics encountering patients who reside in NYC should consider conducting audiometric exams for high-risk populations.
- Clinics should consider conducting audiometric exams among their female populations.
- Clinics need to offer screenings, prophylaxis, education, and/or treatment to people who work outdoors for insect-borne diseases.
- Skin cancer screenings should be included in the list of services provided to workers who spend long periods in the sun.
- The Clinics should utilize research being conducted regarding health condition associated with WTC disaster-related exposure to assist in treating and managing patients with WTC disaster-related exposures.

Outreach

The continuing occupational health challenges speak to the need for the network to expand its outreach efforts to raise the level of awareness about the prevalence, cost, and preventable human suffering which result from occupationally-related disease. There needs to be enhanced collaboration between the Clinics, to allow them to utilize their individual skills to address larger occupational health issues. Materials developed for select populations should be available to all network members, as should translations for immigrant populations.

Research

Balance needs to be maintained between the primary clinical missions and the benefits to occupational disease prevention to be obtained through research. Each Clinic should be involved in internal evaluation identifying effective non-medical interventions and worker training methods to accomplish prevention goals.

Supply of Occupational Health Professionals in NYS

In order to strengthen and expand training programs in occupational health, the Clinics should work on integrating occupational medicine into mainstream medical care. Awareness of the NYS OHCN should be increased through fellowships and residencies with as many medical centers as possible.

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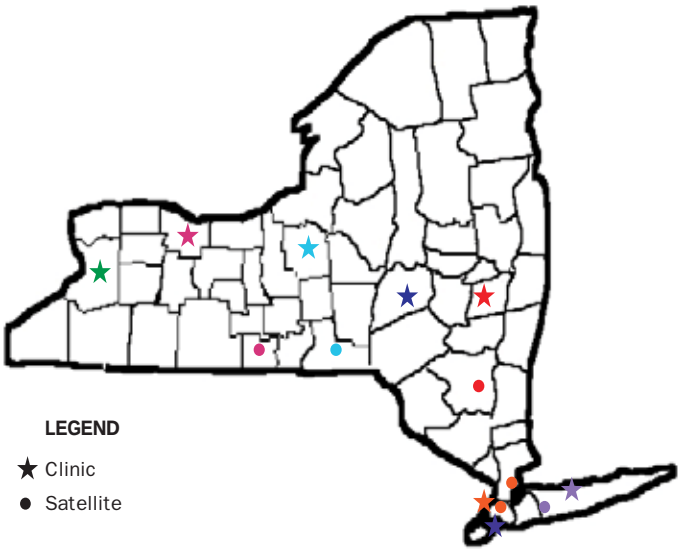
Chapter 1. Background

The New York State (NYS) Occupational Health Clinic Network (OHCN) is unique in the United States as a partially public funded, statewide, public health-based network offering clinical and preventive occupational disease services.[1] It was established in 1987 following the publication of a Mount Sinai School of Medicine evaluation of the problem of occupational disease in New York State[2]. The evaluation focused upon assessing the nature, magnitude and costs of occupational disease in NYS and developing recommendations for improving the recognition, prevention and treatment of occupational disease. The study estimated that occupational exposures were responsible for more than 35,000 new cases of disease and 5,000 to 7,000 deaths each year in NYS. The annual cost, in 1985 dollars, was estimated to be over $600 million for five disease categories - cancer, chronic respiratory disease, pneumoconioses, strokes and coronary heart disease, and fatal kidney disease. The majority of these costs were borne directly by the ill workers and/or their families. With regard to the resources available to workers, there were 73 physicians board-certified in occupational medicine licensed to practice in NYS in 1985.

The evaluation concluded that the state's resources, both in clinical facilities and professionals trained in occupational health, were inadequate to meet the public health need and recommended that the State of New York establish a statewide network of occupational health clinics. Backed by data presented in the evaluation, a group, led by organized labor, lobbied the New York State Legislature to enact this recommendation. As a result, the NYS Legislature appropriated funding through a small assessment of less than 0.3% of the total Workers' Compensation medical expenditures, to create a statewide network of six regional occupational health clinics, with oversight provided by the NYS Department of Health.

Since then, the Network has increased to eight regionally based clinics, some of which have satellite facilities. However, due to funding issues, many of these satellite facilities have closed, or changed location over the years. The Clinics reside in a variety of institutional settings, including state and private medical schools, a healthcare insurer, and a local consortium of unions. Figure 1 displays the locations of the Clinics and the satellite offices, as of January 2006.

Figure 1.1. Location of NYS Occupational Health Clinics



The Clinics employ multidisciplinary teams of physicians, nurses, industrial hygienists, health educators and social workers trained in occupational health, to perform a variety of prevention activities as well as provide clinical services. Staff are able to provide diagnosis and basic treatment for the full range of occupational diseases, along with evaluating the work conditions of the patients to determine whether other co-workers are at risk and to improve the workplace environment. The Clinics are open to anyone in NYS with a potential work-related illness. A sliding fee scale assures access for those without health insurance. Receiving funding from NYS allows Clinic staff to spend more time with each of their patients than typical health care facilities.

The Clinics are located throughout the state in order to meet specific regional needs. One clinic is specifically designed to provide services in the area of agricultural safety and health. While occupational medicine practice is generally similar through all regions of the United States, integration of practice with specific local needs is desirable. Therefore, each Clinic maintains a local advisory committee consisting of local businesses, organized labor, the medical community, local politicians, community and/or health organizations, environmental groups and government representatives.

These boards are used to reach into their own communities and raise awareness of their services and learn more about local needs. Each clinic also focuses on the high-risk industries and occupations within their area. When overlap of these services are identified, the Network works together to meet the general needs of New York workers.

Occupational Health Clinic Network Goals

As described in the Network's Mission Statement, "the primary focus of the New York State Occupational Health Clinic Network is to provide high quality occupational medicine services, specializing in the diagnosis, treatment, and prevention of occupational diseases." The Clinics were established to achieve five main goals:

- To contribute to the quantification and description of the occupational disease burden in the state.
- To increase the accuracy of the diagnosis of occupational disease;
- To improve the treatment and management of occupational disease;
- To contribute to the prevention of occupational disease;
- To strengthen and expand training programs in occupational health for professionals at all levels.

Scope of Report

This report describes the patient population seen by the OHCN from the inception in 1988 through 2003. Information on demographics, types of medical conditions, exposures, and industries and occupations worked in by the patient population are presented in Chapters 2 through 5. Chapter 6 describes the working population in NYS and some of the health issues faced by the NYS workers. This information is used in Chapter 7 to predict the future clinical needs and challenges the OHCN will need to address.

Services

Clinical Services

The Clinic Network enables individual cases of occupational disease to be diagnosed and treated by physicians who are board-certified or eligible in occupational medicine. Due to the potential economic consequences of occupational diseases resulting from the inability to work and the potential loss of employment, the integration of clinical care with other services is essential to the management of the disease. Occupational diseases are under-recognized and therefore, under-diagnosed. Failure to consider the workplace factors that may contribute to a patient's condition can result in the ordering of unnecessary tests, inappropriate referrals, and of equal or greater importance, a missed opportunity to protect others who may be at risk. Many occupational factors act in concert with non-occupational factors to cause disease, so indication of other etiologic factors, such as smoking, does not necessarily rule out a disease as also having an occupational etiologic component.

Healthcare professionals may contact the clinics for the purpose of consultation or referral. The Clinics are located throughout the state to function as regional resources.Patients with possible work-related diseases are evaluated to determine not only medical diagnosis, but also whether their conditions are work-related and, if so, the likely etiologic agents in the workplace. Accurate diagnoses can lead to successful prevention for exposed co-workers, reduced severity, and sometimes complete recovery. An inaccurate diagnosis, such that a person has the disease but is diagnosed as not having it, or missing the possibility of an occupational etiology, can jeopardize the opportunity for prevention not only for the patient, but also for others with similar exposures. An inaccurate diagnosis may also result in the patient undergoing inappropriate diagnostic testing and/or treatment, and can cause unnecessary social and financial costs to both the employers and the workers.

The Clinics also provide medical recommendations for returning injured workers to work under conditions that will allow them to continue working while minimizing the chances for re-injury or delayed recovery.

Industrial Hygiene Services

Because occupational medicine must link clinical care of individuals to preventive efforts in the workplace, it is often critical that the healthcare provider identifies workplace hazards and assists in facilitating workplace prevention efforts. The Clinics each have an industrial hygienist on staff, or have access to one through contracts. Industrial hygienists are professionals with expertise in recognizing, evaluating and controlling health hazards in the workplace. Utilization of an industrial hygienist helps increase the accuracy of diagnoses through understanding the work environment and can help minimize hazardous exposures among co-workers, thus preventing future work-related diseases. By reducing or eliminating exposures, not only are further cases prevented, but also the likelihood that patients can successfully return to work is increased.

Industrial hygiene services focus on workplace hazard evaluations, training and education. Routine educational and workplace intervention programs are guided by individual patients presenting to the Clinics, employers and unions requesting assistance, and by priorities established through knowledge of regional health needs. Through a site visit, the industrial hygienists can identify health and safety problems in the workplace and then develop or recommend corrective measures to prevent future problems. While air and bulk sampling may be used to determine exposure levels, other methods including questionnaires, work practice observation, ventilation assessment, and review of personal protective equipment and engineering controls may be used to determine the potential toxic or hazardous effects of substances or physical agents in the workplace. Examples of the types of industries where the Clinic Network conducted site visits and the number of site visits conducted in one year are provided in Table 1.1.

Effective workplace safety and health programs require appropriately trained workers. Many small employers are often in need of assistance in developing or maintaining their health and safety programs. Therefore, training and education of the workforce focusing upon specific workplace operations are included in the industrial hygiene services offered. Recently, three clinics worked together to develop, coordinate and deliver training at numerous sites for the Operating Engineers Hazardous Waste Worker program.

The industrial hygienist can assist in providing technical assistance and consultation services for employers, unions and public health agencies. Sometimes these services are offered as the result of a presenting patient who serves as a sentinel health event. Other times, an employer or union initiates the contact. Industrial hygienists assist employers and unions in establishing respirator programs including the selection and fitting of respirators, and training the employees in their use. In addition, the Clinics serve as sources of information, consultation, and education regarding new or complex hazards – such as exposure to multiple chemicals, hazards of aerosolized metal working fluids in manufacturing, or latex allergy in health care.

Table 1.1. Number of Industrial Hygiene Site Visits Conducted by the NYS Occupational Health Clinic Network in 2003, by Industry

SIC	Group Name	Number of Visits
01	Agriculture, Forestry and Fishing	17
15	Building Construction-General Contractors and Operative Builders	3
17	Construction-Special Trade Contractors	13
20	Food and Kindred Products	6
26	Paper and Allied Products	1
27	Printing, Publishing and Allied Industries	12
28	Chemicals and Allied Products	1
30	Rubber and Miscellaneous Plastic Products	1
34	Fabricated Metal Products, Except Machinery and Transportation Equipment	2
35	Industrial and Commercial Machinery and Computer Equipment	2
37	Transportation Equipment	5
41	Local and Suburban Transit and Interurban Highway Passenger Transportation	3
42	Motor Freight Transportation and Warehousing	1
48	Communications	4
49	Electric, Gas and Sanitary Services	3
60	Depository Institutions	1
67	Holding and Other Investment Offices	2
70	Hotels, Rooming Houses, Camps and Other Lodging Places	1
73	Business Services	1
76	Miscellaneous Repair Services	1
79	Amusement and Recreational Services	1
80	Health Services	4
82	Educational Services	11
83	Social Services	1
84	Museums, Art Galleries, And Botanical and Zoological Gardens	1
86	Membership Organizations	6
87	Engineering, Accounting, Research, Management and Related Services	4
88	Private Households	5
91	Executive, Legislative and General Government, Expect Finance	2
92	Justice, Public Order, and Safety	1
94	Administration of Human Resource Programs	5
96	Administration of Economic Programs	1
	Missing	5
	Total	**127**

Social Work Support Services

Many of the Clinics have a social worker or nurse advocate on staff to offer counseling regarding financial, social and psychological aspects of occupational diseases. Many Clinic Network patients experience changes in their ability to perform tasks at home, activities of daily living, recreational activities and work duties as a result of their diseases. In addition, patients often have financial concerns resulting from the inability to work, the lag period to obtain Worker's Compensation benefits, changes in lifestyle and family roles, and medical concerns created due to chronic illness. These issues can lead to difficulty coping, requiring the need of interventions. Clinics that do not have a social worker on staff often make referrals to the local Department of Social Services to ensure appropriate services are offered to the patients.

Short-term counseling and guidance are offered to Clinic patients and their families. This involves discussing problems and developing action plans directed towards resolving the issues including crisis intervention, education about illness/injury and common responses, legal services, and referrals to community agencies. Support groups are often organized by the Clinics bringing together patients with similar symptoms, problems and illnesses. Support groups may also be available for families, spouses, and caregivers. Stress reduction techniques are also often taught to Clinic patients.

The Clinics often assist in coordinating services, thus ensuring that appropriate agencies respond to the patients' needs. General information about Medicaid, public assistance, Social Security disability, and Workers' Compensation are offered to Clinic patients, particularly those without health insurance. The Clinics assisted the AFL-CIO in developing the Navigator program that assists union members in navigating the NYS Workers' Compensation system.

The Clinics also assist in disability assessment and rehabilitation services to facilitate safe return to work. The NYS Education Department oversees the VESID – Vocational and Educational Services for Individuals with Disabilities program. Services offered include vocational assessment, vocational counseling, job training and placement, job follow-up, and other services to support the individual's employment objectives.[3] Members of the Clinic Network refer patients to VESID who can no longer work at their jobs. These patients receive job training in new fields, allowing them to remain in the workforce.

The social work support services often note that the agricultural community experiences increased stress levels due to reduced milk prices, the cost of fuel and weather conditions, and the lack of health insurance among many farmers. In order to serve this population better, the farm specialty clinic also runs a program called "Farm Partners". This program offers a coordinated response to assist the farmer and his/her family by coordinating services using other agencies including FarmNet, Department of Social Services, County Mental Health Clinics, Rural Housing, Social Security Administration, Veteran's Administration, Cooperative Extension Associations, American Red Cross, Office for the Aging, Catholic Charities, and VESID. Patients from the agricultural community have additional problems including financial difficulties such as bankruptcy due to potentially losing their farms. Clinics also refer patients from the agricultural community to the AgrAbility Program, which was created to assist people with disabilities employed in agriculture such as amputations, arthritis and mental illness. The project links the Cornell Cooperative Extension Service with a private nonprofit disability service organization to provide practical education and assistance that promotes independence in agricultural production and rural living. The AgrAbility Project assists people involved in agriculture production who work both on small and large operations.

In the past few years, as a direct result of the World Trade Center (WTC) tragedy, there has been an increase in awareness among the psychiatric community of occupational health issues. The existing social work infrastructure maintained by the OHCN has facilitated easier access to psychological services needed by NYS OHCN patients affected by the WTC tragedy. This in turn has created the opportunity for other Clinic patients to receive appropriate psychological services.

Preventive Services

Providing preventive services is one of the goals established for the NYS OHCN. Besides working to prevent occupational diseases and injuries from occurring, providing preventive services also helps the Clinics maintain a presence within the community and serve as springboards for contacts with future patients and clients. Various preventive services including offering immunizations, screening of high-risk workers, and providing respirator fit testing and medical certification are supplied. The Clinics also provide basic health services at health fairs and through worksite wellness programs such as

blood pressure, cholesterol and blood glucose testing, information about breast self-exams, and skin cancer screenings. Classes are also offered on how to prevent work-related health problems such as ergonomic injury recognition, hearing conservation, safe patient handling and movement, and health effects of asbestos. Respiratory screenings are also conducted throughout the farming community at a variety of farm shows and events. A recent study of agricultural workers participating in a screening found over 80% of the participants indicated they were poor users of personal protective equipment (PPE), but after receiving education, over 89% of those pledged to improve PPE usage. A follow-up of a sub-sample of the "pledgers" revealed 24% of those individuals who pledged to use PPE were now using it on a regular basis (data not published).

Multiple types of immunizations are provided by the NYS OHCN, usually through the employer. These include pre-exposure rabies vaccines to veterinary workers, animal control and wildlife workers; Hepatitis A and B vaccinations to firefighters, health care workers, and individuals who may work in hospital operating rooms such as a surgical prosthetic devices employer; and anthrax vaccinations to National Guard, Army Reserve, and local laboratory staff. Other vaccination programs include flu shots and tetanus and Diptheria vaccines.

Screenings of high-risk groups of workers include blood lead testing of people involved in bridge maintenance, stained glass work and residential painting; audiometric screenings for firefighters and workers requiring CDL licensure; asbestosis screenings, pulmonary function tests, EKGs, urinalysis, and vision testing. Quantitative and qualitative fit testing for respirator use, respirator medical certification exams, and respiratory protection training is also provided. Screenings for high-risk workers often include an educational component.

Services to Special Populations

World Trade Center Worker and Volunteer Medical Screening Program

The WTC disaster on September 11, 2001 provided a number of significant public health challenges. The Clinics worked closely with local, state and federal governmental agencies, as well as with employers and unions to assist in providing a coherent public response. The Clinics helped obtain and/or interpret environmental and occupational samples to evaluate the physical, chemical and psychological risks posed by the disaster and its cleanup. They assisted in providing medical certification and fit-testing for respirator use. The Clinics were part of a nationwide consortium of providers, led by Mount Sinai in NYC, funded by the CDC's National Institute for Occupational Safety and Health (NIOSH) and private philanthropies that developed, coordinated and provided medical evaluation, monitoring and treatment services for WTC responders. This program continues to provide free, standardized medical assessments, clinical referrals, and occupational health education for workers and volunteers exposed to hazards during the WTC rescue and recovery effort. Over a two-year period from July 16, 2002 to August 6, 2004, the first 11,768 responders (other than current and retired NYC Fire Department employees) received their first medical screening examination. Analyses of a subset of the participants indicated that a substantial proportion experienced either new-onset or worsened preexisting respiratory symptoms, musculoskeletal symptoms, and gastrointestinal symptoms with symptoms persisting for months after the exposure stopped.[4] Approximately half of those screened for symptoms of post-disaster mental health conditions met the criteria for a clinical mental health evaluation. Six percent of the participants reported symptoms of depression, panic and generalized anxiety, and approximately 20% of participants reported symptoms related to post traumatic stress disorder.[5]

Low Income Populations

An important aspect of the Clinic Network's mission is to make high quality occupational medical services accessible to those working populations with the greatest needs. Low income workers are at substantial risk of occupational injuries and illnesses attributable to employment in the most dangerous jobs, long work hours, poorly controlled physical, chemical and biological hazards in the workplace, inadequate protective equipment, limited access to occupational health information and training, inadequate access to general medical care, and language, literacy and cultural barriers. Not only are occupational medical services provided to these populations, but awareness sessions are offered to participants on hazard communication, worker rights, conflict resolution and stress management.

Providing these populations with access to clinical and preventive occupational medicine services is a challenge that requires innovative approaches. Members of the NYS OHCN have undertaken a variety of approaches to reach these populations. The majority of the Clinics have bilingual staff

and/or access to individuals who can translate for the patients or create fact sheets in multiple languages. The Clinics have collaborated with community-based organizations such as the Chinese Staff and Workers' Association, the Filipino Workers' Center, and Workers' Awaaz (representing South Asian workers from Bangladesh, India and Pakistan). Through these groups and other organizations such as the Salvation Army program entitled Project Re-Direct, the Clinics have conducted community-based screenings of low income workers and have identified that many workers have probable occupational diseases.

Another approach the NYS OHCN has utilized is to expand services through satellite Clinics that allow better geographic accessibility. After the WTC tragedy, members of the Clinic Network utilized mobile medical vans to conduct screenings and follow up on Day Laborers who worked at Ground Zero.

Improving the Treatment and Management of Occupational Disease

Clinical Practice Reviews

The goals of the OHCN include improving the treatment and management of occupational disease in New York State. To this end, Clinic Network staff collaborated to develop nine clinical practice reviews, which were published in the January 2000 issue of the *American Journal of Industrial Medicine*.[1] These were designed to assist clinicians in the diagnosis, treatment and prevention of the following occupational conditions: asbestos-related diseases, work-related asthma, work-related upper extremity disorders including CTS, low back disorders, lead poisoning, noise-induced hearing loss, and solvent-related disorders. A guide for respirator clearance examinations was also developed. The reviews integrate public health approaches (primary, secondary and tertiary disease prevention) into the clinical model by emphasizing a team approach to the diagnosis and treatment of occupational diseases. Public access to these reviews has been provided by the NYSDOH through the NYS OHCN web page (http://www.nyhealth.gov/environmental/workplace/clinic_network.htm). Since posting access to these documents in the Spring of 2000, over 38,000 hits have been made, with an average of approximately 750 hits per month.

Quality Assurance / Quality Improvement

The clinical practice reviews are used by the OHCN to guide clinical practice and as a tool to foster quality of care and consistent practice. A quality assurance/quality improvement (QA/QI) program was developed and implemented to enable the Network to evaluate the level and consistency of care provided in the diagnosis of each of those conditions chosen for the clinical practice reviews. The QA/QI process also enables the Network to evaluate the quality and consistency of case management and the degree to which prevention is integrated into the Clinics' practices.

Utilizing information in the published clinical practice reviews, an audit program was developed for the purposes of evaluation and improvement of patient care. Each Clinic reviewed up to five patient charts for each condition. This program also afforded intra-Clinic as well as inter-Clinic comparisons. To be eligible for review, charts must have included at least one patient visit in 2001 or later (after the clinical practice reviews were published). Charts were reviewed for the presence or absence of specific items/information listed on condition-specific audit checklists. The NYS Department of Health (NYSDOH) then also audited five charts per condition, with approximately half from among those also reviewed by the Clinic. Following each audit, the NYSDOH provided a short report summarizing the audit findings. Audits occurred from September 2003 through October 2005.

Condition-specific audit sheets were developed by the authors of the clinical practice reviews to provide a checklist of criteria that should be part of an occupational health exam (Table 1.2). In addition, ten core criteria were identified that should be noted for any work-related condition. These included an occupational history that includes all past and current jobs; exposures in relevant jobs; the presence of personal protective equipment or other prevention/exposure reduction methods; other non-occupational potential exposure sources; and a smoking history and recommendation for cessation, if appropriate, should also have been noted. Within the chart, certain items should have been clearly noted including work-relatedness, work status, whether co-workers are at risk, and whether there was a decision on Industrial Hygiene involvement. In addition, all patients should have been informed of their diagnosis and treatment options.

Table 1.2. Audit Criteria for Each Clinical Practice Review

Condition-specific Criteria:

Asbestos-related Diseases

- **Symptom History -** evidence of review of asbestos-related symptoms
- **Radiological Results –** chest PA and lateral X-ray or chest CT results
- **Spirometry Results –** pulmonary function test results

Work-related Asthma

- **Relevant Medical History –** notation regarding history of asthma or allergies (adult or childhood)
- **Asthma Symptoms –** presence or absence noted of: wheezing, shortness of breath, chest tightness, or cough
- **Upper Respiratory/ Mucosal Symptoms –** presence or absence noted of: eye irritation, rhinitis, nasal congestion
- **Temporal Relationship** – occurrence/worsening of asthma symptoms in relation to work or workplace exposures clearly noted
- **Symptom/Peak Flow Diary –** maintained or reasons stated why not
- **Evidence Supporting Diagnosis of Asthma –** concise summary with dates of onset (and recrudescence, if appropriate)
- **Job Impact-** note whether patient leaving work or changing jobs due to asthma symptoms

Carpal Tunnel Syndrome

- **History**
  - Hand diagram depicting numbness or tingling in digits 1, 2, and/or 3, **OR** health care provider note describing above symptoms
  - Presence or absence of weakness and/or discoordination of hands, especially involving APB
  - Other contributors noted: MSD, neck or UE trauma, wrist fracture, cervical disk disease, h/o diabetes, hypothyroidism, TB, current pregnancy or lactation, malignancy, collagen vascular disease, OBCP use, uremia, alcohol dependency
- **Physical Examination**
  - Complete exam of neck and upper extremities (inspection, palpation, AROM, RROM, neurological including sensory)
  - Presence or absence of thenar atrophy, Tinel's sign and/or Phalen's noted
- **Laboratory tests -** CBC, SMA, ESR, thyroid function testing
- **Treatment and Follow-up**
  - Referral to surgeon made and documented (if evidence of APB denervation present)
  - Neutral wrist splints provided
  - Referral to PT or OT made if conservative treatment chosen, with documentation of WC authorization requests
  - Return to work restriction provided (clear instruction)

Work-related Upper Extremity Cumulative Trauma Disorders

- **DeQuervain's Disease –** performed Finkelstein's test & recorded result (+ or -)
- **Forearm tendinosis –** presence or absence of symptoms (e.g., pain, paresthesias) in neck and contralateral upper extremity
- **Medial epicondylitis –** presence or absence of symptoms and signs of median or ulnar neuropathy near elbow
- **Lateral epicondylitis –** presence or absence of symptoms & signs of radial or posterior interosseous neuropathy near elbow
- **Ulnar neuropathy at elbow –** presence or absence of pain or paresthesias in 5th or 4th digits (ipsilateral upper limb)
- **Hand-Arm Vibration syndrome –** presence or absence of blanching in at 1 digit in ipsilateral upper limb

(Continued on page 8)

Table 1.2. Audit Criteria for Each Clinical Practice Review (continued)

Low Back Disorders

- **Neurological Signs –** presence/absence notes
- **Past Medical Records –** requested, obtained, reviewed
- **Work Restrictions –** specified, including dates in effect
- **Diagnostic Criteria Supported –** findings on exam consistent with diagnosis and ICD9 codes

Lead Poisoning

- **History** – evidence of review of lead-related symptoms
- **Physical Exam** – findings of CNS, PNS, blood pressure
- **Laboratory Results** – blood lead and ZPP (FEP) levels recorded longitudinally

Noise-Induced Hearing Loss

- **Exposure History –** notation of noise exposure
- **Occupational Exposures (all jobs) –** include source and noise dosimetry
- **Recreational Exposures** – e.g., loud music, firearms, power tools, motorcycle, snowmobile, wood cutting
- **PPE** – use of hearing protection detailed
- **Past Medical History –** notations of:
  - Symptoms, surgery, injuries, infections, trauma
  - Previous audiometry
- **Physical Examination**
  - Evaluation of cranial nerve function- primarily facial nerve
  - Examination of ear canals, TM's
  - Tuning fork determination of conduction & lateralization (Rinne, Weber)
- **Laboratory Results- Audiometry**
  - Includes 0.5, 1, 2, 3, 4, 6, and 8 KHz with appropriate calibration
  - Compared to previous studies and STS is evaluated, when available

Respirator Clearance Examinations

- **Employer and/or Employee –** filed information on work description
- **OSHA Questionnaire –** reviewed by a health professional
- **Certification** - issued

Solvent-related Disorders

- **Previous Conditions –** History in chart of past neurologic, psychiatric, renal, hepatic, dermatologic conditions
- **Physical Examination –** inclusion of positive and negative solvent-related findings and findings indicating possible confounding conditions
- **Non-Occupational –** History of alcohol or other substance abuse, using of medication and herbal products
- **Laboratory Test –** Baseline liver and renal function results noted

Core Criteria:

- **Occupational History**
  - Past and current jobs listed
  - Exposures/sources in relevant jobs
  - Presence of Personal Protective Equipment or other prevention (or exposure reduction) methods
- **Other Exposures (non-occupational) –** possible exposure sources
- **Work-relatedness –** should be clearly noted
- **Work Status –** should be clearly noted
- **Education** – inform patient of diagnosis and treatment options
- **Follow-up**
  - Notation as to whether co-workers are at risk
  - Decision on Industrial Hygiene involvement
- **Smoking** – obtain History and recommend cessation (if relevant)

Patient charts, as a record of clinical evaluations, should routinely follow the guidance developed from the Network's clinical practice reviews. The Clinics have used the QA/QI process to become more conscientious about the way in which they document all aspects of patient care. The Clinics were able to use the QA/QI process to address deficiencies detected in their data collection tools.

Education and Outreach to the Medical Community

Many of the Clinics work with students in the medical community to inform and educate them about occupational health. They act as preceptors to first year medicine residents having them spend time within their Clinics and arranging site visits of industrial settings. They are also mentors for preventive medicine and nursing students. These students observe and participate in patient testing/interaction as part of their program requirements. These preceptor relationships continue to be of mutual benefit to both the students and the Clinic staff. Most Clinics serve as sites for clinical rotation from nearby institutions, which seek out clinical training in occupational medicine. Trainees include third and fourth year medical students, Family Practice, Internal Medicine and Occupational Medicine residents, and foreign medical student and graduates. Training is also provided to primary care providers on diverse topics such as management of Workers' Compensation patients; Grand Rounds are presented at local hospitals. Clinic Network staff also participate as visiting faculty in Rural Medicine Programs.

Migrant Farmworker Clinics

Various Network Clinics have been involved in working with migrant farmworkers. They provide general and preventive health services for conditions such as back, neck or arm strain, skin rashes, eye injuries and respiratory problems. The specialty clinic for agricultural health identified that 15 to 20% of migrant clinic visits are related to occupational problems. Therefore, this Clinic has developed a loose-leaf manual designed for ready access in the examining room. This manual provides information ranging from cultural differences of various migrant groups to descriptions of specific commodity work and the patterns of injury documented for each commodity. Treatment guidelines for common problems are included, as are photocopy-ready patient information sheets in Spanish and Creole.

Emergency Response

The public health approach to treating occupational diseases and injuries has allowed the Clinics to be in a unique position to handle emergencies that affect workers. The Clinics are designed to respond to exposure episodes and disease clusters. In the past few years, two situations, in particular, have occurred in NYS where the Clinics have made substantial contributions. These include the WTC disaster and exposure to Anthrax in a public building. The unique training of clinic medical staff has allowed them to offer immediate technical expertise and consultations with the medical community. Working closely with local, state, and federal governmental agencies, as well as with employers and unions, the Clinics assisted in providing a coherent public health response. The established relationship with social service agencies allow rapid response for social, psychological and financial services – all much needed particularly after the WTC disaster. The Clinics have also been part of the ongoing public health response to bioterrorism by providing guidance to many groups about the risks of various chemical and biological agents, conducting anthrax testing and vaccinations to "at-risk" workers, and educating workers and employers on the signs and symptoms of anthrax and preventive measures they can take to reduce exposure.

Disease Monitoring

Utilization of the public health approach has allowed for effective disease monitoring among workers. For example, the Clinics conduct cardiac risk factor screening for high risk populations as part of their respiratory fit testing certification. They offer screenings for health issues as diverse as skin cancer to Lyme disease, and prophylactic vaccinations for conditions like rabies and Hepatitis. The Quality Assurance/Quality Improvement program, conducted over the past 4 years, confirmed that the Clinics address basic public health issues such as smoking cessation with all patients who smoke.

Table 1.3. Summary of Outreach Activities Conducted by the New York State Occupational Health Clinic Network in 2003*

Type of Activity	Number of Events	Number of Attendees
Education		
Workers	236	8,060
Physicians	2	736
Other healthcare providers	14	235
Students (non-medical)	14	259
Other	41	1,331
Subtotal	**332**	**10,648**
On-Site Services		
Physicals	19	155
Respirator certification and fit testing	38	524
Screenings	41	1,231
Vaccinations	3	39
Subtotal	**101**	**1,477**
Mass Media Outreach		
Print	68	N/A
Radio	11	N/A
Television	26	N/A
Meetings		
Community group	131	8,961
Health care organization	49	644
Health care provider	9	189
Professional/scientific	77	3,456
Worker organization	95	9,217
Subtotal	**361**	**22,467**
TOTAL	927	35,435

* This data is not routinely collected by the OHCN, so numbers are an underrepresentation of outreach activities.

Community Benefits

The public health approach also allows the Clinic Network to reach deep into their local communities. The design of the NYS OHCN, requiring advisory boards to assist in setting policy for each Clinic, has created a network of partners that are useful for disseminating information into the working community, and for developing effective, affordable and acceptable worksite interventions. These partnerships, along with other outreach endeavors, have allowed the Clinics to enlist communities in prioritizing occupational health problems, determining and evaluating potential interventions, and then actually testing these interventions with the goal towards widespread dissemination. Table 1.3 illustrates the various types of education and outreach activities conducted by the NYS OHCN within a one-year time period. The sheer magnitude of activities conducted along with the large number of people potentially affected illustrates the wide range of outreach conducted within the Network.

The Clinics continue to improve the work environment for New Yorkers. They offer substantial education and training courses, and have developed materials being used nationally such as the Mt. Sinai – Irving J. Selikoff Blueprint Project – "Guides for Managing Lead and Silica Control Programs in Construction". Fact sheets about various occupational diseases and exposures created by many of the Clinics are widely distributed. The Clinics also assist in designing and developing interventions in the worksite. This has included working with individual employers, along with redesigning equipment. For example, the New York Center for Agricultural Medicine and Health developed an ergonomic apple bag that is currently being field tested with positive responses from both the apple pickers and the farm managers. The Clinics also play a role in mediating between labor and management to assist in maintaining safe and healthy work environments.

The OHCN efforts to improve workplace environments benefit the community as a whole. For example, improvements to the indoor air quality in school and hospital settings can have immediate health benefits for all individuals who enter these environments. Control of workers' exposures can also control environmental exposures. Concerns about unwanted agrichemicals on farms has prompted the NYS Department of Environmental Conservation to re-institute pesticide collections across the State – thus reducing the potential for leaking into water supplies, exposures to emergency responders when barn fires occur, and exposure to farmers and their families. Reducing the use of hazardous materials can indirectly improve the air quality around manufacturing facilities. Some of the Clinics have participated in Environmental Justice community-based participatory research grants funded by the NIEHS/EPA. The Bellevue/NYU Occupational and Environmental Medicine Clinic assisted in designing methodology to assess home exposures and their impact on asthma in the Williamsburg-Brooklyn area.

Occupational Health Clinic Network Data

Information on each patient visit, stripped of patient identifiers to ensure confidentiality, is provided to the NYSDOH. This data is used to identify hazards, risk factors and trends; direct resources on emerging problems; create prevention strategies; and evaluate the success of various interventions.

The NYSDOH maintains a database containing information on each patient visit provided by each Clinic. This database has been upgraded over time as technology has improved and includes all patient visits from 1988 through the present. Information recorded in the database includes basic demographic variables, employment information, payment and referral information, and up to five diagnoses with up to two putative etiologic agents recorded for each diagnosis. Each Clinic enters data on all visits that occur at their Clinics and satellites and shares this information with the NYSDOH. The NYSDOH conducts quality control of the data and when necessary, the Clinics are responsible for making appropriate corrections to their data. All data presented in this report were obtained through this database. If data for a category is not displayed in a figure, it can be assumed that in that particular instance, the category is equal to zero.

The OHCN are centers for patient referral, not primary care centers. Therefore, the patient population is not representative of the workers in the State of New York, so the data presented in this report is specific to the Clinics, not to NYS workers. Since the OHCN was established in 1988, the data from that year is biased to the three clinics who were established early. Therefore, this data was ignored when examining trends.

Definitions of Terms

Diagnosis – Any health condition recorded in the patient's medical record, or reason for a visit to a Clinic. Patients can have more than one diagnosis recorded at any visit, and the same diagnosis may be recorded on multiple visits. The first visit with a diagnosis is referenced.

Exposure agent – A putative exposure associated with a diagnosis. Patients can have two etiologic agents recorded for each diagnosis.

Exposure type - Patients were categorized by the source of their suspected exposure. Occupational patients had an exposure from either their present or past occupation. Environmental patients had an exposure from a non-occupational environment which include individuals seen for exposures to such places as landfills, home mold-related problems, and a variety of others. In addition, some patients are family members of workers seen for possible health effects related to take-home exposures.

Geographic Region – It is often useful, for purposes of analysis, to divide the state into two regions: NYC and the rest of New York State (all regions of the State excluding the 5 boroughs of the City) due to differences in demographics and types of occupations between the two regions. Patients are presented based on their county of residence, not on where the Clinic was located, nor where their exposure occurred.

Group Screening – The Clinics offer screening services for groups of exposed workers. These services include disease screenings for Lyme disease, Hepatitis, skin cancer, TB and HIV; exposure screenings for asbestos, lead, noise and other toxic health hazards; DOT and respiratory certification screenings, as well as return to work screens. In addition, influenza and rabies vaccines are provided to high-risk worker populations. Because these patients are usually not experiencing symptoms and are not seeking diagnostic services, per se, they are classified separately in the database as group screening patients. If a health condition is identified as a result of the screening, the diagnosis is recorded in the database; otherwise, the visit is recorded with a V-code indicating they were screened, but no disease was present.

Industry – The patient's most relevant industry using 1987 Standard Industrial Classification (SIC) codes.

Occupation – The patient's most relevant occupation using Census 1990 occupation classification systems.

Occupational Disease – Any disease caused or exacerbated by the work environment.

Patient – A patient is somebody who lives (permanently resides) or works in New York State, and is seen by a clinician (clinician includes nurses as long as they conducted a clinical evaluation of the patient).

Patient Type – Patients were categorized by the reason for their visit – either due to a group screening or because they were experiencing disease or injury symptoms.

Patient Visit – An encounter with a Clinic. The number of visits in which a specific ICD-9-CM Code is recorded in the medical record. Because multiple diagnoses can be recorded for a single patient, number of diagnoses does not correspond to the number of clinical encounters occurring at the Clinics.

Symptomatic Patient – Patients seen by the Clinic Network due to disease or injury symptoms.

V-Codes - A code in medical records for patients who were not currently sick and 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.

Work-related –The diagnosing clinician determines whether a case is work-related. If there is a possibility that the diagnosis is related to the patient's work, but it cannot be given the certainty of yes, clinicians may choose "maybe". These are treated as work-related in this report.

World Trade Center Related – The Clinic Network played a critical role in providing medical care to individuals affected by the World Trade Center (WTC) disaster on September 11, 2001. In addition to providing direct medical, psychological and social work services, the Clinics participated in a federally funded screening and medical monitoring program. The scope of the Clinic Network's response was significant and influenced the type of patients seen by the Clinics, the nature of the services rendered and the conditions diagnosed. For some ICD-9-CM categories, it was necessary to separate the WTC-related cases to describe how the conditions seen for those patients differed from conditions diagnosed for those not related to the WTC disaster. This data does not reflect all WTC-patients seen by the Clinics, since for some clinics, the volume of patients necessitated opening separate clinical sites.

References

[1] American Journal of Industrial Medicine. Volume 37, Issue 1, Pages 1-157 (January 2000).

[2] Report to the New York State Legislature. Occupational Disease in New York State. Proposal for a Statewide Network of Occupational Disease Diagnosis and Prevention Centers. Environmental and Occupational Medicine Department of Community Medicine, Mount Sinai School of Medicine of the City University of New York. February 1987.

[3] VESID. www.vesid.nysed.gov, 2004.

[4] CDC MMWR. Physical Health Status of World Trade Center Rescue and Recovery Workers and Volunteers New York City, July 2002 August 2004. 53(35):807-812, 2004.

[5] CDC MMWR. Mental Health Status of World Trade Center Rescue and Recovery Workers and Volunteers New York City, July 2002 August 2004. 53(35):812-815, 2004.

Chapter 2. Patient Characteristics

Magnitude and Trend of Patient Population

Figure 2.1. Number of new NYS OHCN patients seen, by year. Between 1988 and 2003, 47,207 patients were seen by the NYS Occupational Health Clinic Network (OHCN) in 115,406 visits. These patients were roughly equally divided between group screening patients and symptomatic patients; however, in the past few years, there were substantially more symptomatic patients seen. This increase is explained in part by patients seen for conditions related to the World Trade Center (WTC) disaster of September 2001. The number of new patients seen increased almost every year from 635 in part-year 1988 to 4,213 in 2003. Since 2000, this increase has been primarily among symptomatic patients. Overall, the total number of patients seen each year by the NYS OHCN has also increased over the years, to 7,556 patients seen in 2003 (data not shown). Information on when individual Clinics and their satellites opened and closed is available on the top of the graph.

Figure 2.1. Number of New NYS OHCN Patients Seen, by Year

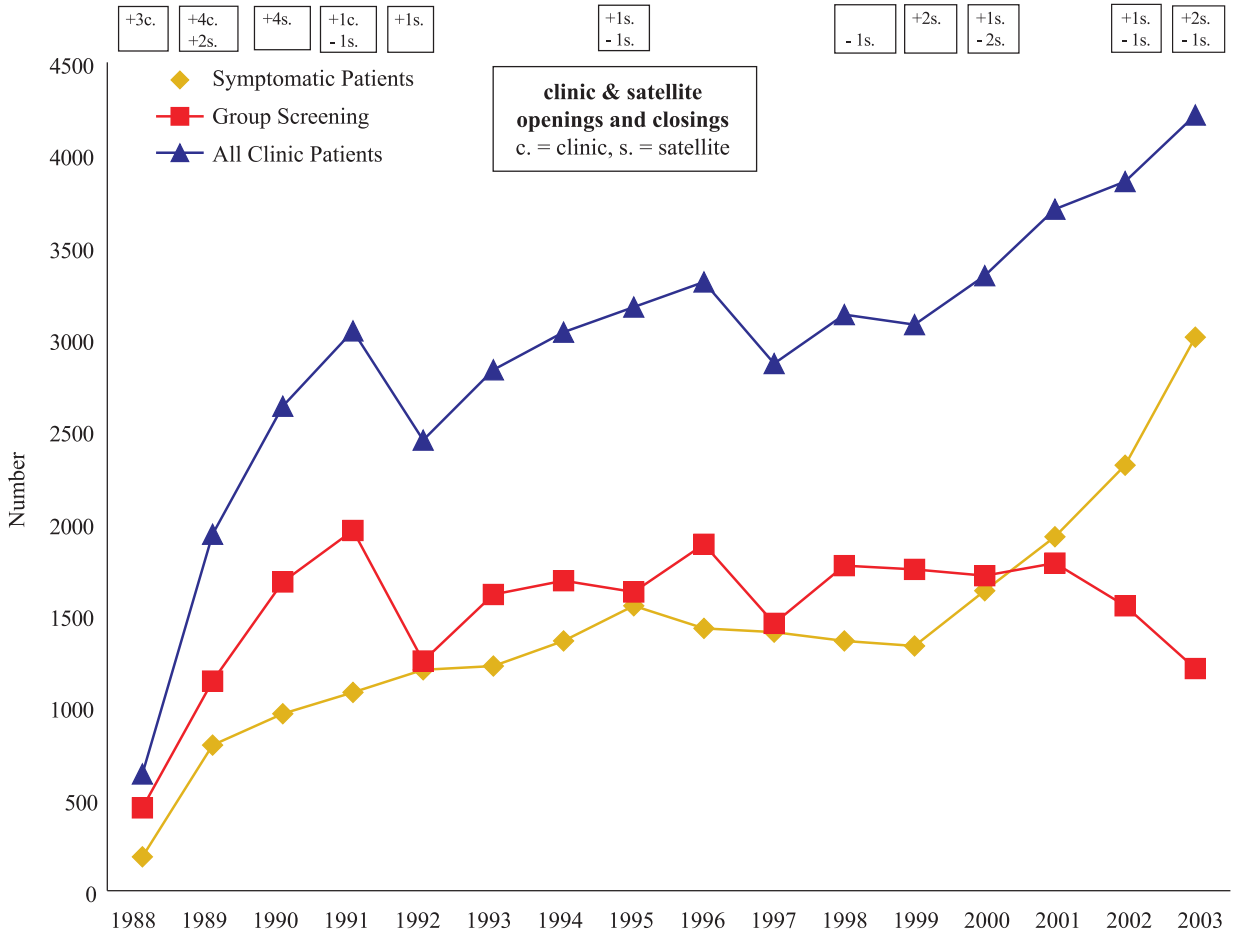
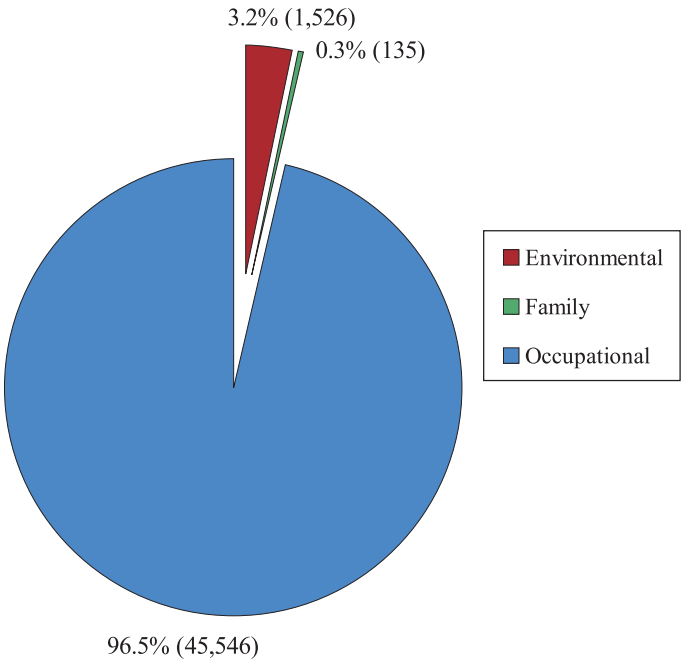


Figure 2.2. Percent of NYS OHCN patients, by type seen. Overall, 45,546 (96%) of patients were seen for occupational exposures. Occupational patients had an exposure from either their present or past occupation. Environmental patients had an exposure from a non-occupational environment which include individuals seen for exposures to such places as landfills, home mold-related problems, and a variety of other exposures. In addition, some patients are family members of workers seen for possible health effects related to take-home exposures.

In general, there is a much higher percent of females (data not shown) among the environmental (58%) and family (86%) patients, compared to the occupational patients (25%).

Figure 2.2. Percent of NYS OHCN Patients, by Type Seen



County of Residence

Figure 2.3. Residence of NYS OHCN patients, by county. Patients were seen from all but one county in NYS, with large percentages residing in counties with large metropolitan areas such as New York City (NYC), Albany, Erie, Monroe and Onondaga counties. There were substantially fewer patients from areas of New York with lower populations such as the Adirondack Park.

Figure 2.3. Residence of NYS OHCN Patients, by County

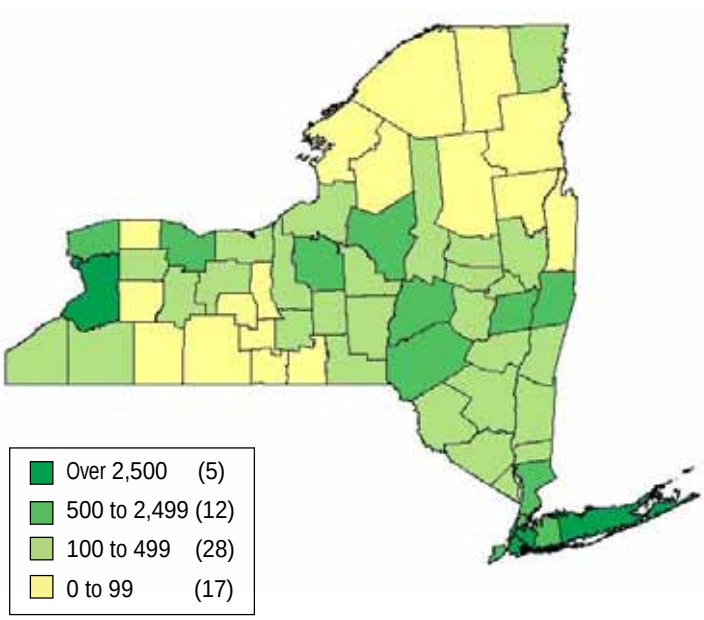
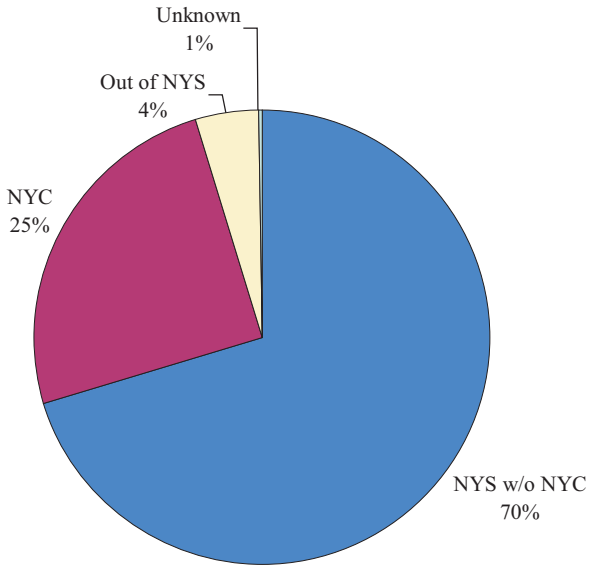


Figure 2.4. Percent of NYS OHCN patients, by geographic region. Overall, 33,136 (70%) patients resided in New York State, outside of NYC, 11,900 (25%) resided in New York City, and 2,103 (4%) were not residents of NYS. Place of residence was unknown for 68 patients.

Figure 2.4. Percent of NYS OHCN Patients, by Geographic Region



Group Screening Patients

Overall, 24,479 (52%) patients were seen in the NYS OHCN as part of a group screening. Among those seen, 7,788 (32%) were part of a respirator certification program, 6,464 (26%) were follow-up for asbestos exposure; and 5,740 (23%) were general occupational health examinations due to an on-the-job exposure. Many of the group screening patients were seen due to potential exposures to hazardous agents including screenings for Lyme Disease, skin cancer, Hepatitis, lead, and hearing. Patients were also screened as part of preplacement and termination examinations.

Sex of Patient Population–Females

Figure 2.5. Percent of female NYS OHCN patients, by geographic region. Females accounted for 26% (n=12,411) of the patient population. Women made up a higher percentage of the patients seen in New York City (32%) as opposed to NYS outside of NYC (25%). Overall, the percent of patients who were female has remained relatively stable. Ninety-two percent of the females were seen for occupational conditions, while 98% of the males were seen for occupational conditions (data not shown).

Figure 2.5. Percent of Female NYS OHCN Patients, by Geographic Region

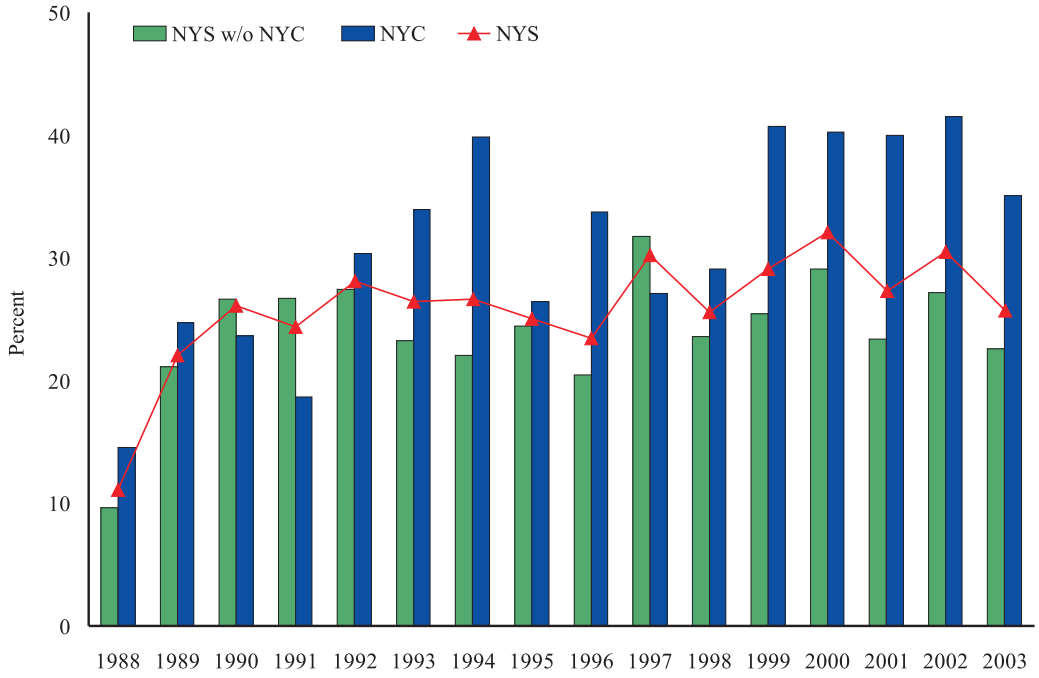
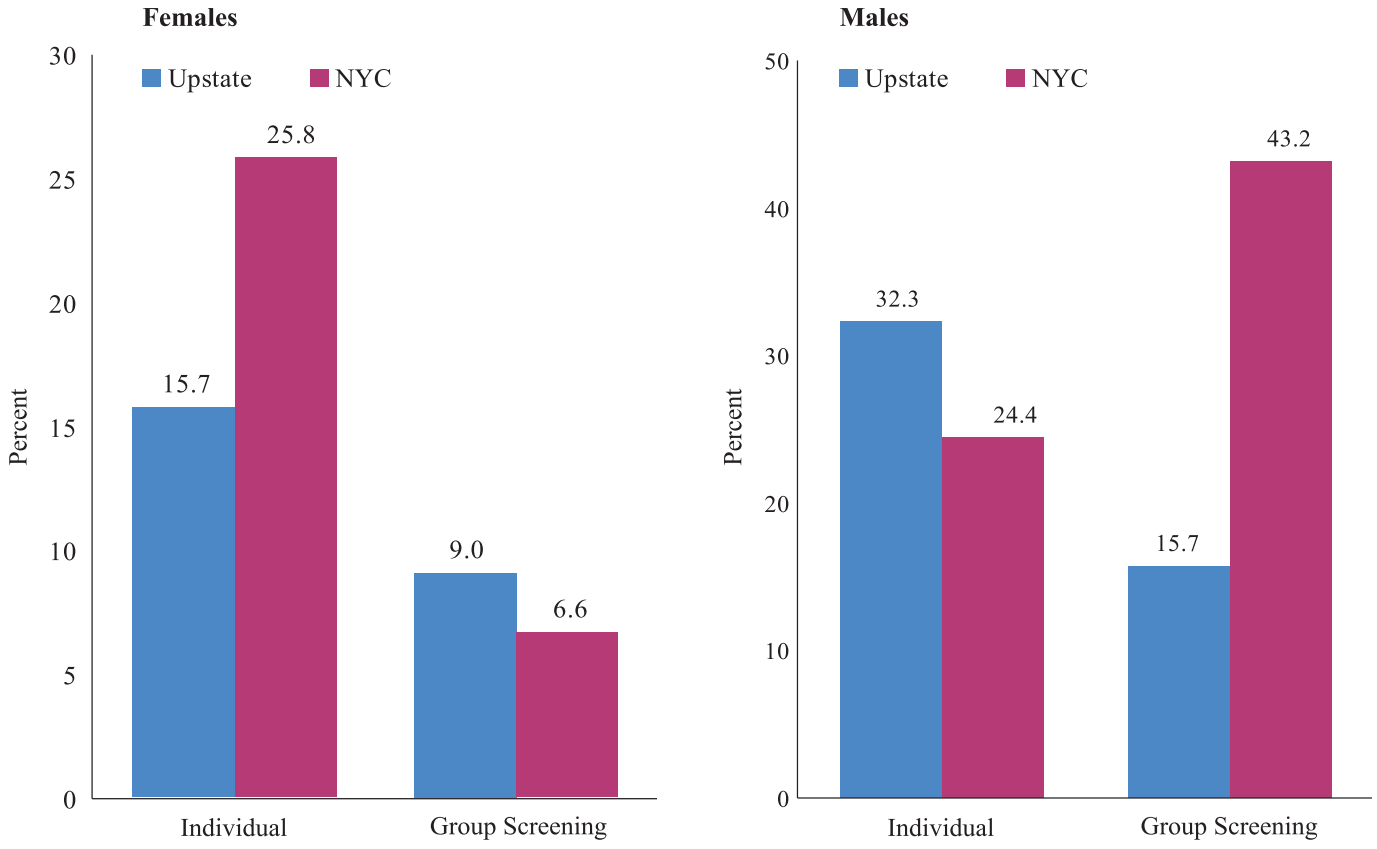


Figure 2.6. Percent of NYS OHCN patients, by sex, geographic region and patient type. Among all of the patients seen in NYS outside of NYC (n=33,136), 5,208 (16%) were symptomatic female patients and 2,993 (9%) were females seen as part of a group screening; 10,688 (32%) were symptomatic male patients, and 14,224 (16%) were males seen as part of a group screening. A greater percentage of women were seen as symptomatic patients in New York City (26%) as opposed to the rest of New York (7%); while a much higher percent of males in New York City were seen as part of a group screening (43%) compared to the percent seen as symptomatic patients (24%).

Figure 2.6. Percent of NYS OHCN Patients, by Sex, Geographic Region and Patient Type



Age of Patient Population

Figure 2.7. Percent of NYS OHCN patients, by age. The mean age of the patients during their first visit to the NYS OHCN was 43 years (data not shown), with over 70% of the patients between 31 and 60 years of age. Almost 1000 patients were under 20 years of age when first seen, and 4,890 patients were over 60 years of age during their first visit to the Clinic.

Figure 2.7. Percent of NYS OHCN Patients, by Age

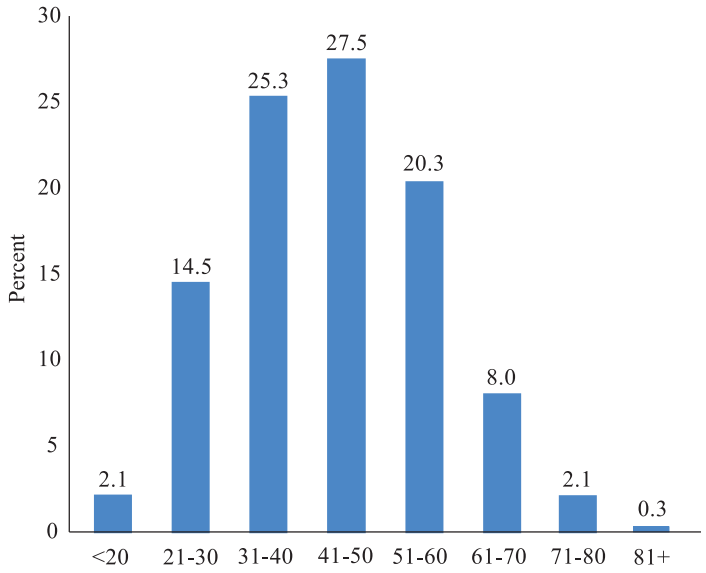
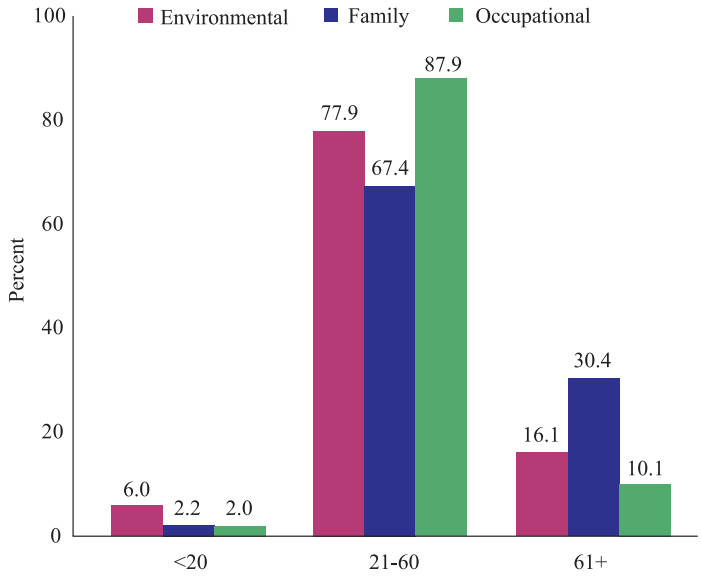


Figure 2.8. Percent of NYS OHCN patients, by type and age. As expected, the majority of occupational patients were between 21 and 60 years of age (88%). A slightly higher percent of environmental patients were younger than 20 years of age (6% vs. 2% each of family and occupational patients), and a substantially higher percent of the family patients were 61 years and older (30% vs. 16% environmental and 10% occupational).

Figure 2.8. Percent of NYS OHCN Patients, by Type and Age



Ethnicity of Patient Population

Figure 2.9. Percent of NYS OHCN patients, by ethnicity and geographic region. Of the patients seen Statewide, 37,703 (80%) were White, 4,617 (10%) were African-American, 3,479 (7%) were Hispanic, and 964 (2%) were Asian. Again, these percents varied by whether the patients were from NYS outside of NYC where 88% of the Clinic patients were White versus NYC where only 55% of the Clinic patients were White. The ethnicity of the patients also varied by whether they were symptomatic or group screening patients - with a higher percentage of non-Whites seen as symptomatic patients (data not shown).

Figure 2.9. Percent of NYS OHCN Patients, by Ethnicity and Geographic Region

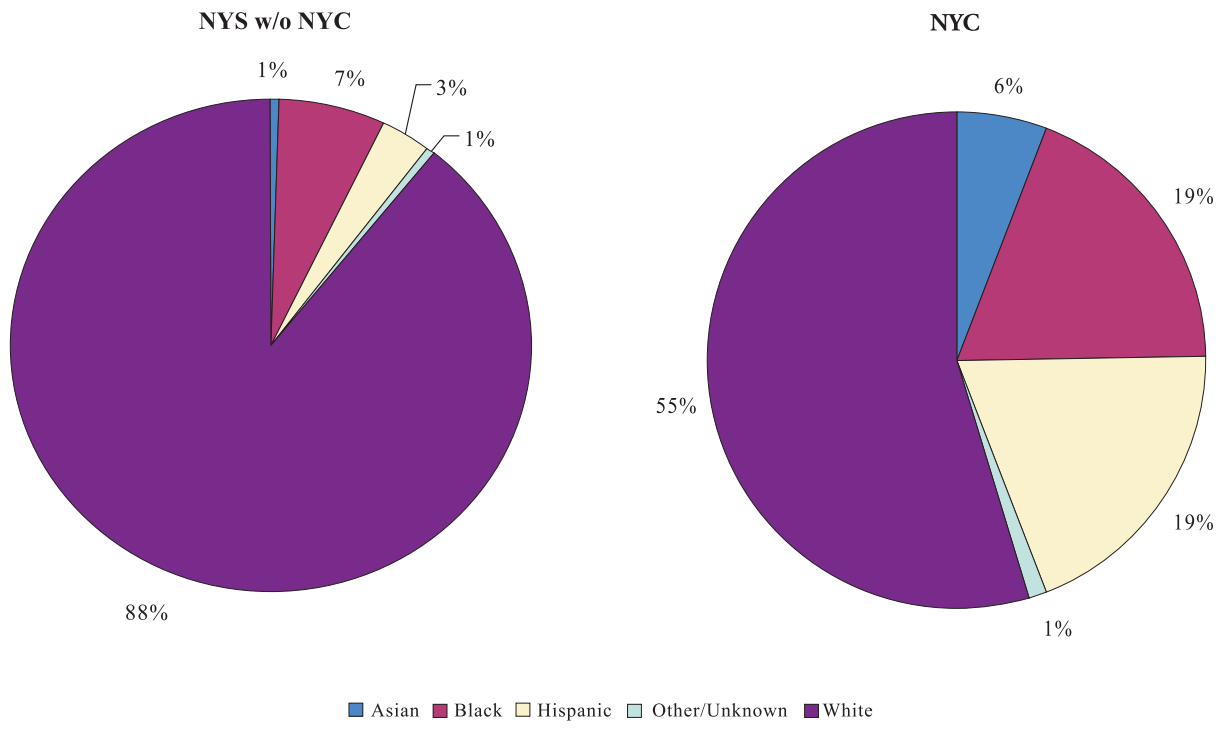
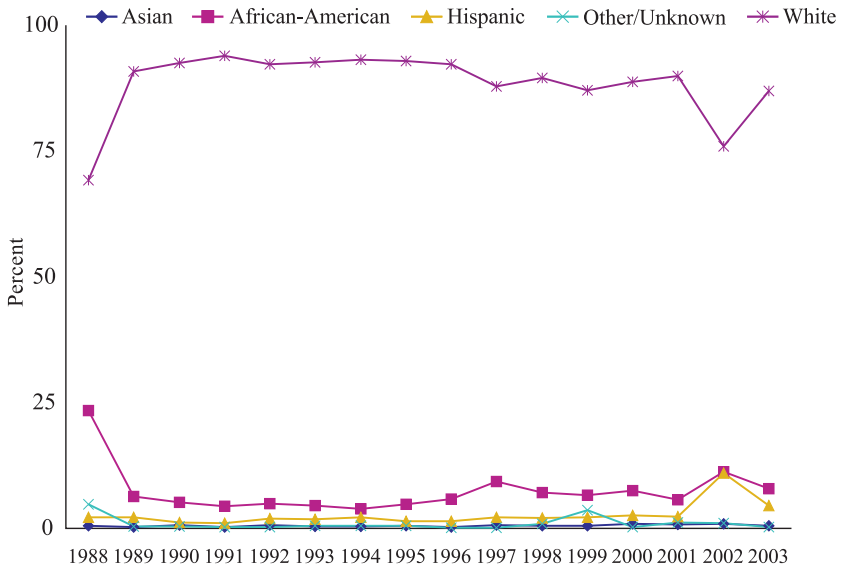


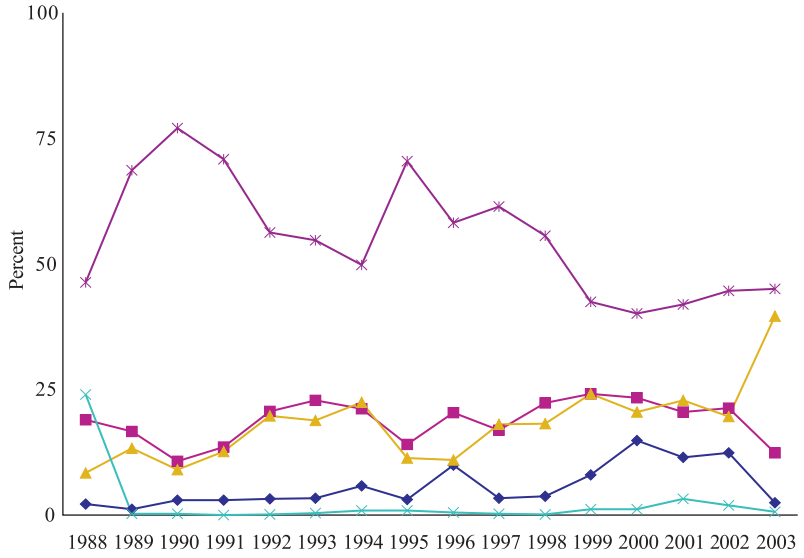
Figure 2.10. Percent of NYS OHCN patients, by ethnicity, geographic region and year. Excluding 1988, the initial year of the Clinic Network, there has been a sharp decrease in the percent of White patients from NYC seen by the OHCN. This trend is not observed in the rest of NYS. A very slight increase in the percent of Hispanic patients is observed, while the percent of African-American and other ethnicities appears to remain relatively constant over time.

Figure 2.10. Percent of NYS OHCN Patients, by Ethnicity, Geographic Region and Year

NYS w/o NYC



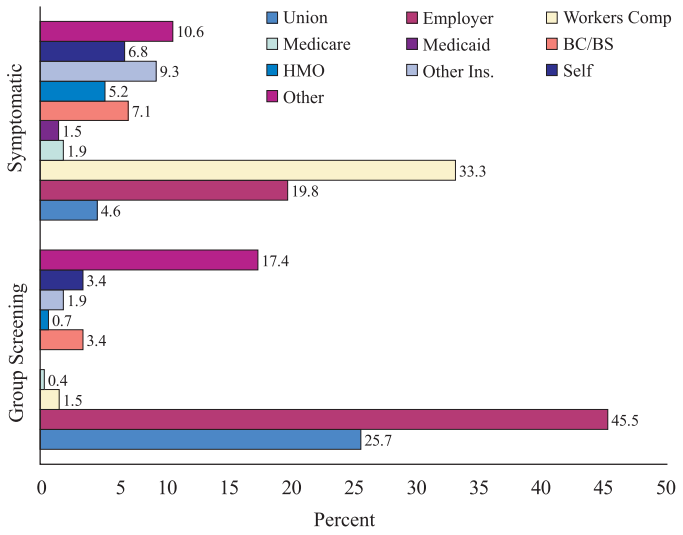
NYC



Source of Payment for Services

Figure 2.11. Percent of NYS OHCN patients, by source of payment and patient type. Among group screening patients, the employer or union was primarily responsible for payment of clinical services (71% vs. 25% of symptomatic patients). Overall, employers were billed for 33% of the Clinic patients' services. Among those patients seen for symptoms, the Clinics expected Workers' Compensation to cover payment of services for 33% of the patients, while this payment source was expected for only 1.5% of the group screening patients.

Figure 2.11. Percent of NYS OHCN Patients, by Source of Payment and Group Screening



Source of Patient Referral

Figure 2.12. Percent of NYS OHCN patients, by referral source and patient type. The clinics are primarily centers of referral, not primary care clinics. The majority of patients regardless of patient type were referred to the Clinics by either their employer or their union (67%), regardless of patient type. Over 90% of the group screening patients and 40% of the symptomatic patients were referred by one of these two sources.

Figure 2.12. Percent of NYS OHCN Patients, by Referral Source and Patient Type

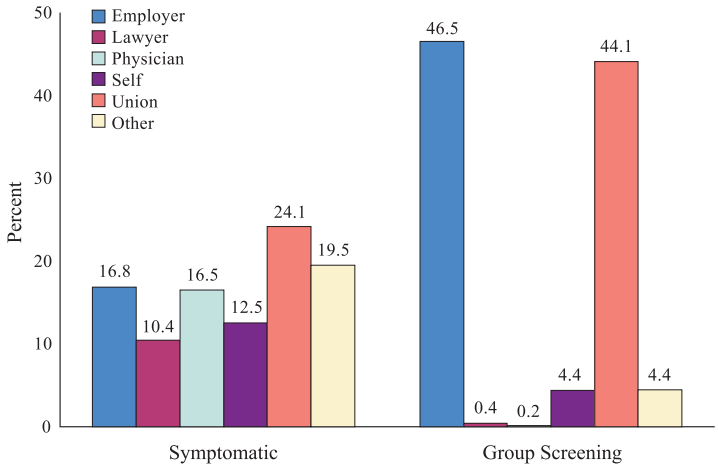
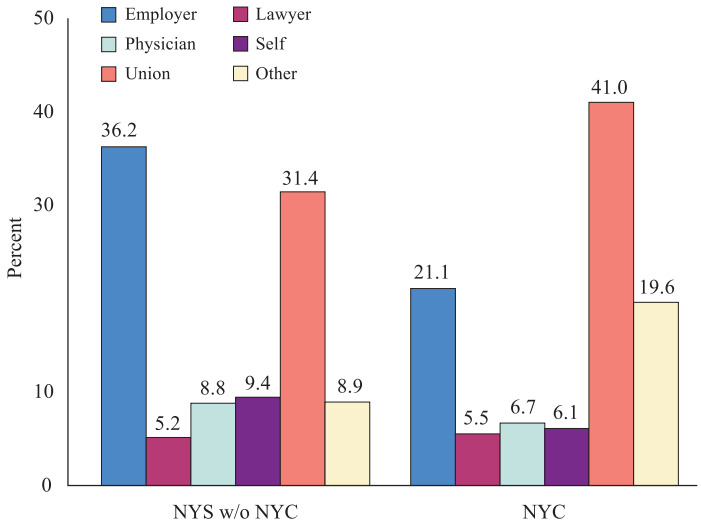


Figure 2.13. Percent of NYS OHCN patients, by referral source and geographic region. There was a difference by geographic location in that Clinics located in NYC received over 40% of their referrals from unions and 21% from employers; while in NYS, outside of NYC, 31% of referrals were from unions and 36% from employers.

Figure 2.13. Percent of NYS OHCN Patients, by Referral Source and Geographic Region



Occupations of Clinic Patients

Figure 2.14. Percent of occupational NYS OHCN patients, by major occupational group and patient type. Examining the job titles among the occupational Clinic patients showed that 13,737 (30%) were employed in precision production occupations; followed by 10,026 (22%) in services, and 9,319 (20%) as operators, fabricators and laborers (data not shown). Among the symptomatic patients, 5,439 (25%) worked in precision production, 4,831 (22%) as operators and laborers, 3,821 (18%) in technical and sales occupations, and 3,647 (17%) as managers and professionals. Among the group screening patients, 8,298 (35%) worked in precision production, 6,668 (28%) in service occupations, and 4,488 (19%) as operators and laborers.

Figure 2.14. Percent of Occupational NYS OHCN Patients, by Major Occupational Group and Patient Type

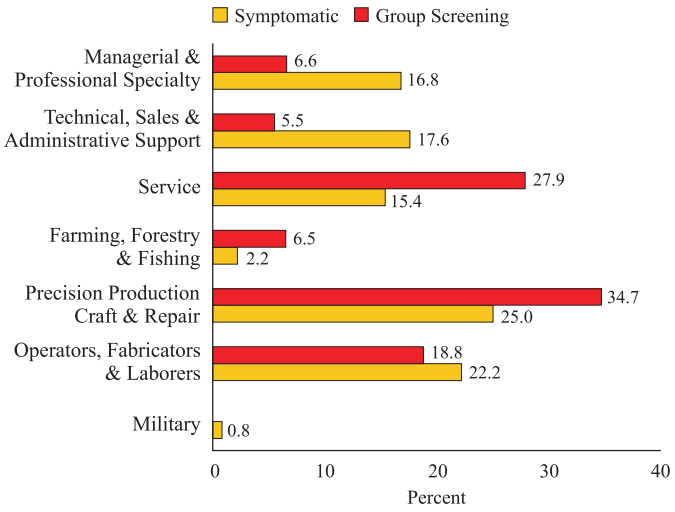
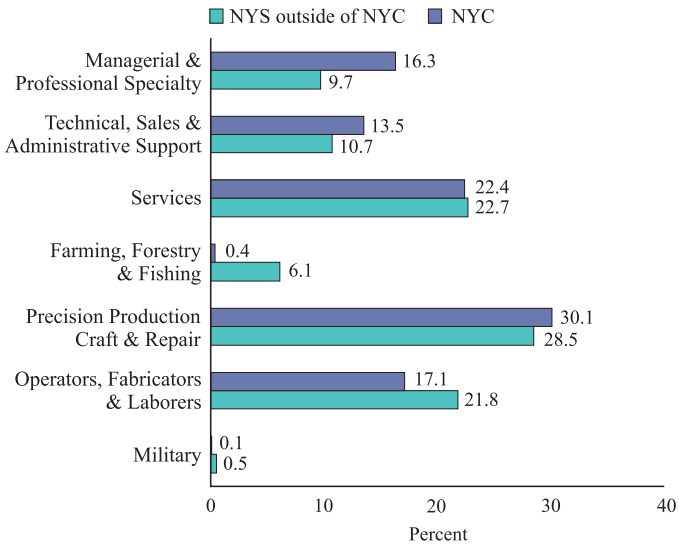


Figure 2.15. Percent of occupational NYS OHCN patients, by major occupational group and geographic region. The largest percent of Clinic patients were employed in precision production, craft and repair occupations in both NYC (30%) and the remainder of NYS (29%), followed by those employed in services occupations (22% in both NYC and NYS outside of NYC). In NYC, 1,857 (16%) were employed as managers and professionals, compared to 3,108 (10%) in the rest of NYS. In contrast, only 1,951 (17%) were employed as operators, fabricators and laborers in NYC versus 7,008 (22%) in the rest of NYS. Similarly, there were more people employed in farming, forestry and fishing outside of NYC (43 in NYC versus 1,979 in the rest of NYS).

Figure 2.15. Percent of Occupational NYS OHCN Patients, by Major Occupational Group and Geographic Region



Industries of Clinic Patients

Figure 2.16. Percent of occupational NYS OHCN patients, by major industrial group and patient type. Among those patients seen for occupational exposures, 10,316 (23%) were employed in the services industry; followed by 10,195 (22%) in construction and 9,970 (22%) in public administration at the time of their first visit to the Clinic (data not shown). Variability among the type of industry also occurred when the patient was seen as part of a group screening. Among those seen in the Clinics as part of a group screening, 6,760 (28%) worked in the construction industry and 5,999 (25%) worked in public administration; while among the symptomatic patients, 3,435 (16%) worked in the construction industry and 3,971 (18%) worked in public administration.

Figure 2.16. Percent of Occupational NYS OHCN Patients, by Major Industrial Group and Patient Type

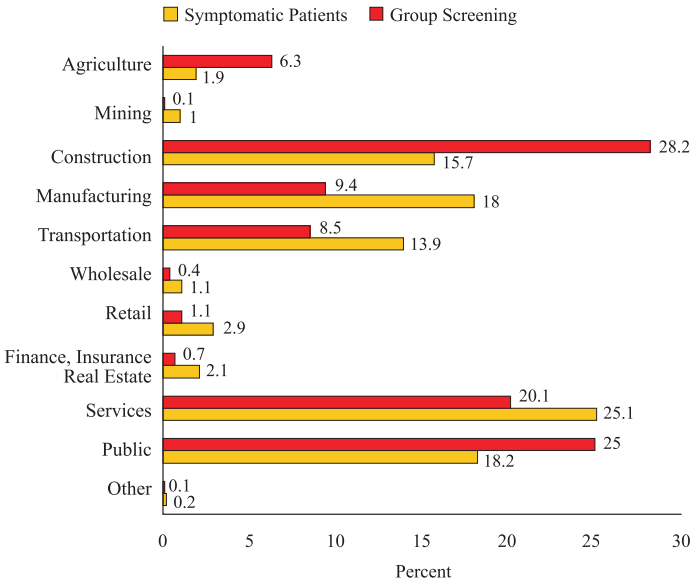
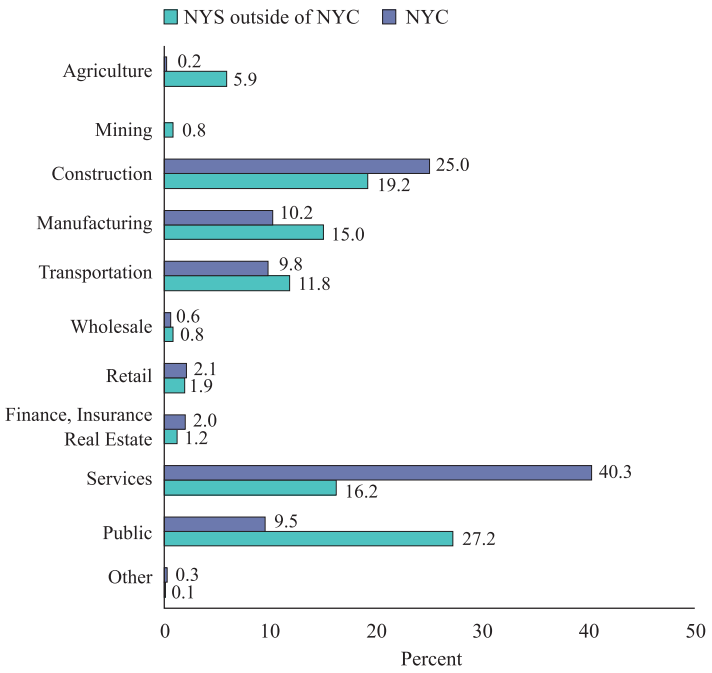


Figure 2.17. Percent of occupational NYS OHCN patients, by major industrial group and geographic region. In NYC, 4,619 (40%) of occupational patients were employed in the services industry, compared to 5,236 (16%) in the rest of NYS. Likewise, 2,862 (25%) were employed in the construction industry in NYC compared to 6,202 (19%) in the rest of NYS.

Figure 2.17. Percent of Occupational NYS OHCN Patients, by Major Industrial Group and Geographic Region



Chapter 3. Diagnoses, Selected Illnesses and Conditions of Patients

This chapter provides data describing the magnitude, distribution, and major demographic characteristics of illnesses and health conditions seen by the NYS Occupational Health Clinic Network (OHCN). Patients are presented by the first time a diagnosis is made. These diagnoses may change with subsequent visits due to further testing and presentation of symptoms. In order to present the patient load of some of these conditions, data is occasionally presented by number of visits per year. Patients seen in the NYS OHCN may have underlying conditions such as high cholesterol that are diagnosed through health screenings at workplaces or as part of the patient examination. Therefore, other health conditions that may not be directly related to the primary diagnosis of concern are often diagnosed and recorded in the patient database. However, due to differences in operations between the Clinics, these data are not always included in the patient database and do not necessarily provide an accurate indication of co-morbid and underlying conditions.

Disease categories were classified utilizing the International Classification of Diseases Ninth Revision (ICD-9-CM) main categories[1]:

- 001-139: Infectious and parasitic diseases;
- 140-239: Neoplasms;
- 240-279: Endocrine, nutritional, and metabolic diseases, and immunity disorders;
- 290-319: Mental disorders;
- 320-389: Diseases of the nervous system and sense organs;
- 390-459: Diseases of the circulatory system;
- 460-519: Diseases of the respiratory system;
- 520-579: Diseases of the digestive system;
- 680-709: Diseases of the skin and subcutaneous tissue;
- 710-739: Diseases of the musculoskeletal system and connective tissue;
- 780-799: Symptoms, signs, and ill-defined conditions;
- 800-999: Injury and poisoning; and
- V01-V84: Supplementary classification of factors influencing contact with health services.

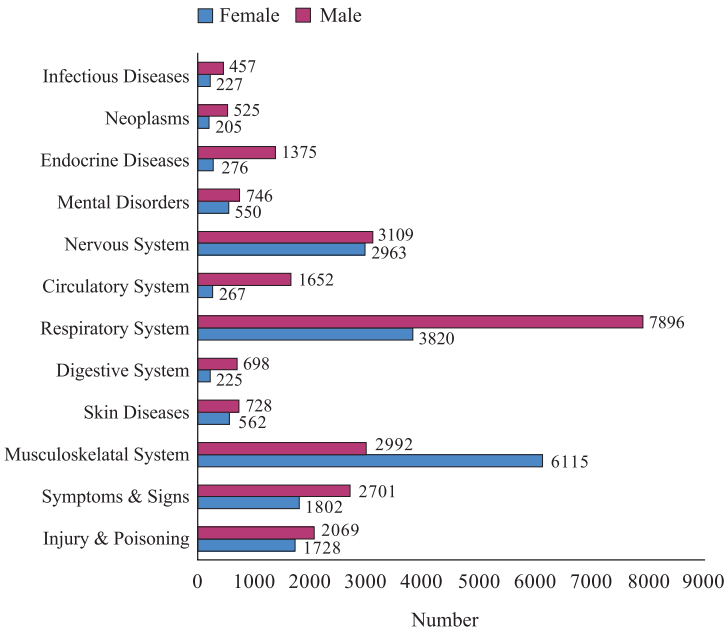
Because of the small number of patients seen, the following categories were combined into a group classified as "other":

- 280-289: Diseases of the blood and blood-forming organs;
- 580-629: Diseases of the genitourinary system;
- 630-677: Complications of pregnancy, childbirth, and the puerperium;
- 740-759: Congenital anomalies; and
- 760-779: Certain conditions originating in or during the perinatal period.

Use of these categories does not always accurately reflect the types of diseases experienced by the NYS OHCN patients. For example, repetitive stress disorders are categorized under both "Diseases of the nervous system and sense organs" and "Diseases of the musculoskeletal system and connective tissue".

Figure 3.1. Number of diagnoses in NYS OHCN patients, by main ICD-9-CM diagnostic categories and sex. Overall, there were 75,730 diagnoses made for the 47,210 patients seen by the Clinic Network between 1988 and 2003. Males were seen primarily for diseases of the respiratory system (n=7,896), nervous system (n=3,109), musculoskeletal system (n=2,992), and for signs and symptoms (n=2,701). Females were seen primarily for diseases of the musculoskeletal system (n=6,115), respiratory system (n=3,820), and nervous system (n=2,963). There were 31,417 NYS OHCN diagnoses with V-codes (data not shown). These were patients who were not currently sick but visited 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.

Figure 3.1. Number of Diagnoses in NYS OHCN Patients, by Main ICD-9-CM Diagnostic Categories and Sex



Infectious and Parasitic Diseases
(ICD-9-CM Codes 001-139)

Figure 3.2. Number of infectious and parasitic disease diagnoses in NYS OHCN patients, by year and work-relatedness. Between 1988 and 2003, there were 684 diagnoses of an infectious or parasitic disease. Of these, 358 were work-related, 66 were possibly work-related and 260 were not related to work. Increases observed in certain years were a result of screenings conducted by one or more of the Clinics. There was a sharp increase in the number of non-work-related infectious disease diagnoses in 2003. Overall, there were 1,220 patient visits where infectious diseases were diagnosed (data not shown).

Figure 3.2. Number of Infectious and Parasitic Disease Diagnoses in NYS OHCN Patients, by Year and Work-relatedness

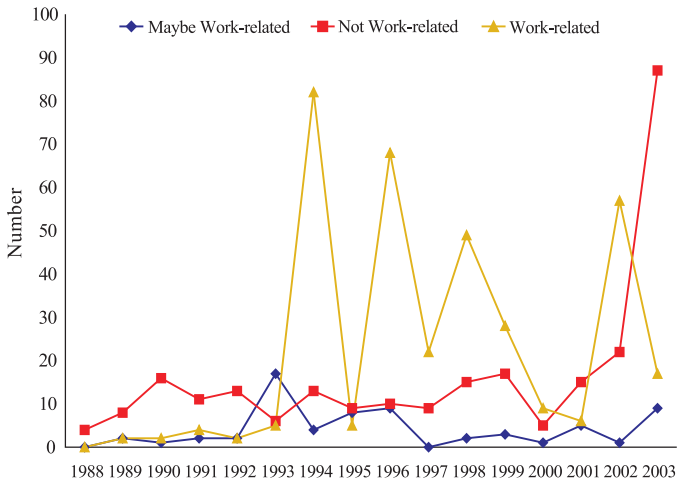
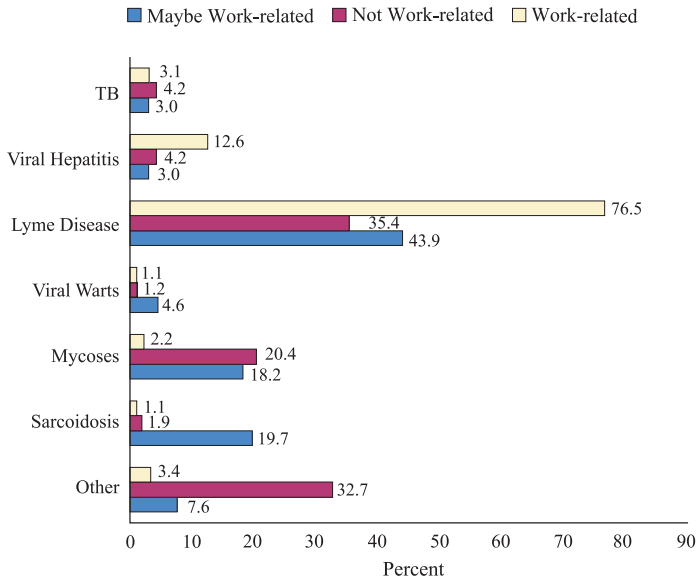


Figure 3.3. Percent of infectious and parasitic disease diagnoses in NYS OHCN patients, by type of disease and work-relatedness. The majority of these diagnoses were Lyme Disease (n=406), of which 77% were considered work-related. Of interest, is the increase seen in non-work-related patients (Figure 3.2) in 2003 was primarily due to screenings for Lyme Disease. Another 67 diagnoses were sarcoidosis, although only 1% of these were classified by the diagnosing physician as work-related. Of the 73 mycoses diagnoses, 8 were work-related and 25 were dermatophytosis.

Figure 3.3. Percent of Infectious and Parasitic Disease Diagnoses in NYS OHCN Patients, by Type of Disease and Work-relatedness



Neoplasms
(ICD-9-CM Codes 140-239)

Figure 3.4. Number of diagnoses of neoplasms in NYS OHCN patients, by year and work-relatedness. Overall, there were 730 diagnoses of neoplasms between 1988 and 2003, of which 40% were work-related, 31% were possibly work-related and 29% were not related to work. The Clinics as centers of referral are used to assess work-relatedness of neoplasms. The sharp increase of work-related neoplasms seen between 1995 and 1997 was due primarily to one clinic conducting skin cancer screenings. There were 889 patient visits where neoplasms were diagnosed (data not shown).

Figure 3.4. Number of Diagnoses of Neoplasms in NYS OHCN Patients, by Year and Work-relatedness

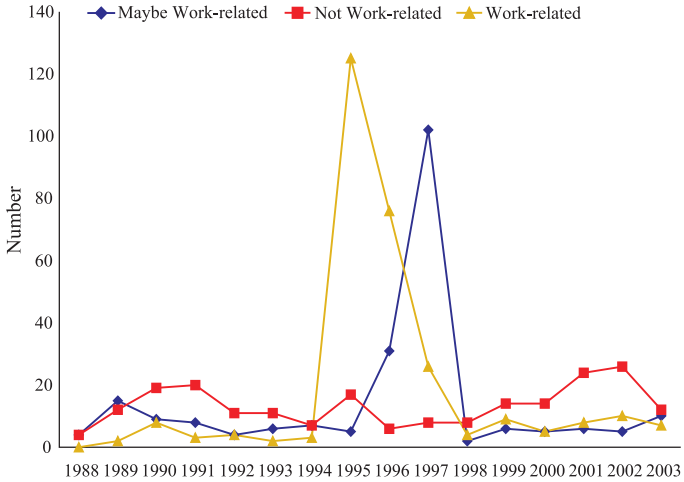
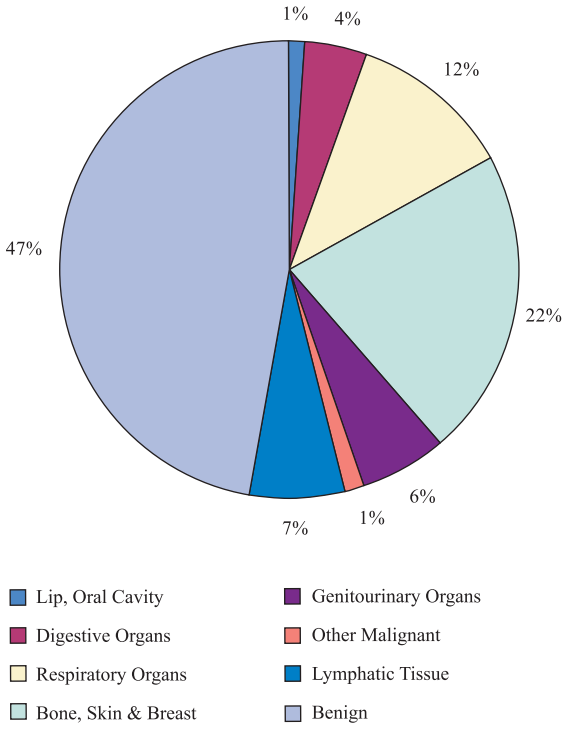


Figure 3.5. Percent of neoplasm diagnoses in NYS OHCN patients, by type of neoplasm. There were 135 malignant skin cancer diagnoses and an additional 282 benign skin lesion diagnoses. These were diagnosed as part of skin cancer screenings of high-risk populations conducted by the Clinics, displaying the effectiveness of these screenings. Other primary neoplasms diagnosed include cancer of the colon and rectum (n=22), of which 55% were work-related and 36% were possibly work-related; and cancer of the trachea, bronchus, lung and pleura (n=64), of which 53% were work-related and 28% were possibly work-related (data not shown).

Of the malignant skin neoplasms diagnosed, 55% were work-related. These occurred primarily among those working in the agricultural or logging industry (93%). Females accounted for 43% of this group (data not shown).

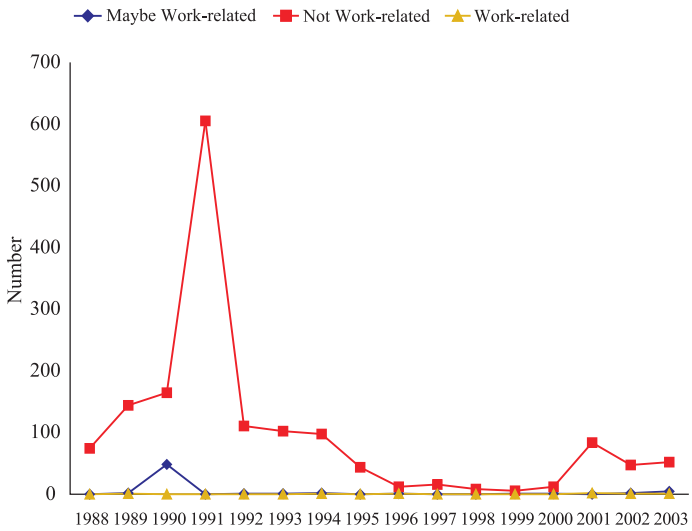
Figure 3.5. Percent of Neoplasm Diagnoses in NYS OHCN Patients, by Type of Neoplasm



Endocrine, Nutritional, and Metabolic Diseases and Immunity Disorders
(ICD-9-CM Codes 240-279)

Figure 3.6. Number of endocrine, nutritional and metabolic disease and immunity disorder diagnoses in NYS OHCN patients, by year and work-relatedness. There were 1,651 diagnoses of diseases in this category, of which only 7 were related to work, and another 64 were possibly work-related. Patients, either as part of their clinical examination or part of a health screening, have co-morbid conditions identified and recorded in the database. It is anticipated that the data presented is an underreport of those seen with these conditions since some of the Clinics do not include this information in the database. Therefore, even though a small percent of the diagnoses in this category were work-related, 91% of the diagnoses were made on patients seen for an occupational condition and 70% were recorded as part of a group screening (data not shown). The majority of these diagnoses were hypercholesterolemia (58%), and another 13% were diabetes. The large increase seen in 1991 was primarily due to more patients participating in group screenings that year, compared to all other years. Overall, there were 2,069 patient visits where diseases in this category were diagnosed (data not shown).

Figure 3.6. Number of Endocrine, Nutritional and Metabolic Disease and Immunity Disorder Diagnoses in NYS OHCN Patients, by Year and Work-relatedness



Mental Disorders
(ICD-9-CM Codes 290-319)

Figure 3.7. Number of mental disorder diagnoses in NYS OHCN patients, by year and World Trade Center (WTC) status. There were 1,296 diagnoses of diseases in this category, of which 914 (71%) were not related to the World Trade Center (WTC) disaster. Overall, there were 3,855 visits to the NYS OHCN where mental conditions were diagnosed with 62% of the visits among those with definite work-related conditions. The impact of work-related conditions often extends beyond physical impairment. Many NYS OHCN patients exhibit changes in their ability to perform daily tasks including recreational activities and work duties as a result of their diseases. Moreover, patients can face financial concerns from being out of work and prolonged delays in receiving Workers' Compensation benefits. These issues can overwhelm patients' coping resources and necessitate professional intervention. To address these needs, many of the Clinics have a social worker or nurse advocate on staff to provide counseling regarding the financial, social and psychological aspects of work-related illness and injury. Those patients diagnosed with mental disorders not related to the WTC presented primarily for back injuries (n=53) and sprains and strains of the back (n=20), general symptoms and symptoms involving the head and neck (n=68 and n=51, respectively), asthma (n=57), chronic pharyngitis and sinusitis (n=43), lead poisoning (n=32), respiratory conditions due to chemical fumes and vapors (n=28), disorders of soft tissues (n=26), and carpal tunnel syndrome (n=20) (data not shown). It is anticipated that the data presented reflects those patients who have a primary mental health condition, but under represents the true amount of mental disorders experienced by patients suffering from occupational disease since this is often not recorded in the database.

Figure 3.7. Number of Mental Disorder Diagnoses in NYS OHCN Patients, by Year and World Trade Center Status

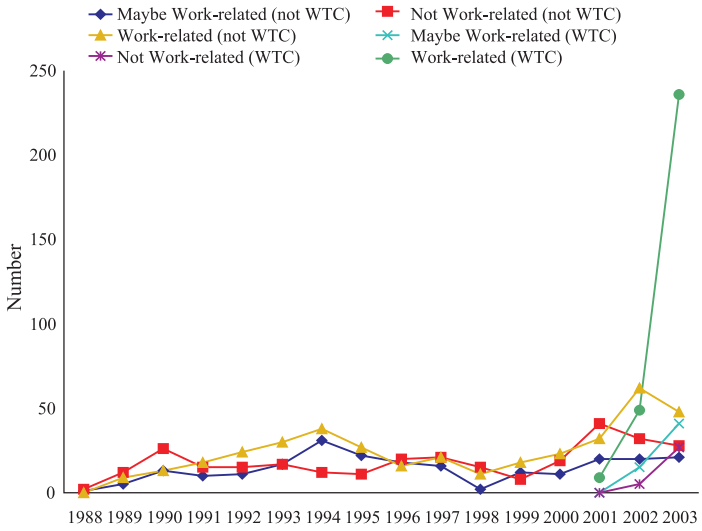


Figure 3.8. Number of work-related mental disorder diagnoses in NYS OHCN patients, by industry of employment and World Trade Center (WTC) status. The majority of the work-related mental condition diagnoses not related to the WTC disaster occurred among those employed in the services industry (33%) followed by those employed in manufacturing (27%), public administration (15%), transportation (10%) and construction (5%). One-third of the work-related mental disorder diagnoses related to the WTC disaster were among those employed in the public administration industry (33%), with 26% and 24% of the diagnoses occurring among those working in the services and construction industries, respectively.

Figure 3.8. Number of Work-related Mental Disorder Diagnoses in NYS OHCN Patients, by Industry of Employment and World Trade Center (WTC) Status

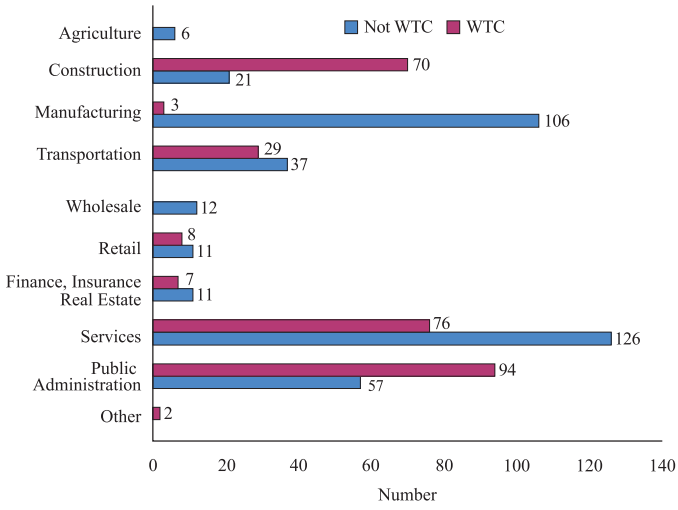


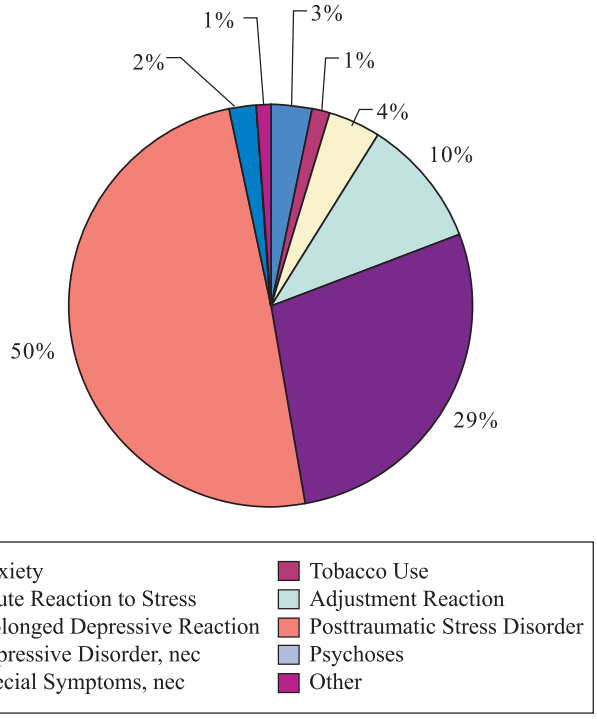
Figure 3.9. Percent of mental disorder diagnoses in NYS OHCN patients, by type of disorder and World Trade Center (WTC) status. There were 382 diagnoses of mental disorders attributable to the WTC disaster. Of these, 294 (77%) were work-related. The primary diagnosis (n=189) in this group were posttraumatic stress disorder (ICD-9-CM code 309.81) and 107 diagnoses of prolonged depressive reaction (ICD-9-CM code 309.1). Among these 382 diagnoses, there were 923 patient visits between 2001 and 2003 for these and other conditions related to the WTC disaster.

Of those patients not related to the WTC disaster, 390 (43%) were work-related conditions, of which 103 were diagnoses of dysthymic disorder (ICD-9-CM code 300.4) which includes anxiety depression and reactive depression; 76 were depressive disorders (ICD-9-CM code 311) and 41 were posttraumatic stress syndrome (ICD-9-CM code 309.81).

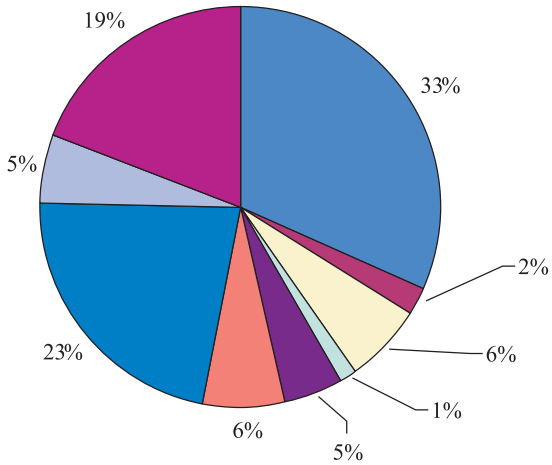
The mental disorders not related to the WTC disaster were almost evenly divided between males (51%) and females (49%). The majority of these diagnoses were among residents of NYS outside of NYC (90%) and were White (84%) (data not shown). A much higher percent of WTC-related patients were male (74%) compared to the non-WTC patients (51%). A large percent of the WTC patients (70%) were residents of NYC (data not shown). The NYS OHCN has provided care to many of the workers and area residents involved in this tragedy - emphasizing that the effects of this tragedy are far-reaching in both geography and time.

Figure 3.9. Percent of Mental Disorder Diagnoses in NYS OHCN Patients, by Type of Disorder and World Trade Center (WTC) Status

WTC



Not WTC



Diseases of the Nervous System and Sense Organs

(ICD-9-CM Codes 320-389)

Figure 3.10. Number of diagnoses of diseases of the nervous system and sense organs in NYS OHCN patients, by year and work-relatedness. There were 6,080 diagnoses of diseases in this category, of which 68% were work-related and 25% were possibly related to work. The majority of the diagnoses in this category were carpal tunnel syndrome (n=2,166) of which 89% were work-related; noise-induced hearing loss (n=1,521) of which 42% were work-related while another 56% were possibly work-related; cubital tunnel syndrome (n=656) of which 90% were work-related; toxic encephalopathy (n=351) of which 69% were work-related; and nerve root and plexus disorders (n=302) of which 85% were work-related (data not shown).

Figure 3.10. Number of Diagnoses of Diseases of the Nervous System and Sense Organs in NYS OHCN Patients, by Year and Work-relatedness

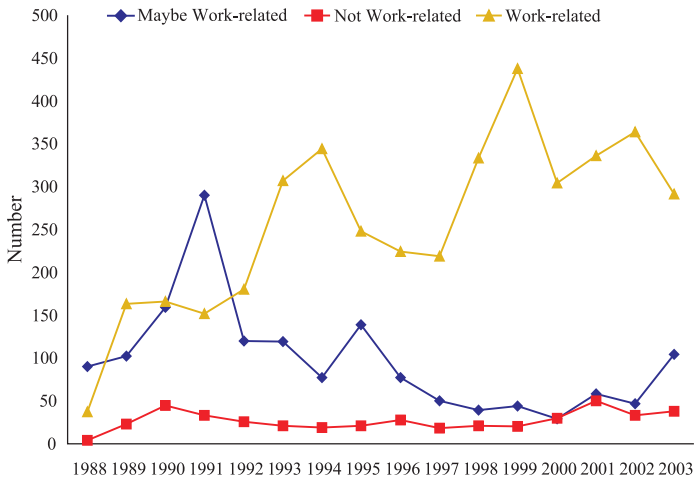


Figure 3.11. Percent of diagnoses of diseases of the nervous system and sense organs in NYS OHCN patients, by type of disease and sex. An almost even number of diagnoses of diseases within this category occurred among males (n=3,109) and females (n=2,963). Almost half (47%) of the diagnoses among males were noise-induced hearing loss (NIHL), while over half (54%) of the diagnoses among females were carpal tunnel syndrome. Among the NIHL diagnoses, 96% resided in NYS outside of NYC (data not shown).

Figure 3.11. Percent of Diagnoses of Diseases of the Nervous System and Sense Organs in NYS OHCN Patients, by Type of Disease and Sex

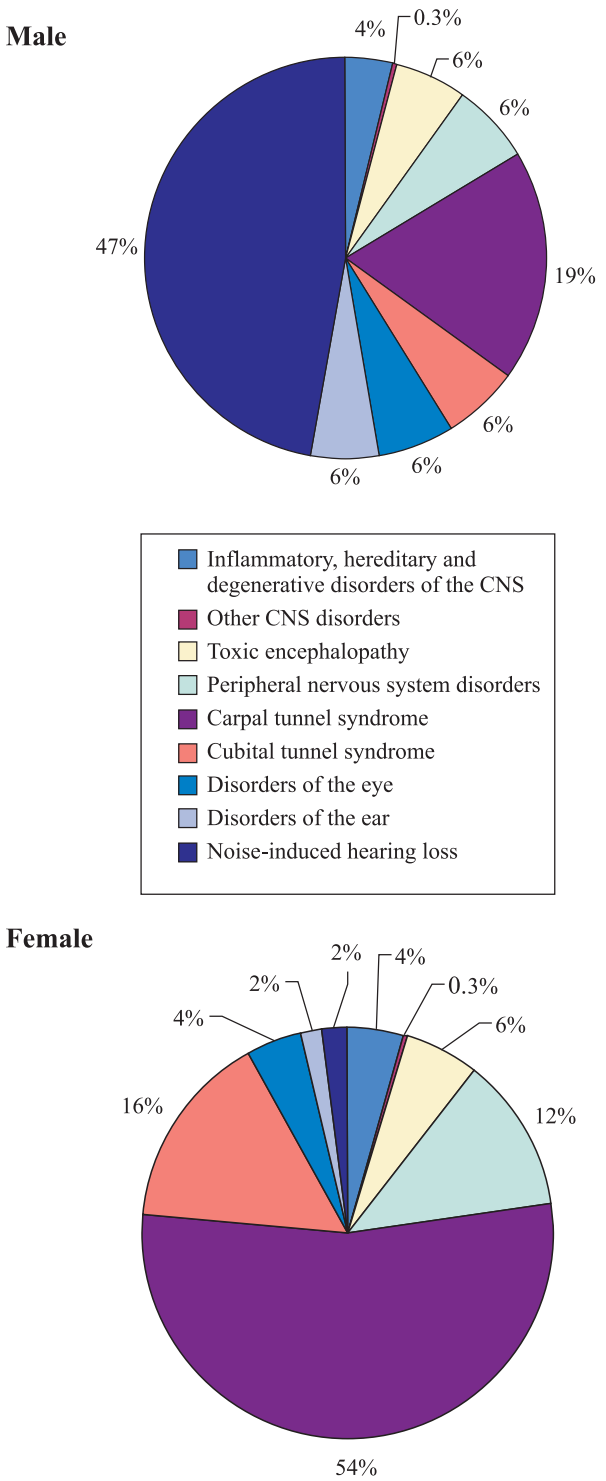
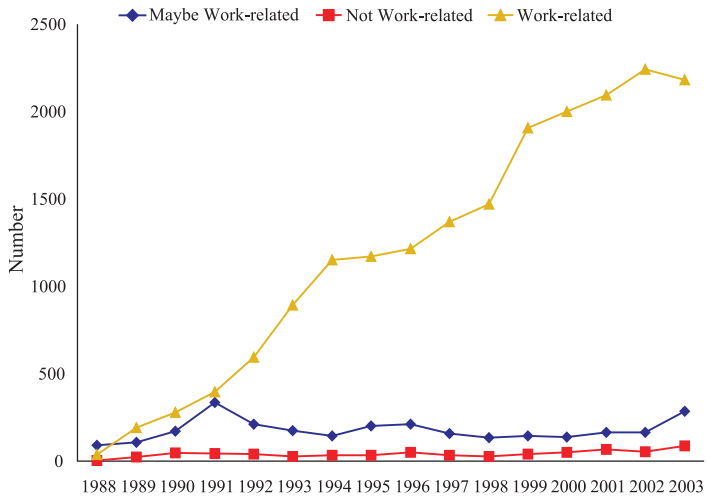


Figure 3.12. Number of NYS OHCN patient visits for diseases of the nervous system and sense organs, by year and work-relatedness. There were 22,680 patient visits for these conditions, primarily among those diagnosed with work-related conditions (85%). Patients with repetitive stress disorders such as carpal tunnel syndrome (12,327 visits), cubital tunnel syndrome (2,423 visits), and nerve root and plexus disorders (1,495 visits) accounted for the majority of the patients seen in multiple visits for their conditions. The chronic nature of these conditions necessitates multiple visits.

Figure 3.12. Number of NYS OHCN Patient Visits for Diseases of the Nervous System and Sense Organs, by Year and Work-relatedness



Diseases of the Circulatory System
(ICD-9-CM Codes 390-459)

Figure 3.13. Number of circulatory system disease diagnoses in NYS OHCN patients, by year and work-relatedness. There were 1,919 diagnoses of diseases of the circulatory system, of which 3% were work-related and 14% were possibly work-related. However, 94% of these patients were being seen for an unrelated occupational condition, indicating that the Clinics are also diagnosing other health conditions as part of their clinical work. Increases observed in certain years were a result of screenings conducted by one or more of the Clinics. The majority of these patients (72%) were diagnosed with hypertension. Slightly more than 70% of the patients resided in NYS outside of NYC, and the vast majority of the patients diagnosed with diseases of the circulatory system were male (86%). Overall, there were 3,011 patient visits where diseases in this category were diagnosed (data not shown).

Figure 3.13. Number of Circulatory System Disease Diagnoses in NYS OHCN Patients, by Year and Work-relatedness

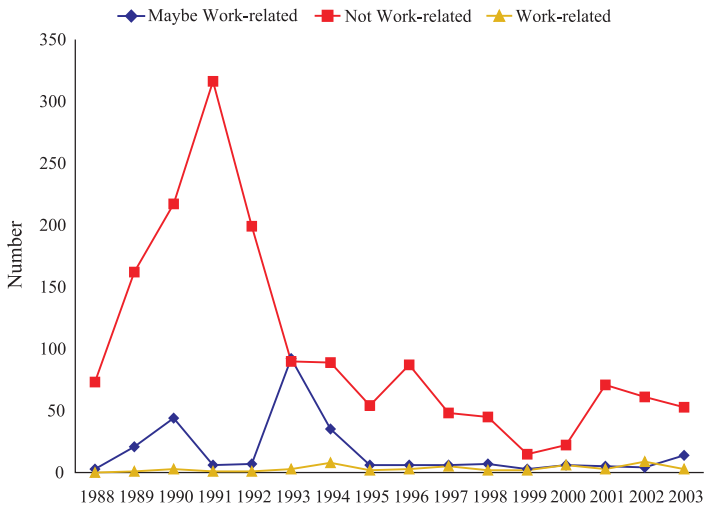
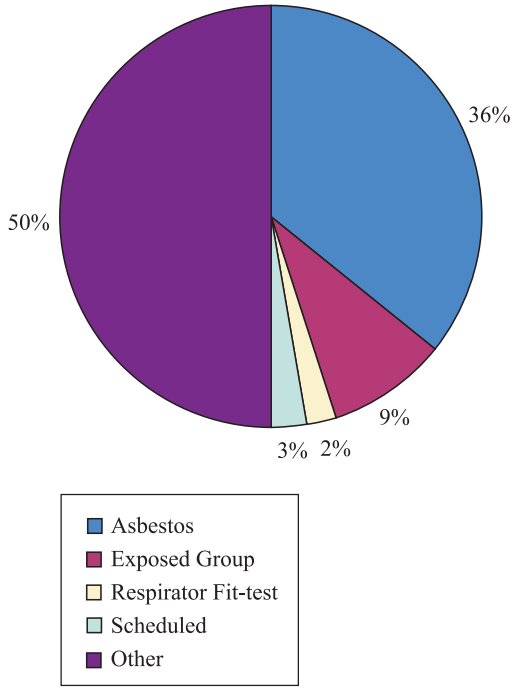


Figure 3.14. Type of group screening for NYS OHCN patients diagnosed with diseases of the circulatory system. Of the diagnoses of a disease of the circulatory system, 1,045 (54%) were diagnosed as part of a group screening. The majority of these patients (68%) were seen as part of asbestos exposure follow-up exams. Another 18% were screened due to a suspected exposure, such as for lead poisoning, Lyme disease, or a chemical spill.

Figure 3.14. Type of Group Screening for NYS OHCN Patients Diagnosed with Diseases of the Circulatory System



Diseases of the Respiratory System
(ICD-9-CM Codes 460-519)

Figure 3.15. Number of respiratory system disease diagnoses in NYS OHCN patients, by year and World Trade Center (WTC) status. There were 11,747 diagnoses of a disease of the respiratory system. Of these diagnoses, 63% were work-related and another 24% were possibly related to work. There were 2,271 (19%) respiratory system disease diagnoses related to the WTC disaster.

Figure 3.15. Number of Respiratory System Disease Diagnoses in NYS OHCN Patients, by Year and World Trade Center (WTC) Status

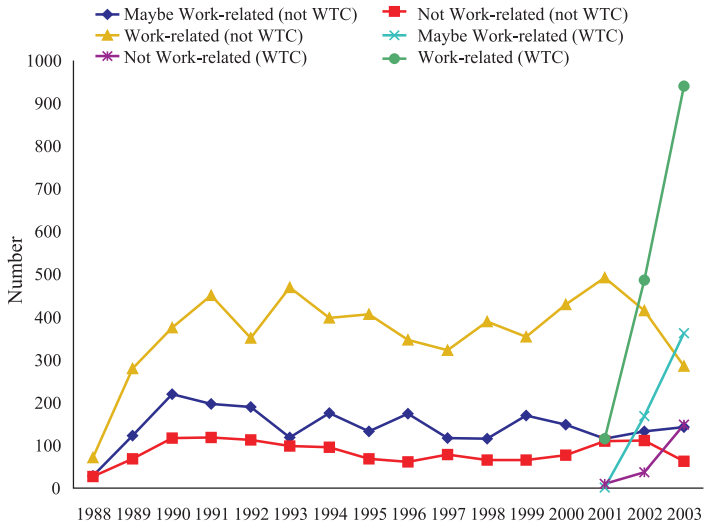


Figure 3.16. Number of NYS OHCN patient visits for diseases of the respiratory system, by year and World Trade Center (WTC) status. There were 22,698 visits for respiratory system disease diagnoses. Of these visits, 69% were work-related and 14% of those were related to the WTC disaster. There has been a steady increase in the number of visits for work-related respiratory diseases displaying the burden of these chronic conditions to both the patients and the NYS OHCN.

Figure 3.16. Number of NYS OHCN Patient Visits for Diseases of the Respiratory System, by Year and World Trade Center (WTC) Status

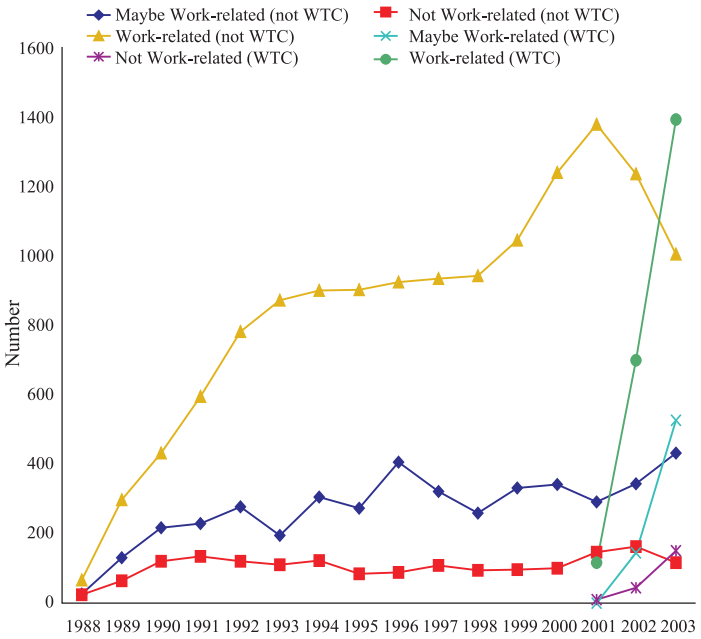
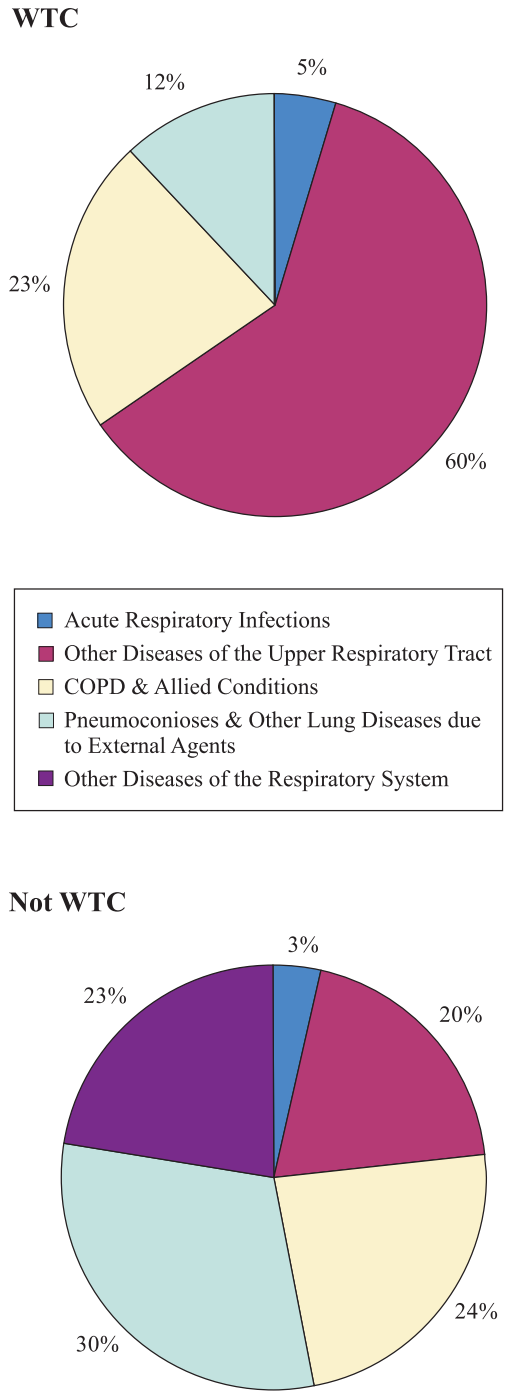


Figure 3.17. Percent of work-related respiratory disease diagnoses in NYS OHCN patients, by type of disease and World Trade Center (WTC) status. The majority of the WTC-related respiratory system disease diagnoses were in the category "Other Diseases of the Upper Respiratory Tract" (ICD-9-CM Codes 470-478). These included work-related chronic pharyngitis and chronic sinusitis (ICD-9-CM Codes 472 and 473) which accounted for 1,318 diagnoses, of which 713 (54%) were related to the WTC disaster. Almost a third of the work-related non-WTC respiratory system disease diagnoses (30%) were classified as "Pneumoconioses and Other Lung Diseases due to External Agents" (ICD-9-CM Codes 500-508) compared to 12% of the WTC diagnoses. This included 873 diagnoses of asbestosis not related to WTC. Also included in this group are respiratory conditions due to chemical fumes and vapors (ICD-9-CM Code 506) which accounted for 984 of the work-related diagnoses of which 178 (18%) were related to WTC exposures. Approximately 23% of both the WTC and non-WTC diagnoses were "Chronic Obstructive Pulmonary Disease and Allied Conditions (ICD-9-CM Codes 490-496). This included 1,308 work-related asthma diagnoses (ICD-9-CM Code 493) of which 307 (23%) were related to WTC.

Figure 3.17. Percent of Work-related Respiratory Disease Diagnoses in NYS OHCN Patients, by Type of Disease and World Trade Center (WTC) Status



Work-related Asthma

Work-related asthma diagnoses (ICD-9-CM Code 493) that were not associated with the WTC disaster were relatively equally divided between males (48%) and females (51%); three-quarters of the work-related asthma diagnoses associated with WTC exposures occurred among males (76%). Non-WTC related diagnoses occurred among those primarily from NYS outside of NYC (72%) and among those who were White (78%); WTC-related diagnoses occurred primarily among those from NYC (63%) and among those who were White (64%) (data not shown).

Figure 3.18. Percent of work-related asthma diagnoses in NYS OHCN patients, by industry of employment and World Trade Center (WTC) status. The majority of non-WTC work-related asthma diagnoses occurred among those employed in the services industry – particularly health (11%) and educational (13%) services, followed by the manufacturing industry (23%). The principal occupations at risk for work-related asthma, excluding the WTC disaster, included administrative support (15%), machine operators (15%), cleaning and building services, households (9%), farm managers and workers (9%) and professional specialties (7%) including teachers (7%) (data not shown). Work-related asthma diagnoses among those with WTC-related exposures occurred among those employed in construction (22%), public administration (39%), and services (19%) industries. The principal occupations at risk for work-related asthma among the WTC exposed population included protective services (22%), construction trades (18%) and professional specialties (8%).

Figure 3.18. Percent of Work-related Asthma Diagnoses in NYS OHCN Patients, by Industry of Employment and World Trade Center (WTC) Status

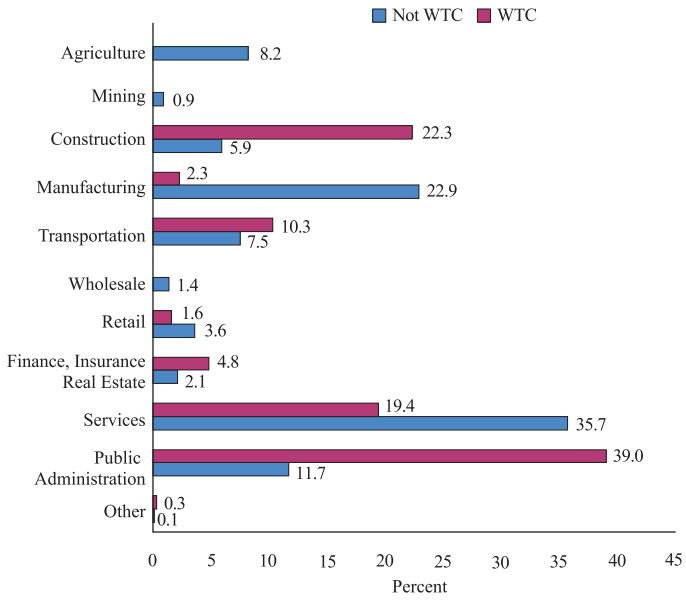
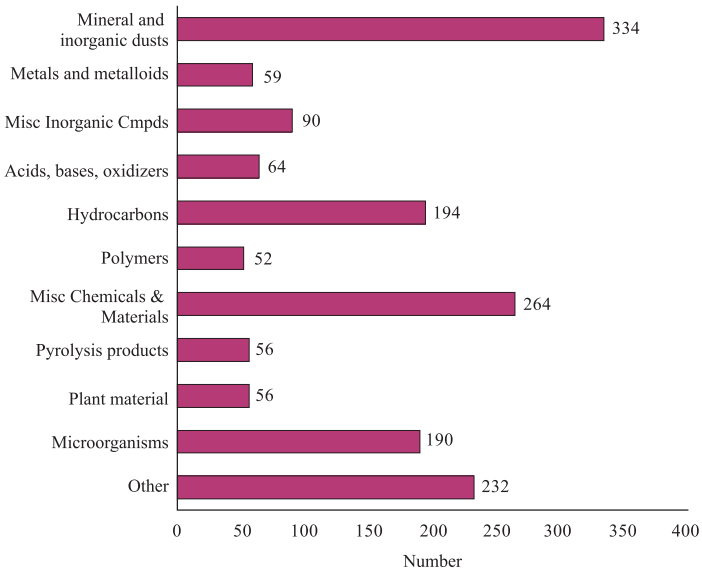


Figure 3.19. Number of work-related asthma diagnoses in NYS OHCN patients, not World Trade Center (WTC) related, by source of exposure. There were 1,923 exposures associated with diagnosed of work-related asthma, of which 1,604 were not associated with the WTC disaster. Of these non-WTC exposures, 334 were to dusts (21%), with 295 exposures non-specified dusts (data not shown). Miscellaneous chemicals and materials accounted for 264 exposures, primarily exposures to indoor air pollutants (n=132), cleaning materials (n=45), and chemical dusts (n=38); and miscellaneous inorganic compounds accounted for 90 exposures, primarily 63 irritant gas exposures. Microorganisms accounted for 190 exposures, primarily molds (n=176); and hydrocarbons accounted for 194 exposures with 97 exposures to solvents. Patients could be exposed to more than one agent.

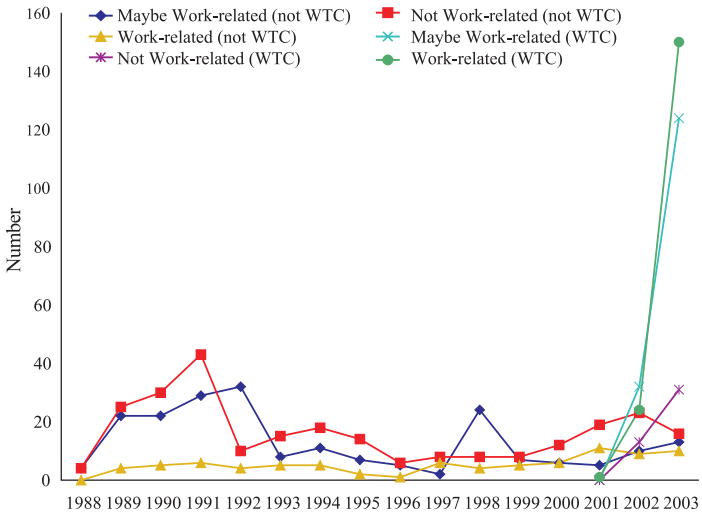
Figure 3.19. Number of Work-related Asthma Diagnoses in NYS OHCN Patients, not World Trade Center (WTC) Related, by Source of Exposure



Diseases of the Digestive System
(ICD-9-CM Codes 520-579)

Figure 3.20. Number of digestive system disease diagnoses in NYS OHCN patients, by year and World Trade Center (WTC) status. There were 924 diagnoses of diseases of the digestive system. Of these diagnoses, 258 (28%) were work-related and 363 (39%) were possibly related to work. There were 375 diagnoses associated with the WTC disaster (41%). The majority of diagnoses (n=428) were diagnosed with gastroesophageal reflux (ICD-9-CM Code 530.81) including 359 (84%) of the diagnoses associated with WTC-related exposures. Another 121 of the non-WTC diagnoses were diagnosed with melena (ICD-9-CM Code 578.1), and 73 were diagnosed with diseases of the liver, primarily hepatitis (data not shown). Overall, there were 1,150 patient visits where diseases in this category were diagnosed (data not shown).

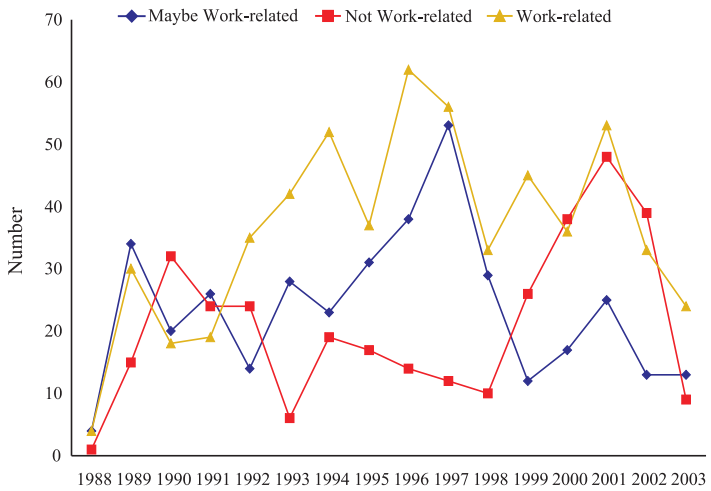
Figure 3.20. Number of Digestive System Disease Diagnoses in NYS OHCN Patients, by Year and World Trade Center (WTC) Status



Diseases of the Skin and Subcutaneous Tissue
(ICD-9-CM Codes 680-709)

Figure 3.21. Number of skin and subcutaneous tissue disease diagnoses in NYS OHCN patients, by year and work-relatedness. There were 1,293 diagnoses of a disease of the skin and subcutaneous tissue, of which 45% were work-related and 29% were possibly work-related. There were 676 diagnoses of contact dermatitis (ICD-9-CM Code 692) of which 56% were work-related (data not shown). Another 179 diagnoses were of dermatoses including actinic keratosis and seborrheic keratosis (ICD-9-CM Codes 702.0 and 702.1). These were often identified in skin cancer screenings conducted by the Clinics. Overall, there were 3,122 patient visits where diseases in this category were diagnosed (data not shown).

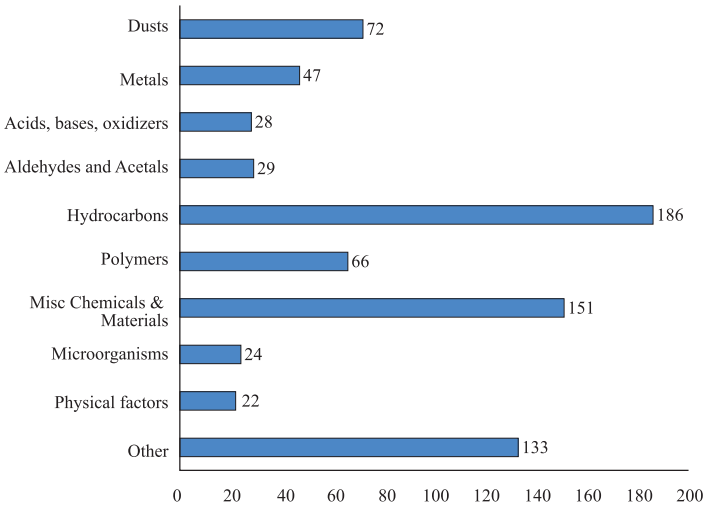
Figure 3.21. Number of Skin and Subcutaneous Tissue Disease Diagnoses in NYS OHCN Patients, by Year and Work-relatedness



Contact Dermatitis

Figure 3.22. Number of contact dermatitis diagnoses in NYS OHCN patients, by source of exposure. There were 379 diagnoses of contact dermatitis. Exposures among these patients include 186 hydrocarbon exposures which included 59 exposures to cutting oils and 101 exposures to non-specified solvents. Another 151 exposures were to miscellaneous chemicals and materials, which included 27 indoor air pollutant exposures, 42 chemical dust exposures, 14 to non-specified pesticides, and 24 to cleaning materials (data not shown). Patients could be exposed to more than one agent.

Figure 3.22. Number of Contact Dermatitis Diagnoses in NYS OHCN Patients, by Source of Exposure



Diseases of the Musculoskeletal System and Connective Tissue
(ICD-9-CM Codes 710-739)

Figure 3.23. Number of musculoskeletal system and connective tissue disease diagnoses in NYS OHCN patients, by year and work-relatedness. There were 9,132 diagnoses of a disease of the musculoskeletal system of which 82% were work-related and another 11% were possibly related to work. In general, there has been a steady increase in the diagnosis of these conditions. Among the diagnoses of work-related musculoskeletal conditions, 5,098 (68%) were among females; 3,904 (52%) were among NYC residents; and 4,591 (62%) were among Whites, 1,395 (19%) among African-Americans and 1,039 (14%) among Hispanics (data not shown). Overall, there were 26,338 patient visits where diseases in this category were diagnosed. There has also been a steady increase in the number of visits for work-related musculoskeletal diseases with over 3,990 patient visits in 2003, thus displaying the burden of these conditions to both the patients and the NYS OHCN.

Figure 3.24. Percent of work-related musculoskeletal system and connective tissue disease diagnoses, in NYS OHCN patients, by occupation and ethnicity. Over one-fourth (28%) of the diagnoses of musculoskeletal diseases worked in administrative support occupations. There were 528 diagnoses among African-Americans (38% of all musculoskeletal disease diagnoses among African-Americans) who worked in administrative support occupations. There were 1,924 diagnoses (26%) who worked in executive and professional specialty occupations with 549 diagnoses among editors and reporters. Thirty-two percent of the diagnoses of musculoskeletal diseases among Asians and Whites worked in these occupations. There were 780 musculoskeletal disease diagnoses among those who worked in service occupations including 260 among nursing aides and 108 among janitors and cleaners, of which 283 (42%) were African-American; 836 were diagnosed among machine operators with 260 among Hispanic workers and 100 among Asian workers. Among the machine operators diagnosed with musculoskeletal diseases, 259 worked with textile machines.

Figure 3.23. Number of Musculoskeletal System and Connective Tissue Disease Diagnoses in NYS OHCN Patients, by Year and Work-relatedness

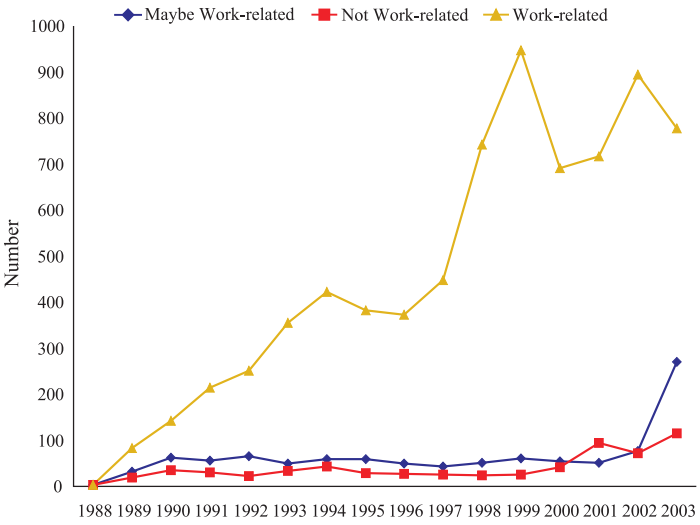


Figure 3.24. Percent of Work-related Musculoskeletal System and Connective Tissue Disease Diagnoses, in NYS OHCN Patients, by Occupation and Ethnicity

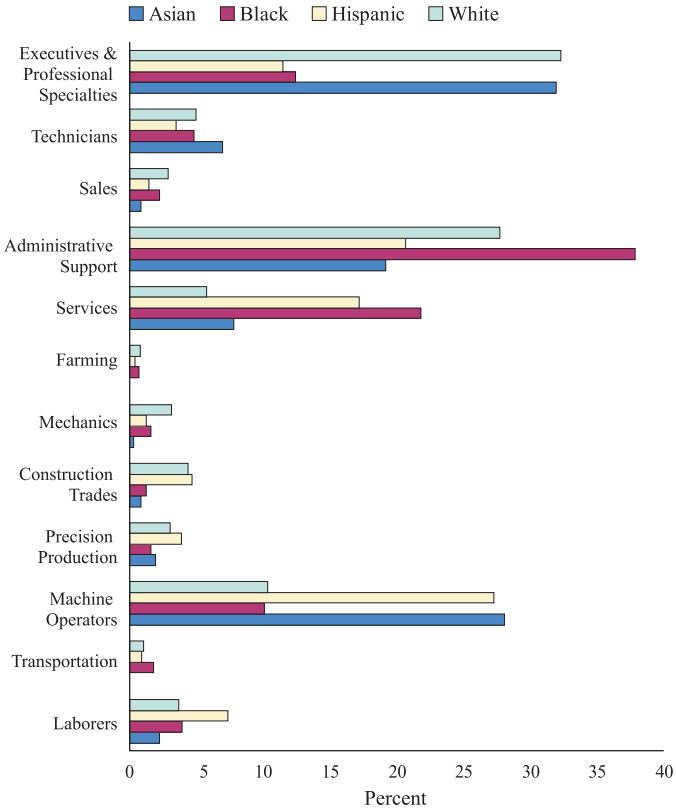
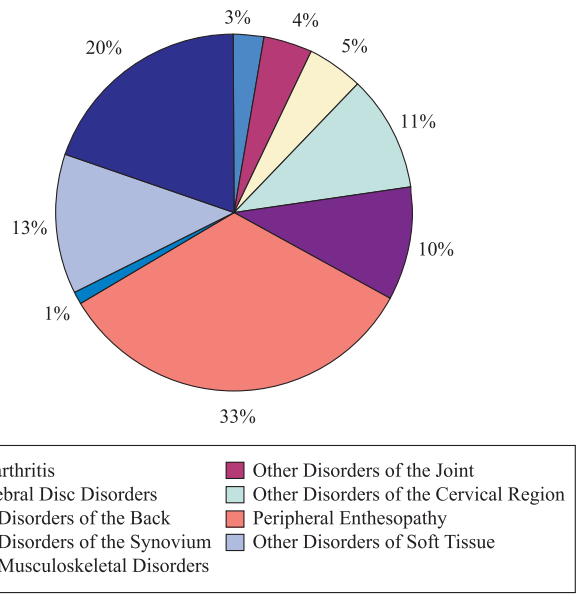


Figure 3.25. Percent of musculoskeletal system and connective tissue disease diagnoses in NYS OHCN patients, by type of disease. There were 976 diagnoses of disorders of the cervical region (ICD-9-CM Code 723) of which 366 were cervicalgia and 373 were cervical radiculitis. There were 925 diagnoses of other disorders of the back (ICD-9-CM Code 724) of which 533 were lumbago and 138 were radicular syndrome of lower limbs. Slightly more than a third (n=3,060) of the diagnoses were peripheral enthesopathies (ICD-9-CM Code 726) including 695 with rotator cuff syndrome, 1,080 with enthesopathy of the elbow (362 with medial epicondylitis and 668 with lateral epicondylitis), 525 diagnoses of enthesopathy of the wrist, and 531 with unspecified enthesopathy. An additional 1,393 diagnoses were made for other disorders of the synovium (ICD-9-CM Code 727) of which 497 were de Quervain's disease and 496 were other tenosynovitis of the hand and wrist. Other disorders of the soft tissue (ICD-9-CM Code 729) accounted for 1,164 diagnoses including 736 for myalgia and myositis.

Figure 3.25. Percent of Musculoskeletal System and Connective Tissue Disease Diagnoses in NYS OHCN Patients, by Type of Disease

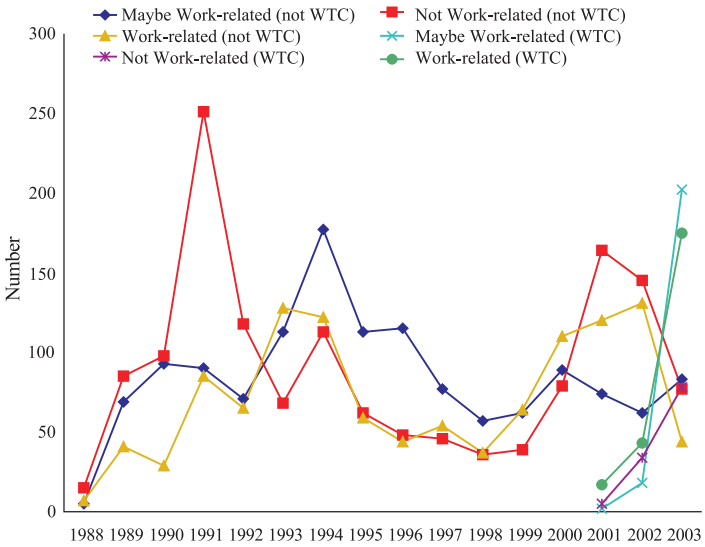


Symptoms, Signs and Ill-defined Conditions

(ICD-9-CM Codes 780-799)

Figure 3.26. Number of symptoms, signs and ill-defined condition diagnoses in NYS OHCN patients, by year and World Trade Center (WTC) status. There were 4,508 diagnoses of symptoms, signs or ill-defined conditions, of which 1,375 (31%) were work-related and 1,572 (35%) were possibly related to work. There were 574 (13%) diagnoses in this category related to the WTC disaster. Increases in the non-work-related patients, observed in certain years, were a result of screenings conducted by one or more of the Clinics; while the increase seen in 1993 and 1994 among work-related patients was primarily attributed to coding patterns by a single physician. There were 7,964 patient visits where patients presented for symptoms and signs. Diagnoses were primarily for symptoms involving respiratory system and other chest symptoms including shortness of breath and wheezing (n=1,024 not related to the WTC disaster and 403 related to WTC), general symptoms (n=874 not related to WTC) which includes dizziness and fatigue; and 807 symptoms involving the head and neck such as headaches (data not shown).

Figure 3.26. Number of Symptoms, Signs and Ill-Defined Condition Dagnoses in NYS OHCN Patients, by Year and World Trade Center (WTC) Status



Injuries and Poisonings
(ICD-9-CM Codes 800-999)

Figure 3.27. Number of injury and poisoning diagnoses in NYS OHCN patients, by year. There were 3,840 diagnoses of injuries or poisonings, of which 81% were work-related and another 9% were possibly related to work. There were 12,001 patient visits where patients were diagnosed with injuries and poisonings (data not shown). Until 1998, there was a steady increase in the number of patients seen for these conditions over time. The increase observed in 1998 among the work-related patients was a result of screenings conducted by one or more of the Clinics.

Figure 3.27. Number of Injury and Poisoning Diagnoses in NYS OHCN Patients, by Year

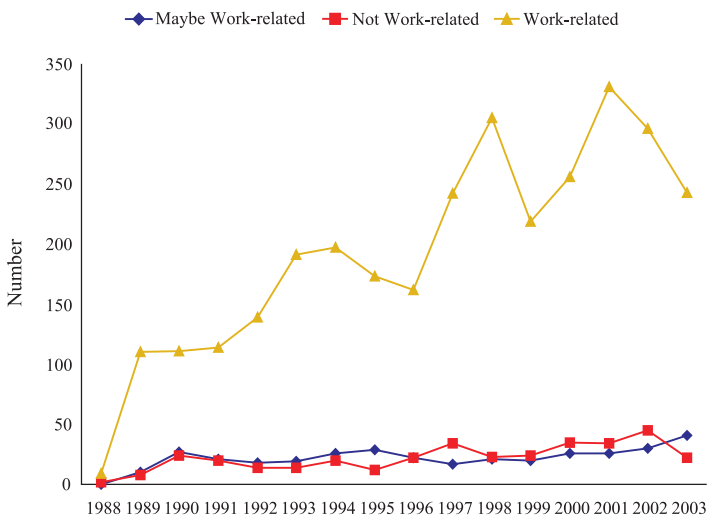
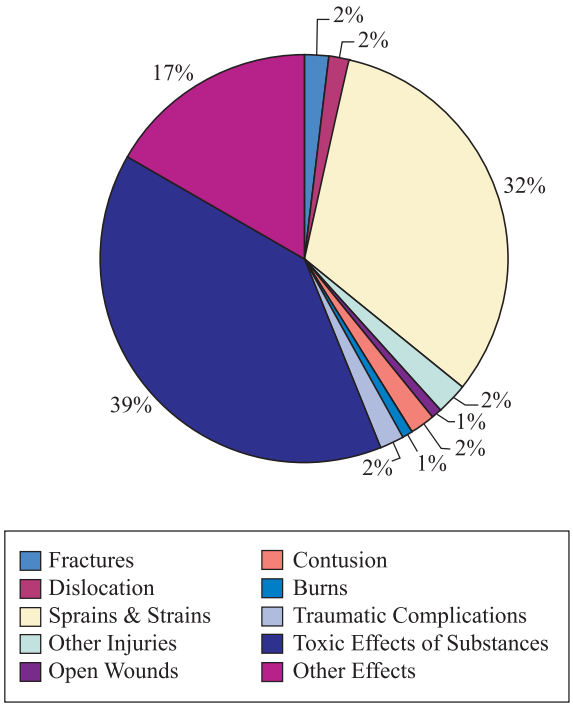


Figure 3.28. Percent of injury and poisoning diagnoses in NYS OHCN patients, by type of injury or poisoning. There were 1,495 diagnoses (39%) seen for toxic effects of substances that included 902 diagnoses of toxic effects from lead (ICD-9-CM Code 984). Another 1,233 (32%) diagnoses were sprains and strains including 476 back sprains or strains to unspecified parts of their backs and 329 sprains and strains to shoulders.

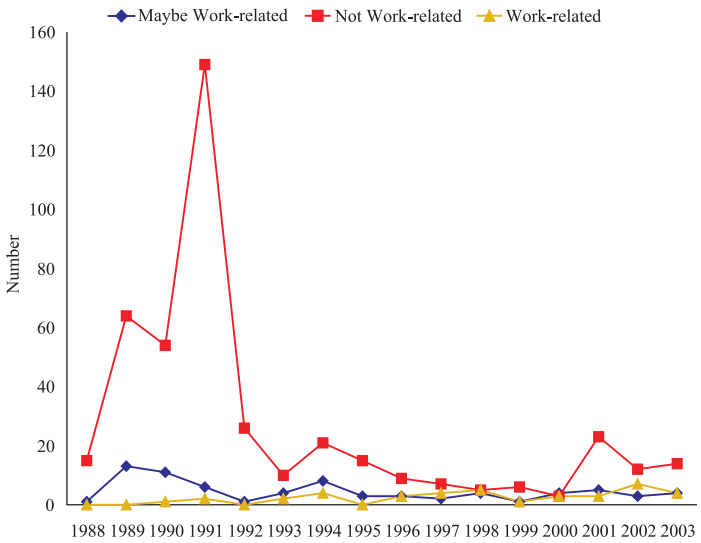
Figure 3.28. Percent of Injury and Poisoning Diagnoses in NYS OHCN Patients, by Type of Injury or Poisoning



Diseases of Other Systems

Figure 3.29. Number of diagnoses of diseases in all other categories in NYS OHCN patients, by year and work-relatedness. There were 545 diagnoses in "other" disease categories including diseases of the blood and blood-forming organs (n=166) (ICD-9-CM Codes 280-289), diseases of the genitourinary system (n=329) (ICD-9-CM Codes 580-629), complications of pregnancy, childbirth and the puerperium (n=7) (ICD-9-CM Codes 630-677), congenital anomalies (n=41) (ICD-9-CM Codes 740-759), and certain conditions originating the perinatal period (n=2) (ICD-9-CM Codes 760-779). Overall, there were 838 patient visits where diseases in these categories were diagnosed (data not shown). Most patients diagnosed with diseases in these categories were identified as a result of screenings, which is apparent by the increases seen in 1989 and 1991 when large group screenings were conducted by one or more of the Clinics.

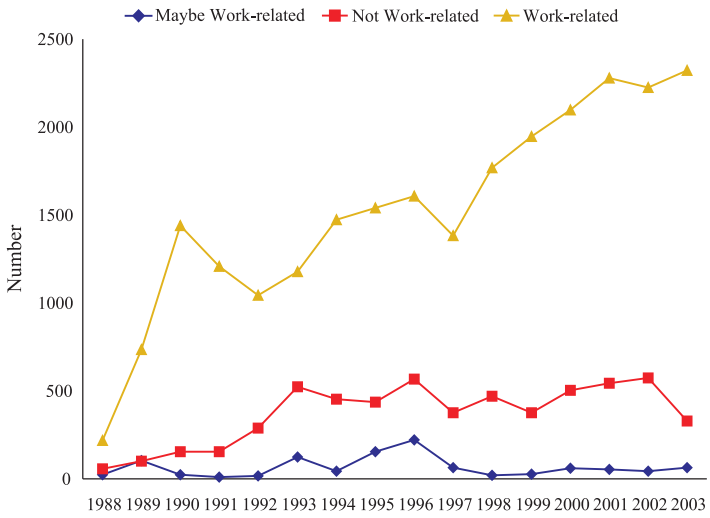
Figure 3.29. Number of Diagnoses of Diseases in all Other Categories in NYS OHCN Patients, by Year and Work-relatedness



V-Codes
(ICD-9-CM Codes V01-V84)

Figure 3.30. Number of diagnoses for patients not currently sick, seen for a specific purpose in NYS OHCN patients, by year and work-relatedness. Patients recorded with V-codes in their medical records by the NYS OHCN were patients who were not currently sick and 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). There were 31,417 diagnoses classified with V-codes, of which 24,463 (78%) were work-related. Of all patients recorded with V-codes, 22,452 (71%) were seen as part of group screenings. There has been a steady increase in the number of screening patients seen by the NYS OHCN. Overall, there were 46,319 patient visits where patients were seen for specific purposes, not related to diseases (data not shown).

Figure 3.30. Number of Diagnoses for Patients Not Currently Sick, Seen for a Specific Purpose in NYS OHCN Patients, by Year and Work-relatedness



References

[1] International Classification of Diseases. 9th Revision. Clinical Modification. Sixth Edition. 2005. Practice Management Information Corporation.

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:

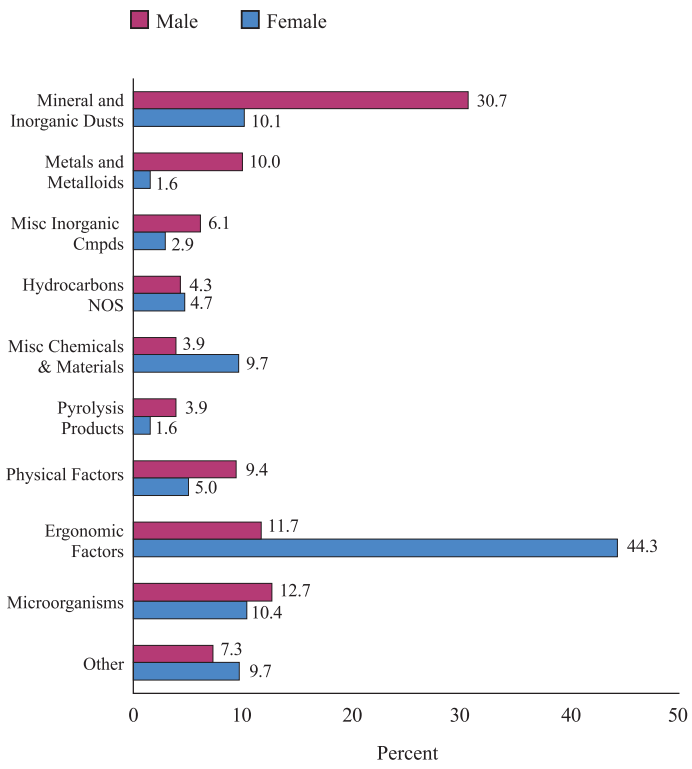
- Mineral and inorganic dusts (010-012);
- Metals and metalloids (020-024);
- Miscellaneous inorganic compounds (040-042);
- Hydrocarbons, NOS (170-171);
- Miscellaneous chemicals & materials (320-327);
- Pyrolysis products (330-331);
- Physical factors (350-354);
- Ergonomic factors (360-362); and
-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

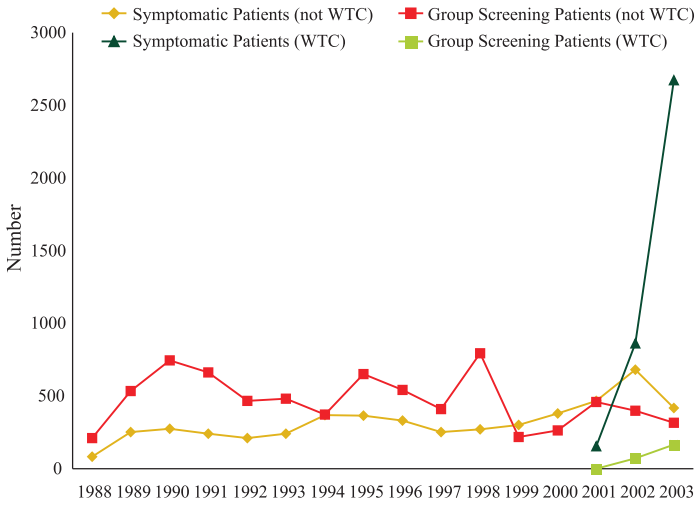
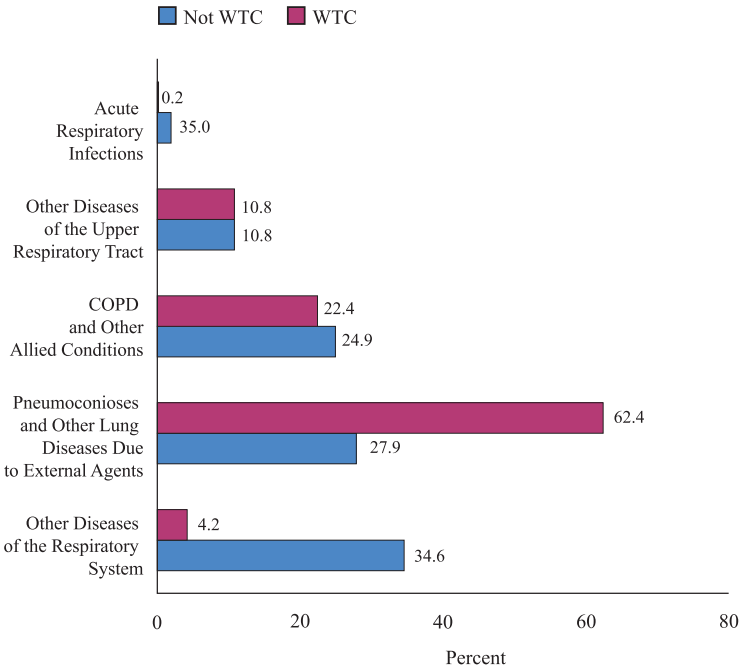


Figure 4.3. Percent of NYS OHCN exposures to mineral and inorganic dusts, by type of respiratory disease diagnosis and World Trade Center (WTC) status.

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.

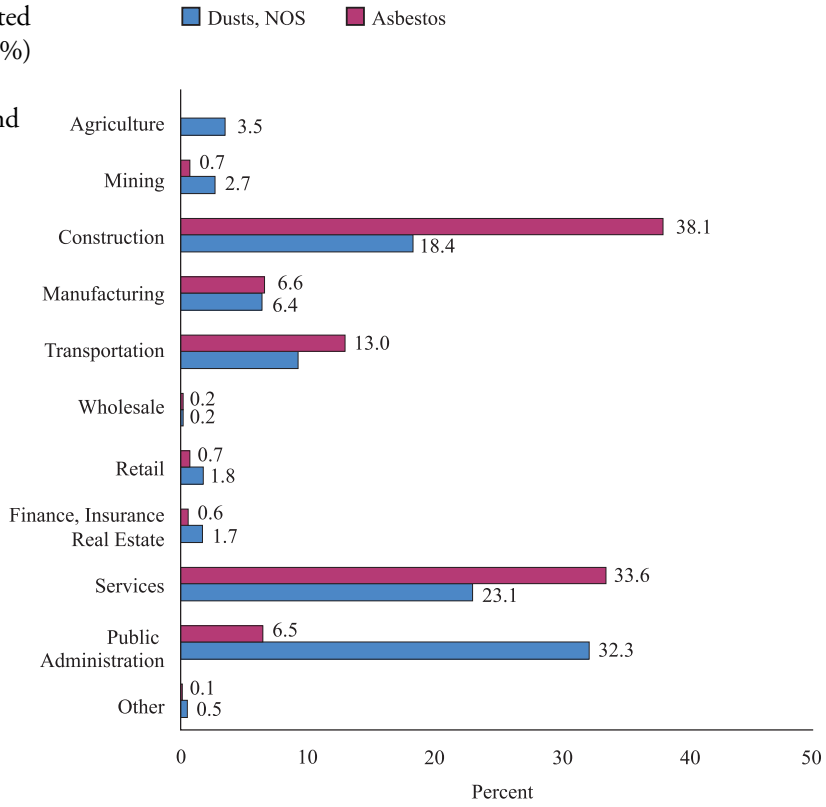
Figure 4.3. Percent of NYS OHCN Exposures to Mineral and Inorganic Dusts, by Type of Respiratory Disease Diagnosis and World Trade Center (WTC) Status



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

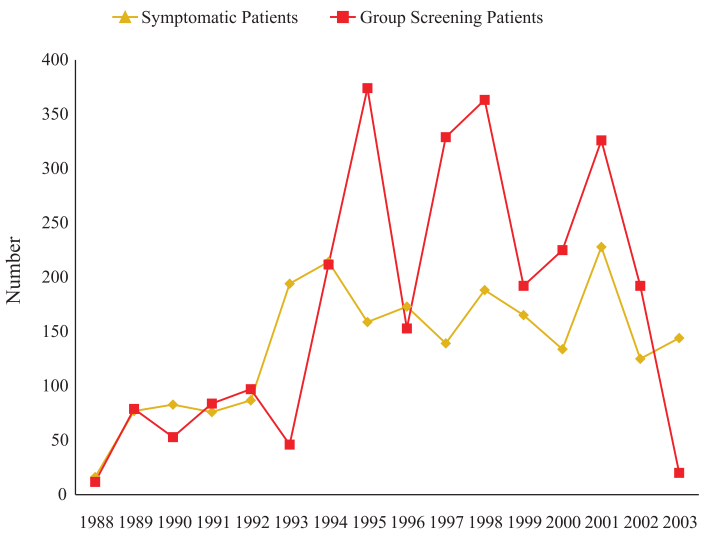


Exposures to Metals and Metalloids

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).

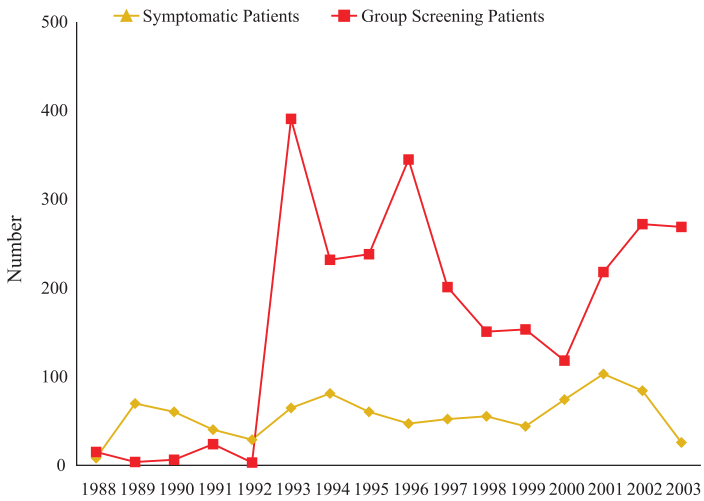
Figure 4.5. Number of NYS OHCN Exposures to Metals and Metalloids, by Year



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).

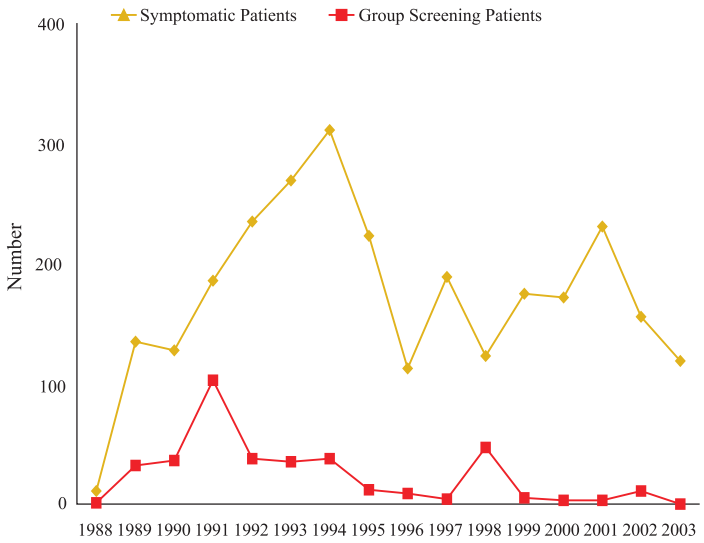
Figure 4.6. Number of NYS OHCN Exposures to Miscellaneous Inorganic Compounds, by Year



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

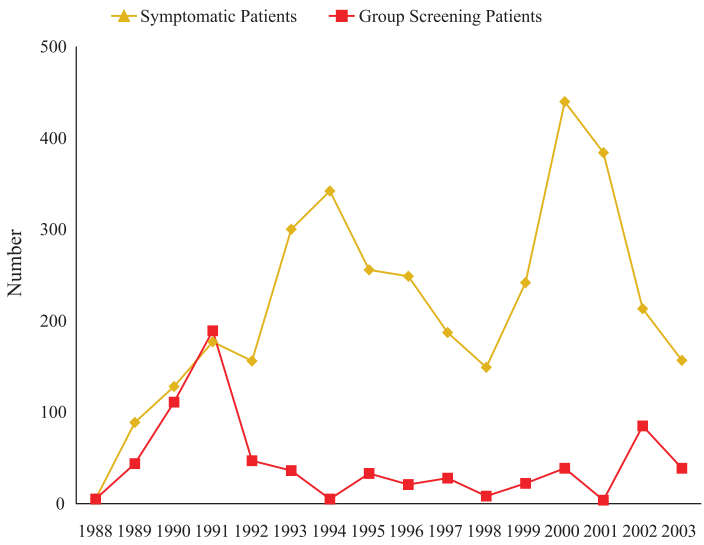
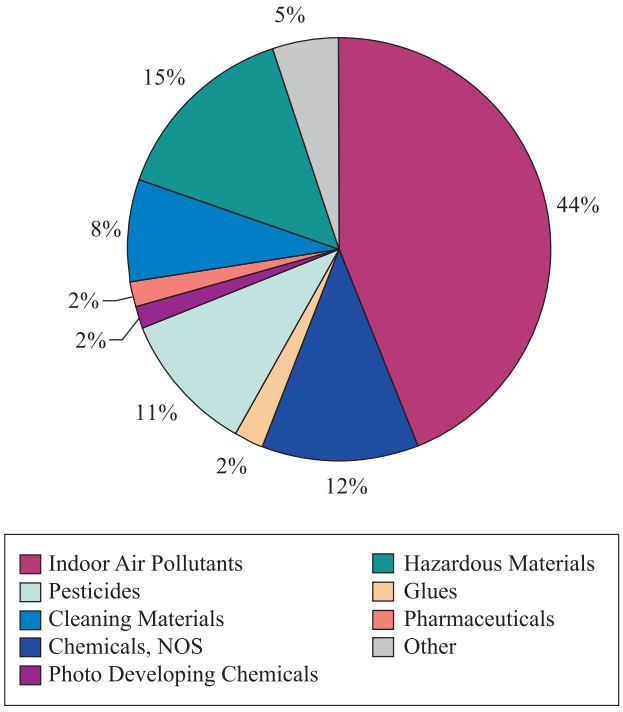


Figure 4.9. Percent of NYS OHCN exposures to miscellaneous chemicals and materials, by type of chemical or material. Among this group, there were 1,835 (44%) reported exposures to indoor air pollutants. There were 617 reported exposures to hazardous wastes, of which 243 (39%) were among group screening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

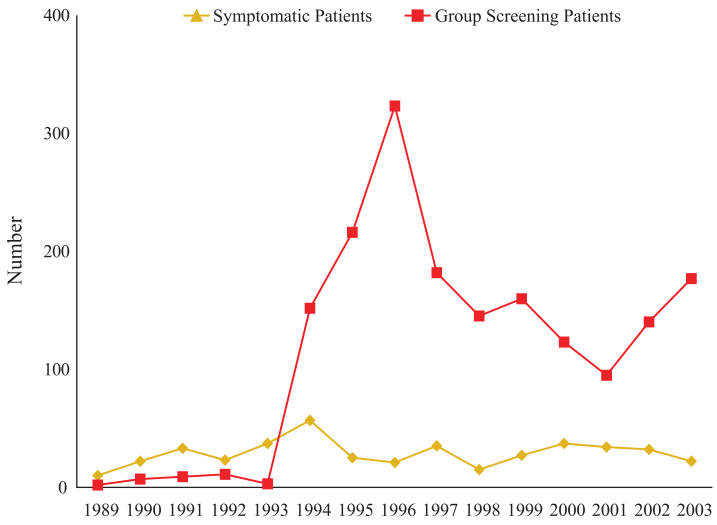
Figure 4.9. Percent of NYS OHCN Exposures to Miscellaneous Chemicals and Materials, by Type of Chemical or Material



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

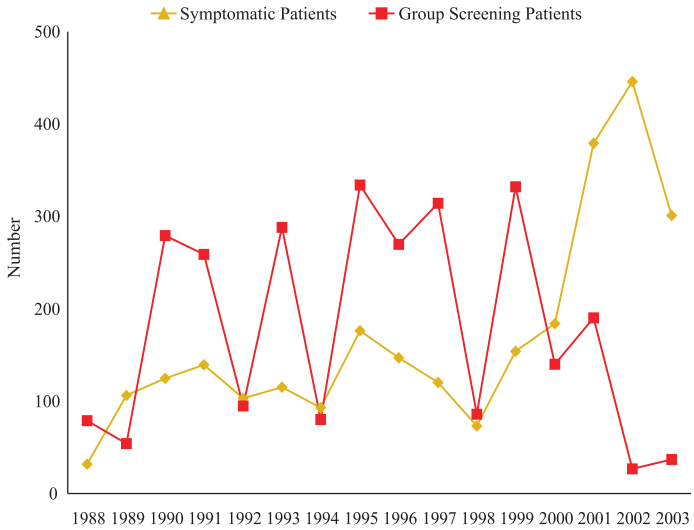
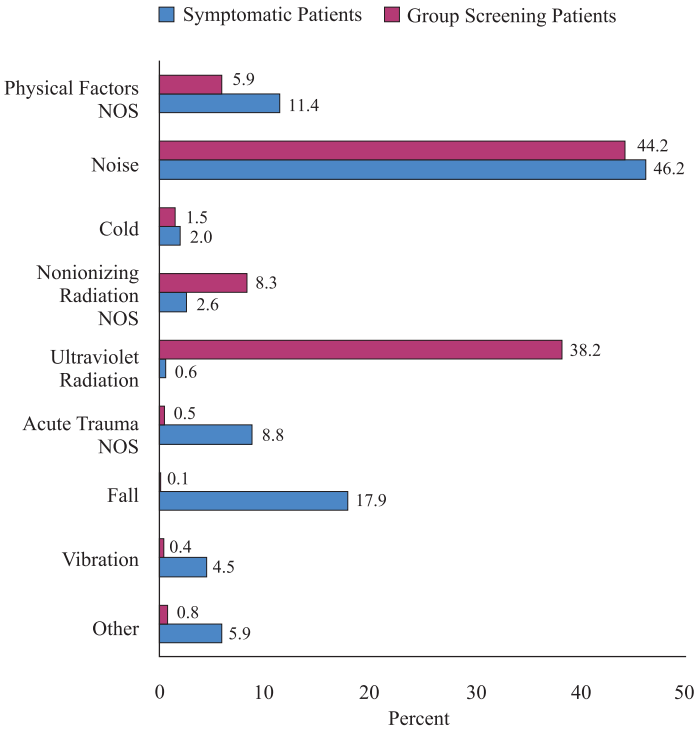


Figure 4.12. Percent of NYS OHCN exposures to physical factors, by physical factor and patient type. There were 2,511 reported exposures to noise of which 1,267 (46%) were among group screening patients. There were 1,110 reported exposures to ultraviolet radiation – 98% of these exposures were skin cancer 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

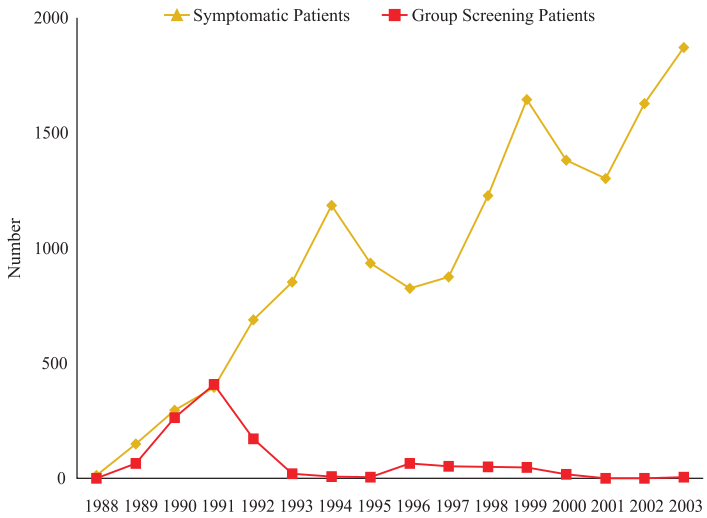
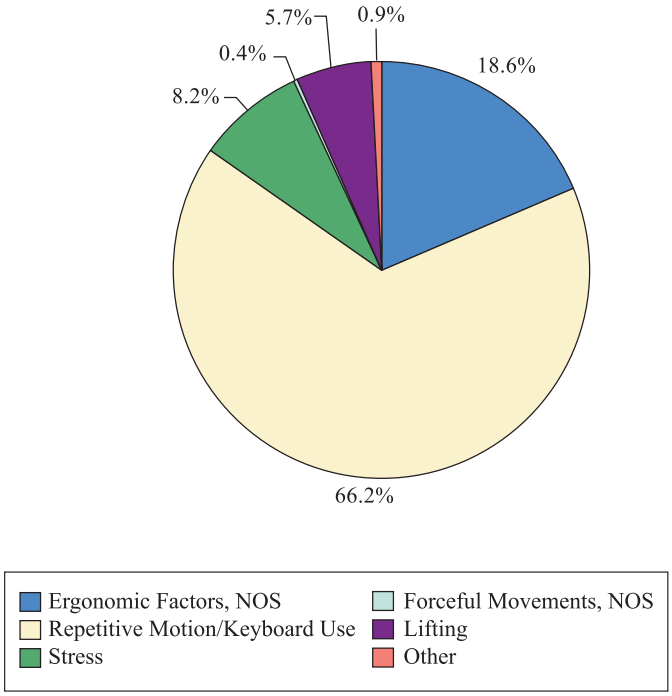


Figure 4.14. Percent of NYS OHCN exposures to ergonomic factors, by type of factor. Of these reported exposures, 10,878 (66%) were repetitive motion including keyboard use, 1,354 (8%) were stress, and 934 (6%) were lifting. Another 3,061 (19%) were to non-specified ergonomic factors.

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).

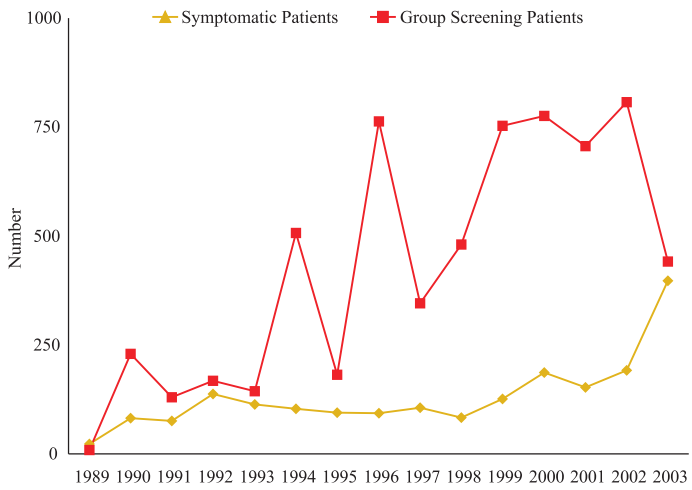
Figure 4.14. Percent of NYS OHCN Exposures to Ergonomic Factors, by Type of Factor



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

Chapter 5. Industries and Occupations of Patients

This chapter provides data describing the distribution of industries and occupations of the NYS Occupational Health Clinic Network (OHCN) occupational patients. Major disease diagnoses and etiologic agents by each industry grouping are also examined. Patients are presented by all industries or occupations they worked in during the time period represented by their clinic visits; therefore, the number of industries and occupations reported exceeds the number of patients. If a patient's diagnosis was associated with a previous job, only that industry and occupation is presented.

Industry categories were classified utilizing the main categories of the Standard Industrial Classification Codes (1987)1:

- 01-09: Agriculture, forestry, and fishing;
- 10-14: Mining;
- 15-17: Construction;
- 20-39: Manufacturing;
- 40v49: Transportation;
- 50 -51: Wholesale trade;
- 52-59: Retail trade;
- 60-67: Finance, insurance, and real estate;
- 70-89: Services;
- 91-97: Public administration; and
- 99: Nonclassifiable establishments.

Occupation categories were classified using the 1990 Bureau of Census Occupational Classification System[2]:

003-199: Managerial & Professional Specialty Occupations:
- 003-068: Professional specialty;
- 069-083: Natural scientist;
- 084-106: Health treating;
- 113-163: Teachers;
- 164-199: Other professionals.

203-389: Technical, Sales and Administrative Support Occupations:
- 203-235: Technicians;
- 243-285: Sales;
- 303-389: Administrative support.

403 – 469: Service:
- 403-407: Private household;
- 413-427: Protective service;
- 433-469: Other service.

473-499: Farming, Forestry, and Fishing Occupations

503-699: Precision production, Craft, and Repair Occupations:
- 503-549: Mechanics;
- 553-599: Construction trades;
- 613-617: Extractive;
- 628-699: Precision production.

703-889: Operators, Fabricators and Laborers:
- 703-799: Machine operators;
- 803-814: Motor vehicle operators;
- 823-834: Transportation;
- 843-859: Material moving;
- 864-889: Laborers.

There were only 178 patients employed in the military, so these patients were not examined separately.

When examining the diagnoses or exposures of patients within an industry or an occupation, patients are presented by the first time a diagnosis is made or an exposure is recorded within that job. Patients often have more than one diagnosis recorded. 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.

Figure 5.1. Industries of employment of NYS OHCN patients, by patient type. Occupational Health Clinic Network Patients seen between 1988 and 2003 were primarily employed in services, construction and public administration industries. Approximately half of those employed in services and public administration were symptomatic patients, while only 36% of those employed in construction were symptomatic patients.

Figure 5.1. Industries of Employment of NYS OHCN Patients, by Patient Type

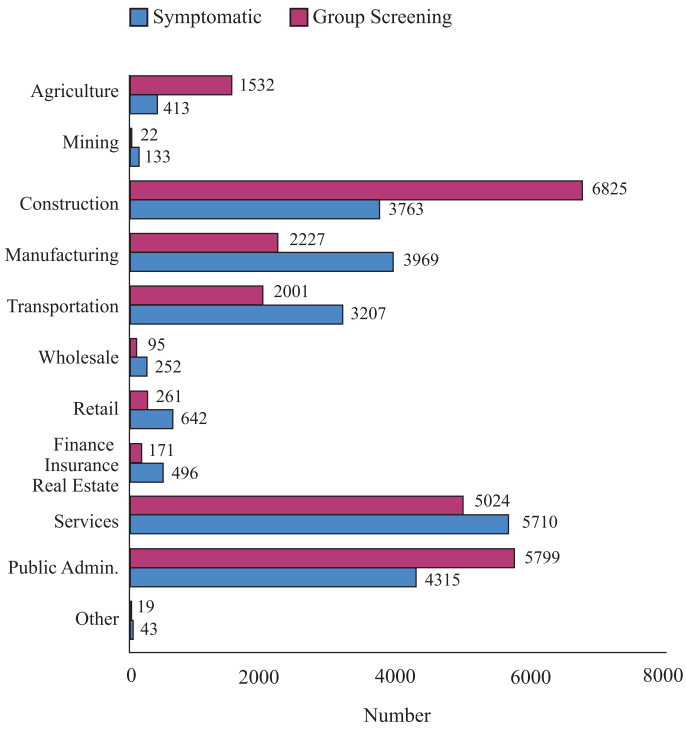


Figure 5.2. Occupations of employment of NYS OHCN patients, by patient type. Both symptomatic and group screening patients seen between 1988 and 2003 reported employment in precision production, craft and repair occupations primarily in construction trades, mechanics and precision production occupations (data not shown). A high number of group screening patients were employed in the services industry (n=6,595), primarily in protective services (data not shown).

Figure 5.2. Occupations of Employment of NYS OHCN Patients, by Patient Type

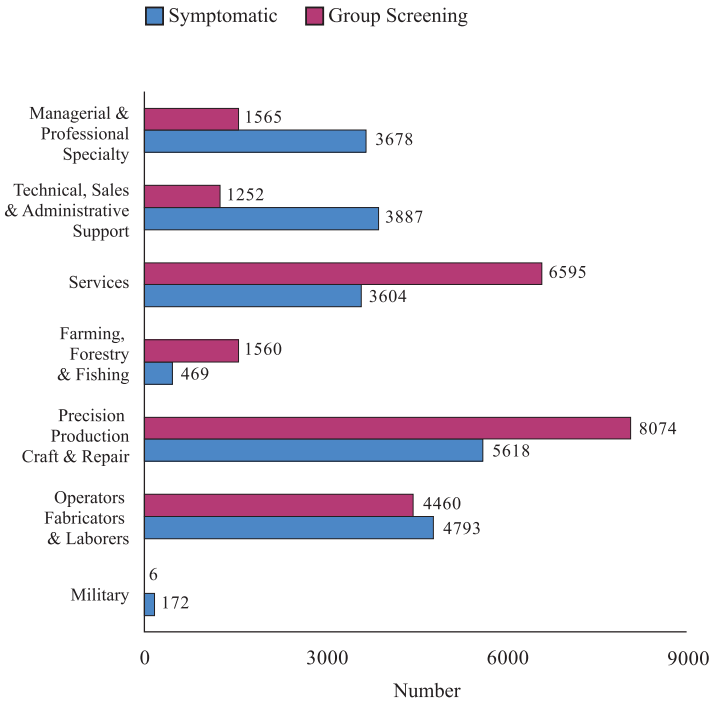
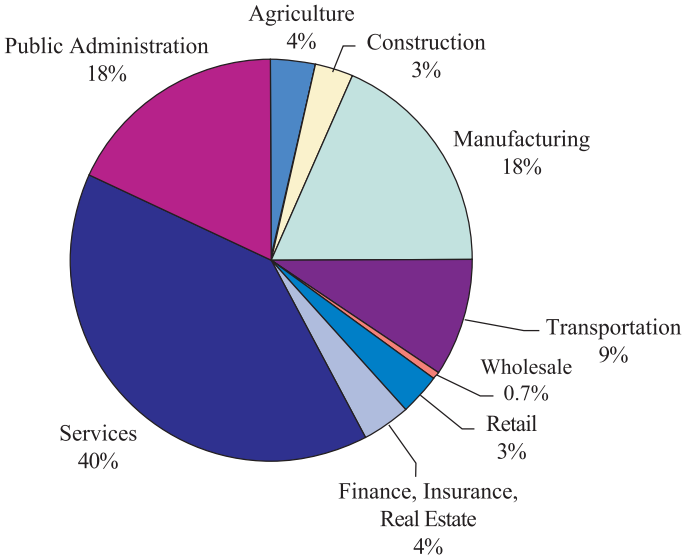


Figure 5.3. Percent of industry of employment of NYS OHCN patients, by sex. Among the Clinic patients, females were employed primarily in the services (40%), manufacturing (18%) and public administration (18%) industries. Males were primarily employed in the construction (29%), public administration (23%) and services (17%) industries. Almost all of the clinic patients employed in mining industries and construction industries were male (99% and 97%, respectively); approximately three-quarters of those employed in agriculture, transportation, wholesale trade, and public administration were male (78%, 79%, 77% and 79%, respectively); and slightly more than half of those employed in retail, services and "other" industries were male (56%, 56%, and 55%, respectively; data not shown). A higher number of females than males reported employment in managerial and professional specialty occupations (n=2,793 vs. 2,444) and in technical, sales and administrative support occupations (n=3,502 vs. 1,631) (data not shown).

Figure 5.3. Percent of Industry of Employment of NYS OHCN Patients, by Sex

Females



Males

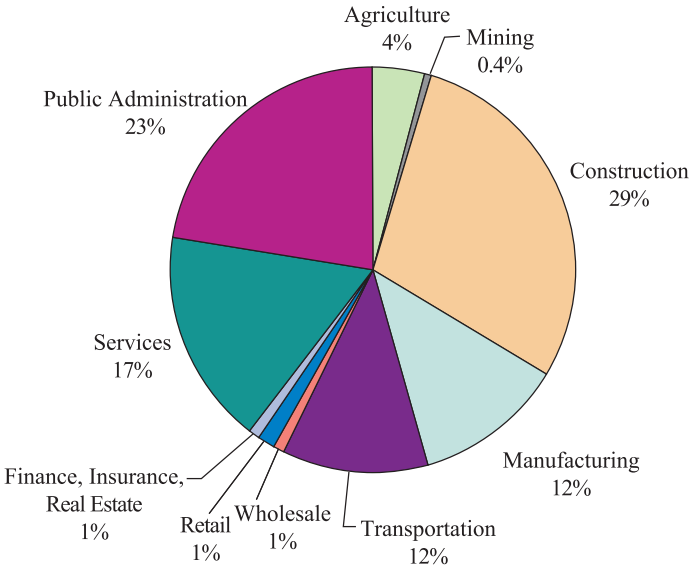
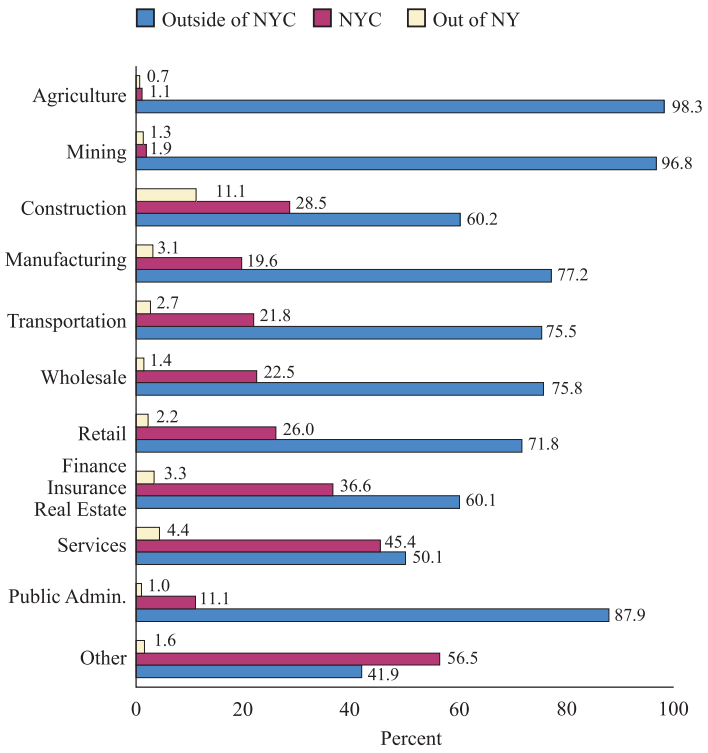


Figure 5.4. Geographic region of residence of NYS OHCN patients, by industry. Since 70% of the patients resided in NYS outside of NYC (Figure 2.4), the majority of the patients in each industry category reside in NYS outside of NYC. There were a high percentage of NYC residents employed in "other" (56%), services (45%), and finance (37%) industries. A relatively high percent of those employed in construction (11%) were not residents of NYS.

Figure 5.4. Geographic Region of Residence of NYS OHCN Patients, by Industry



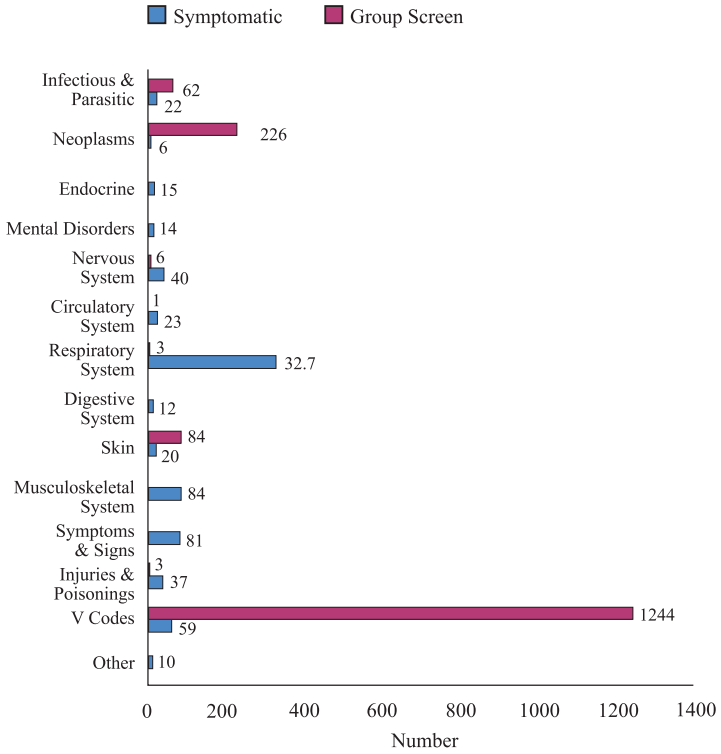
Industries

Agriculture, Forestry and Fishing

(SIC Codes 01-09)

Figure 5.5. Diagnoses among NYS OHCN patients working in the agriculture, forestry and fishing industry, by patient type. Among symptomatic patients working in the agriculture, forestry and fishing industry, there were 327 diagnoses of respiratory diseases. Forty percent of these were asthma diagnoses, 14% were extrinsic allergic alveolitis including farmers' lung and 13% were chronic bronchitis (data not shown). As previously described (Figures 3.4 and 3.21), the high number of neoplasms and skin diseases diagnosed among group screening patients were diagnoses of skin cancer or pre-cancerous skin conditions.

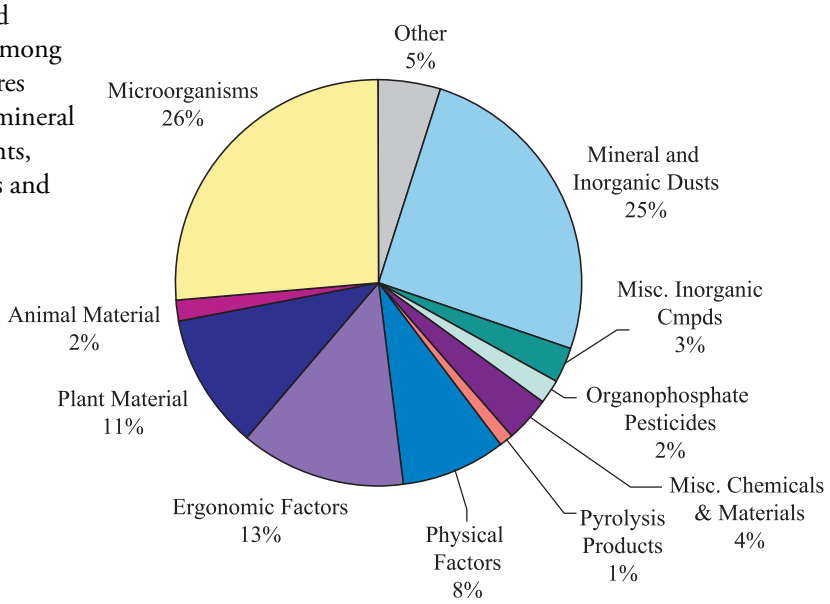
Figure 5.5. Diagnoses[1] Among NYS OHCN Patients Working in the Agriculture, Forestry and Fishing Industry, by Patient Type



[1]Excludes V-codes for 59 symptomatic, and 1,244 group screen patients

Figure 5.6. Exposures among NYS OHCN symptomatic patients working in the agriculture, forestry and fishing industry. There were 2,161 exposures identified among the agricultural, forestry and fishing patients. Among the symptomatic patients, 26% of the reported exposures were to microorganisms, primarily mold; and 25% to mineral and inorganic dusts. Among the group screening patients, 52% of the reported exposures were to microorganisms and 47% were to physical factors (data not shown).

Figure 5.6. Exposures Among NYS OHCN Symptomatic Patients Working in the Agriculture, Forestry and Fishing Industry



Mining
(SIC Codes 10-14)

Figure 5.7. Diagnoses among NYS OHCN patients working in the mining industry, by patient type. Among the 157 individuals working in the mining industry, there were 627 diagnoses, of which only 48 of these diagnoses were among group screening patients. The primary diagnoses observed for all individuals working in mining were respiratory diseases (n=200), primarily chronic bronchitis (n=71), pleurisy (n=25), and chronic obstructive pulmonary disease (n=25). There were 163 nervous system disease diagnoses of which 147 (90%) were noise-induced hearing loss.

Figure 5.7. Diagnoses Among NYS OHCN Patients Working in the Mining Industry, by Patient Type

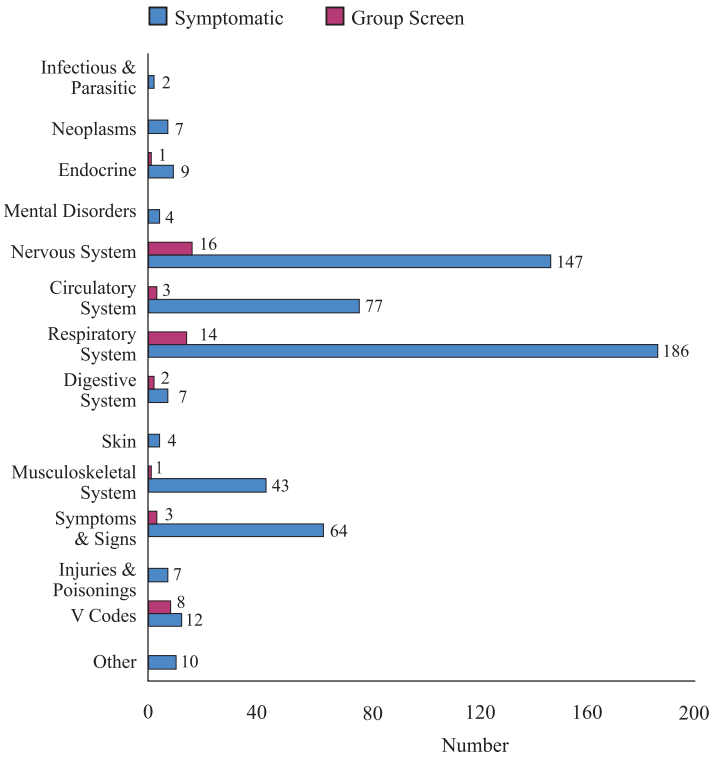
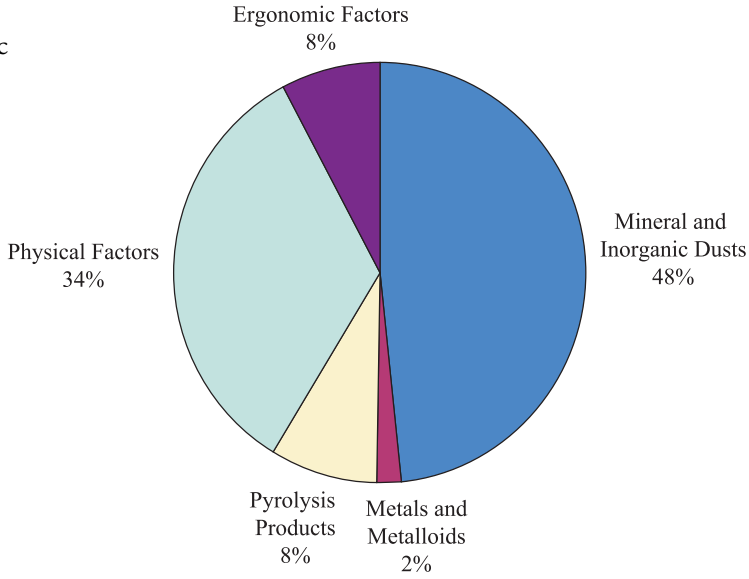


Figure 5.8. Exposures among NYS OHCN patients working in the mining industry. There were 490 exposures identified among the patients working in the mining industry. Most of the mineral and inorganic dust exposures were to unspecified dusts (n=134), asbestos (n=55), and talc (n=31). Exposures to physical factors which accounted for 34% of the exposures among the patients in this industry were primarily to noise (n=148).

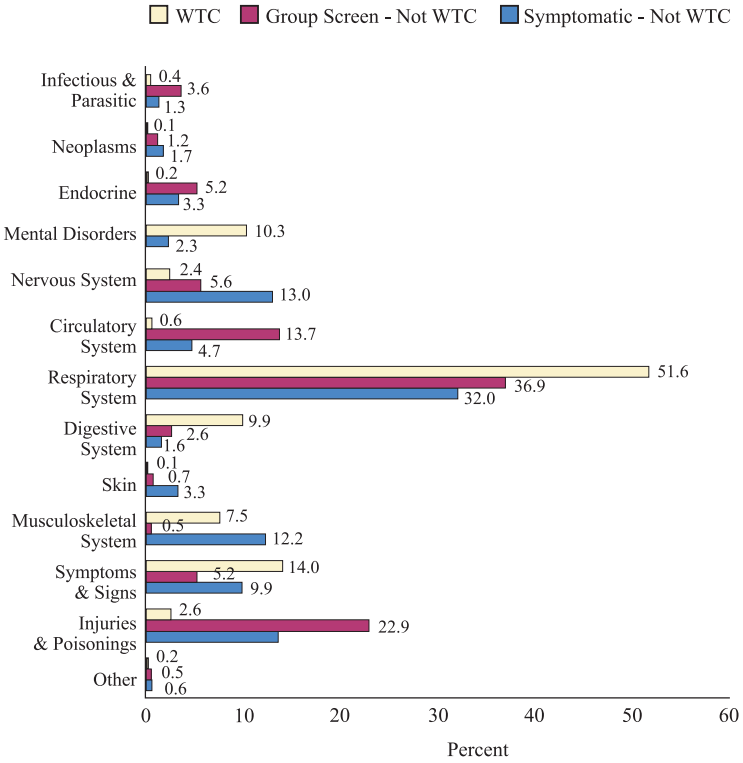
Figure 5.8. Exposures among NYS OHCN Patients Working in the Mining Industry



Construction
(SIC Codes 15-17)

Figure 5.9. Diagnoses among NYS OHCN patients working in the construction industry, by patient type. There were 14,688 diagnoses among the 10,588 patients employed in the construction industry. Of these, 8% were associated with the World Trade Center (WTC), 57% were among group screening patients, and 59% were V-codes. Patients recorded with V-codes in their medical records were not currently sick and 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). These patients are not included in the chart. Excluding V-codes, the primary diagnoses were respiratory diseases. Among those patients not related to the WTC, 747 (15%) were pleurisy, 318 (6%) were asbestosis, and 124 (2%) were asthma; among the WTC patients, 144 (16%) were chronic pharyngitis, 88 (10%) were asthma, and 80 (9%) were chronic sinusitis. Among the injuries and poisonings, there were 702 diagnoses of lead poisoning with 468 (67%) identified among the group screening population.

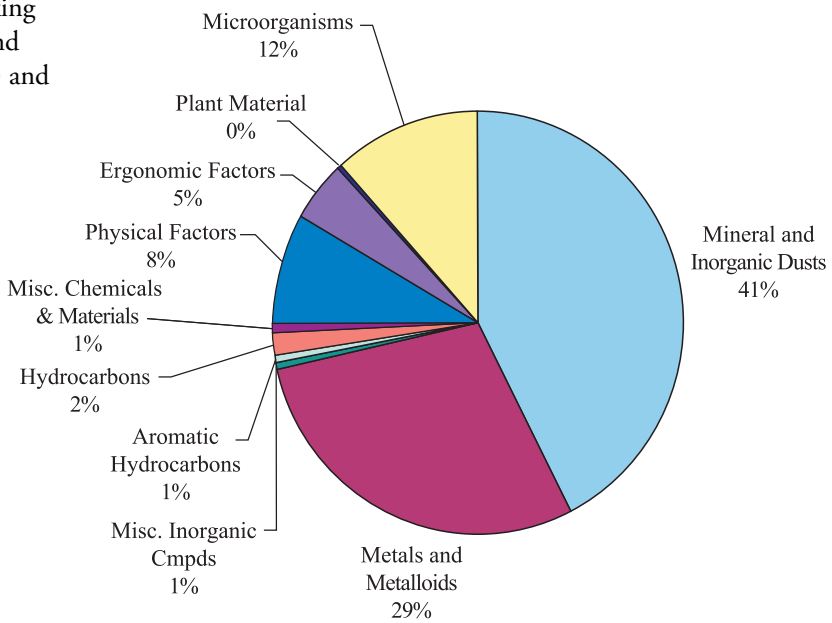
Figure 5.9. Diagnoses[1] Among NYS OHCN Patients Working in the Construction Industry, by Patient Type



[1]Excludes V-codes for 2,735 symptomatic, and 6,076 group screen patients

Figure 5.10. Exposures among NYS OHCN patients working in the construction industry. There were 9,820 exposures identified among the patients working in the construction industry. Most of the mineral and inorganic dust exposures were to asbestos (n=2,408) and unspecified dusts (n=695). Exposures to metals and metalloids were primarily to lead (n=2,603), while exposures to microorganisms were primarily non-specified infectious agents.

Figure 5.10. Exposures Among NYS OHCN Patients Working in the Construction Industry



Manufacturing
(SIC Codes 20-39)

Figure 5.11. Diagnoses among NYS OHCN patients working in the manufacturing industry, by patient type. Among the 6,196 patients employed in the manufacturing industry, there were 11,341 diagnoses. Of these, 26% (n=2,952) were group screening patients, and 23% (n=2,595) were V-codes. Excluding the V-codes, the primary diagnoses were musculoskeletal diseases of which there were 577 enthesopathy diagnoses. Diseases of the respiratory system accounted for the next largest group of which there were 427 asthma diagnoses and 302 diagnoses of respiratory conditions due to chemical fumes and vapors. The third largest category of diagnoses were nervous system disorders, primarily carpal tunnel syndrome (n=582) and noise-induced hearing loss (n=523).

Figure 5.11. Diagnoses Among NYS OHCN Patients Working in the Manufacturing Industry, by Patient Type

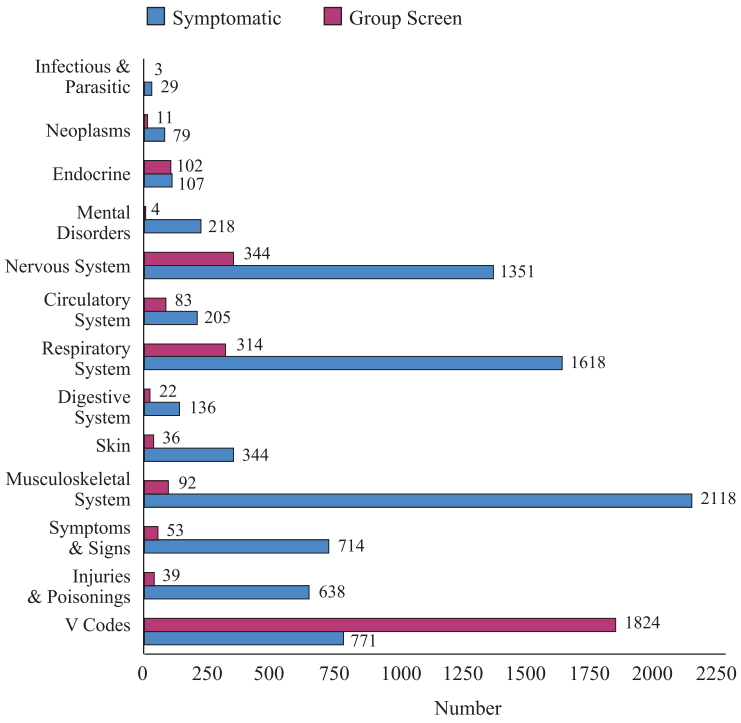
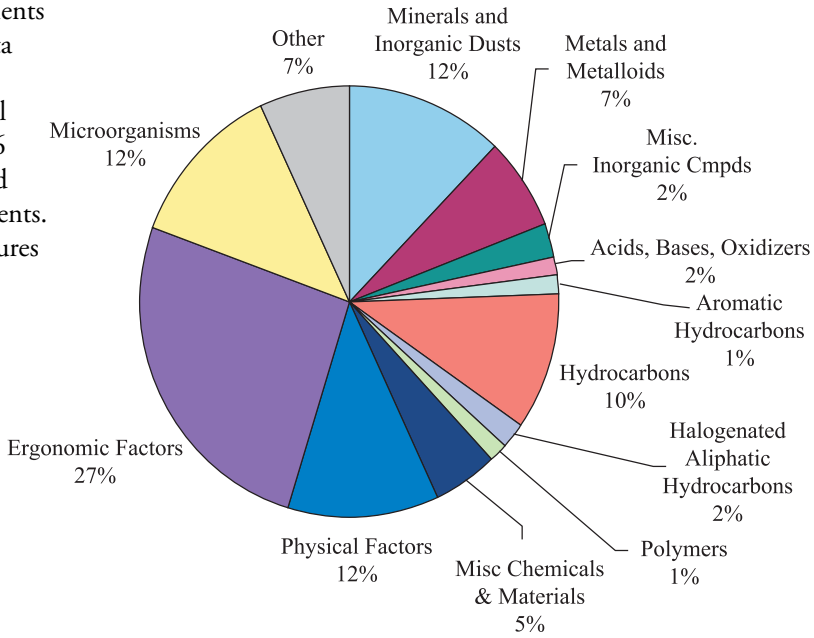


Figure 5.12. Exposures among NYS OHCN patients working in the manufacturing industry. Among the patients working in the manufacturing industry, there were 8,036 exposures identified. Over half of the patients working in this industry were machine operators (data not shown). The majority of the specified ergonomic factors involved repetitive motion (n=1,240). Mineral and inorganic dusts were primarily asbestos, with 346 exposures identified among symptomatic patients and 213 exposures identified among group screening patients. There were 411 exposures to solvents, and 756 exposures to noise of which 58% were among group screening patients (data not shown).

Figure 5.12. Exposures Among NYS OHCN Patients Working in the Manufacturing Industry



Transportation
(SIC Codes 40-49)

Figure 5.13. Occupations of NYS OHCN patients working in the transportation industry, by patient type. There were 1,974 patients in the transportation industry who were employed in precision production, craft and repair occupations, (includes mechanics, construction trades, and precision production), primarily as telephone and telephone line installers and repairers. There were 1,900 transportation industry patients employed as operators, fabricators and laborers, with 504 employed as bus drivers (all but two were symptomatic patients), and 534 employed as bridge, lock and lighthouse tenders (only 7 were symptomatic patients). There were 721 transportation industry patients working in administrative support occupations with 153 as postal or mail clerks or mail carriers, and 84 as general office clerks.

Figure 5.13. Occupations of NYS OHCN Patients Working in the Transportation Industry, by Patient Type

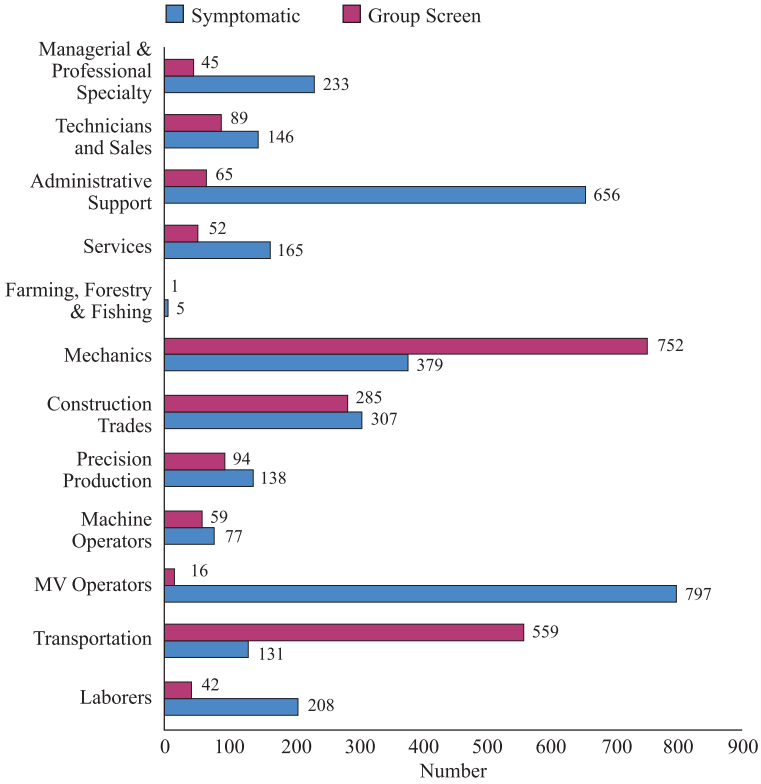


Figure 5.14. Diagnoses among NYS OHCN patients working in the transportation industry, by patient type. Among the 5,208 patients employed in the transportation industry, there were 7,880 diagnoses of which almost one-third (32%) were among group screening patients. Excluding V-codes, patients working in the transportation industry were primarily diagnosed with diseases of the musculoskeletal system (n=1,155) with 295 diagnoses of various enthesopathies, 75 diagnoses of myalgia, 74 of lumbago, and 72 of de Quervain's disease. There were 1,184 diagnoses of diseases of the respiratory system including 212 with pleurisy, 205 with asbestosis, and 178 with asthma.

Figure 5.14. Diagnoses Among NYS OHCN Patients Working in the Transportation industry, by Patient Type

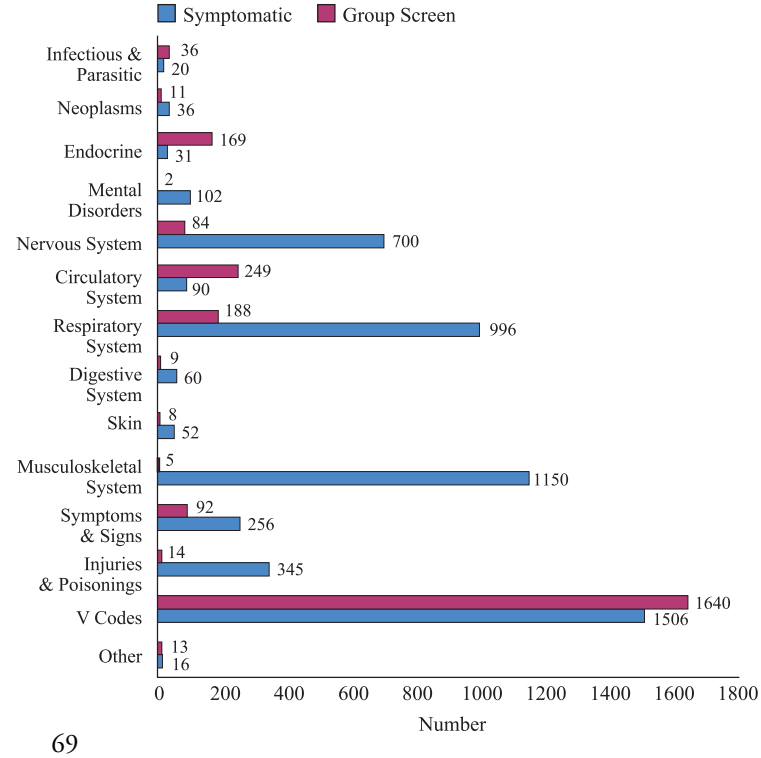
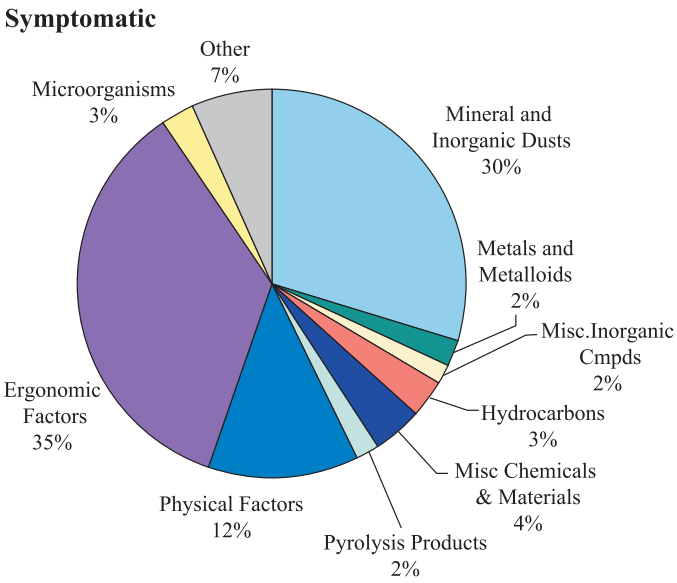
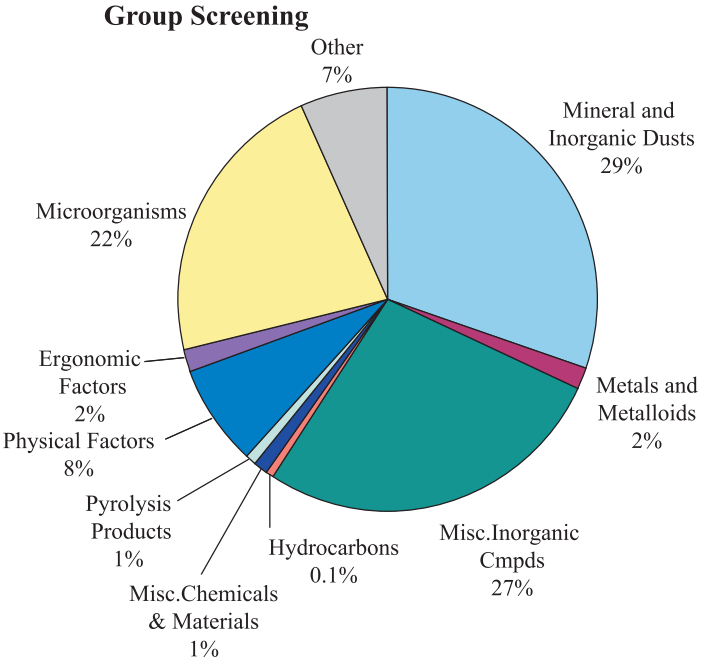


Figure 5.15. Exposures among NYS OHCN patients working in the transportation industry, by patient type. Among the patients working in the transportation industry, there were 4,733 exposures identified. Among symptomatic patients, there were 942 exposures to ergonomic factors, primarily repetitive motion (n=561), stress (n=67), and heavy lifting (n=59). There were also 793 exposures to minerals and inorganic dusts, primarily asbestos (n=532). Among the group screening patients, there were 625 screenings for exposures to minerals and inorganic dusts of which 554 were for asbestos; 560 to miscellaneous inorganic compounds of which 454 were screenings for exposure to carbon monoxide, and 454 screenings for microorganisms.

Figure 5.15. Exposures Among NYS OHCN Patients Working in the Transportation Industry, by Patient Type





Wholesale Trade
(SIC Codes 50-51)

Figure 5.16. Occupations of NYS OHCN patients working in the wholesale trade industry, by patient type. Patients working in the wholesale trade industry were primarily employed as operators, fabricators and laborers (n=140) with 74 employed as machine operators and 32 employed as motor vehicle operators. Another 105 were employed in technical, sales and administrative support occupations with 40 in sales and 37 in administrative support.

Figure 5.16. Occupations of NYS OHCN Patients Working in the Wholesale Trade Industry, by Patient Type

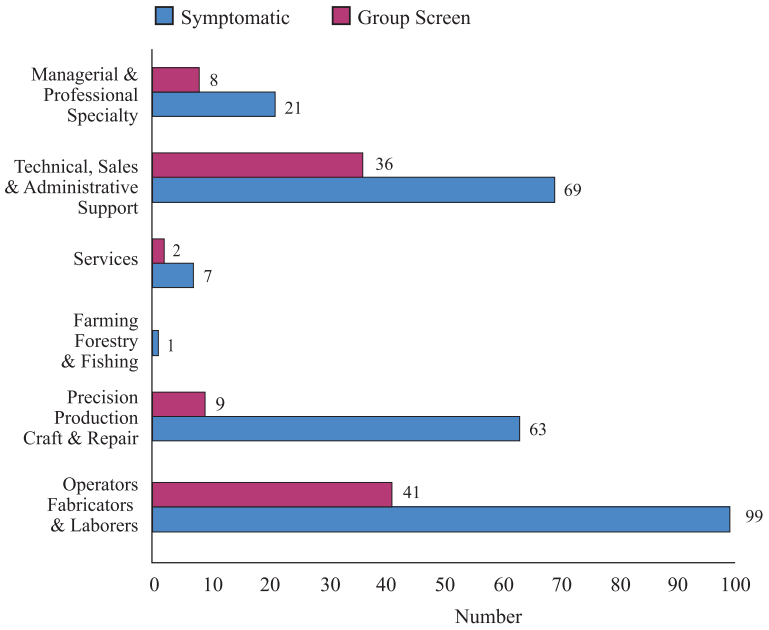


Figure 5.17. Diagnoses among NYS OHCN patients working in the wholesale trade industry, by patient type. Among the 347 patients employed in the wholesale trade industry, there were 348 diagnoses of which 28% were group screenings with only V-codes recorded as their diagnoses. Excluding V-codes, patients working in the wholesale trade industry were primarily diagnosed with diseases of the musculoskeletal system (n=52), the respiratory system (n=43), and the nervous system (n=29). No specific diseases were diagnosed in a large proportion of this population.

Figure 5.17. Diagnoses Among NYS OHCN Patients Working in the Wholesale Trade Industry, by Patient Type

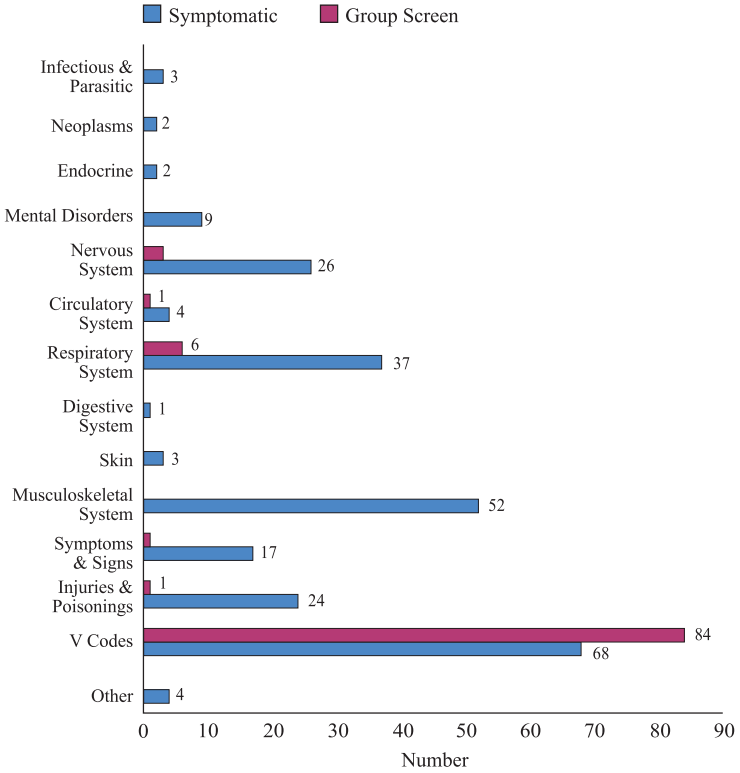
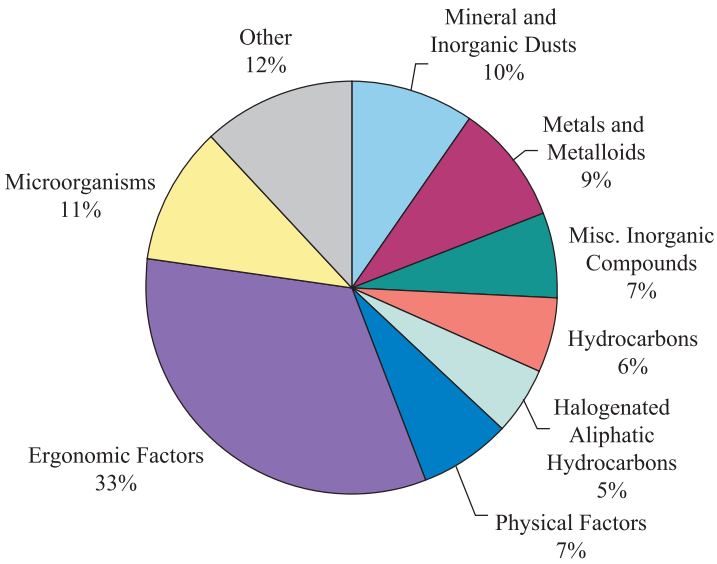


Figure 5.18. Exposures among NYS OHCN patients working in the wholesale trade industry. Among the patients employed in the wholesale trade industry, there were 350 exposures identified. One-third of these were to ergonomic factors, primarily repetitive motion. There were 38 exposures to microorganisms, primarily infectious agents among the group screening population.

Figure 5.18. Exposures among NYS OHCN Patients Working in the Wholesale Trade Industry



Retail Trade
(SIC Codes 52-59)

Figure 5.19. Occupations of NYS OHCN patients working in the retail trade industry, by patient type. Patients working in the retail trade industry were primarily employed in technical, sales and administrative support occupations (n=269) with 108 employed as sales workers and 42 as sales supervisors. Another 205 patients were employed in precision production, craft and repair occupations with 90 employed as mechanics and repairers. There were 188 patients employed in services occupations with 159 working in food preparation and service.

Figure 5.19. Occupations of NYS OHCN Patients Working in the Retail Trade Industry, by Patient Type

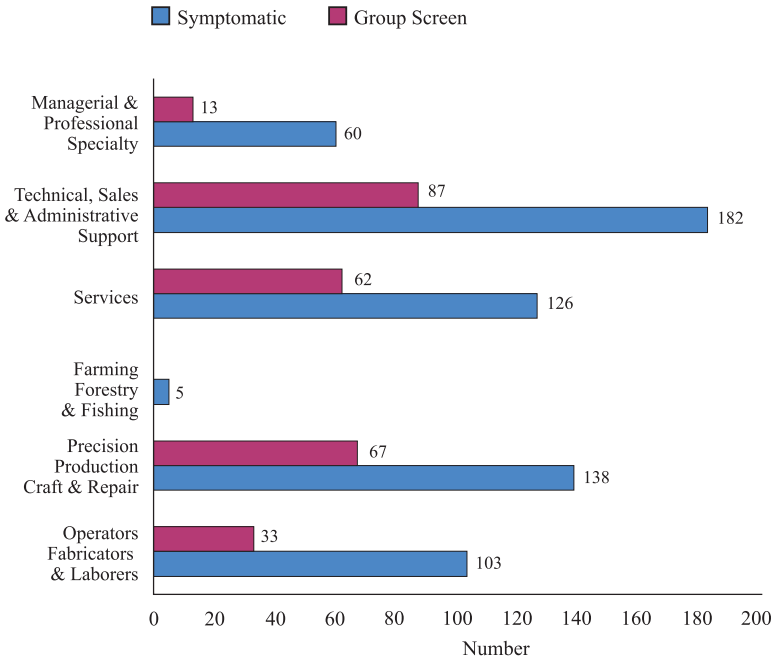


Figure 5.20. Diagnoses among NYS OHCN patients working in the retail trade industry, by patient type. Among the 903 patients employed in the retail trade industry, there were 862 diagnoses of which 30% were group screenings. Excluding V-codes, patients working in the retail trade industry were primarily diagnosed with diseases of the musculoskeletal system (n=173), followed by the respiratory system (n=125) with 40 asthma diagnoses and the nervous system (n=120) with 67 diagnoses of carpal tunnel syndrome.

Figure 5.20. Diagnoses Among NYS OHCN Patients Working in the Retail Trade Industry, by Patient Type

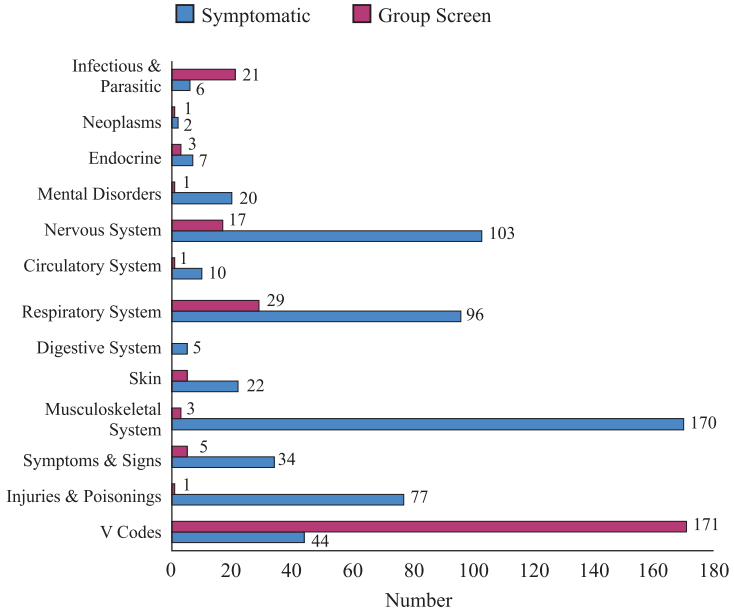
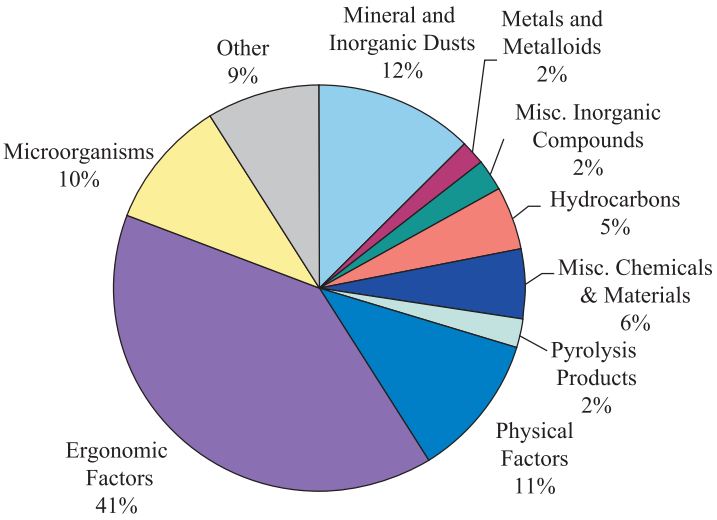


Figure 5.21. Exposures among NYS OHCN patients working in the retail trade industry. There were 966 exposures identified among the patients employed in the retail trade industry. The majority of these were ergonomic factors (n=385), primarily repetitive motion (n=178). There were 120 exposures to mineral and inorganic dusts including 54 to nonspecified dusts and 61 to asbestos. Another 111 exposures were to physical factors primarily lifting (n=69).

Figure 5.21. Exposures Among NYS OHCN Patients Working in the Retail Trade Industry



Finance, Insurance and Real Estate
(SIC Codes 60-67)

Figure 5.22. Diagnoses among NYS OHCN patients working in the finance, insurance and real estate industry, by patient type. There were 658 diagnoses among the 667 patients employed in the finance, insurance and real estate industry, of which 26% were group screenings. Patients were primarily employed in administrative support occupations including secretaries and computer operators (data not shown). Excluding V-codes, patients working in this industry were primarily diagnosed with diseases of the musculoskeletal system (n=139) with 57 diagnoses of peripheral enthesopathies, followed by the respiratory system (n=90) with 28 asthma diagnoses and the nervous system (n=76) with 48 diagnoses of carpal tunnel syndrome.

Figure 5.22. Diagnoses Among NYS OHCN Patients Working in the Finance, Insurance and Real Estate Industry, by Patient Type

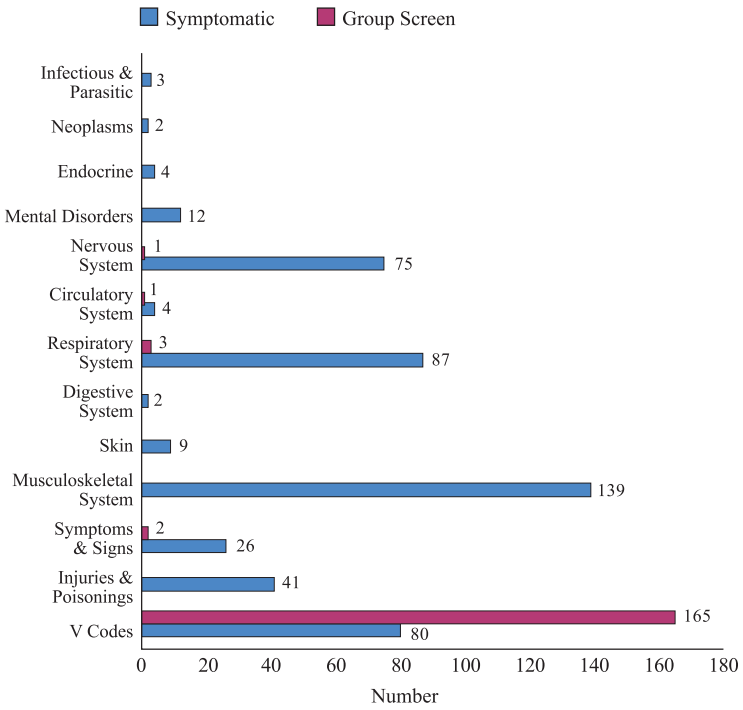
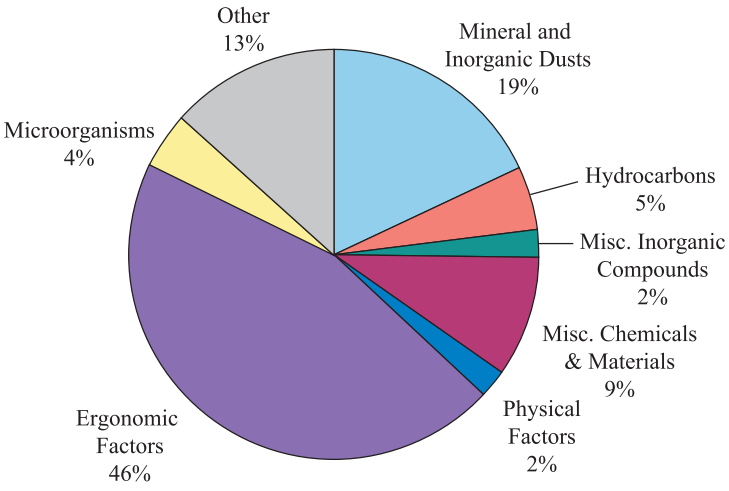


Figure 5.23. Exposures among NYS OHCN patients working in the finance, insurance and real estate industry. There were 593 exposures identified among the patients employed in the finance, insurance and real estate industry. The majority of the exposures (n=269) were to ergonomic factors, primarily repetitive motion (n=173). There were another 107 exposures to mineral and inorganic dusts, almost equally divided between nonspecified dusts and asbestos.

Figure 5.23. Exposures Among NYS OHCN Patients Working in the Finance, Insurance and Real Estate Industry



Services
(SIC Codes 70-89)

Figure 5.24. Occupations of NYS OHCN patients working in the services industry, by patient type. Patients working in the services industry were primarily employed in service occupations. Within the services occupations, 67% were seen as part of group screenings. The principal services occupations included 2,126 working in cleaning and building service occupations excluding households; 474 in protective services including 421 working in firefighting and fire prevention occupations; 225 in personal service occupations including 109 in childcare; 222 in private households; and 210 in food preparation and service occupations. There were 2,820 service industry patients working in managerial and professional specialty occupations, of which 27% were group screenings. These included 771 teachers, 669 in professional specialties, and 525 in health treating occupations. Another 2,009 patients were employed in technical, sales and administrative support occupations, of which 21% were group screenings. These patients were primarily in administrative support occupations, including secretaries, stenographers and typists (n=447) and general office clerks (n=152).

Figure 5.25. Diagnoses among NYS OHCN patients working in the services industry, by patient type. Among the 10,734 patients employed in the services industry, there were 10,744 diagnoses of which 47% were group screenings (n=5,053) and 44% were V-codes (n=4,745). Excluding V-Codes, patients working in the services industry were diagnosed primarily with diseases of the respiratory system (n=1,610) including 377 diagnoses of asthma, 258 diagnoses of chronic pharyngitis and sinusitis, 171 diagnoses of asbestosis, and 158 diagnoses of pleurisy. There were 1,234 diagnoses of diseases of the musculoskeletal system including 120 diagnoses of enthesopathy of the elbow region, 92 diagnoses of myalgia, and 92 diagnoses of unspecified enthesopathy.

Figure 5.24. Occupations of NYS OHCN Patients Working in the Services Industry, by Patient Type

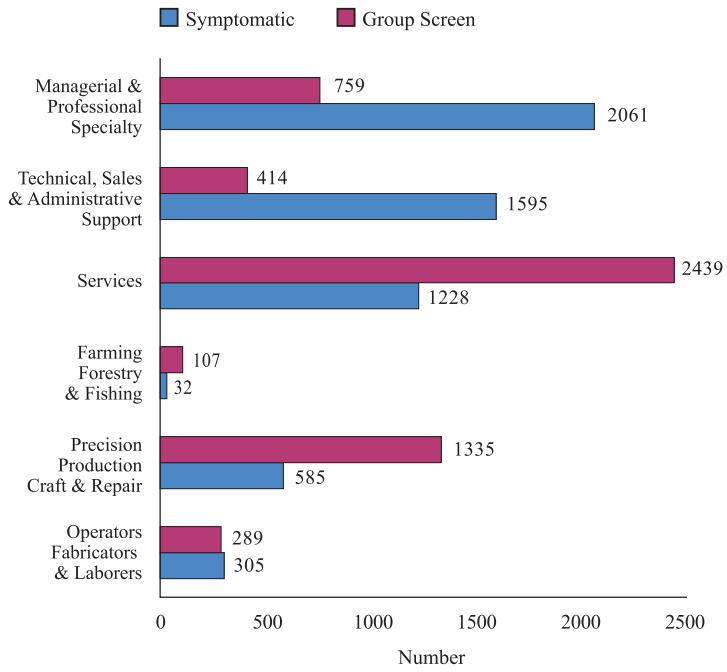


Figure 5.25. Diagnoses Among NYS OHCN Patients Working in the Services Industry, by Patient Type

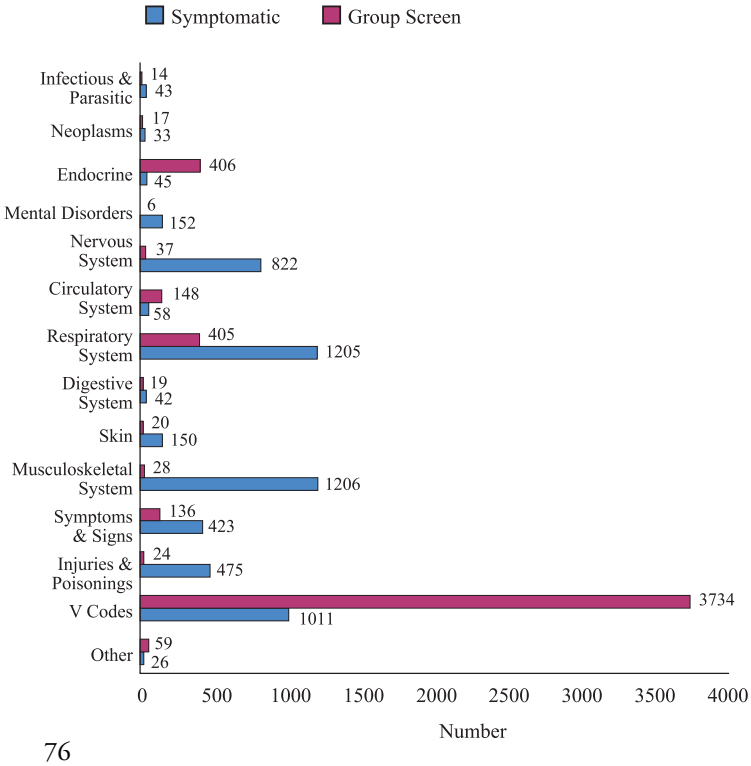
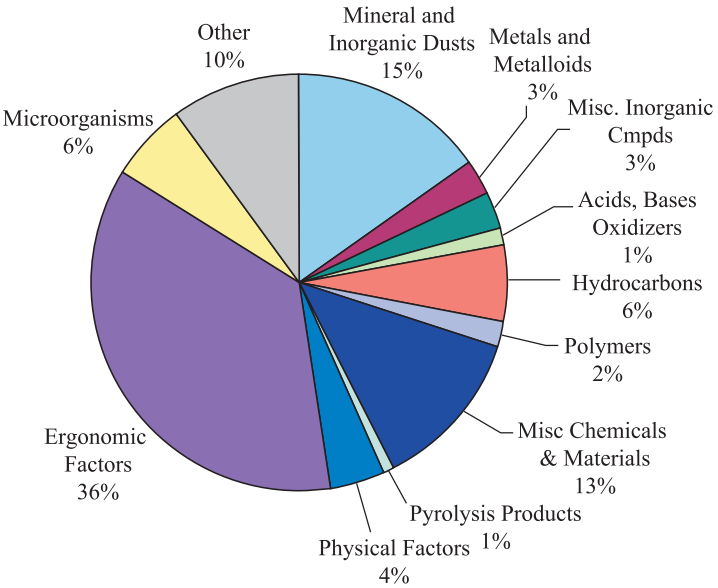


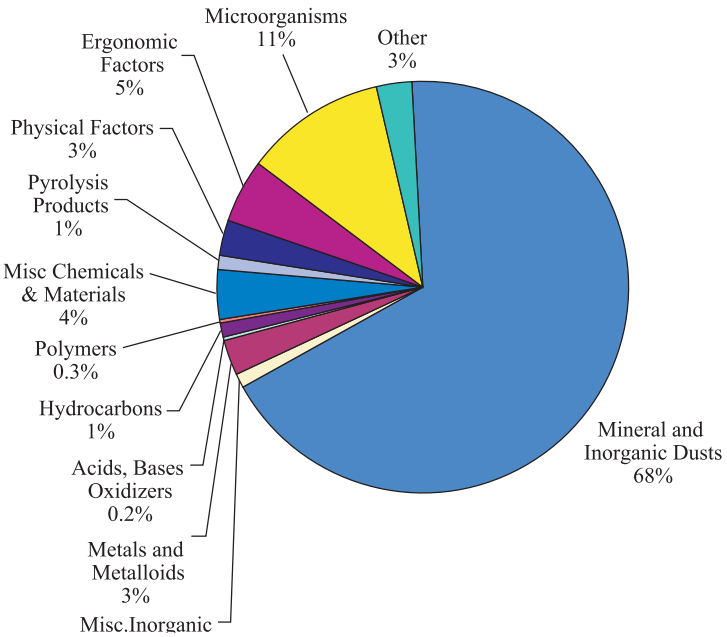
Figure 5.26. Exposures among NYS OHCN patients working in the services industry, by patient type. Among patients working in the services industry, there were 10,952 exposures identified. Of these, 3,926 were to mineral and inorganic dusts, of which 74% were part of group screenings primarily for asbestos exposure. There were 2,631 exposures to ergonomic factors among these patients, of which 8% were group screenings. These exposures were primarily repetitive motion (n=1,576) and stress (n=285).

Figure 5.26. Exposures Among NYS OHCN Patients Working in the Services Industry, by Patient Type

Symptomatic



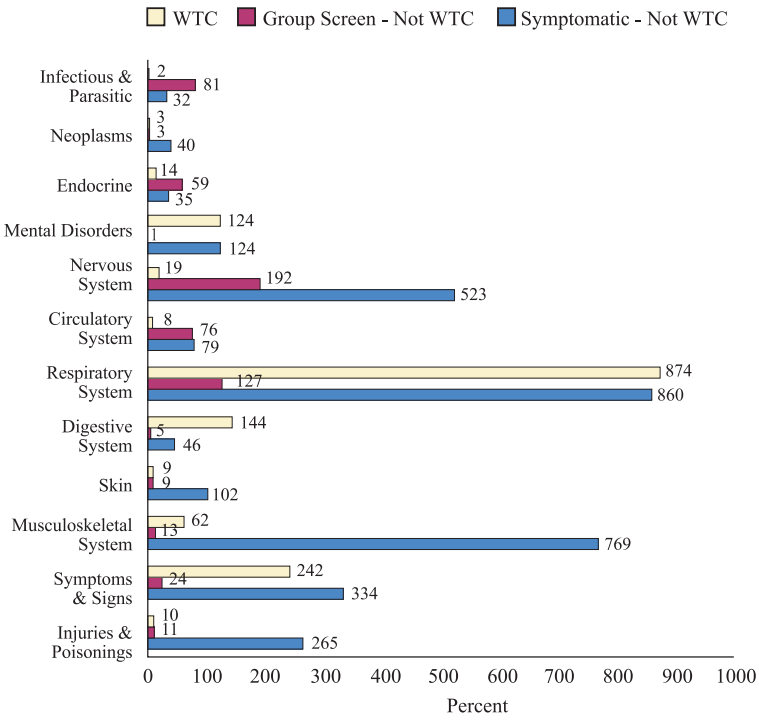
Group Screening



Public Administration
(SIC Codes 91-97)

Figure 5.27. Diagnoses among NYS OHCN patients working in the public administration industry, by World Trade Center (WTC) status and patient type. Among the 10,114 patients employed in the public administration industry, there were 14,723 diagnoses of which 49% were group screenings (n=7,273), 14% were WTC-related (n=2,032) and 64% were V-codes (n=9,377). Excluding V-Codes, patients working in public administration were diagnosed primarily with diseases of the respiratory system (n=1,861) of which 47% were among patients involved with the WTC rescue and recovery. Among those patients without WTC exposures, 219 (22% of respiratory conditions) were diagnosed with respiratory conditions due to fumes and vapors and 208 (21%) were diagnosed with asthma. Among the WTC exposed patient population, 212 (24%) were diagnosed with chronic pharyngitis, 174 (20%) with asthma, and 159 (18%) with chronic sinusitis. There were another 844 diagnoses of diseases of the musculoskeletal system primarily among symptomatic, non-WTC patients, and 734 diagnoses of diseases of the nervous system including 291 (40%) diagnoses of noise-induced hearing loss.

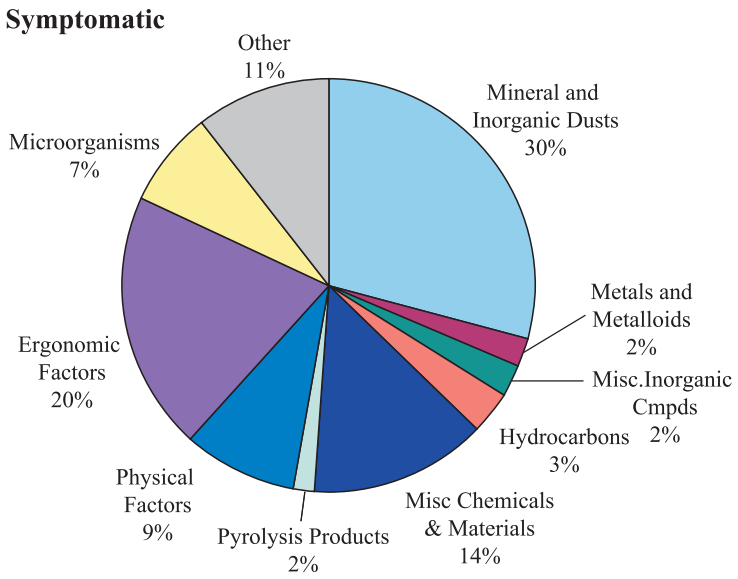
Figure 5.27. Diagnoses[1] among NYS OHCN Patients Working in the Public Administration Industry, by World Trade Center (WTC) Status and Patient Type

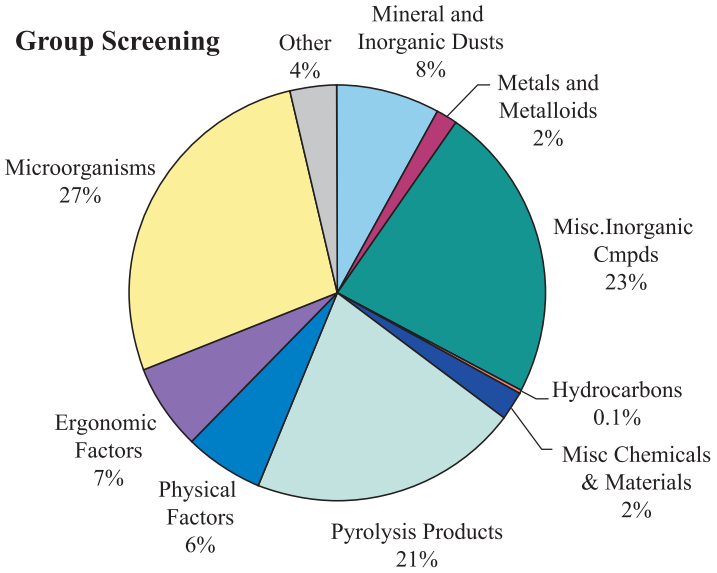


[1]Excludes V-codes for 2,723 symptomatic and 6,654 group screen patients

Figure 5.28. Exposures among NYS OHCN patients working in the public administration industry, by patient type. Among the patients working in the public administration industry, there were 11,856 exposures identified of which 66% (n=7,832) were group screenings. Thirty percent of the exposures (n=1,791) among the symptomatic patients were to mineral and inorganic dusts of which 996 were to non-specified dusts. These exposures were primarily associated with the WTC (data not shown). Another 20% of the exposures among the symptomatic patients were to ergonomic factors, of which 377 were to repetitive motion and 180 were to stress. Among the group screening patients who worked in the public administration industry, 27% (n=2,135) were screened for exposures to microorganisms. These were primarily non-specified infectious agents. Another 23% were screened for exposures to miscellaneous inorganic compounds, primarily non-specified irritant gases; and 21% were screened for exposures to pyrolysis products, specifically combustion products, fumes and smoke inhalation.

Figure 5.28. Exposures Among NYS OHCN Patients Working in the Public Administration Industry, by Patient Type





Occupations

Managerial and Professional Specialty Occupations

(Codes 003-199)

Figure 5.29. Number of NYS OHCN patients working in managerial and professional specialty occupations, by patient type. There were 5,243 patients employed in the managerial and professional specialty occupations. There were 2,110 patients employed in executive, administrative and managerial occupations, of which 33% were group screenings; and 219 natural scientists of which 54% were group screenings. Health treating occupations include physicians and dentists, along with nurses, pharmacists and therapists. There were 633 patients in these occupations of which 31% were group screenings. Teachers accounted for 1,473 patients of which 23% were group screenings.

Figure 5.29. Number of NYS OHCN Patients Working in Managerial and Professional Specialty Occupations, by Patient Type

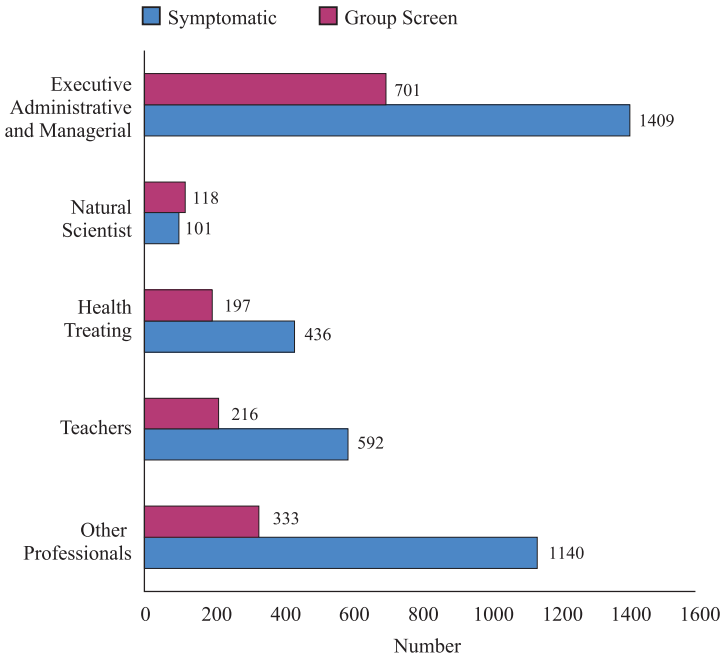
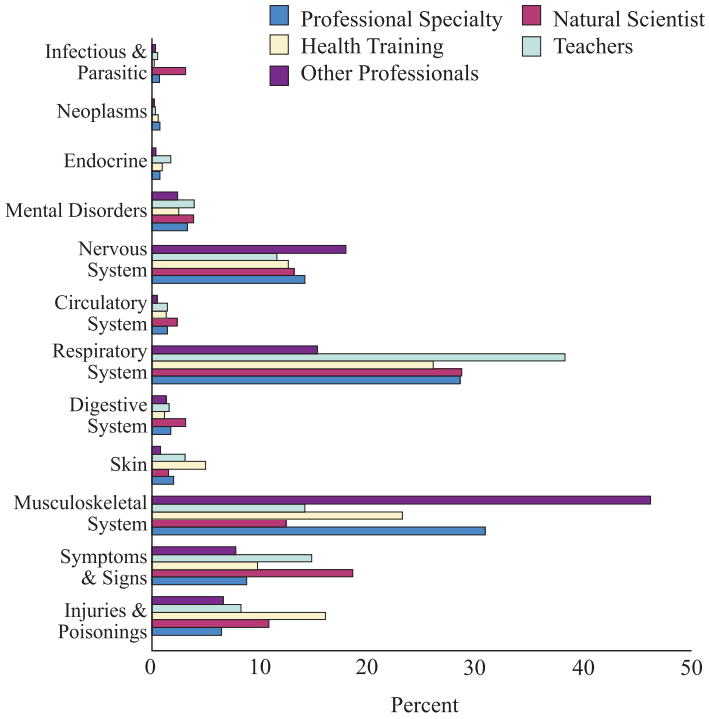


Figure 5.30. Diagnoses among NYS OHCN symptomatic patients working in managerial and professional specialty occupations. There were 9,658 diagnoses of which most were diseases of the musculoskeletal system (23%) primarily peripheral enthesopathies (n=935) and diseases of the respiratory system (19%) primarily asthma (n=419). Among the different occupational groups within this category, those in professional specialties experienced primarily diseases of the musculoskeletal and respiratory system; and natural scientists, health treating professionals and teachers primarily experienced diseases of the respiratory system. Exposures were primarily to mineral and organic dusts, miscellaneous chemicals and materials, and to ergonomic factors (data not shown).

Figure 5.30. Diagnoses[1] Among NYS OHCN Symptomatic Patients Working in Managerial and Professional Specialty Occupations



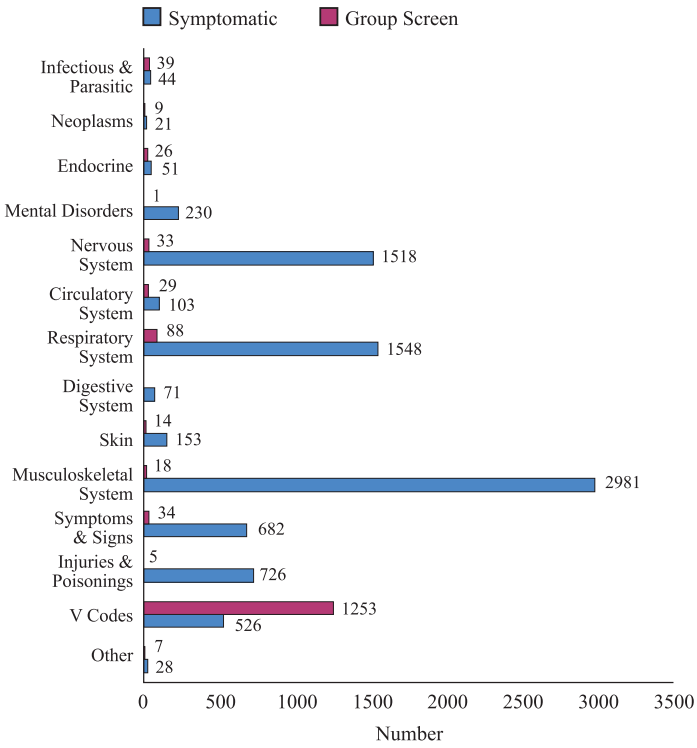
[1]Excludes V-codes for 1,329 professional specialty, 170 scientists, 376 health treating, 178 teachers, and 382 other professionals

Technical, Sales and Administrative Support Occupations
(Codes 203-389)

There were 5,139 patients employed in this category of which 1,322 were technicians and related support occupations including health technologists and science technicians; 483 were in sales occupations, and 3,334 were in administrative support occupations including clerical. Of these patients, 24% were group screenings.

Figure 5.31. Diagnoses among NYS OHCN patients working in technical, sales and administrative support occupations, by patient type. There were 10,238 diagnoses among these patients, of which 15% were group screenings. The majority of the patients experienced diseases of the musculoskeletal system (n=2,999), followed by diseases of the respiratory system (n=1,636) and the nervous system (n=1,551). This was similar for all occupational groups within this category. Exposures were primarily to ergonomic factors, mineral and inorganic dusts, microorganisms, and miscellaneous chemicals and materials (data not shown).

Figure 5.31. Diagnoses Among NYS OHCN Patients Working in Technical, Sales and Administrative Support Occupations, by Patient Type



Service Occupations
(Codes 403-469)

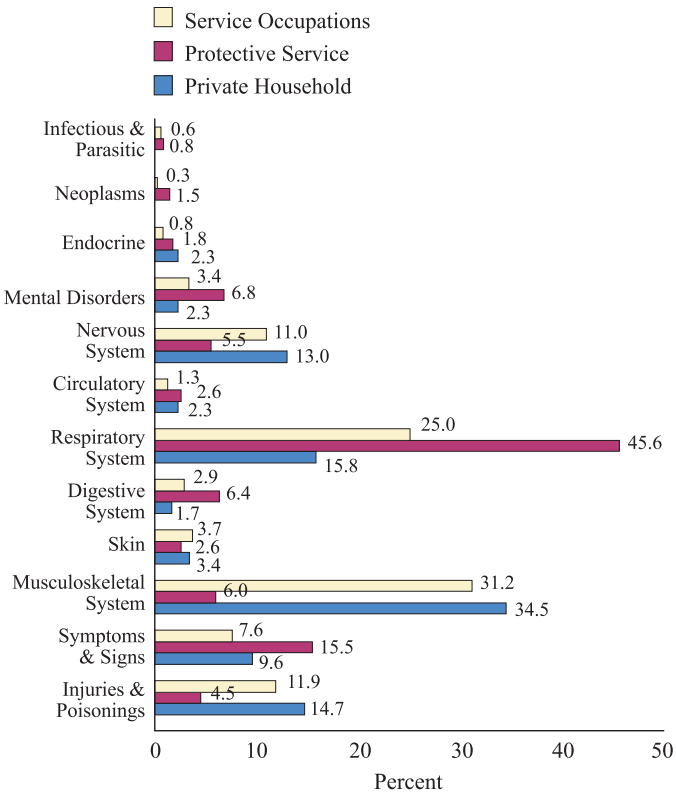
There were 10,199 patients employed in this category of which 230 were in private household occupations, 6,501 were protective service occupations, and 3,468 were service occupations, except protective and household. Of these patients, 65% were group screenings.

Figure 5.32. Diagnoses among NYS OHCN symptomatic patients working in service occupations. Among these patients, there were 5,635 diagnoses and 8,928 V-codes. Patients employed in private household occupations (including cooks, housekeepers and child care workers) and in general service occupations including food preparation, health service, cleaning service and personal service, were primarily diagnosed with musculoskeletal diseases (34% and 31%, respectively). Those in general service occupations experienced primarily disorders of the back (n=330). Patients employed in the protective services were diagnosed primarily with respiratory diseases (45%) primarily asthma (n=143), respiratory conditions due to chemical fumes and vapors (n=68) and pleurisy (n=66). The majority of those employed in protective services were seen as group screening patients (66%). Exposures were primarily mineral and inorganic dusts, ergonomic factors, and miscellaneous chemicals and materials (data not shown).

Farming, Forestry and Fishing Occupations
(Codes 473-499)

There were 2,029 patients employed in farming, forestry and fishing occupations. Of these patients, 77% were group screenings. Diagnoses and exposures were very similar to those identified among those in the agriculture, forestry and fishing industry (Figures 5.5 and 5.6).

Figure 5.32. Diagnoses[1] Among NYS OHCN Symptomatic Patients Working in Service Occupations



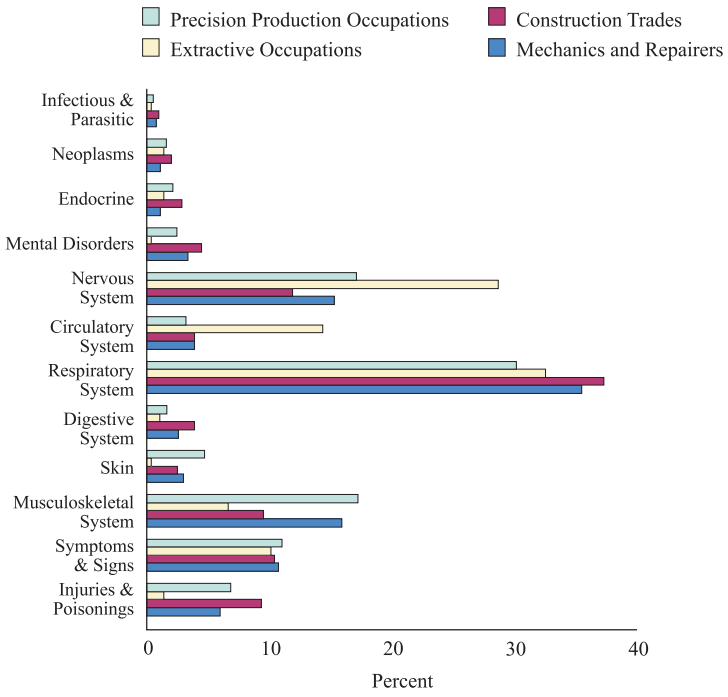
[1]Excludes V-codes for 142 private household, 6,896 protective services, and 1,890 service occupations

Precision Production, Craft and Repair Occupations
(Codes 503-699)

There were 13,726 patients employed in precision production, craft and repair occupations, of which 59% were group screenings. There were 2,367 mechanics and repairers of which 58% were group screenings; 8,811 patients employed in construction trades of which 59% were group screenings; 142 employed in extractive occupations of which 24% were group screenings; and 2,406 employed in precision production occupations including machinists, sheet metal workers, dressmakers and butchers, of which 61% were group screenings.

Figure 5.33. Diagnoses among NYS OHCN symptomatic patients working in precision production, craft and repair occupations. Among these patients, there were 10,436 diagnoses and 10,406 V-codes. The primary diagnoses were respiratory diseases, although the type of disease varied by the type of occupation. Mechanics and repairers, the construction trades, and precision production occupations were diagnosed mostly with asbestosis (11%, 12%, and 8%, respectively, of all respiratory diseases), pleural plaques (11%, 22%, and 18%, respectively), and asthma (6%, 4% and 5%, respectively). Extractive occupations were diagnosed principally with chronic bronchitis (19% of all respiratory diagnoses). They were also diagnosed with a relatively high percent of nervous system diseases, primarily noise-induced hearing loss. Exposures among these occupations were similar to those in the construction industry (Figure 5.10).

Figure 5.33. Diagnoses[1] Among NYS OHCN Symptomatic Patients Working in Precision Production, Craft and Repair Occupations



[1]Excludes V-codes for1,581 mechanics, 7,629 construction, 29 extractive occupations, 1,167 precision production occupations

Operators, Fabricators and Laborers
(Codes 703-889)

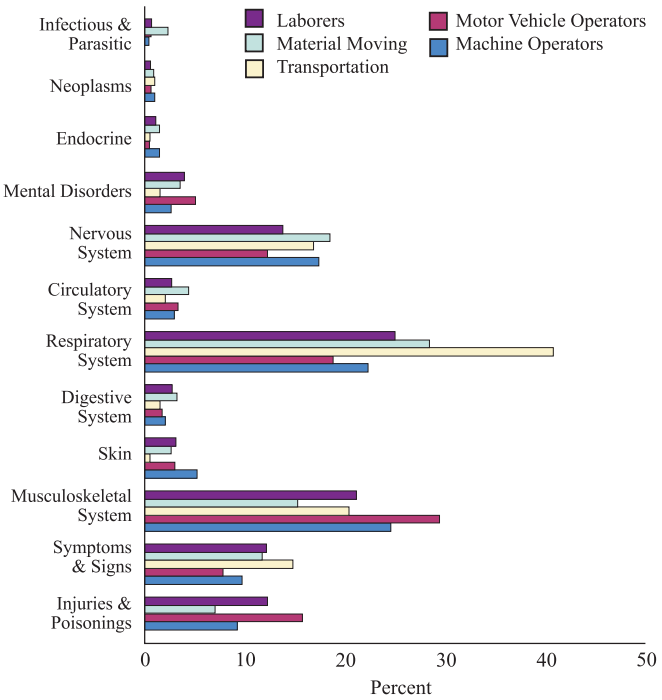
There were 9,227 patients employed as operators, fabricators and laborers of which 49% were group screening patients. There were 3,771 machine operators, assemblers and inspectors of which 47% were group screenings; 1,254 motor vehicle operators of which 18% were group screenings; 665 other transportation occupations including rail and water transportation and material moving equipment operators of which 84% were group screenings; and 2,761 handlers, equipment cleaners, helpers and laborers of which 52% were group screenings.

Figure 5.34. Diagnoses among NYS OHCN patients working as operators, fabricators and laborers, by patient type. Excluding V-codes, patients in these occupations experienced primarily respiratory diseases, diseases of the musculoskeletal system and of the nervous system.

There were 4,777 diagnoses among machine operators of which 14% were group screenings. Twenty-three percent of the diseases experienced by machine operators were respiratory with 246 diagnoses of asthma and 182 diagnoses of respiratory conditions due to chemical fumes and vapors. Another 22% of the diseases experienced by machine operators were of the musculoskeletal system including 312 diagnoses of peripheral enthesopathies, 146 diagnoses of other disorders of the synovium, tendon and bursa, 120 unspecified disorders of the back, and 106 other disorders of soft tissues. Nineteen percent of the diseases experienced by machine operators were of the nervous system with 359 diagnoses of carpal tunnel syndrome and 316 diagnoses of noise-induced hearing loss. The primary exposure among machine operators was to ergonomic factors (n=1,003), followed by microorganisms (n=997), hydrocarbons (n=523), mineral and inorganic dusts (n=206), and physical factors (n=497) (data not shown).

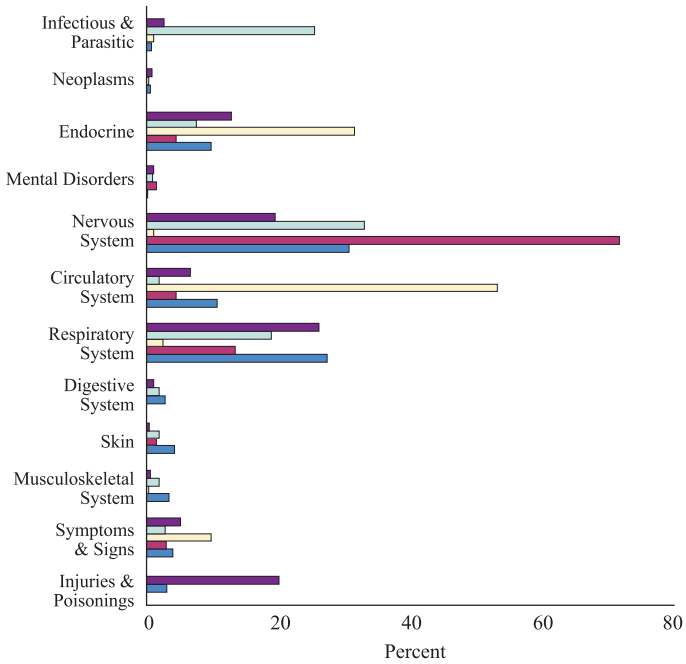
Figure 5.34. Diagnoses[1,2] Among NYS OHCN Patients Working as Operators, Fabricators and Laborers, by Patient Type

Symptomatic



[1]Excludes V-codes for 407 machine operators, 783 motor vehicle operators, 21 transportation operators, 128 material moving operators, 776 laborers
[2]Excludes V-codes for 1,959 machine operators, 178 motor vehicle operators, 396 transportation operators, 476 material moving operators, 1,277 laborers

Group Screening



Excluding V-codes, there were 2,617 diagnoses among motor vehicle operators of which 10% were group screenings. Motor vehicle operators experienced many of the same conditions as machine operators with 27% of the diagnoses involving the musculoskeletal system, and 18% of the respiratory system and of the nervous system. The specific disease diagnoses were very similar to the machine operators. Exposures to motor vehicle operators were primarily to physical factors (n=176), ergonomic factors (n=172) and mineral and inorganic dusts (n=121) (data not shown).

There were 482 diagnoses among transportation workers, excluding V-codes, of which 59% were group screenings. Transportation workers primarily experienced diseases of the circulatory system with 86 diagnoses of hypertension and 28 coronary atherosclerosis. Another 19% of the diagnoses among transportation workers were endocrine diseases including 68 diagnoses of hypercholesterolemia and 20 diagnoses of diabetes. These were exclusively among group screening patients. Eighteen percent of the diagnoses among transportation workers were of the respiratory system, although there was not any particular disease diagnosed among this group of workers. Transportation workers were almost exclusively exposed to miscellaneous inorganic chemicals (n=452).

There were 447 diagnoses among material moving occupations, excluding V-codes, of which 24% were group screenings. Over a quarter of these patients (26%) were diagnosed with respiratory diseases which were primarily asthma (n=19), asbestosis (n=15) or pleurisy (n=17). Twenty-two percent of these patients were diagnosed with diseases of the nervous system almost all being noise-induced hearing loss. Exposures to those in material moving occupations were to microorganisms (n=357), mineral and inorganic dusts (n=166), and physical factors (n=144) (data not shown).

Excluding V-codes, there were 1,822 diagnoses among handlers, equipment cleaners and laborers of which 27% were group screenings. Twenty-five percent of these patients were diagnosed with respiratory diseases primarily asbestosis (n=65) and pleurisy (n=68). Sixteen percent were diagnosed with diseases of the musculoskeletal system and 15% were diagnosed with diseases of the nervous system, primarily noise-induced hearing loss. Patients in these occupations experienced exposures to mineral and inorganic dusts (n=947), metals and metalloids (n=398), physical factors (n=348) and ergonomic factors (n=316).

References:

[1] Standard Industrial Classification Manual. 1987. Executive Office of the President. Office of Management and Budget.

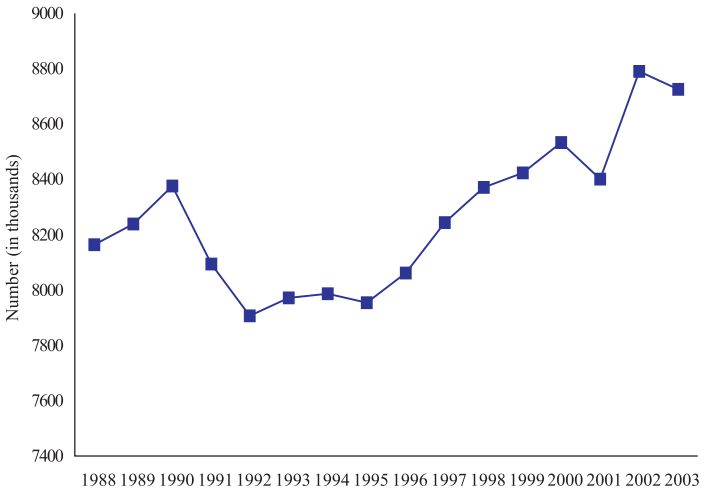
[2] U.S. Office of Federal Statistical Policy and Standards. 1980. Standard Occupational Classification Manual, 1980. Washington, DC: U.S. Government Printing Office.

Chapter 6. New York State Workforce

The patients seen by the NYS Occupational Health Clinic Network represent a unique subset of the New York State working population. This chapter describes the NYS workforce and some of the health issues faced by this population. Comparisons to the Clinic Network population are made, where applicable.

In 2003, New York State (NYS) had over 8,726,000 full-time employees – with approximately 3.4 million in NYC and 5.4 million in NYS outside of New York City (NYC).[1] The number of workers has varied over time (Figure 6.1). It is often useful, for purposes of analysis, to divide the state into two regions: NYC and the rest of New York State (all regions of the State excluding the 5 boroughs of the City) due to differences in demographics and types of occupations between the two regions.

Figure 6.1. Number of Full-Time Employees in NYS, 1988-2003

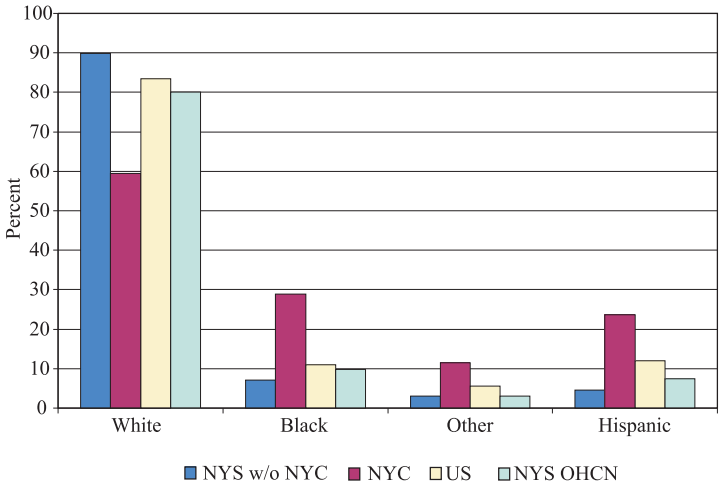


Race and Ethnicity

The NYS working population, excluding NYC, is predominantly White (Figure 6.2). In the past few years, there has been a slight increase in the percent of other races including African Americans and those of Hispanic origin (data not shown). In 2002, NYS without NYC had a slightly higher percent of working females (47.4%), teenagers (2.1%), and older workers (3.6%) than in the United States (46.7%, 1.8%, and 3.2%, respectively). Approximately 6% of workers in NYS, excluding NYC, were self-employed and 21% worked in part-time jobs (data not shown).[2] The Clinic population mimics the US population.

The NYC working population is much more ethnically diverse than the rest of the state (Figure 6.2) with a much higher percent of African Americans, other races, and those of Hispanic origin than the rest of NYS and the U.S. working populations. In 2002, approximately 7% of NYC workers were self-employed and almost 14% worked in part-time jobs. NYC had a slightly higher percent of working females (48.5%) and older workers (4.0%) than the United States (46.7% and 3.2%, respectively). Only one percent of the NYC working population were teenagers (16 to 17 years old), which was lower than the national percent of 1.8% (data not shown).[2]

Figure 6.2. Percent of Civilian Employment, by Race, for NYS without NYC, NYC, the US and the NYS OHCN, 2002



*Clinic Network includes data from 1988-2003

Hispanics and Foreign-born

In NYS, a large percent of the workforce is foreign-born and/or Hispanic, particularly in comparison to the rest of the US. In 2000, New York had 2.9 million Hispanic residents. The largest Hispanic population in the nation resides in NYC where there are more than 1.1 million Hispanic workers. [3] Among Hispanic men, 30% are employed in private households and 22% in retail trade; among Hispanic women, over 35% are employed in private households and over 32% are employed in the manufacturing industry.[3] Compared to Whites in NYS, Hispanic workers in NYS account for a disproportionate percentage of those working in service occupations and as machine operators and laborers (Table 6.1).

In NYS, Hispanic workers experience approximately six percent of recorded work-related injuries and illnesses compared to 12% in the US and 16% of the traumatic fatalities.[1] Hispanics make up 7% of the NYS OHCN population. Respiratory diseases accounted for 26% of the disease conditions experienced by the Clinic Hispanic population, and musculoskeletal diseases accounted for 25% of their disease conditions. Over 41% of the Clinic Hispanic population was employed in the services industry.

In 2002, more than 40% of the US Hispanic population was foreign-born.[4] Foreign-born men are more likely to be in the labor force (81%) than native-born men (72%).[2] Foreign-born workers are employed primarily in management occupations (27%), followed by service occupations (23%) and sales and office occupations (18%).[2] The median earning of foreign-born workers is approximately 75% of that of their native-born counterparts.[2]

Table 6.1. Percent Distribution of NYS Employed Persons by Occupation and Race, 2002

Occupation	White	African American	Hispanic
Executive, administrative, managerial	16.6	10.8	8.0
Professional specialty	18.5	13.3	8.9
Technicians and related support	2.8	2.5	1.8
Sales	11.6	8.3	9.8
Administrative support, including clerical	14.1	16.0	11.9
Service	14.9	29.1	28.7
Precision production, craft	9.3	6.2	10.1
Machine operators, assemblers, inspectors	3.6	3.9	7.5
Transportation and material moving	3.9	5.7	6.0
Handlers, equipment cleaners, helpers, laborer	3.0	3.9	5.7

African-Americans

Approximately 15% of the NYS workforce is African American, compared to 11% nationally. This percentage varies substantially between NYC where approximately 26% of the workforce is African American, compared to the remainder of NYS where only 8% of the workforce is African American. In NYS, African Americans work primarily in services occupations and in administrative support (Table 6.2). Slightly less than a quarter of African Americans employed in NYS work in managerial and professional specialty occupations. Between 1992 and 2002, African Americans experienced 6% of all work-related fatalities, statewide, but 23% of the work-related fatalities in NYC (excluding events from September 11, 2001).[5] African Americans made up 7% of the clinic population in NYS outside of NYC, but 19% of the clinic population in NYC (Figure 2.9).

Age

Older Workers

The percent of older Americans working has been on the increase in the past few years. The hazards encountered by older workers are similar to those faced when they were younger; however, the injuries experienced are often more severe and require longer recovery times.[6,7] Currently, 60% of those aged 55 to 64 are in the labor force, and 14% of those aged 65 years and older are working. On average, over 10,000 workers 55 to 64 years old and over 1,400 workers 65 years and older in NYS are reported with a work-related injury or illness.[1] The percent of workers aged 55 to 64 reported with work-related injuries and illnesses in NYS is higher than the national average, while the percent of workers aged 65 years and older with work-related injuries and illnesses is approximately the same as nationwide figures.

Over one-fourth of the NYS OHCN patient population was 55 years of age or older during their initial visit. Half of these patients were seen as part of screening programs. Diagnoses among the 55 to 64 year olds were primarily diseases of the respiratory system (33%), of the musculoskeletal system (15%) and of the nervous system (14%). Among those 65 years and older, diagnoses were primarily diseases of the respiratory system (45%) and of the circulatory system (11%), and neoplasms (9%).

Teen Workers

Young workers are believed to be at increased risk of occupational injury due to limited job knowledge, training and skills.[8] This limited knowledge may result in young workers performing tasks outside their usual assignments, being unfamiliar with work requirements and safe operating procedures, and being unaware of their legal rights. Youths may also be at increased risk of injury from chemical and other physical exposure risks at work. The rapid growth often occurring in the teen years may increase their risk for harm from exposures to hazardous substances or that may disrupt the function and maturation of their organ systems.[9]

It is estimated that between 70 to 80 percent of teens have worked for pay at some time during high school.[9] On average in NYS, approximately 3,000 workers 19 years of age and younger are reported with work-related injuries and illnesses. For the most part, the NYS OHCN does not encounter many youths. One-quarter of the patients under 19 years of age were seen for environmental conditions, and 70% of the young occupational patients were seen as part of group screenings. Diagnoses for this group were primarily respiratory diseases.

Women in the Labor Force

Women make up about 47% of the workforce in NYS. This percent has been relatively stable since 1996 and is consistent between NYC and the rest of NYS. Overall, among working age women, the level of educational attainment has increased substantially from about 1 in 10 women holding college degrees in 1970 to 3 in 10 women.[10] Nationally, about 26% of employed women worked part-time, and 5.6% were multiple jobholders.[10]

Women in NYS are primarily employed in administrative support occupations (22.6%), professional specialties (20.9%), and service occupations (21.4%).[1] Nationally, Hispanic and African American women were more likely than White or Asian women to work in the service occupations.[10] Almost 40% of women in NYS are employed in the services industry, 20% in government and 16% in trade.[1]

Overall, women have a lower share of occupational injuries and illnesses experiencing only eight percent of the work-related traumatic fatalities and 37% of the work-related injuries and illnesses in New York.[1] This difference is partially explained by the differences in the occupations and industries of employment for males and females. In 2003, musculoskeletal injuries were the leading source of workplace injuries nationwide among females.[11] In the NYS OHCN population, there were twice as many women as men diagnosed with diseases of the musculoskeletal system, accounting for 29% of all diagnoses among women and only 11% of all diagnoses among men (excluding V-codes). Specifically, women accounted for 73% of the carpal tunnel syndrome diagnoses and 72% of the disorders of muscles and tendons and their attachments.

Minimum-Wage Workers

According to the Current Population Survey estimates for 2004, there were 4,009,000 workers in NYS paid hourly rates. Of those, 128,000 were paid below 70% minimum wage of $5.15 per hour.[1] About four percent of women reported earning wages at or below minimum wage compared with about two percent of men. Among all workers paid hourly rates, nine percent were 16 to 19 years of age, and four percent were 65 years and over. In both of these age groups, there was a higher percent of women than men earning at or below minimum wage – 12% vs. 7% of 16 to 19 year olds and 6% vs. 2% of those 65 years and over.

Over three-fourths of minimum wage workers were in service occupations – primarily food preparation and serving (59%) and personal care (8%). Another 7% were employed in sales occupations. By industry, 62% of minimum wage workers were employed in leisure and hospitality industries, 8% in retail trade, and 7% in education and health services.[12]

Low Income Workers

Approximately two million individuals, or 11% of the NYS population, do not have access to basic medical care. This could be due either to the lack of available primary care, uninsurance or unaffordability.[13] In NYS, there is a system of Community Health Centers that provides primary care to underserved communities including low-income families, migrant workers, and farm workers. Approximately 74% of the patients served by the Community Health Centers are minorities, and 69% are at or below the federal poverty level.[14] The Clinic Network ensures no worker is turned away by using a sliding-fee scale for patients without health insurance or who are unable to pay for clinical services.

High-Risk Industries and Occupations

Table 6.2 displays the average percent of employment, by industry, for each of the New York geographic regions and for the United States, as comparison, for 1996 through 2002*. A large percent of the population are employed in the services and retail industries. In NYS excluding NYC, a higher percent of individuals are employed in the public administration industry, compared to the rest of the country; while in NYC, a higher percent of workers are employed in the transportation, communication and utilities industries than in the rest of NYS and the United States. Between 1998 and 2003, there has been an overall decline in the number of manufacturing and wholesale trade businesses and employees in NYS, while most other industries have increased both the number of establishments and the number of employees.[15,16]

*For comparison purposes, the distribution of employment among the Clinic Network Patients is included.

Table 6.2. Percent of Employment, by Industry, 1996-2002 – US, NYS without NYC and NYC[21]

Employment	Clinic Network Patients	NYS w/o NYC	NYC	Entire NYS	US
Agriculture	4.1	1.9	0.2	1.2	2.5
Mining	0.3	0.1	0.0	0.1	0.4
Construction	22.6	5.9	5.0	5.7	6.8
Manufacturing	13.2	14.1	8.4	10.9	15.0
Transportation, Communication, Utilities	11.1	7.5	9.1	7.6	7.2
Wholesale Trade	0.7	3.8	3.0	3.2	3.9
Retail Trade	1.9	15.9	15.1	15.7	16.9
Finance, Insurance, Real Estate	1.4	7.0	11.1	8.3	6.6
Services	22.9	38.2	45.4	42.4	36.1
Public Administration	21.6	5.4	4.0	4.8	4.5

According to the US Bureau of Labor Statistics (BLS), 190,000 New Yorkers in 2002 suffered from work-related injuries or illnesses with 96,100 of those involving days away from work. Workers at high-risk for nonfatal occupational injuries and illnesses in NYS include those involved in the manufacture of aircraft and parts, air transportation, health services and highway and street construction among state government employees, and public order and safety including police and fire protection among local government employees.[17] Unfortunately, illness and injury information by geographic region (NYC vs. rest of NYS) is not available from BLS (personal communication, 2004).

The fatality rate for 1995 through 1999, by industry group, is displayed for each New York region and the United States for comparison (Table 6.3). These data indicate that workers in New York State outside of NYC are at high risk for fatalities in the agriculture, construction and transportation industries; and that NYC workers are at high risk for fatalities primarily in construction and transportation.

Table 6.3. Five-year Average Fatality Rate, by Industry, 1995-1999 – US, NYS without NYC and NYC

Fatalities	NYS w/o NYC	NYC	Entire NYS	US
Agriculture	24.2	0	22.9	23.0
Mining	0	0	0	24.5
Construction	11.2	20.1	13.9	14.3
Manufacturing	2.3	0.7	1.9	3.5
Transportation, Communication, Utilities	7.0	12.2	9.2	12.7
Wholesale Trade	1.7	4.7	2.7	4.9
Retail Trade	1.6	6.6	3.4	2.9
Finance, Insurance, Real Estate	0.6	1.2	0.9	1.3
Services	0.8	1.5	1.1	2.1

High-Risk Exposures

Lead

Using data from the NYS Department of Health's Heavy Metals Registry, there has been a decline in the prevalence of elevated blood lead levels among adults in NYS. Since 1994, there has been a 53% decrease in the number of workers reported with levels greater than or equal to 25 µg/dL associated with or due to occupational exposures (Table 6.4). At the same time, there has been over a four-fold increase in the number of individuals reported with blood lead levels below 25 µg/dL, indicating a high rate of screening for lead poisoning (data not shown). It is unknown whether individuals with potential occupational lead exposures are part of this screening activity. While the majority of the reduction in elevated blood lead levels appears to be due to better mechanisms to control lead exposure in the workplace, other factors may also be involved. The number of NYS companies using lead has decreased as a result of either work process changes to eliminate lead or company closings, following national trends.[18] Another factor in the reduction of elevated blood lead levels may be the elimination or reduction of biomonitoring by some companies.

Despite the overall decline in prevalence of elevated blood lead levels, there are certain groups that have an increase in prevalence including occupationally exposed iron workers, lead abaters and residential remodelers (with both occupational and non-occupational sources). This is due to increases in both blood lead testing among exposed individuals and in blood lead levels among these groups. Non-occupational exposures represent a relatively large percent of individuals with severely elevated blood lead levels, compared to lower blood lead levels. It is possible that these individuals were tested because they had symptoms.

Although a substantial number of adults in NYS are having their blood lead levels tested, other information indicates that the registry does not accurately reflect the true magnitude of exposure to lead in the State. There are approximately 283,000 people employed in industries with the potential for lead exposure.[2] While all of these employees may not be exposed to lead, a large percentage probably are and many employees in other industries may also be exposed. A study in California found that only 2.6% of workers with direct exposure to lead were in routine blood monitoring programs.[19] There are also numerous individuals engaged in home renovations, target shooting and other hobbies with the potential for lead exposure who often do not get their blood lead levels tested. Therefore, the registry may only be providing the lower boundary of the magnitude of lead exposure in New York.

Since 1988, the NYS OHCN has tested 2,676 individuals for lead exposure, of which 10% had blood lead levels of 25 µg/dL or higher. Of those tested for exposure, 84% worked in the construction industry (Figure 4.5).

Table 6.4. Number of Adults with Blood Lead Levels 25 µg/dL or Greater, Reported to the New York State Heavy Metals Registry, by Occupational Status, by Year

		Occupational		Non-Occupational		Both		Unknown	
	Total	N	%	N	%	N	%	N	%
1994	**1135**	1007	88.7	84	7.4	13	1.1	31	2.7
1995	**1038**	917	88.3	64	6.2	18	1.7	39	3.8
1996	**1104**	887	80.3	75	6.8	15	1.4	127	11.5
1997	**1052**	912	86.7	74	7.0	18	1.7	48	4.6
1998	**920**	787	85.5	77	8.4	10	1.1	46	5.0
1999	**945**	809	85.6	73	7.7	7	0.7	56	5.9
2000	**945**	795	84.1	67	7.1	11	1.2	72	7.6
2001	**826**	650	78.7	80	9.7	19	2.3	77	9.3
2002	**798**	591	74.1	76	9.5	11	1.4	120	15.0
2003	**634**	474	74.8	88	13.9	9	1.4	63	9.9

Asbestos

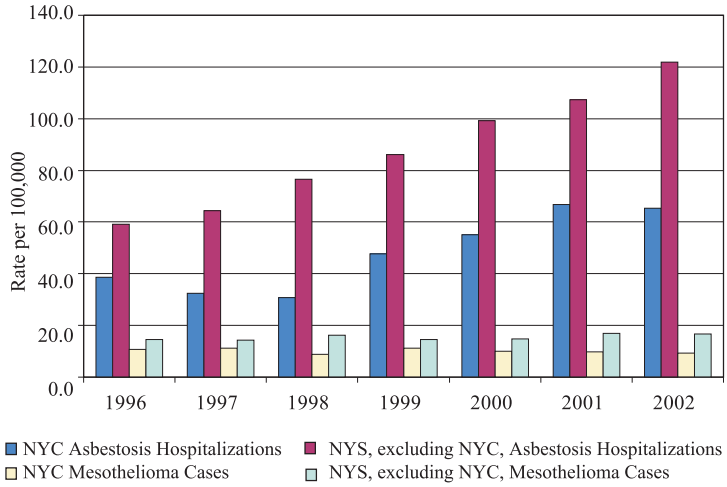
The rate of hospital discharges of individuals with asbestosis and of people diagnosed with mesothelioma (per the NYS Cancer Registry) has been steadily increasing since 1996 (Figure 6.3). This data does not include residents hospitalized outside of NYS or in federal hospitals. Although most of these cases are from past exposures and there is little that can be achieved through current work-site interventions, there is a public health benefit to continued screening of high-risk workers to ensure they get appropriate medical care related to their conditions related to past exposures. Workers continue to be exposed to asbestos through asbestos abatement and demolition work. Others, in the course of their work, continue have asbestos exposure including maintenance workers, telephone line installers and plumbers. The NYS OHCN is assisting in this effort as evidenced by the identification of 9,507 exposures to asbestos among the patient population (Figure 4.2).

Physical / Ergonomic Work Factors

Physical and ergonomic factors such as repetition, force, posture, and vibration are associated with the development or recurrence of adverse medical conditions. Epidemiologic evidence focuses chiefly on disorders that affect the neck and the upper extremity, including tension neck syndrome, shoulder tendinitis, epicondylitis, carpal tunnel syndrome, and hand-arm vibration syndrome. Work organization and psychosocial factors influence the relationship between exposure to physical factors and work-related musculoskeletal disorders. Literature reviews have identified a number of specific physical exposures strongly associated with specific musculoskeletal disorders when exposures are intense, prolonged, and particularly when workers are exposed to several risk factors simultaneously.[20]

According to the Bureau of Labor Statistics, in NYS in 2000 there were over 40,000 musculoskeletal disorders involving days away from work among private sector employees, with one-fourth of these involving the neck, shoulder and upper extremities, and over half involving the back.[21] Physical and ergonomic factors accounted for almost one-fourth of all exposures experienced by the NYS OHCN population. The dramatic increase over time in musculoskeletal disorders diagnosed by the Clinic Network is anticipated to continue to increase (Figure 3.23).

Figure 6.3. Annual Age-standardized Rates of Asbestos Hospital Discharge and Mesothelioma Cases, by Geographic Region and Year



NYS Workforce Projections

During the next 10 to 15 years, work in the United States will continue to be influenced by demographic factors, changes in technology and economic globalization.[22] Aspects of work that can be affected include the size and composition of the workforce, features of the workplace and compensation packages.

The major demographic factor expected to influence the workforce is the aging population. Between 2005 through 2020, the working population in NYS aged 55 through 64 is expected to grow by 25% or 500,000 workers.[23] It is expected that the percent of women in the workplace will continue to increase, although not as rapidly as in the past 20 years. The combination of more women working and the aging population increases the responsibilities of workers outside of the work environment, including caring for children and/or older parents. The other demographic factor expected to influence the workforce in NYS is the expected increase in international immigration which will increase the racial and ethnic diversity of the workforce.

Despite this growth, the overall expectation for NYS is slow growth in the working population, primarily due to a decline among younger workers and outmigration. Due to this slow labor force growth, employers will use increasingly non-traditional methods to attract employees to avoid labor shortages.

These may include higher wages, flexible schedules or telecommuting, or more generous fringe benefits.[22] Employers may also seek to use previously untapped labor force capacity such as low-income women with children, former military personnel and immigrants.[22]

Due to the increasing use of computers and advanced technology in workplaces, workers in all occupations will be required to have increased levels of skills and education. As the demand for lower skilled workers decreases and as workers increase their educational and skill levels, the wage gap between high- and low-paying jobs is expected to widen.[23] Occupational projections for NYS through 2012 indicate an increasing need for workers in almost all categories except administrative support occupations and production occupations – both categories where many of those with lower educational levels often work.[24] This shift in employment categories will require a renewed focus on worker retraining and upgrading of skills.[23]

Occupational projections for NYS through 2012, reported by the New York State Department of Labor[24], indicate over 20% growth in both computer and mathematical occupations and in nursing, psychiatric and home health aides. The largest anticipated increases by percent employment are among physician assistants, medical assistants, physical therapist assistants and aides and occupational therapist assistants and aides; all corresponding to needs produced by the aging population. Growth is also anticipated in the construction trades, specifically among tile and marble setters, cement masons, drywall installers, tapers, electricians and roofers. The largest anticipated reductions are among word processors and typists, computer operators, assemblers, and machine operators.[24]

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Chapter 7. Future Challenges

The overall mission of the NYS OHCN is to contribute to maintaining a healthy workforce. The NYS OHCN has contributed to occupational medicine by publishing in peer-reviewed journals, developing the clinical practice reviews, issuing industrial hygiene guidelines that are used nationally, diagnosing emerging diseases, and defining new examples of work-related diseases. Information from the Clinic Network has been submitted to OSHA to assist with formulating regulations. By utilizing a public health approach of treating the worker, conducting preventive medicine and improving the work environment, the Clinic Network has been able to work towards this goal. As previously discussed in Chapter 1, the Clinics are in a unique position to provide immediate response to exposure episodes or disease clusters. The NYS OHCN has successfully provided education and training tools to workers, employers, and medical care providers within their communities. The NYS OHCN efforts go beyond the individual worker and their employer, and have benefited entire communities.

Since the establishment of the NYS OHCN, the nature of workplace hazards has changed rather significantly. There remains a pressing public health need to diagnose, treat and prevent work-related illness. There is still a profound shortage of trained occupational medicine practitioners. Few other practitioners provide comprehensive preventive services; thus, the NYS OHCN remains uniquely qualified to provide this care.[1]

The challenges to address these needs have intensified. Since the Network was established, the nature of the delivery of health care services has been dramatically altered. The impact of health maintenance organizations on access to health care services and the significant changes in Workers' Compensation law and administrative procedures have created increasingly difficult challenges to the OHCN's ability to provide service to workers with occupational disease.
Flat funding of the NYS OHCN since 1997 has inhibited the ability of the Clinics to continue to address their mission due to rising costs and newly emerging occupational health needs. Satellite Clinics that were started have had to close, thus limiting access to the Clinics. Hours have been cut, staff has been reduced, and services such as physical, occupational and medical massage therapy have been cut. New initiatives have had to be cancelled and the Clinics have had to reduce the number of patients seen in order to identify other funding sources. The patient load on the Clinics continues to increase, but many Clinics have found it difficult to offer both continued care to their existing patient population and to identify and assist new patients.

Delays in processing claims by Workers' Compensation insurance carriers continues to create hardships for the patients and the Clinics. Clinics have had to develop techniques to allow for communicating insurance issues with their patients, addressing needs not being met by the delay of payments, and advocating for the patients with lawyers and within the Workers' Compensation system. The limited reimbursement offered to medical practices from Workers' Compensation in NYS has also created a financial strain on the Clinics, requiring them to supplement the cost of the patient visits with the funding from NYS.

Analysis of the data provided by the Clinics along with information on New York States's changing workforce reveals specific areas upon which the Clinics should consider as they continue to provide high quality diagnostic, treatment and preventive occupational health services in New York State.

Clinical Services

The ability of the OHCN to diagnose occupational diseases and understand toxic exposures from the work environment allows the Network to be available throughout the state for consultations or referrals from other medical providers. Therefore, the clinicians need to be aware of newly identified workplace hazards and provide appropriate care based on the current knowledge of occupational health issues. Since they are sometimes the only resource available to workers, they should continue to expand their services to identify co-morbid conditions, and sociological stressors.

- **The Clinics should ensure that they continue their focus on the diagnosis of occupational disease.** Activities such as pre-employment physical examinations or periodic evaluations, treating acute occupational injuries, and delivering general medical care in an occupational setting are necessary, but do not constitute a practice which focuses on the diagnosis and treatment of occupational diseases.

- **The Clinics should continue to be able to identify new associations between workplace exposures and diseases.** They should also be aware of and focus on emerging risks such as work organization, cardiovascular disease related to the work environment, and psychological outcomes.
- **Clinics need to plan accordingly to handle the patient load expected due to repetitive stress disorders.** The number of patients seen with these disorders continues to increase and the chronic nature of these conditions necessitate multiple patient visits (Figures 3.12 and 3.23).
- **The Clinics should continue to screen for co-morbid conditions, such as diabetes, hypertension and hypercholesterolemia, during patient visits.** This will help ensure the total health and safety of the working population in NYS.
- **Mechanisms need to remain in place to assist the patients and their families with psychological and sociological issues.** The Clinics need to continue to be aware of the multiple stressors inflicted by being unable to work or from continuing to work with chronic illness or chronic pain, and be able and willing to assist them (Figure 3.7).

Prevention Services

Workforce Issues

The major demographic factors expected to influence the workforce over the next 15 years are the aging population and the expected increase in international immigration. Therefore, the Clinic Network needs to be prepared to continue and possibly expand their work to reach these populations and address occupational health issues relevant to them.

- **Further focus needs to be placed upon low-income and immigrant populations. The NYS OHCN should continue to use their skills to reach these populations.** Joint partnerships with community groups, including community health centers and migrant clinics should be forged wherever possible.
- **Efforts should continue to reach high-risk female workers, particularly those of Hispanic ethnicities and African American race, and those of low-income.** These populations appear to be at higher risk for occupational diseases (Figure 2.6).
- **Outreach should be conducted to aging workers providing prevention information.** While these workers currently experience a lower rate of work-related injuries and illnesses, these rates are anticipated to increase as the working population ages.
- **Education regarding physical and ergonomic factors and avoidance of needlestick injuries should be offered, particularly to low-income workers in the medical fields.** As the need for assistants in the medical fields continues to increase, there will be an increase in the need for this information.

High Risk Exposures

Because occupational medicine must link clinical care of individuals to preventive efforts in the workplace, it is often critical that the healthcare provider identifies workplace hazards and assists in facilitating workplace prevention efforts. The Clinic Network needs to continue screening their patient populations for health effects from specific exposures.

- **The Clinics need to continue to screen high-risk workers for toxic effects of lead exposure.** Even though cases of lead poisoning have decreased over time, certain populations are still at increased risk. High-risk workers include bridge rehabilitation workers, residential remodelers, and shooting range em ployees (Figure 3.27).
- **Screenings for asbestos-related diseases should continue.** Clinics should consider expanding their screenings of construction workers, particularly masons and road maintenance workers, to include screening for silica-related diseases.
- **Clinics encountering patients who reside in NYC should consider conducting audiometric exams for high-risk populations** (Figure 3.11).
- **Clinics should consider conducting audiometric exams among their female populations** (Figure 3.11).
- **Clinics need to offer screenings, prophylaxis, education, and/or treatment to people who work outdoors for insect-borne diseases.** Clinics need to recognize the risks for tick and mosquito-borne diseases within their catchment areas, particularly as Lyme Disease continues to spread throughout NYS (Figure 3.3). Recent experiences with West Nile Virus show that new infectious diseases can rapidly appear and immediate public health interventions, particularly to outside workers, should be conducted.

- **Skin cancer screenings should be included in the list of services provided to workers who spend long periods in the sun.** This would include farmers, loggers, construction workers, and public works employees (Figure 3.5).
- **The Clinics should utilize research being conducted regarding health conditions associated with World Trade Center disaster-related exposure to assist in treating and managing patients with WTC disaster-related exposures.** It is anticipated that diagnosis of these health conditions will continue to increase for a period of time.

Outreach

The continuing challenges speak to the need for the network to expand its outreach efforts to raise the level of awareness about the prevalence, cost, and preventable human suffering which result from occupationally-related disease.[1] Core groups, which should know about the NYS OHCN and should be utilizing their services, are still too often unaware of what the network has to offer. Policy makers often have only minimal familiarity with common occupational diseases, and the effects these conditions can have on workers. While the overwhelming majority of outreach work will continue to be carried out by individual Clinics, increased collaboration between the Clinics and the development of network-wide resources to promote greater utilization of their services needs to be developed. These resources can include:

- Standardized public service announcements (PSAs)
- Statewide list of media resources
- Boilerplate newsletter articles
- Camera read print ads
- Display materials for statewide meetings of health professionals, legal, labor and employer groups
- Presentation materials (e.g., slides, lecture outlines) for health professional grand rounds or seminars.

Although the number of unionized employees has been declining, the Clinics should continue to reach out to the unions. Unions have access to unique worker populations and can also assist with access to worksites. Because of this decline, the NYS OHCN should also focus upon reaching out to employers.

There needs to be enhanced collaboration between the Clinics, to allow them to utilize their individual skills to address larger occupational health issues. Materials developed for select populations should be available to all network members, as should translations for immigrant populations.

Research

Balance needs to be maintained between the primary clinical missions and the benefits of occupational disease prevention to be obtained through research. Research can include further database analyses for use in prevention including developing accurate methods to conduct ongoing surveillance of occupational diseases and exposures of public health importance in New York State. Research may also include conducting pilot clinical research projects for diagnosis, management, and final health and work outcomes.

Each Clinic should be involved in internal research evaluating the most effective use of industrial hygiene and other non-medical interventions; and what are the most effective worker training methods to accomplish preventive goals.

Network research activities may include health survey research and publication of clinical case reports and case series; pilot clinical research projects to improve the accuracy of recognition and diagnosis of occupational diseases, the effectiveness of clinical management, and the final health and work outcomes of occupational diseases of public health importance in NYS.

Supply of Occupational Health Professionals in NYS

Another goal established for the NYS OHCN was to strengthen and expand training programs in occupational health for professionals at all levels. In order to continue working towards this goal, the Clinics should work on integrating occupational medicine into mainstream medical care. Awareness of the NYS OHCN should be increased through fellowships and residencies with as many medical centers as possible.

The number of board-certified occupational medicine physicians in NYS has increased from 73 in 1985 to 97 in 2003 for a rate of 1.1 per 100,000 workers in the state. There are currently 290 members of the American College of Occupational and Environmental Medicine (ACOEM). The majority of these physicians are not board-certified in occupational medicine. It is unlikely that this larger group of self-designated occupational medicine physicians significantly increases the availability of services established specific to diagnosis and treatment of occupational disease since they often spend their time delivering general medical care in an occupational setting or to identified occupational groups. Meanwhile, the number of board-certified industrial hygienists has increased from 91 in 1985 to 316 in 2003. There are also currently 306 board-certified occupational health nurses in NYS.

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